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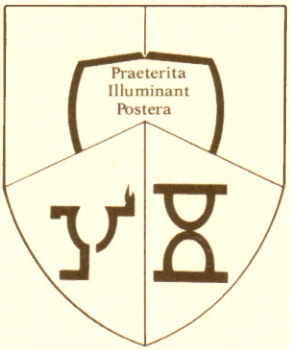

The Accounting Historians Journal

December 1992
Volume 19, Number 2

Research on the Evolution of Accounting Thought and Accounting Practice

The Accounting Historians Journal

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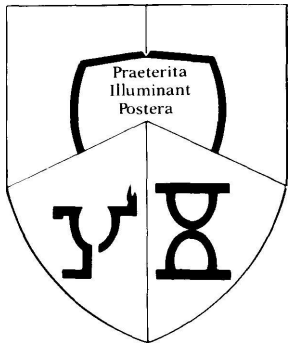

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THE ACCOUNTING HISTORIANS JOURNAL

Semiannual Publication of
The Academy of Accounting Historians

Volume 19, Number 2 **December 1992**

CONTENTS

Main Articles

Review of Books and Other Publications

THE ACCOUNTING HISTORIANS JOURNAL
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1992 Vangermeersch Manuscript Award

Thomas Tyson
ST. JOHN FISHER COLLEGE

THE NATURE AND ENVIRONMENT OF COST MANAGEMENT AMONG EARLY NINETEENTH CENTURY U.S. TEXITLE MANUFACTURERS

Abstract: Several authors have suggested that a particular managerial component was needed before cost accounting could be fully used for accountability and disciplinary purposes. They argue that the marriage of managerialism and accounting first occurred in the United States at the Springfield Armory after 1840. They generally downplay the quality and usefulness of cost accounting at the New England textile mills before that time and call for a re-examination of original mill records from a disciplinary perspective.

This paper reports the results of such a re-examination. It initially describes the social and economic environment of U.S. textile manufacturing in New England in the early nineteenth century. Selected cost memos and reports are described and analyzed to indicate the nature and scope of costing undertaken at the mills in Lowell, Massachusetts, in the late 1820s and early 1830s. The paper discusses how particular cost information was used and speculates why certain more modern procedures were not adopted. Its major finding is that cost management practices fully measured up to the business complexities, economic pressures, and social forces of the day.

Several recent studies of nineteenth century cost management[1] [Hoskin and Macve, 1988; Ezzamel, Hoskin and Macve, 1990] have suggested that a particular managerial component was needed before cost accounting could be fully used by owner/managers for accountability and disciplinary purposes.

This research was financially supported by St. John Fisher College's Summer Grant Program.

[1]The expression "cost management" best describes the use of cost information by nineteenth century mill owners and managers. The terms "cost management", "cost accounting", and "cost keeping" all generally represent the use of cost-based information to assist management and are used interchangeably throughout the paper.

According to the authors, the marriage of managerialism and accounting first occurred at the Springfield Armory after 1840 once West Point-trained managers were firmly in place. The authors acknowledge that cost management was conducted at the U.S. textile mills before that time, but question its overall importance and ability to differentiate skill levels or establish accountability over workers and their production. They also call for a re-examination of the original records from a "disciplinary" perspective [Hoskin and Macve, 1988, p. 71].

This study pursues this challenge by re-examining the nature and environment of cost accounting at the cotton textile mills in Lowell, Massachusetts, during the 1820s and early 1830s. Primary documents and secondary source material are analyzed to arrive at an interpretation of cost management practices during that time. Analysis indicates that cost information was fully utilized by mill owners and managers and, in conjunction with other disciplinary and social factors, provided critical information needed to run the businesses profitably. The absence of certain accounting procedures, including methodical depreciation and norm-based standard costing, are best viewed as reflecting business complexities, economic pressures, and social forces of the day rather than as deficiencies awaiting a particular managerial component or further technical development.

The paper initially describes the environment of U.S. textile manufacturing with special attention given to the Lowell-type mills in the 1820s and early 1830s. The Lowell mills in the 1820s and 1830s have been characterized as "the most technologically advanced factories in the nation" [Dublin, 1979, p. 68]. Social and economic factors within this environment are discussed to illustrate why certain costing procedures were implemented and how cost information may have been used. Surviving examples of cost memos and reports are then described to indicate the nature of costing that was undertaken at that time.

THE ENVIRONMENT OF TEXTILE MANUFACTURING[2]

Textile manufacturing in New England during the early 1800s exemplifies the transition from mercantile to industrial

[2] Primary source material for this study was obtained at three locations: the Massachusetts Historical Society (MHS) and Harvard University's Baker Library (Baker), both in Boston, MA, and the Museum of American Textile History (MATH) in North Andover, MA.

accounting in the United States [Porter, 1980] and is representative of the industry that first embarked on large-scale factory production in America.[3] Aided by the rapid diffusion of technology from England [Jeremy, 1981], factory production of cotton textiles in New England took one of two general forms. In Rhode Island and Connecticut, Samuel Slater built small mills that were organized as partnerships, which were personally managed by owners, utilized family labor, and maintained the putting-out system (hereafter, "the Slater system"). Lowell-type mills were more than ten times larger than the typical mill in the Slater system [Dublin, 1979]. In Massachusetts, a group of Boston merchants formed joint-stock corporations, hired professional managers, and produced textiles in large, fully integrated factories (hereafter, "the Lowell system"). Both systems required the participation of New England labor that was unaccustomed to factory life and periodically in short supply [Prude, 1983].[4]

Factory work in the early nineteenth century entailed six day, 72-84 hour work weeks in harsh environments where illness and injury were commonplace [Luther, 1970]. The degree of labor's complicity with industrial capitalism and the level of owners' willful exploitation of labor are contentious issues that do not clearly illuminate the nature and development of cost management in the cotton textile industry.[5] Social and eco-

[3] Alfred Chandler [1977] discusses the McLane Report of 1832 which described the current state of American manufacturing. Eighty-eight of the 106 companies having assets greater than $100,000 were in the textile industry. Textile manufacturing represented a similar proportion of firms with assets between $50,000 and $100,000 and of enterprises employing more than 250 workers.

[4] Ware [1966] mentions that mill owners had to overcome the prejudice against factory work and the fact that western lands were available and affordable to New Englanders.

[5] Mathews [1991] and Morone [1991] discuss tension between self-interest and the common good that characterized the transition to industrial capitalism. Thompson [1967] and Jeremy [1990] provide differing perspectives on this transition. Regarding mill workers' complicity, Dublin [1979, p. 79] concluded "There is little evidence, in the 1820s and 1830s at least, that women workers resented regulation of their conduct by the corporations. Their letters and reminiscences are notably free of complaints on this score." According to Tucker [1984, p. 172, 173], "the home became another training ground for a generation of factory hands. Lessons taught there stressed the implicit, unquestioning obedience and deference to authority deemed necessary for good family and government, for a well-ordered society, and for the successful operation of the factory system."

nomic forces and the shifting balance of power between workers and owner/managers better explain all phases of the work environment including cost management procedures.[6]

The Slater System

Samuel Slater began producing yarns and threads in Rhode Island in the 1790s. In order to induce farm families to live and work in his factory communities, Slater maintained traditional church and family values and a paternalistic social structure. Males were given custody for all family wages and were not forced to compete directly against women and children in low status, machine-tending positions. Supervisory and authority positions were also limited exclusively to males. Factory supervisors continually reinforced the complementary virtues of industrial discipline and Puritanism (regularly, sobriety, punctuality, obedience, and self-improvement) in their roles as church elders.[7] These values generally appealed to mill operatives and, until the mid 1830s, were accepted by them out of moral obligation [Tucker, 1984].

The Slater system's initial reliance on paternalism complemented its work force and underlying social structure and may have forestalled the use of cost accounting as a control device.[8] According to Prude [1983, p. 117]:

> . . . the bookkeeping iconography of these mills reveals further efforts to acknowledge conventional household

[6] Over time under both systems, increasing mechanization led to a depersonalized, machine-paced environment [Prude, 1983]. Production was constantly stretched out (workers had to tend more machines) and speeded up (workers had to produce more goods in a given time period) in order to maintain profits in light of steadily falling prices and increasing competition [Roediger and Foner, 1989]. The severity of output requirements and piece-rate reductions, and the enforcement of written regulations depended on economic forces (level of competition, supply of labor, etc.) and resulted in varying degrees of worker resistance.

[7] Tucker [1984, p. 170] emphasized the common social structure underlying church and factory: "Many values, including punctuality, attention to duty, and seriousness of purpose, were neatly summarized in the Webster Sabbath school constitution, which was drawn up by local church officials. The constitution was in fact a code of conduct similar to that maintained in the factory."

[8] Accounting records at the Slater mills were not examined directly. Tucker has researched these records extensively and in a personal telephone conversation with the author reported the failure to locate any significant cost accounting reports dating before the 1830s.

> relationships and hierarchies ... Such policies helped assured the viability of families inside local factory compounds.

The hegemony of the family-based authority system also precluded differentiating wages solely according to an individual's output regardless of age or gender. In this environment, the dual influences of church and family, rather than aspects of the cost accounting systems, effectively sustained factory discipline.

Economic, technological, and social factors combined to compel the implementation of more comprehensive costing procedures.[9] The slump in the cloth market in conjunction with the rise in the price of cotton pressured Slater and his heirs to reduce costs. The adoption of the power loom in the mid 1820s enabled the Slater firms to employ a larger, full-time labor force whose output needed to be more closely monitored and measured. The work force also became more homogeneous as young children were gradually phased out of factories and more single women were hired.[10] Privileges once accorded to householders were eventually removed so that individuals rather than the family became the measurable work unit. Beginning in the early 1840s, each worker received his or her wages individually. This pay scheme contrasts with the Lowell system in which workers were compensated individually from the mills' inception. Professional managers in the form of factory agents also replaced Slater family members and became accountable for cost and quality [Tucker, 1981].

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[9] According to Tucker [1984, p. 223], "By the 1830s management appeared to be ready to sacrifice the moral discipline associated with the family and the church in order to obtain more extensive control over the individual worker. Privileges once accorded the householder in the factory came under scrutiny and began to be dismantled as economic forces became the primary influence in the actions of management." Because of "a near-perfect degree of product competition from about 1835 onwards," textile manufacturers were forced to accept the market price for their goods [McGouldrick, 1968, p. 34].

[10] Children were also employed in Lowell Mills, but in far fewer numbers than in the Slater system, primarily because of the complexity of the Lowell machinery [Bender, 1975]. Although the employment of children in factories was condemned for humanitarian reasons [Luther, 1970], economic factors clearly supported it. According to Ware [1966, p. 244], "The wages received by children seem hardly worth working for. The Troy Company paid some of its child workers the miserable sum of thirty-three cents a week." The first legal restrictions limiting child labor (three months of schooling a year were required for children under 15) were enacted by the Massachusetts Legislature in 1836.

As a result of these changes, the Slater mills eventually paralleled their Lowell counterparts in managerial structure, level of integration, and nature and regularity of the work force. According to Tucker [1984, p. 205], an "elemental form" of cost accounting was introduced (at the Slater mills) in the late 1830s. More extensive cost management procedures had already been implemented in the Lowell system because certain aspects of its social system and work environment warranted them.[11] Lowell mill owners also relied on social institutions (church, family, schools, etc.) to reinforce mill discipline; however, unique conditions of the Lowell system (a much larger work force, absentee owners, greater automation, and full integration) led to the earlier use of costing procedures to supplement these paternalistic devices.

The Lowell System

The development of textile manufacturing at Waltham and Lowell has been described in detail [Dalzell, 1987; Gregory, 1975; Spalding, 1969]. This study focuses on the mills that were built by a group of Boston merchant/entrepreneurs in Lowell, Massachusetts, during the 1820s and early 1830s. Other researchers [Dublin, 1979; Lubar, 1983] have indicated that because of interlocking directorships and common management, technology, resources, and information used by one mill were widely known and available to others. Accordingly, "the Lowell system" will be the terminology used regarding procedures undertaken by one or more of the Lowell mills.

In summary, a group of successful Boston merchants (the Boston Associates) built the first fully integrated textile mill in Waltham, Massachusetts in 1814. Realizing financial success, they constructed a number of similar mills in Lowell, Massachusetts, and other New England towns during the 1820s and 1830s. All of the mills were organized as joint stock companies and were capitalized at over $500,000 in $1,000 share increments. By 1840, nine Lowell corporations operated 29 mills and produced over one million yards of cloth weekly; and, according to Montgomery [1970, p. 162], produced more yarn and cloth

[11] Walsh and Stewart [forthcoming] have re-examined accounting records at the Slater mills and report little evidence of cost accounting before 1820. They also indicate that significant cost data began to appear in the mid 1830s at the Lowell mills; however, comparative cost reports dating from the late 1820s have been located and are described in this paper.

"than is produced in any other factories without exception in the world."

Although ownership later expanded beyond the Boston Associates, effective control was continually maintained by the members or their kinship networks. In accordance with Massachusetts law, a treasurer was legally responsible for protecting corporate assets. Surviving records indicate that the treasurer prepared a financial report which was examined annually by selected stockholders who served as directors and participated in this and other committee activities.[12] Certain treasurers, factory agents, and directors were actively involved in the operations of more than one mill and their interactions are well-documented [Gregory, 1975; Josephson, 1949].

From inception, operational control at each Lowell-system mill was delegated to a superintendent who acted as technical expert, and a factory agent who served as chief operations officer [Lubar, 1983]. The typical factory agent was not technically trained and was primarily selected for his managerial skills and executive ability.[13] There were no middle managers *per se,* but overseers and second-hands were fully accountable to the factory agent for output and quality levels, staffing, and record keeping.[14] According to Prude [1983, p. 83], overseers were members of the managerial elite, and "stood indisputably atop the social order of the mill compounds." The administrative functions and hierarchies of the Lowell mills display key char-

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[12] Committees were formed to regularly audit the Treasurer's books, and, as needed, to identify and purchase suitable mill sites, contract or set prices for buildings and machinery, develop procedures to cut fire risk, and determine the type of cloth each mill should produce. That directors and committee members were never compensated for these services or related expenses [Appleton, 1858] is overlooked by critics of the corporations' high dividend-to-earnings payout ratio [Dalzell, 1987; Josephson, 1949]. Dividends averaged 10.75 percent between 1825 and 1835 at the Merrimack Company [Gregory, 1975].

[13] Mill agents in 1830 included a former sea captain, prison warden, and school teacher. See Bagnall [1977] for a detailed description of factory agents' background, training, and responsibilities. Josephson [1949] suggests that factory agents were also selected for their social standing.

[14] An agreement appointing Ebenezer Hobbs as overseer and clerk at the Boston Manufacturing Company on April 1, 1819 reveals the expectations for these positions: "that he will devote to their service all his time and talents, that he will truly and faithfully account for all monies committed to him for the use of said company; that he will comply with the careful directives of the Agent in direction of said company" [Baker, *Boston Manufacturing Company*, Unbound Papers, Box 2-A Archives MSS:44].

acteristics of managerialism that are first attributed to the Springfield Armory only after 1840 [Hoskin and Macve, 1988].

The Lowell mills differed from the Slater system in ways that affected the implementation and nature of cost management. Lowell mills immediately adopted power weaving and integrated all phases of textile production under one roof.[15] The owners needed a large, full-time work force and chose to establish a social system that made a factory life appealing to farm girls, would attract them to Lowell, and yet maintain factory discipline. In addition to large multi-story factories, the Lowell corporations funded the construction of boarding houses, single family dwellings, two churches, and a library.[16] Given their mercantile background, the Boston Associates were probably more export-oriented than their Slater counterparts and, consequently, faced more direct competition from the more mature British mills. Restrictive tariffs protected the U.S. mills from British competition in the U.S. market, but export trade had to be played more evenly. By concentrating on fine cloths, the Lowell mills were able to supplant British dominance in China and South America, and by 1845, overseas trade had become more profitable than domestic commerce [Gregory, 1975].

Strict rules regarding many aspects of behavior were established and generally accepted, although the level of enforcement varied according to the supply of labor at the time [Dublin, 1979]. Boarding house regulations in the early 1830s include the requirement of attendance at public worship on the Sabbath and note that boarding houses "must be closed at *ten o'clock*, in the evening."[17] These regulations reflect the standards and mores of family life of the day [Ware, 1966] and illustrate how the Lowell system utilized church teachings to instill factory discipline. The deterioration of factory life and the creation of a permanent working class culture that began in the 1840s was certainly not anticipated at the time the mills were established.[18]

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[15] Textile manufacturing requires a series of separate processes to convert raw cotton to finished cloth. These steps include carding, dressing, bleaching, spinning, and weaving and are described in detail by Jeremy [1981]. All of these procedures were first integrated at a single large mill by the Boston Associates in Waltham in 1814.

[16] Baker Library, *Merrimack Manufacturing Company*, Vol. 1, Directors Meetings.

[17] "Regulations of Boarding Houses," MATH, *Nathan Appleton Collection*.

[18] Correspondence between mill girls and their families indicates that factory work was intentionally perceived to be impermanent [Dublin, 1979]. Mill

COST MANAGEMENT IN THE LOWELL SYSTEM

Accounting historians continue to push back the inauguration of cost accounting practices. Initially, they focused on the 1880s because cost and financial accounts were not thought to be fully integrated until that time [Littleton, 1933; Garner, 1954; Chatfield, 1974]. Historians then examined the cotton textile industry and determined that integration occurred as early as 1810 in England [Stone, 1973], and in the 1840s and 1850s in America [Tucker, 1981; Johnson, 1981]. When the definition of cost accounting is broadened to include cost management, the date recedes even further. For example, Johnson [1981, p. 516] defined cost accounting as "designed to provide financial information for management decision-making and control." The most recent studies indicate that cost management practices were undertaken in the last third of the eighteenth century in the British textile and ironworks industries [Fleischman and Parker, 1991 and 1990].

Factors that warranted cost-based information were in place from the inception of the Lowell mills. Large, fully integrated facilities faced foreign and domestic competition in markets characterized by steadily falling market prices.[19] Evidence clearly indicates that British mill technology and costing procedures were well known in the United States.[20] Surviving records

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owners also preferred to keep factory work temporary, perhaps to avoid creating a permanent proletariat [Guttman, 1976] or duplicating the same type of factory work environment that existed in England [Appleton, 1858]. Mantoux [1961] described the horrid working conditions that existed for women and children in many British factories, conditions that were well known in America in the early 1800s and were eventually approached in later years. For example, Ware [1959, p. 63] indicated that "by 1846 the weavers (in the U.S.) had been reduced to 'a state of abject misery and suffering'."

[19] According to Nathan Appleton [1832, 1858], the price obtained for the same type of cotton sheeting fell steadily from 1816 to 1843 as follows:

Date	Price per yd.
1816	$.30
1819	.21
1823	.17
1826	.13
1829	.09
1831	.10
1843	.065

[20] According to Gregory [1975, p. 239], "In selecting fabrics, determining articles to be manufactured, and assigning prices, Appleton . . . gathered a mass

also indicate that cost information was compiled and used internally and made available to corporate shareholders on a regular basis. Among its statistics, the *Treasurer's Report* [1867] for the Lawrence Manufacturing Company includes the cost of labor per pound in the Carding, Spinning, Dressing, and Weaving Departments in each year dating from 1831. The report also contains the profits and losses and dividends declared each year, the cost of enlargements and improvements, and expenditures incurred for ordinary repairs and renewals. Furthermore, costing procedures used in one mill can be attributed to the entire Lowell system since interlocking arrangements enabled the mills to function as a homogeneous group.[21]

Various cost reports and procedures in the Lowell system have been discussed previously [Johnson, 1981; Lubar, 1984; Porter, 1980], but to some, the use of cost information has not been clearly demonstrated [Ezzamel, Hoskin, and Macve, 1990; Hoskin and Macve, 1988]. This section describes selected cost reports and discusses how they helped facilitate resource allocation decisions and cost reduction efforts and why certain more modern accounting procedures were excluded. Considered in

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of information from varied English sources: price tags, costs of production from the mills, and data from his old mercantile associates abroad." In 1828, for example, Nathan Appleton received a letter from his brother in England describing the machinery, power requirements, and output of the W. Beavens Factory "which is one of the best to see, it having been in operation only three years, and all its machinery of the newest and most approved kinds" [MHS, *Appleton Family Papers*, Box 4, Folder 4.8]. In 1829, a letter from John Hall discussed the costs of operating a steam engine and mentioned that "the wear and tear, repairing, including the interest may be calculated at 12 per cent per annum" [MHS, *Appleton Family Papers*, Box 4, Folder 4.11]. These letters support Appleton's remarks to the U.S. House of Representatives [1832a, p. 10] regarding the need to know the costs of producing British textiles:

> ... the first inquiry manufacturing makes is the original cost of the article with which he proposes to compete ... does the gentleman suppose that any rational man would erect a cotton mill to manufacture goods for exportation without ascertaining precisely what goods could be furnished for from Manchester?"

[21] Interlocking arrangements created a community of interest that enabled prices, wages, work rules and technology to be standardized throughout the Lowell system [Dublin, 1979; Josephson, 1949; Layer, 1955; Lubar, 1983]. Far from being unethical, these arrangements were thought to protect society and the economy from destructive competition and speculation. According to Gregory [1975, p. 238], "Daily they (the Boston Associates) met at noon at the Boston Exchange where by private, informal negotiations they borrowed money, planned new projects, and exchanged business information."

context with social, technical, and economic forces of the day, these reports appear to supply all the cost-related information that was needed or would be used and "provided the management with a clear picture of the company's sources of profit and loss" [Spalding, 1969, p. 22].

Comparative Cost Reporting

The most outstanding feature of the cost accounting reports from the Lowell mills is the detail of comparative cost reporting. Historical records reveal that cost comparisons were conducted between different time periods, individual products and product lines, and different mills. In summary, these records appear to suggest that cost reporting may have been used for cost control purposes. Key aspects of the more noteworthy reports are now discussed.

An October 1827 report entitled "Memo of Cloth Made and its Cost at Lowell" provides unit and total costs for each type of cloth during the most recent six month period at Merrimack Manufacturing Company.[22] The report also includes percentage calculations for "apparent waste" and "real waste" for each of the mills, suggesting that quality was regularly measured, perhaps in comparison to quality norms.

An October, 1828 six-month summary report entitled "Profit and Loss on each kind of Cloth" reports the prior six months' profit for each of Merrimack Manufacturing Company's five mills. Because each mill produced only one grade of yarn, profitability by product grade was determinable as well.[23] An 1830 report entitled, "Cost of each Cloth and gain in each Mill" provides more detail by including revenues by cloth type, direct costs for cotton, carding and spinning, and weaving, and a common allocation for general expenses and repairs. Total print and an average cost per pound and per yard of cotton is also computed for each mill. Johnson [1981] and Johnson and Kaplan [1987] contend that the purpose of cost accounting in the nineteenth century cotton mills was to coordinate, control, and increase the efficiency of multiple internal conversion processes, but not to link the financial performance in each process to overall profitability. Surviving summary reports indicate that

[22] MHS, *Appleton Family Papers*, Section 4.7.
[23] MHS, *Appleton Family Papers*, Section 4.9.

this linkage was made on a regular basis, thereby suggesting cost accounting's importance to ownership.

Comparative cost reporting may have been an important mechanism in stimulating cost reduction and greater efficiency among the Lowell system mills. Regarding comparatively strong financial performance at the Jackson mill in 1836, for example, Samuel Appleton wrote that "They must wake up at the Appleton and try to beat them the next six months to come."[24] Common ownership, rotating management, and a common sales agency enabled information from different companies and mills to be consolidated, evaluated, and acted upon. Gregory [1975, p. 257, 242] summarized the impact of these shared relationships:

> Although the promoters provided the common core of control, through a loosely organized system of interlocking directorates, the companies within the system both competed and cooperated with each other ... By pitting one company against another, it (the common sales agency) spurred the mills to increased production and efficiency.

Unit Cost and Profit Calculations

Accurate cost per unit information was needed to maintain profit margins in light of a continually falling market prices for finished cotton products (see footnote 19). Surviving records indicate that a variety of detailed cost per unit calculations were conducted. One report prepared in October of 1826 and entitled "Cost of Various Styles of Prints" provides unit cost numbers for 13 different styles.[25] The cost of "Blue and Whites", for example, is built up by including unit costs for four operations (bleaching, printing, dipping, making up), one cost cell, (the col. room), and an allocation (general expense). This information could have been used to establish or evaluate prices and to help control inventory. The inventory of cloth on hand at the Merrimack Manufacturing Company on April 15, 1826 totaled $132,504 and was broken down into unit and total pricing for 32 different styles of cloth.[26]

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[24] MHS, *Appleton Family Papers*, Section 5.12.
[25] MHS, *Appleton Family Papers*, Section 4.4.
[26] MHS, *Appleton Family Papers*, Section 4.2.

An October, 1827 report entitled "Cost of Printing" details the total and unit costs of various operations for the prior six month period. The report includes nine separate *operations,* one of which is labeled *General Expenses.* Each operation includes a unique number of yards produced and separate costs for materials and labor. The left and bottom margins also contain individual and summary unit cost notations from April 1828. This report suggests that unit cost information was monitored over time and, when used in conjunction with selling prices, could establish the overall profitability of printing. An 1830 factory agent's memo to company directors further illustrates how unit costs were a critical factor in allocating productive capacity among products and in deciding to perform work internally or by subcontract.[27]

Miscellaneous Cost Reports

Several other cost-based reports are noteworthy. The computation of the overseer's premium at the Appleton mills in November, 1830 and a supporting memo illustrate how cost information was used in conjunction with incentive-based labor contracts.[28] The premium of six mills per pound was based on exceeding a targeted (or standard) level of 10,000 pounds of good output from each mill per week (rejected cloth was subtracted from total output). A later memo indicates that annual bonuses were capped individually ($75 per overseer) and in total ($250 per mill). These financial incentives certainly mustered greater labor productivity, but not without a social cost. Incentive-based pay schemes may have encouraged overseers to slow down or set clocks back in order to obtain additional output from operatives [Josephson, 1949]. Incentive pay may also have contributed to deteriorating work conditions and the abuse accorded individual operatives [Luther, 1970].

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[27] Twenty-five percent higher output prevented the bleach works at the Merrimack Manufacturing Company from meeting internal demand in June, 1830. As a result, Kirk Boot, Merrimack's factory agent, reported that "We have attempted by reducing the quality of all work ... but find that this is no economy because it not only enhances the cost of dyeing, but makes it less perfect." Boot proposed to "put out" the *I* and *W* cloth to bleaching to the Hamilton Company at $.03 a pound. "In this way doing the expensive bleaching only, the apparent cost will be considerably increased, but we expected the saving in dyeing will fully compensate us" [Baker, *Merrimack Manufacturing Company*, Volume 1 Directors Meetings, p. 89].

[28] MATH, *Nathan Appleton Collection*, Section 4.101.

Other reports show how cost information was or could be used in conjunction with operational decisions. A memo prepared on September 26, 1829 calculates the amount of money that would have been earned by 12 different classes of labor in the 13 weeks ending August 29 if they had been paid at then current prices.[29] Given that prices for finished goods were falling steadily during the period, this particular cost information could have been used to establish the output requirements that were needed to maintain earlier profit levels.

Another memo describes the output differences between looms operating at high speed and common speed in two mills over a three week period in 1831.[30] The memo's author determined that "The 80 looms on high speed norm 3,083 yards more than the other in 18 days." Applying cost numbers to these output differentials would have enabled management to determine the impact of wage rate adjustments on profits.

The Absence of Methodical Depreciation

Several researchers have criticized the Lowell cost management system for the absence of methodical depreciation. They suggest a developmental deficiency by implying that the concept of depreciation was unknown to mill management [Hoskin and Macve, 1988] or that its absence was intentional and led to inflated profits, excessive dividends, the under-capitalization of facilities, and the eventual decline of the industry [Dalzell, 1987; Spalding, 1969]. An assessment of environmental factors, however, rationally explains depreciation's absence during this and later time periods [Tyson, 1990; McGaw, 1985].[31]

Evidence indicates clearly that the concept of depreciation as loss of value was widely understood in the cotton textile industry by the early 1830s. Montgomery [1832, p. 191] included 7.5% of machinery for "tear and wear" in calculating Profit and Loss per fortnight for an English textile operation. More directly, the Massachusetts legislature [Laws of the Common-

[29] MATH, *Appleton Papers*, Section 4.98.

[30] MATH, *Appleton Papers*, Section 4.109.

[31] Johnson and Kaplan [1987] discuss the cost management systems employed in the steel and railroad industries and note their omission of methodical depreciation. Depreciation first appeared with regularity in large vertically integrated firms in the early twentieth century. The reasons why Carnegie and others did not require accounting information to monitor fixed capital in the steel business apply equally well to the cotton textile industry.

wealth, 1831] required existing corporations to provide an estimate of the value of the real and personal "estate" of the Corporation.[32] In response to the Act, a committee of Appleton Company directors prepared a "Statement of Cost and Value" on November 24, 1832. Included in the adjustments to cost are two items that represent depreciation: $14,944.15, "From first cost of Machinery" and $15,410.60, "Being 10 per cent deducted for difference between old and new machinery." The committee explained how they derived their "depreciation" adjustments:

> The committee have reduced in their valuation the property of this company used for manufacturing purposes, so as to be near the value of other mills built by Lowell, since its establishment, and no regards has been (given) to the effect, that political events may have on this and other property of the kind.[33]

As a result of the valuation, the book value of machinery was reduced and the residual profits adjusted accordingly. Surviving records reveal that machinery valuations and book adjustments were performed at the Appleton Company in 1838, 1845, 1849, and 1857, indicating that valuations were made periodically, perhaps in conjunction with new stock offerings.[34] Incomplete records preclude precise conclusions regarding the regularity and motivation of asset revaluations, but surviving records clearly demonstrate an awareness of depreciation and the difficulties in determining current value. In regard to determining fair value in compliance with the Massachusetts Act of 1830, a committee of Merrimack Manufacturing Company directors wrote:

> The greatest difficulty was found in making a satisfactory valuation of the Machinery in the 5 mills for spinning and weaving. In this department very considerable improvements have been made and great reductions in the price of machinery since the contracts were

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[32] The historical record shows that nine identical petitions, each from a separate county, were submitted to the legislature requesting the inclusion of a limited liability feature to corporate ownership. The Suffolk County petition contained 239 names, eight of whom were recognizable as "Boston Associates". The provision within the 1830 law that required the valuation of corporate debts, credits, and property appears to be the cost of obtaining the limited liability feature.

[33] MATH, *Appleton Papers*, Section 3.13.

[34] MATH, *Appleton*, Section 3.15.

> made a part of that now in use. They adopted the principle of considering the machinery in No. 2 which is supposed to unite all the latest improvements, and to have been built at the very lowest price, as the standard.[35]

There are a number of reasons why depreciation may not have been recorded methodically. For one, expenditures to maintain, renew, and improve existing machinery were all recorded in a *Repairs* account that was fully charged to income. Depreciation was also an uncontrollable cost that was about the same for all mills [Lubar, 1983] and essentially irrelevant for making cost comparisons. Depreciation numbers are also unlikely to influence replacement decisions given the rapid pace of technological innovation at that time [McGaw, 1985]. The use of periodic revaluations and residual profit adjustments, in conjunction with recapitalization, is a more direct way of funding fixed capital.[36] In any case, the concept of depreciation and the need to cover the cost of fixed capital were known and understood. In remarks before the House of Representatives, Nathan Appleton [1832b, p. 19] displayed a keen understanding of practical economics and the need to monitor costs:

> The natural price of every commodity is the cost of the labor, and the value of the use of the capital employed in its production. The disturbing causes are the relative proportion of supply and demand. Now the practical man watches the disturbing causes which are in constant action, with great indifference for the natural price. The student of political economy knows and cares nothing for the active disturbing causes, but supposes the actual price to be always in conformity with the remote tendency.

The Absence of a Fully-Developed Standard Cost System

Researchers have recently suggested that a certain disciplinary power associated with West Point training was needed be-

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[35] Baker, *Merrimack Manufacturing Company*, Vol. 1, Directors Meetings, p. 75.

[36] The Lowell corporations originally ensured that no more than two-thirds of capital would be tied up in fixed assets, and that expansions would not be financed out of earnings; however, "In some few instances this principle has been disadvantageously encroached upon by increasing the original machinery without a proportional increase in capital" [Appleton, 1858, p. 30].

fore managerialism would individualize norms of behavior, utilize standard costs, and construct a work force described as "a cohort of calculable persons that could be managed" [Ezzamel, Hoskin and Macve, 1990, p. 160]. However, many other factors better explain why standard costs were intentionally not implemented in the Lowell system during this time period.[37]

For one, the lack of education and sobriety, and the pace of production would have prevented individual operatives from self-reporting production data. For example, Bagnall [1908] indicated that most mechanics were addicted to alcohol. In an address on working conditions in New England in 1832, Luther [1970, p. 20] reported that "in 8 mills all on one stream, within a distance of two miles, we have 168 persons who can neither read nor write."

In the early years at Lowell, at least through the 1820s, economic need was not the primary motive that brought farm girls to work in the mills [Dublin, 1979; Ware, 1966]. Some of the reasons for moving to Lowell include the desire to escape the boredom of the farm, the sociability of city life, opportunities for education and greater independence. Therefore, exceptionally stringent work rules and individualized output requirements in conjunction with standard costs may have led to intolerable levels of turnover and were thus intentionally avoided. According to Prude [1983], workers' voluntary terminations accounted for nearly 50 per cent of the turnover between 1816 and 1820. Mill girls' own accounts from this same time period suggest that quitting behavior was a common form of protest to work rules and conditions perceived to be unreasonable [Dublin, 1979; Josephson, 1949]. According to Ware [1966, p. 236]:

> In contrast to the starvation wage with which the English could obtain pauper labor, the American manufacturers had from the first to offer a wage which would entice into the mills a class of self-supporting farmers and mechanics, as well as girls for whom 'gain, not bread' was the motive for factory work.

Continual innovations in technology throughout the early period also discouraged the development of standard costs that would quickly be rendered out-of-date. Instead productivity was

[37] Unfortunately, *standard costs* do not have a universally accepted definition and are often interpreted differently. This writer defines *standard costs* as the level of costs that should be. Standard costs also suggest the individualization of norms and the calculation of variances.

increased by adjusting piece rates, machine speeds, and tending responsibilities so that only industrious workers could earn fully adequate wages. Using the market to shape the cost of labor through piece-rate adjustments reflected rational decision making rather than a cost accounting deficiency.

Several noted researchers have argued that cost accounting was needed to control internal production processes only after wage contracts were substituted for market piece rates [Johnson, 1981; Johnson and Kaplan, 1987]. Surviving records indicate, however, that piece rates were the common form of remuneration at the Lowell mills long after cost management practices were initiated. For example, a September, 1829 memo entitled "Prices for Job Hands" identified piece rates for twelve different classes of labor, six of which had different rates depending on the type of cloth produced.[38] Dublin [1979] describes how piece-rate adjustments were effectively used to reduce operatives' wages in the 1860s. Englander [1987] indicates that piece-rate accounting, in conjunction with the inside contract system of production, was used by many U.S. industries into the twentieth century. More research is needed to determine the impact of piece-rate accounting on standard costs, budgets, and other accounting procedures. Market-based piece rates were used by the Boston Manufacturing Company in 1814 and by Superintendent Lee at the Springfield Armory as early as 1819 [American State Papers, 1823]. Therefore, attributing the transition of piece-rate accounting into individualized norms to West Point managerialism appears unwarranted.

Ezzamel, Hoskin, and Macve [1990, p. 159], in discussing how Daniel Tyler in 1832 at the Springfield Armory developed norms of what "the good worker working solidly could and should achieve," contend that "there appears to be no historical precedent for this kind of standard setting." However, Pollard [1965, p. 191] describes how prizes were given to the hardest working boy and girl, "and their output became the norm for the rest." Surviving records from the Lowell mills in the 1820s similarly show that output norms and associated piece wages were set according to the efforts of the most skilled workers. Competition within the cotton textile industry may account for the early development of this productivity-enhancing mechanism.

A number of factors explain why individualized norms were

[38] MATH, *Appleton Papers*, Section 4.96.

not incorporated into standard costs during the time-frame under study. Owner/managers were able to fully exchange cost and other labor related information; consequently, they could control costs effectively and efficiently through a uniform set of rules and regulations. An 1829 memo labeled "Regulations Agreed upon by Agents of Merrimack, Hamilton, and Appleton" outlines the terms of discharge and form of discharge letter to be issued and illustrates how blacklisting served to strengthen managerial control. In another example, a statement detailing the number of girls working, missing, and out sick on March 6, 1841 in each of the five Lawrence mills was sent to the agent of the Appleton Company.[39] The fact that the Lowell work force was predominantly female may help explain their general complicity with these rules and why management was able to delay the use of cost accounting for control purposes.[40]

Having full and certain knowledge of the costs of production, facilitated through interlocking directorships and the exchange of key business data, enabled gentlemen's agreements to maintain consistent wage rates and regulations.[41] The uniform marketing and pricing of finished goods by a common sales agency also staved off destructive price competition among the Lowell companies. The growth of organized labor, the increasing complexity of multi-activity firms, and the inability to utilize piece-rate adjustments all help explain the need for standard costs in later years.

SUMMARY AND CONCLUSIONS

To argue that Lowell costing methods were under-developed discounts the social environment of early American textile

[39] MATH, *Appleton Papers*, Section 4.36.

[40] There were several minor work stoppages during the early 1830s at Lowell, but these lasted only a few days and were not widely supported. Guttman [1976, p. 20] quotes an unnamed source regarding the advantage of employing females in the mills: "Women are much more ready to follow good regulations, are not captious, and do not clan as the men do against the overseers."

[41] On January 16, 1828 the following vote was passed: "That the presidents be requested to communicate to the ??? Mfg. Company . . . that the practice of inveigling workers from other Establishments is inconsistent with the preservation of good fellowship as it is with their mutual interests [Baker Library, *Merrimack Manufacturing Company*, Vol. 1, Directors Meetings]. Empirical research has shown that wages were standardized across the whole textile manufacturing industry [Layer, 1955].

manufacturing as well as the economic factors that demanded that certain cost information be routinely provided to owner/managers of successful businesses. To further contend that a particular type of managerial training was needed to enforce accountability or utilize accounting to its full potential ignores a record replete with detailed cost keeping and accountability procedures. Tucker [1984, p. 105], for example, relates how Samuel Slater monitored his work force by examining every piece of cloth in the early years from outworkers:

> If weavers took more than four months to complete their work, they were docked a half-cent a yard on the cloth returned, and if they failed to return all the yarn given out, they were charged for it and dismissed.

The absence of certain accounting procedures is better interpreted as reflecting business complexities, economic pressures, or social forces of the day rather than as a lack of knowledge, a developmental deficiency, or missing a needed managerial component.

Perhaps strict rules, regulations, and labor costing procedures were not implemented at the Springfield Armory much before 1840 because of the absence of a highly competitive market, or because armory workers, being more skilled, were able to maintain control of work processes until that time. Ware [1966] and Dublin [1979] support this latter position, while Grimsted [1985, p. 8] seemingly refutes it:

> Whatever the differing sources of strength and vulnerability of various groups of skilled craftsmen and unskilled industrial workers in this era, they were in sufficiently similar situations to make use of broadly similar mechanisms to try to protect their interests.

In either case, a War Department board examining practices at the Armory in 1841 determined that "in all the private establishments which were visited by the board, the hours of labor are fixed by regulation" [Benet, 1878, p. 401]. The board was probably referring to the cotton mills in Lowell where operatives had been subject to strict industrial discipline for nearly twenty years. Accountability and costing systems may also have been utilized in other large, highly integrated, and competitive industries before 1840. According to Cochran [1981, p. 98]:

> In the years before 1820, the United States had become firmly set on the road to modern industrializa-

tion; twenty years later, by the standards of that day, the nation was industrialized.

Surviving cost reports from the Lowell mills are comprehensive and mathematically exact and suggest that cost information was regularly provided to assist in a variety of important decision-making areas. Although the absence of complete records prohibits a full understanding of cost-keeping and reporting practices, enough records survive for one historian to conclude that Lowell owner/managers were "pioneers in the development of business accounting procedures in the decades before the Civil War" [Dublin, 1979, p. 25]. One can safely conclude that systematic cost-keeping procedures were present and well-utilized in the United States before 1840.

REFERENCES

American State Papers, Class V, Military Affairs II, Document 246, "Armory at Springfield," Communicated to the House of Representatives by the Committee on Military Affairs (March 3, 1823): 538-553.

Appleton, Nathan, *Introduction of the Power Loom and Origin of Lowell*, Lowell: B. H. Penhallow (1858).

_____, "Remarks of Mr. Appleton of Massachusetts on Mr. Bouldin's Resolution of Inquiry into the Nature of Minimum Duties," House of Representatives, January 21, 1832, Washington: Jonathon Elliot (1832).

_____, "Speech of Mr. Appleton of Massachusetts in reply to Mr. McDuffie of South Carolina," on the Tariff Delivered in the House of Representatives U.S. on the 30th of May, 1832, Washington: Gales and Seaton (1832).

Baker Library, Harvard University, *Merrimack Manufacturing Company*, Boston, MA.

Bagnall, William R., *Sketches of Manufacturing Establishments in New York City, and of Textile Establishments in the Eastern States*, edited by Victor S. Clark, 4 Volumes (1908), North Andover, MA: Museum of American Textile History (1977).

Bender, Thomas, *Toward an Urban Vision*, Baltimore: The Johns Hopkins University Press (1975).

Benet, Stephen V. ed., *A Collection of Annual Reports and Other Important Papers Relating to the Ordnance Department*, Volume 1, Washington: Government Printing Office (1878).

Chandler, Alfred D. Jr., *The Visible Hand: The Managerial Revolution in American Business*, Cambridge: Harvard University Press (1977).

Chatfield, Michael, *A History of Accounting Thought*, Hinsdale, IL: Dryden Press (1974).

Cochran, Thomas C., *Frontiers of Change: Early Industrialism in America*, New York: Oxford University Press (1981).

Dalzell, Robert F., *Enterprising Elite: The Boston Associates and the World They Made*, Cambridge: Harvard University Press (1987).

Dawley, Alan and Paul Faler, "Working-Class Culture and Politics in the Industrial Revolution: Sources of Loyalism and Rebellion," *Journal of Social History*, Vol. 9 (1975): 466-80.

Dublin, Thomas, *Women at Work*, New York: Columbia University Press (1979).

Englander, Ernest J., "The Inside Contract System of Production and Organization: A Neglected Aspect of the History of the Firm," *Labor History*, Vol. 28, No. 4 (Fall 1987): 429-446.

Ezzamel, Mahmoud, Keith Hoskin, and Richard Macve, "Managing It All by Numbers: A Review of Johnson & Kaplan's 'Relevance Lost'," *Accounting and Business Research* (Spring, 1990): 153-166.

Fleischman, Richard K. and Lee D. Parker, "British Entrepreneurs and Pre-Industrial Revoluation Evidence of Cost Management," *The Accounting Review*, Vol. 66, No. 2 (April, 1991): 361-375.

_____, "Managerial Accounting Early in the British Industrial Revolution: The Carron Company, a Case Study," *Accounting and Business Research*, Vol. 20, No. 79 (1990): 211-221.

Garner, S. Paul, *Evolution of Cost Accounting to 1925*, Tuscaloosa: University of Alabama Press (1954).

Gregory, Frances W., *Nathan Appleton Merchant and Entrepreneur 1779-1861*, Charlottesville: University Press of Virginia (1975).

Grimsted, David, "Ante-Bellum Labor: Violence, Strike, and Communal Arbitration," *Journal of Social History*, Vol. 19 (Fall, 1985): 5-28.

Guttman, Herbert G., *Work, Culture, and Society in Industrializing America*, New York: ALfred A. Knopf (1976).

Hoskin, Keith W. and Richard H. Macve, "The Genesis of Accountability: The West Point Connections," *Accounting, Organizations and Society*, Vol. 13, No. 1 (1988): 37-73.

Jeremy, David J., *Technology and Power in the Early Cotton Industry: James Montgomery and the Second Edition of His "Cotton Manufacture" (1840) and the Justitia Controversy about Relative Power Costs*, Philadelphia: American Philosophical Society (1990).

_____, *Transatlantic Industrial Revolution: The Diffusion of Textile Technologies between Britain and Ameria, 1790-1830*, Cambridge: MIT Press (1981).

Johnson, H. Thomas, "Toward a New Understanding of Nineteenth-Century Cost Accounting," *The Accounting Review*, Vol. 56, No. 3 (July, 1981): 510-518.

_____, "Early Cost Accounting for Internal Management Control: Lyman Mills in the 1850's," *Business History Review*, Vol. XLVI, No. 4 (Winter 1972): 466-474.

_____ and Robert S. Kaplan, *Relevance Lost*, Boston: Harvard University Press (1987).

Josephson, Hannah, *The Golden Threads: New England's Mill Girls and Magnates*, New York: Duell, Sloan and Pearce (1949).

Laws of the Commonwealth of Massachusetts Passed at the Several Sessions of the General Court, Beginning May, 1828 and Ending May, 1831, Vol. XI, Chap. LIII, Boston: Dutton and Wentworth Printers to the State (1831).

Layer, Robert G., *Earnings of Cotton Mill Operatives, 1825-1914*, Cambridge: Harvard University Press (1955).

Littleton, A. C., *Accounting Evolution to 1900*, New York: American Institute Publishing Co. (1933)

Lubar, Steven, "Managerial Structure and Technological Style: The Lowell Mills, 1821-1880," *Proceedings*, Business History Conference 1984 Annual Meeting (1984): 20-30.

_____, *Corporate and Urban Contexts of Textile Technology in Nineteenth-Century Lowell, Massachusetts: A Study of the Social Nature of Technological Knowledge*, Unpublished Dissertation, Chicago, IL (1983).

Luther, Seth, "An Address to the Working-Men of New England, on the State of Education, and on the Condition of the Producing Classes in Europe and America," Boston, 1832, in *Religion, Reform, and Revolution: Labor Panaceas in the Nineteenth Century*, Leon Stein and Philip Taft editors, New York: Arno Press (1970).

Massachusetts Historical Society (MHS), *Appleton Family Papers*, Boston, MA.

Mathews, Jean V., *Toward a New Society: American Thought and Culture 1800-1830*, Boston: Twayne Publishers (1991).

McGaw, Judith A., "Accounting for Innovation: Technological Change and Business Practice in the Berkshire County Paper Industry," *Technology and Culture*, Vol. 26, No. 4 (1985): 703-725.

McGouldrick, Paul F., *New England Textiles in the Nineteenth Century*, Cambridge, Mass.: Harvard University Press (1968).

Montgomery, James, *The Cotton Manufacture of the United States Contrasted and Compared with that of Great Britain* (1840), New York: Burt Franklin (1970).

_____, *The Carding and Spinning Master's Assistant*, Glasgow, Scotland: John Niven (1832).

Morone, James A., *The Democratic Wish: Popular Participation and the Limits of American Government*, Basic Books, Inc. (1990).

Museum of American Textile History (MATH), *Nathan Appleton Collection*, North Andover, MA.

Pollard, Sidney, *The Genesis of Modern Management*, Cambridge, MA: Harvard University Press (1965).

Porter, David M., "The Waltham System and Early American Textile Cost Accounting 1813-1848," *The Accounting Historians Journal*, Vol. 13, No. 1 (Spring 1980): 1-15.

Prude, Jonathan, *The Coming of Industrial Order*, Cambridge: Cambridge University Press (1983).

Roediger, David R. and Philip S. Foner, *Our Own Time: A History of American Labor and the Working Day*, New York: Greenwood Press (1989).

Spalding, Robert V., *The Boston Mercantile Community and the Promotion of the Textile Industry in New England, 1813-1860*, New Haven: Yale University (1969).

Stone, Williard E., "An Early English Cotton Mill Cost Accounting System: Charlton Mills, 1810-1889," *Accounting and Business Research* (Winter 1973): 71-78.

Thompson, E. P., "Time, Work-Discipline, and Industrial Capitalism," *Past and Present*, Vol. 38 (1967/68): 56-97.

Treasurer's Report, *Statistics of the Lawrence Manufacturing Company of Lowell From 1831 to 1867*, Boston: Prentiss & Deland Printers (1867).

Tucker, Barbara M., *Samuel Slater and the Origins of the American Textile Industry*, 1790-1860, Ithaca, NY: Cornell University Press (1984).

_____, "The Family and Industrial Discipline in Ante-Bellum New England," *Labor History*, Vol. 21 (Winter 1979-80): 55-74.

_____, "The Merchant, the Manufacturer, and the Factory Manager: The Case of Samuel Slater," *Business History Review*, Vol. LV, No. 3 (Autumn 1981): 297-313.

Tyler, Daniel, *Daniel Tyler: A Memorial Volume containing His Autobiography and War Record*, New Haven (1883).

Tyson, Thomas, "Accounting for Labor in the Early 19th Century: The U.S. Arms Making Experience," *The Accounting Historians Journal*, Volume 17, No. 1 (June 1990): 47-59.

Walsh, Eamonn J. and Ross E. Stewart, "Management Accounting in the United States: A Prelude to a History," working paper.

Ware, Caroline F., *The Early New England Cotton Manufacture*, New York: Russell & Russell (1966).

Ware, Norman, *The Industrial Worker 1840-1860*, Gloucester, MA: Peter Smith (1959).

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THE INTRODUCTION OF "ARABIC" NUMERALS IN EUROPEAN ACCOUNTING

Abstract: The general adoption of "Arabic" numerals by European bookkeepers occurred at least five hundred years after their introduction to the scholarly world. The early availability yet late adoption of this numeration is shown to be due to several factors, not least to interplay between the culture and cultural conservatism of clerks and the educational and intellectual changes of the early Italian Renaissance.

THE MODERN VIEW OF THE RELATIONSHIP OF ROMAN NUMERALS TO MEDIEVAL ACCOUNTING[1]

A commonly held view of the heritage of Roman accounting in Medieval times is that of Chatfield [1974, p. 16]: "Taken as a whole, the Roman accounting legacy to the Middle Ages was tenacious but of doubtful value. The preference for Roman numerals continued among bookkeepers until the sixteenth cen-

[1] Terminology notes:

(1) In the body of this paper the term "Arabic" is applied to the numerals whose modern descendants are written 0, 1, 2, . . . in European langauges. The origins of these numerals lie beyond the present topic; suffice it to say that the origins are complex, probably ultimately involving contributions by Mesopotamian, Indian, Greek, and Arabian cultures. The use of the term "Arabic" should not be taken as expressing a commitment to the dominance of one part of that heritage.

(2) The modern and Medieval meanings of many words are different. Even the term "abacus" had many meanings at all times. The device was not called *abacus* in ancient times; in fact, in the strict sense, it had no name at all. The normal terminology in Latin was *tabula (calculatoria)*, and the tokens used were called *calculi* (literally, "pebbles"). A user of the device was called *calculator.* In Greek, the corresponding term was τράπεζα, while the tokens were called ψῆφος and the operator was called ψήφιστης. We cannot be sure of the terms in Old English, the only other language of pre-Renaissance Europe with a surviving large scholarly literature, but they were probably *tæfel* (a loan from Latin), perhaps *tæfel-stan*, and *rimere*, respectively. Recognizing this terminology, the "abacus" is mentioned occasionally (which is all we should expect) in classical literature (*cf.* the references given by de Ste. Croix [1956, p. 60 n. 5]; also the notes of Macve [1985, p. 262]) and in Medieval literature before the late tenth century (a convenient sampling is in Latham [1975, *s.vv. calculatio, calculator,*

tury, hundreds of years after the introduction of Arabic numbers." The preference is well-known,[2] but its causes are not.

Chatfield [1974, p. 24] also reflects another commonly held view in saying of English Exchequer accounting, "The use of Roman numerals made arithmetic cumbersome and errors had to find. Worse, it perpetuated a narrative form account in which no real attempt was made to bring receipts and expenditures face to face in parallel columns."[3] This vision of a relationship between double-entry and Arabic numeration is apparently traceable to Sombart [1916], for whom both the notation and the bookkeeping practice were part of the relationship between rationality and capitalism.[4, 5] The notion of a relationship be-

calculatorius, calculo, calculus); other Medieval Latin dictionaries also provide convenient references). See also below, especially nn. 9 and 30, for the use of *abacus* to denote arithmetic in general. In the body of this paper, unless otherwise specified in context, "abacus" is used in the modern sense.

(3) The term *algorithm* is used in its modern sense, a well-specified set of computational instructions, while the cognate term *algorism* and its derivatives are used to designate arithmetic technique(s) supposedly based on the works of the Arab mathematician al-Khwarizmi. See also below, n. 24.

[2] The introduction of "Arabic" numerals in the West is a much more complicated subject than is usually presented. The standard presentation is still Smith and Karpinksi [1911]; see also Flegg, ed., [1989] and Ifrah [1981]. There is little doubt that "Arabic" numerals were well-known to academic circles by the eleventh century; the introduction of the new numeration system to bookkeeping seems to have occurred primarily in the late fifteenth century. The first examples are actually early fourteenth century, from Italian sources (*v. infra*). However, the introduction was slow — most fifteenth-century books of account use Roman numerals; "Arabic" numerals are not standard until the late sixteenth century (instructive is the selective but still useful survey of Arabic numeral usage and forms by Hill [1915]). Many modern presentations (*e.g.*, Parker [1989]) write as if the advent of the new numeration was instantaneous.

[3] Compare also Baxter [1983, p. 136-7] on the "cramping effect that they [*viz.*, Roman numerals] had on ways of thought." See also Littleton [1933, p. 20-21]. The notion that Roman numerals were an impediment to accounting is perpetuated even in Parker [1989], and Weis and Tinius [1991], evidently drawing only on secondary sources.

[4] A concise critical survey of Sombart's views is in Braudel [1982, p. 572 f]. See also Nussbaum [1933, p. 159 f]. However, Sombart's notion seems to have been based, among other sources, on a possible exaggeration of the impact of Leonardo of Pisa.

There is obviously no association between the oppositional form of accounts and "Arabic" numeration. Examples of double-entry accounting in Roman numeration are easily found — *e.g.*, Castellani [1952, *passim*]. Furthermore, columnar arrangements of many kinds employing Roman numeration are common throughout the Medieval period.

[5] The notion (see Chatfield [1974, p. 33]) that Arabic numerals were "within a generation after their exposition by Leonardo of Pisa (1202), widely used by

tween Arabic numeration and the rise of double-entry accounting was revised and advocated again by de Ste. Croix [1956], once more resting on the supposition that Arabic numerals, presumably largely due to the advocacy of Leonardo of Pisa ("Fibonacci") had a direct and immediate impact on European commercial record keeping.

Careful consideration of numeric notation and the associated computational system(s) used in Medieval accounting leads, however, to a picture different from the views just cited. Such a consideration must rest, above all, on direct examination of the primary sources. This evidence shows that the tenacity of Roman numeration[6] was not due to irrationality, ignorance, or the inferior performance of arithmetic. That tenacity, together with the circumstances of the ultimate triumph of a new numeric notation, was bound up, not just with the needs of merchants or bankers, but also with the intellectual history of late Medieval and early Renaissance Europe. In turn, this intellectual history had implications for the development of accounting after Roman numeration had been abandoned.

On the other hand, while the lack of documentation makes it impossible to establish with certainty the role played by Leonardo of Pisa, it will appear from the evidence presented here that the introduction of Arabic numerals into European bookkeeping was probably a Pisan innovation, datable at least to the early fourteenth century. Such a chronology does not, however, by itself confirm de Ste. Croix's views on the origins of double-entry. Confirmation of his hypothesis can come only from showing that some double-entry documents in Arabic notation predate all double-entry documents in Roman notation.

COMPUTATION IN MEDIEVAL ACCOUNTING: ROMAN NOTATION AND ITS RELATIONSHIP TO THE ABACUS

Whether in the Italian double-entry, English Exchequer, or in other systems, Western European commercial records of the

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Italian merchants" stems apparently from a speculation by Ball [1915, p. 168], picked up by Littleton [1933, p. 21]. At best it appears that Leonardo's impact was confined to Pisa, and even then is not clearly attested until 1305 — see below.

[6]Convenient and general introductions to Roman numeration are surprisingly hard to find. A good summary is Karpinski [1925, p. 19 f.]; in a specialized but important context, see Menninger [1958, tr. 1969, p. 279 f.]. On the origins of Roman numeration, seemingly in tally marks, see Keyser [1988].

Middle Ages almost uniformly use Roman numeric notation until the fifteenth century. The modern student knows this notation only from a few days' study, which was probably rather painful and seemingly impractical. It is today an occasional source of amusement for arithmetic teachers to threaten children with having to do "long division" in Roman numerals.[7]

Nevertheless, the notation was in its time both effective and efficient — indeed, as will be seen, superior in some respects to Arabic numeration. Roman notation was probably introduced to most Medieval schoolchildren early in their education.[8]

In understanding the role of Roman numerals, it is essential to understand that their effective usage was bound up with the use of the abacus.[9] The abacus[10] was the primary calculating

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[7] Relatively efficient techniques for direct manipulation of Roman numerals are possible; however, there is no evidence for them in the Middle Ages. See Detlefsen, *et al.* [1976].

[8] For a general account of Medieval educational practices, see, *e.g.*, Wagner, [ed., 1983]; Medieval education for the pupil's early years was primarily concerned with the trivium, particularly its first segment, "grammar". But the term "grammar" as actually applied in schools must be understood very broadly, connoting something like modern "literacy" (except in pre-Conquest England, almost exclusively in Latin). It is instructive that essentially every figure up through the tenth century today thought of as a major figure in the history of Medieval mathematics (*e.g.*, Boethius, Bede, Gerbert) was in his time also famous in connection with the trivium. This is nowhere more evident than in the works of Gerbert, always strongly influenced by rhetoric and logic ("dialectic").

No Medieval text in which Roman numeric notation is used makes a special effort to introduce and explain it; its usage seems to have been presumed as a normal part of writing. Other numeric notation systems were also common, such as the runic system (in many ways a scholarly system — for an introduction to runic writing and the associated numeric and pseudo-numeric notations, see, *e.g.*, Klingenberg [1973], Düwel [1983]) and the tally system (see, *e.g.*, Menninger [1958 tr. 1969, p. 223 f.]; also now Baxter [1989]).

[9] The vocabulary of the abacus and late Medieval arithmetic is difficult. In the Medieval period up to the last quarter of the tenth century, the device known today as the abacus was known as the *tabula*, but most references to it use the more distinctive term *calculus* and its derivatives. In the last quarter of the tenth century the term *abacus* appears, but refers to the scholarly device; from the eleventh century onwards, this term is also used by extension to denote the subject of calculation in general. This usage of *abacus* continues until at least the sixteenth century. Until about 1400 the term *arithmetica* and its derivatives refer not to arithmetic but to a discipline which today would be called "numerology."

[10] The most recent discussion of the abacus in an accounting context is Baxter [1989], but the discussion is not helpful. On the nature and use of the abacus in general, see Pullan [1969], particularly valuable for an account of the usage of the classical and Medieval abacus. See also Menninger [1958, tr. 1969,

device of the Middle Ages on Western Europe.[11] The Medieval commercial abacus had several variants, ranging from the large

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p. 295 f.]; Barnard [1916] also gives presentations of most of the published techniques for using the Medieval abacus or counting-table. Several types of abacus should be distinguished, including the classical and Medieval forms (implemented primarily by tokens placed on or between lines drawn on a flat surface, such as a table), the Medieval monastic or academic form (a large device, with a distinctive arch-topped columnar layout), and the modern forms employing beads on rods. As the illustrations in Pullan [1969, p. 22, 29, 37, 49, 50, 53] show, the Medieval commercial abacus was essentially unchanged from the form known in classical antiquity. This seems unthinkable unless the device had continued to be used essentially without interruption. There are other reasons for expecting that the abacus continued in use as needed: it was widely known, inexpensive, and performed a function otherwise difficult to duplicate in societies where writing materials were comparatively expensive. Moreover, it is likely that at least the elementary use of the abacus was taught not in the quadrivium (the part of the Medieval education curriculum concerned primarily with mathematics), but rather either informally as part of occupational training or in the trivium (the part of the curriculum concerned with language skills). A list of books owned by an English grammar master in the tenth century shows "reckoning" (*gerim*) among a set of books which is otherwise purely part of the trivium (see Robertson [1956, p. 250-251] — very interesting is that the books are all evidently in Latin except the arithmetic, which seems to have been in Old English. This could have been simply a calendar — so Robertson, ed. — or a copy of Bede. But perhaps it was a translation of Boethius? Or of Victorius?) Note, too, that the summary of the usual early Medieval curriculum (Rabanus Maurus, *De Institutione Clericum*) clearly indicates that "arithmetic" was to be understood in the sense of Boethius — *i.e.*, numerology, not computation.

[11] Occasionally modern writers still write as if the abacus had disappeared from Western Europe during the centuries following the fall of the Roman Empire. Yeldham [1926] held that "manual" reckoning (*cf.* Bede, in a scholarly context) was the normal way in which arithmetic was done during the "Dark Ages"; the view still obtains in Murray's otherwise extremely perceptive history [1978, p. 163 f.]. But Murray's interpretation of early references to the abacus is doubtful. In particular, the late tenth-century English reference (see Murray [1978, p. 454 n. 11]) as a *tabula pictoria* is possibly a mistake for *tabula pictagoria*, "Pythagorean table". The earlier references to the abacus in connection with geometry (seemingly not arithmetic) are probably highly significant — scholarly knowledge of the abacus was probably distinct from popular usage and may well have been associated with mathematical literature called "geometry". However, it must be born in mind that the term *geometria* did not designate a discipline precisely comparable to the modern "geometry;" see Shelby [1983]. It is probably not merely faulty editing that resulted in the attachment of an account of the "Arabic" numeration system in the *Geometry* of (pseudo-?) Boethius.

De Ste. Croix [1956, esp. p. 60] questions the primacy of the abacus, particularly for ancient Greek alphabetic notation. However, there is no direct or indirect reference to algorithmic calculation or anything like it anywhere in classical literature or archaeology. Moreover, de Ste. Croix ignores the evidence

surface[12] used in the English Exchequer to the more common "lines" form apparently derived directly from the abaci of classical antiquity.[13]

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which plainly connects the abacus and Roman (and Greek acrophonic) notation to the abacus. Perhaps the Greek alphabetic numeral system (and its Semitic precursors) were connected primarily with computation by tables (see particularly Menninger [1958, tr. 1969, p. 272 f.]), but this need not preclude the abacus and by no means implies algorithmic calculation.

[12] Whether the surface was ruled off to resemble a modern checker-board is questionable. Holmes [1952, p. 271] argues that in the twelfth century the term *scaccarius* was applied in general to gaming or convenient flat tables, such as were used for chess.

The relevant passage in Richard Fitz Nigel's *de Scaccario* specifically states that the exchequer was named according to its resemblance to a gaming table (perhaps hence, by implication, not like the usual abacus table); see also Baxter [1989], but the *de Scaccario* explicitly mentions lines, not squares. On the other hand, Fitz Nigel extends the metaphor in a fashion which makes a checker-board-like appearance by no means impossible. In any event, the Exchequer was not the usual commercial abacus, but was intelligible to those who knew such abaci. It is certainly an interesting subject for further research that the only modern game commonly played on "lines" (such as — in fact certainly the same as — the lines of the abacus) is backgammon — whose boards are commonly still printed on the back of checkerboards. On the early history of sectioned game-boards, see in general Murray [1913].

[13] No abaci seem to survive from the early Middle Ages. This is, however, hardly evidence that the abacus ceased to exist; in fact, it is possible that they are still in existence but unrecognized. The resurgence of interest in arithmetic in the late tenth century and the publicity accorded to "abacists" is sometimes taken as the rediscovery of the abacus — but the first writer, Gerbert (c. 980) says not that the knowledge of the abacus had been lost, but merely that there had been no writing on the subject for a long time — see Bubnov, ed. [1899, p. 6]; *Itaque cum aliquot lustra jam transierint, ex quo nec librum, nec exercitium harum rerum habuerimus, quaedam repetita memoria, eisdem verbis proferimus, quaedam eisdem sententiis*, "And so, since several long periods have passed during which we have had neither a book nor [even] an exercise [manual relating to] these matters, we offer up certain things repeated verbatim from memory, and certain things [not verbatim but] the same in concept." This passage has in the past (see Bubnov's note *ad locum*) been taken as referring to an earlier work of Gerbert's, but seems at least equally likely to refer to some work(s) or lore (now lost) on which Gerbert drew. Indeed, the entire substance of the introduction to Gerbert's *Regulae de Numerorum Abaci Rationibus* makes clear that he is drawing on a tradition which was not new. The real question is more likely to be whether this work of Gerbert actually refers to the abacus (in the modern sense) at all.

As to physical evidence, few abaci survive from antiquity, when they surely were common. The problem lies in the fact that the abacus was more of a concept than an artifact — any flat surface and a few tokens could be used to make an abacus. The nature of the abacus is shown in its name: the classical word (Greek ἄβαξ, Latin *abacus*) means 'table' or simply 'flat surface' (compare

The essential principle of the abacus (in any form) is that of place-value notation. Since, as will be shown below, Roman numerals are closely bound to the abacus, this means that the claim that Roman numeration "knows nothing of place-value" (de Ste. Croix, [1956, p. 52]) is at least much too simple. In the abacus, a token (bead, counter, or even a simple impression in a sand-covered table) derives its value from its location in a column or on a line. Arithmetic is made possible by two place-value rules:

(1) numbers are represented by the number of tokens in a place-value location;
(2) a place-value location can only contain a specified maximum number of tokens.

These two rules allow operations such as addition to be accomplished by the obvious placement of stones. When a place-value location fills up, the location is cleared and a stone is placed in the next adjacent (higher-valued) location, an act essentially the same as "carrying" in modern arithmetic with paper and pencil. To indicate the place value attached to a location, ancient and Medieval abaci used lines, usually marked at one end with a numeric symbol which indicated the upper limit on the number of stones allowed in the location. To facilitate rapid interpretation of the numbers shown on the board, stones were typically placed both on and between the lines.

The examples shown by Barnard [1916, p. 254 f.] and Pullan [1969, especially p. 62 f.] show one convention (described originally by Recorde, 1542), by which the Roman numeral constituents *I, X, C,* and *M* correspond to lines, with *V, L,* and *D* used between the lines. This abacus could be read quickly and required relatively few counters to function. The positions

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its usage to describe part of a column in Vitruvius); despite the frivolous etymology frequently suggested — still even in Baxter [1989] — the word is unlikely to be associated with a Semitic word for "dirt" (not "sand" or "dust" in the sense of a medium for drawing figures). Similarly Greek τράπεξα and Latin *tabula*.

For use on rough-hewn tables, a heavy table-cloth with lines or squares on it allowed the rapid movement of counters or tokens. The device used in Medieval English treasury computations, the *scaccarius* 'exchequer', is named from the resemblance of its cloth covering to the checker- or chess-board. This may be an English or Norman innovation of the early twelfth century — see Richard Fitz Nigel, *Dialogus de Scaccario*, giving both the "modern" (*i.e.*, twelfth-century) name and the older name for the treasury (ed. Johnson, rev. Carter and Greenway [1983, p. 7]).

of the counters (when correctly placed) corresponded directly to the written representation of numbers in Roman notation.[14]

Thus Roman notation was tied closely to the abacus and to place value. This is reflected even in the ancient technical terminology of treatises on the abacus; *articulus* and *digitus* (in modern terms, "the digit of the next higher abacal position" and "the digit of the currently considered abacal position," respectively).[15]

Any common arithmetic operation could be readily performed with the abacus; addition and subtraction are well-known to be rapid and easy. Other operations, such as multiplication and division, were more difficult, but readily possible with a little training.[16] Modern examples (using the Oriental bead-and-rod abacus) are common in which skilled abacists

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[14] The one seeming exception is the subtractive notation — *e.g.*, XLIV for 44., but this is a secondary refinement which reduces the chance of confusion between expressions such as XXXIIII and XXXXIIII. Examples of numbers written without the subtractive convention are common throughout the whole history of Roman numerals, but more rarely are the symbols for 5, 50, or 500 not used. See also Smith [1925, v. 2, p. 58-59].

[15] On the antiquity of the terminology, see any good Latin dictionary for references under *articulus* and *digitus*. Despite the seemingly obvious interpretation as references to counting on fingers, the terminology may have another origin as references to lines. It is possible that *digitus* designated the lines of the abacus while *articulus* designated the spaces between the lines (the fundamental meaning of *articulus* seems to be "a little juncture" between two things).

That Roman notation has no special symbol for zero does not mean the absence of the concept of place value; the need for zero is a representational issue which would not arise with computation on an abacus. On the other hand, it arises naturally in tabular computation and is very convenient for algorithmic calculation.

[16] We do not know with certainty how multiplication and division were performed. Probably multiplication and division were performed with the aid of tables, such as those of Victorius (*v. infra*), whose design seems to presuppose some rules such as Gerbert's *Regulae* — which, conversely, seem to imply the availability of such tables. See Pullan [1969], for relatively modern techniques. Roman hand-held calculators (see particularly the illustrations in Menninger [1958, tr. 1969, p. 305]) also show symbols for the fractions 1/2, 1/4, and 1/3. Techniques for such operations as extractions of roots are also well-known to modern users of the abacus (see, *e.g.*, Crook [1958]).

In the accounts of authors such as Gerbert, the operations of multiplication and division (indeed, much of the work of the abacist) are frequently described as immensely difficult. See Murray [1978, p. 158]. What is unclear is the extent to which such descriptions are purely literary (it must be remembered that men such as Gerbert had a primarily rhetorical education). The origins of the imagery of the "sweating abacist" certainly bear further study.

compute faster and more accurately than persons using calculators (see, *e.g.*, Flegg, ed., [1989, p. 194]).

Besides being an efficient and rapid way to achieve arithmetic results, the abacus is also flexible. By changing the rule about the limit of tokens allowed in a place-value location, arithmetic can accommodate a very wide variety of notations. A good example is in older monetary systems, such as the English system before the currency reform of 1974. English school children of the twentieth century, who worked mostly without abaci, had a much more difficult task in computing monetary amounts than did their predecessors who had only to remember that the limit in one location of the abacus was 12 (pence in a shilling), in the next 20 (shillings in a pound). In fact, the abacus is still the only conveniently available device which permits computations with numbers in which each position is expressed in a different base.

In its power, convenience, and direct correspondence with Roman notation, the Medieval abacus not only supported this numeration; it made it efficient and easily understood. To modern eyes, it might seem that difficulties could arise in the case of very large or very small numbers. However, even such numbers, uncommon in Medieval commercial contexts, can be handled.[17] The power of the abacus as a general calculating device is seen in its academic extension, the large abaci constructed by Gerbert of Aurillac and others.[18] These were constructed appar-

[17] For large numbers, the problems are vocabulary and symbolism; workable symbolisms were ancient and fairly well-known (see Menninger [1958 tr. 1969] and Pullan [1969]). The vocabulary might have been another matter, particularly for the extremely large numbers treated by the scholarly abacus. It is likely that at least some of the interests of the Medieval abacists lay in the question of the existence of a "largest number" or its name (if it existed). Thus the development of a general system for naming very large numbers may well have had some philosophical importance. For small numbers, too, the vocabulary was also of importance; the techniques for manipulating such numbers rested primarily on reduction to a useful common denominator (usually twelfths or sixtieths). Tables such as those of Victorius frequently included results of operations on fractions. That interest in naming numbers was high is consistent with the generally rhetorical character of much early Medieval mathematics.

[18] For examples see particularly Menninger [1958 tr. 1969]. In somewhat the same way as modern supercomputers, these abaci developed a (semi-)popular fame. The scholarly abacus seems usually to have been implemented with columns at the top of which an arch was represented — hence the term *arcus pythagoreus*, encountered in many variations. The earliest clear references to the scholarly abacus are to the work of Gerbert of Aurillac (late tenth century), but it is not certain that such abaci originated with Gerbert.

ently for special computations involving very large numbers — at least as large as 10^{27} — but they were not commercially useful. Perhaps the scholarly abacus was involved with speculative numerology stimulated by the advent of the year AD 1000 (see esp. Murray [1978, p. 164]).

THE INTRODUCTION OF THE NEW NUMERATION IN ACCOUNTING

To answer the question of why Arabic numeration was adopted, the resources available to late Medieval accountants must be surveyed to determine how they were perceived at the time.

Background to the New Numeration: Other Systems of Notation and Computation

Despite the importance of the abacus in calculation, other methods were known in the Medieval period. Hand signals[19]

The arch appears to be an allusion to a traditional iconography of Wisdom, which extended well outside the realm of the abacus — see, *e.g.*, Masi [1983, p. 13 f.]. The iconography was of ancient derivation — *e.g.*, the calendar for AD 354 preserved in a Carolingian copy (*cf.* Schapiro [1940]; there are many Medieval scriptural canons which use the form also) — and was connected with celestial imagery, appropriate since much of the Pythagorean heritage of mathematics and wisdom was preserved in a peculiarly astronomical context (see still Cumont [1912]). This heritage, in turn, probably has its roots in the ancient Near East.

The scholarly abaci seem always to have used special counters, called *apices*, "letters." On each counter was written a symbol for the number of tokens which it represented. Apparently Gerbert's academic abacus, like its successors, used 9 numeric symbols which are to be identified with the "Arabic" numerals 1-9. Some importance seems to have been attached to knowing the names of the numerals and the abacal columns in which the tokens were placed; in the case of the names of the columns, the reason lies perhaps in the attention given to developing a vocabulary for very large numbers. In the case of the names of the 9 different *apices*, the names were believed to be "Chaldean" — and indeed they are (with one certain exception and a conceivable second) Late Babylonian Akkadian).

[19] Described by Bede, *de Temporum Ratione* (early eighth century). For a convenient English translation, see Yeldham [1926, p. 30 f.]; see also Menninger [1958 tr. 1969, p. 201 f.]. The method(s) is (are) older than the Middle Ages. Note the ancient counters shown by Yeldham, [1926, p. 31], also by Menninger [1958 tr. 1969, p. 211 f.]. The counters show the same hand-symbolism as in Bede. What was the use of these counters? Menninger thinks the tokens were game counters, which is at least believable. But no known ancient game involves the kind of arithmetic which seems to be implied by the tokens. Could they have been abacal tokens like Gerbert's *apices*?

were more a way of representing numbers and counting than a calculation technique. Also known (in academic circles, at least) was the use of tables for arithmetic.[20] This technique, dependent on the availability of writing materials,[21] was respectable, old, and powerful.[22] Tabular computation, however, seems to have been primarily restricted to scholarly contexts because no Medieval popular reference to or evidence for it have been found.

Besides Roman numerals, many other systems of numeric notation were known to the Ancient world (see Menninger [1958 tr. 1969]). Of particular importance to the historian is the cuneiform notation, which even in its early forms used a place-value notation (albeit somewhat inconsistent — see Neugebauer and Sachs [1945, p. 2f.]) By its latest period, even a symbol for zero was consistently used in certain scholarly contexts (see Neugebauer [1955]). This system seems to have been the stimulus for developments (apparently novel) in India[23] leading to an

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[20] The canonical set of tables was the *Calculus* (the name is revealing, although one must remember that titles of ancient and Medieval books are not purely the authors' creations in the same way as are modern titles) of Victorius of Aquitaine. The only modern edition is by Friedlein [1871]. The *Calculus* seems to have been associated with astronomical (and hence calendrical) computation — see Friedlein [1869, p. 43]. Tables were, from ancient times onwards, the normal way in which specialized and advanced computation was achieved; for example, Ptolemy's *Almagest* is full of them. But whether tabular computation was truly a separate stream of computational lore is unclear — commercial arithmetic then (as now) required multiplication and division only rarely.

[21] And certainly facilitated by, but perhaps not requiring the presence of an abacus. In fact, Gerbert's *Regulae de Numerorum Abaci Rationibus* gives only rules for placement of results, not the results themselves, which seems to imply the availability of a set of tables such as that of Victorius.

[22] Tabular computation originated in ancient Mesopotamia. Neugebauer [1945 with Sachs, 1957] presents a comprehensive view of the Old Bablyonian tabular system. It was the stimulus (although perhaps not directly the source) of the calculational system employed by classical mathematicians and astronomers, particularly in an astronomical context (*e.g.*, Ptolemy). This tradition was well-known throughout Medieval times.

It is a mistake to treat tabular computation as evidence for the ignorance of arithmetic in the Middle Ages. The technique was used for advanced calculations, although it may occasionally (perhaps in some periods often) have entered the commercial world for problems such as the computation of interest (as in Babylonia — see Neugebauer and Sachs [1945, p. 36 and note 96d]).

[23] The impact of Babylonian mathematical scholarship in India seems to be particularly associated with astronomy. See Pingree [1978, 1987]; this is hardly a coincidence.

algorithmic[24] method for arithmetic. The technique, unfortunately, depended on the convenience of writing materials, which were expensive in the Medieval West.

Aside from their importance in the history of mathematics, these other systems of computation were significant because of their implications for the use of writing materials. Algorithmic arithmetic contributed an interest in convenient, inexpensive writing materials; tabular computation carried with it the habit of tabular (including columnar) arrangement of documents.

The Arrivals of Algorism and Arabic Notation in the West

Essential to understanding the ultimate bookkeeping adoption of Arabic numerals is the manner of their introduction to Western Europe. The new arithmetic was seen in the West as having received a supreme expression in the works of al-Khwarizmi (early ninth century).[25] This work was communicated fairly rapidly to the Latin-speaking West, where it attracted great attention.[26] The new arithmetic technique, "algorism", was at least fairly well-known in scholarly circles in Western Europe by the second half of the eleventh century.[27]

The arrival of algorism occurred about the same time[28] as that of the system of arithmetic notation today popularly known

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[24] The word derives from the name of al-Kawarizmi, the great Arab mathematician of the early ninth century AD. A convenient summary of the life and works of al-Khwarizmi is Sezgin [1974, p. 288 f].

[25] The Arabic text(s) of this work (or works?) is now lost, and the work is known through Latin. For the Latin, see Vogel [1963]; an English translation with important comments is given by Crossley and Henry [1990]. Despite the great importance of al-Khwarizmi's work on arithmetic, he left much to be done in the development of efficient algorithms.

[26] Perhaps the attention is due not to its stimulation of mathematical thinking but rather because it arrived when such thought was already vigorous. It is significant that al-Khwarizmi's work is expressed in terms which, although overlaid with Islamic conventions, evoke Pythagorean numerology — the same language in which western works were expressed.

[27] The relationship (if any) of the work of Gerbert of Aurillac (late tenth century) to the methods of al-Khwarizmi has not been studied. Gerbert's methods appear (at first glance) oriented towards the abacus, but also could be interpreted in terms of tabular calculation or even algorism. Gerbert's vocabulary (particulary the terms *articulus* and *digitus*), which was already old, was at the very least not simply an imitation of al-Khwarizmi.

[28] Perhaps the advent of the "Arabic" numerals was more in the nature of a revival. Medieval tradition, dismissed by modern scholars, associated the Arabic numerals with Boethius (late 5th-early 6th century AD); the association was particularly in the *Geometry* attributed to him, which includes a curious and

as "Arabic". This system soon came to be inextricably bound up with algorism, where its notation was more convenient than Roman numerals because of its greater compactness, generality, and (perhaps most important) its association with the East, from which wisdom was believed to come. Works on algorism show a knowledge of (and often, but not always, use) this notation.[29]

Despite a strong association, Arabic numerals were not confined to algorism. Academic works on the abacus (such as those of Gerbert's followers) show a knowledge of the notation in the context of "abacal" arithmetic.[30] However, whether associated with abacal or algorismic calculations,[31] Arabic numeration was confined to academic usage for a long time. Specifically, it was used extensively in calendrical and astronomical calculations. Outside of works on mathematics and astronomy, the notation first appeared in dates.[32]

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seemingly irrelevant excursus using the numerals. Boethius, in turn, was following in the ancient tradition of Pythagorean numerology and geometry, which seems to have its roots in the ancient Near East. See Masi [1983] on Boethius' mathematical agenda; on the background of Pythagorean mathematical lore there is no useful recent work, but some hint of its nature and scope can be found in Heath [1921, ch. III and V]. The "Arabic" numerals seem to be mentioned in a Syriac scholarly context (astronomical) dating from AD 662 [Nau, 1910, p. 225-226].

[29] Interestingly, the manuscript of the Latin translation of al-Khwarizmi's work (see Crossley and Henry [1990]) uses mostly Roman symbols, but the Roman numerals are clearly an adaptation of an underlying "Arabic" notation. This is frequently the case in other works on algorism — and serves as a caution. Algorism is not inherently tied to "Arabic" numerals, despite their convenience.

[30] Still by far the best survey of the development of both abacal and algorismic arithmetic in the early second millennium is that of Cantor [1894]. Murray [1978] is also convenient but gives fewer details.

[31] Problems such as the terminology make the borderline between the abacal and algorismic techniques less than certain. Thus the work of Leonardo of Pisa had the title *Liber Abbaci*, but was a work which strenuously advocated the superiority of algorism. The picture is further confused by the famous sentence near the beginning of the *Liber Abbaci* in which Leonardo says that he traveled widely and learned many methods of calculating, *sed hoc totum et algorismum atque arcus pictagore quasi errorem computavi respectu modi indorum*. This seems to be translatable as "but I counted all of this, along with algorism and the Pythagorean arch, as almost an error in comparison with the method of the Indians." (The "Pythagorean arch" is probably a reference to the scholarly abacus.) Probably Leonardo meant here the algorism of his day, which he regarded as deficient in comparison to his own knowledge.

[32] See Murray [1978, ch. 7 f.]; Smith and Karpinski [1911, ch. VIII]; Hill [1915, *passim*]; Menninger [1958, tr. 1969, p. 438 f.].

Evidence for the Use of Arabic Notation in Commercial Records

Before the fifteenth century, there are traces of Arabic numerals in commercial usage — but these traces stand out in contrast to the general, indeed, almost complete, dominance of Roman numeration. Wherever Arabic numerals are found in commercial documents before 1400, the usage has the atmosphere of a somewhat disreputable innovation, except (perhaps) in Pisa. This would be natural, for one of the most important attributes of commercial records is, necessarily, credibility, which is always risked by innovation.

Instances in Commercial Documents. Arabic notation for money amounts and quantities first appears (in published material) sporadically in the journals of some branches of the Gallerani firm as early as 1305 (see Bigwood, [1961, vol. 1, p. 6f.])[33] and in the trial balances of the delle Brache firm in Pisa (1326, see Antoni [1967, esp. p. 9]); it was more or less standard in those records for at least a quarter of a century, after which Roman numeration again dominates. The notation reappeared late in the century (again in trial balances, but this time only in the bookkeeper's notes) in the records of the Datini Company's Pisa branch.[34] It is reasonable to speculate that other Pisan records of the fourteenth century also sometimes used Arabic numerals.

[33] The Gallerani material thus seems to be the earliest example published to date. Most of the instances of "Arabic" numerals are dates or folio references (hence essentially outside the commercial sphere), but monetary amounts are found (*e.g.*, September 13, October 6, etc.). Without access to the originals, it is impossible to confirm a general impression that "Arabic" numerals were preferred by the clerk when running out of space. It is also possible that the clerk may have been copying the numerals from memoranda or that the numerals show that algorism (rather than an abacus) was being used for computation.

Unfortunately, the identity of the clerk who used "Arabic" numerals in the Gallerani records is unknown. It is not inconceivable that he was from Pisa (although the records were written elsewhere, such as in London), which would be consistent with the practices of the delle Brache.

[34] See Zerbi [1952, p. 134]; unfortunately, Zerbi's transcription does not distinguish Roman numerals (used in the entries proper) from "Arabic" (used in the notations and folio references). A photographic reproduction of a similar document from the Barcelona branch (1399) is in de Roover [1956, pl. V]. Caution must be exercised in reading modern editions of Medieval accounts; for example, Sapori's otherwise careful edition of the books of the Alberti del Giudice [1952] uniformly employs "Arabic" interpretations of Roman numerals.

Struik (1948 p. 105, relying on a private communication from Edler de Roover) had already called attention to the appearance of "Arabic" numerals in the Medici books as early as 1406. The usage of the Medici books is identical to

There are two points which suggest perspective on these Pisan Arabic numbers: first, Pisa was, of course, the home of Leonardo of Pisa, whose attempt to popularize the Arabic notation as early as 1202 has already been mentioned. However, these early commercial examples seem (probably) confined to Pisa and unparalleled elsewhere. This suggests a local, Pisan tradition, perhaps ultimately traceable to Leonardo himself (although that is speculation — there is no published evidence for the period from 1202 to 1305).[35] Second, the consistent use of the numerals appears only in the trial balances. As described (admittedly somewhat later), *e.g.*, by Pacioli [1494, ch. 34], the trial balance is basically an internal document, not truly part of the accounting records themselves. The appearance of Arabic numeration in amounts in the Gallerani journals is so sporadic that conclusions are difficult — but even there Roman numerals clearly predominate, which confirms the view that Roman numeration was considered correct, even by a clerk who knew Arabic notation.

With the possible exception of the Gallerani material, Arabic numerals do not appear outside of Pisan contexts in any commercial documents prior to the fifteenth century when they appear in the amount columns in the records of the Medici bank (1439, see Struik [1948]). Thereafter the usage of Arabic numeration becomes steadily more common, first in Italy, spreading to the rest of Europe during the sixteenth century.

The fact that the introduction of Arabic numeration to commercial records seems to be Italian is probably significant — one might have expected, for example, a Catalonian connection arising from the well-known presence of Arabic numerals in early scholarly manuscripts from the region (see, *e.g.*, Hill [1915]). However, documents such as those published by Bisson [1984] show no trace of Arabic numeration, nor does the notation appear anywhere in published French, German or English commercial records from before the fifteenth century.

Knowledge of and Need for Arabic Numerals. The relatively late commercial acceptance of Arabic numerals contrasts with

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that of the Datini records until 1439, when the Medici books begin to use "Arabic" numeration in the entries proper.

[35] An anonymous reviewer of an earlier version of this article indicates awareness of the appearance of "Arabic" numerals in *postings* in Pisan records of the late thirteenth century. Apparently the documents are not yet published. In any case the chronological gap between the appearance of the *Liber Abbaci* and the appearance of "Arabic" numerals in Pisa is still considerable.

knowledge of such materials among educated men. The numerals, along with algorism, although not necessarily known in detail or used practically, were nevertheless known to many educated Europeans from the eleventh century onwards.[36] Individuals familiar with accounting practice knew and mentioned these numbers (*e.g.*, Chaucer and Langland).[37] Both algorism and the number symbols were apparently taught in at least some schools.[38] The reasons for the failure of accounting to adopt the new system did not lie in ignorance; knowledge could spread rapidly even in Medieval times — compare the rapid spread[39] of the "abacist" literature from Gerbert's time, or the development of the Exchequer accounting system.[40] Similarly, there is plenty of evidence to show international communication of accounts (the records of the Gallerani, delle Brache, and Datini firms alone show this).[41]

Conversely, the introduction of Arabic numeration was not due to the demands of merchants. Although it is an *argumentum de silentio*, one does not hear complaints from Medieval

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[36] Menninger [1958 tr. 1969], Murray [1978], and Flegg [1989] all give examples. For literary and related examples, see, *e.g.*, Yeldham [1926, ch. V, ch. VIII, *et passim*].

[37] Chaucer, at least a large part of whose career was spent in the context of accounting, knew "Arabic" numeration (as *noumbres of augrim, i.e.*, of algorism — in the treatise on the astrolabe, I.7). But Roman numerals are universal in the English accounting of Chaucer's day. Chaucer also knew the scholarly abacus — see "Miller's Tale", I. 24, along with astronomical or astrological accouterments; for Langland, Gower, and other citations, see the *Oxford English Dictionary*.

[38] See particularly Smith and Karpinski [1911, ch. VIII]. By "schools" is meant here institutions below the university level. But the evidence is presently lacking to permit an assessment as to the geographical or chronological extent of such teaching, or the level(s) at which it might have occurred. The only concrete detail we have is the statement of Villani (1345) that as many as 1,000 pupils were studying the abacus and algorism in Florence. This is possible, but Florence is not necessarily typical (note its close, if not always amicable, relationship with Pisa); moreover it is hard to tell just what kind of teaching Villani means. (See particulary Murray, 1978, p. 172).

[39] See Murray [1978, p. 163 f.]. The scholarly abacus was certainly known in most of Europe by at the latest a century after Gerbert's death, probably in most places within twenty years.

[40] Or, perhaps more comparably, the virtually complete replacement of Old English in administrative and literary use in England following the conquest of 1066. Within 30 years, Old English was rare in any written context, although it had a large written literature which continued to be consulted.

[41] On international trade and the consequences for bookkeeping in Medieval times see, *e.g.*, Braudel [1979 *passim*], de Roover [1963], Pounds [1974, esp. ch. 8 and 9].

merchants or bankers concerning the quality or speed[42] of the arithmetic available to them, nor is there dissatisfaction with the Roman notation. In fact, arithmetic is rarely mentioned, although counting and counters are occasionally mentioned. Large, important transactions (such as international debts of kings) were handled without difficulty,[43] and the systems could handle high transaction volumes (by the standards of the times — for example, the English Exchequer system). One might at first blush think that perhaps merchants and bankers demanded more powerful arithmetic notation because of the expansion of trade — yet the late fourteenth and early fifteenth centuries, when the first introduction of Arabic numerals occurred, were hardly a time of general economic expansion.[44]

The Role of Leonardo of Pisa. Of the evidence which seems to suggest the early (*i.e.*, thirteenth- and fourteenth-century) use of Arabic notation in commerce, probably the most important is Leonardo of Pisa's *Liber Abbaci* (1202).[45] Despite its name, this

[42] The reference cited by Murray [1978, p. 166 and note *ad loc.*] to Smith [1925, v. 2 p. 188], quoting John Palsgrave is relatively late, to the latter's textbook, *Lesclarcissement de la Langue Francoyse (1530)* "I shall reken it syxe tymes by aulgorisme or you can caste it ones by counters." This is tendentious, although intended to explicate the term "algorism." A decade later, Palsgrave, translating *Acolastus* (from Latin), explains *rationes omneis concinnabo ad calculos* as "I wyll trymme al my reasons to counters. i. [alternatively] I wyll caste al my smalle parcelles together in order, into a great somme, or I wyl cast my counters, or with counters, make all my reckenynges." See Carver [1937, p. 40]. This wording could imply that Palsgrave saw counters as the normal way to get a sum. See also Barnard [1916, p. 255] and, for background, Ward [1899, vol. 1 p. 253 f.].

[43] Compare, for example, the long list of loans from Italian bankers to the English monarchy, all accounted (from the English kings' viewpoint) in Roman numerals using Exchequer methods (see Rhodes [1902]).

[44] The picture of late Medieval/early Renaissance times is, of course, complex but there is solid evidence for at least substantial declines in many, probably most, areas and aspects of the economy. See, *e.g.*, Pounds [1974, ch. 10]. This is not to say that a company such as Datini's might not have obtained success within the generally unfavorable conditions, with that success attributed to superior arithmetic and bookkeeping; but there is no obvious evidence for such a speculation.

[45] There is no convenient, complete modern translation. The work was edited as part of Leonardo's works by Boncompagni [1857]. A good account of the *Liber Abbaci* is in Yushkevich [1964, p. 371 f.].

It is sometimes casually asserted that Leonardo acquired his knowledge of arithmetic in a commercial context; but the *Liber Abbaci* says no such thing — the reasons for Leonardo's presence in various Near Eastern places are not necessarily the same as the manner in which he learned mathematics. See particularly Murray [1978, p. 192].

work is not primarily concerned with the abacus in the narrow sense of a computational device — it was, rather, a programmatic work on numeric methods.[46] Leonardo advocated algorism and displays a clear knowledge of the Arabic numerals.

The main reason for thinking that Leonardo's work should be associated with mercantile practice is that it is profusely illustrated with commercial examples, drawn from the author's own experience (and that of his father, as a Pisan commercial legate in North Africa).[47]

The evaluation of the commercial examples of the *Liber Abbaci* is problematic. Most of the examples employ Arabic numeration in a fashion which could be interpreted as didactic in

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[46] Leonardo was by no means the first Medieval writer with this agenda; quite a few other authors wrote on the use of algorism during the twelfth century. See particularly Beaujouan [1982], advocating the view that Leonardo's great contribution was written algorithms which could be used without erasures. This is very possible, but documentation of the details is difficult. Certainly the techniques evident in such documents as those of the Datini firm are more like Leonardo's than those of the twelfth-century treatises on algorism.

[47] Murray [1978, p. 192], discusses and dismisses the misunderstanding that Leonardo learned algorism from Arab merchants. Leonardo learned at least some of his mathematics directly from non-European sources. The misunderstanding was still present in de Ste. Croix [1956, p. 65-66], even quoting in Latin the relevant passage, which should be translated "Since my parent was appointed by his country as public scribe in the *duana* of Bougie for the Pisan merchants who met there, (and) caused me to join him in my youth, ... there he had me learn and attend studies in the abacus for a while. When I had been introduced to the technique of the nine Indian numerals by a marvelous teaching, I liked and understood the knowledge of the technique so much more than any others that wherever afterwards I went on business I learned with great interest and (despite) conflicting accounts whatever was studied of it in Egypt, Syria, Greece, Sicily, and Provence in all its various fashions." The passage does not say that he learned his mathematics in the course of commercial activity, but rather that the commercial activity brought him to countries where he learned mathematics. It is by no means clear that Leonardo encountered algorism in a commercial context. Similarly, the passage does not say that Leonardo learned his arithmetic from a "Moslem" master (*cf.* Parker [1989, p. 110]), which is only a plausible speculation.

Possible Arabic influence on European commercial arithmetic and accounting in the period roughly bounded by AD 1000-1500 is a subject for further study; the influence on mathematics is beginning to become clearer, but the details of interaction in the sphere of accounting are at present essentially unknown. One well-known fact is, however, pregnant with suggestiveness: Thomas Brown, considered such an expert that he was given a special position in the procedure of the English Exchequer, had previously been prominent in the Norman government of Sicily, where his name appears even in Arabic documents. Connections such as this offer a promising field for future research.

intent, not necessarily reflecting the actual practice of commercial arithmetic, but rather belonging to pure mathematics in a surprisingly modern sense; moreover, the *Liber Abbaci* was not widely read in its own time (see Murray [1978, p. 173-174]), even in academic circles. One example which may point towards a more secure contact with actual practice is from folio 10 (ed. Boncompagni), in which Leonardo advocates what is in effect a summary journal — this is written in Roman notation, but in the manuscript (next to the version in Roman) appear the same amounts in Arabic notation.[48] This is part of Leonardo's advocacy of the superiority of his version of algorism, intended to show how convenient the Arabic version was. However, the setup and implied procedure could be what underlies the appearance of Arabic numerals in the (apparently mostly or entirely Pisan) fourteenth-century examples cited previously.

Thus, aside from the sporadic and (mostly, if not entirely) Pisan instances of the fourteenth century, whose connection to Leonardo's methods remains unknown in detail, no surviving Medieval examples of bookkeeping appear to show influence by Leonardo's methods.

Secondary References to Arabic Numbers. There are occasional other instances of commercial reference to (not occurrence of) Arabic numerals. Most famous is probably the rule adopted in 1299 (and subsequently reaffirmed several times) by the Florentine Arte del Cambio (the Exchange Guild). The relevant text can be translated as follows:

> (Article CII)
>
> That No Member of the Guild May Write in His Book By Abacus
>
> Item, it is established and ordained that no one from this guild shall dare or permit through himself or through someone else to write or have written in his book [of account] or memorandum-book or in any other part of his, in which or in the [several items of] which he writes disbursements and receipts anything

[48] A photocopy of a manuscript of this passage kindly provided by an anonymous reviewer appears to show that the numerals in Leonardo are paleographically different from those found in the fourteenth century documents discussed earlier. A careful and detailed study of the paleography of the numerals may now be possible for a scholar with access to the manuscripts and would be most desirable. Some features of the picture are now clear, including the intrusion of characters of fundamentally Latin origin — see Lemay [1977] and, more briefly, Beaujouan [1982, p. 469-470].

> which is to be interpreted in the manner or letter[s] of the abacus, but [rather] he shall write openly and fully by letter[s].[49]

This legislation has customarily been interpreted as forbidding the use of Arabic numerals, with the consequent interpretation that the practice must have been sufficiently widespread to require suppression. Such an interpretation is, although possible, not necessitated by textual evidence.[50] A more likely interpretation is that the Florentine legislation was supposed to prevent a practice accepted in Pisa,[51] but even that is speculative without further evidence.

On the other hand, the reference in the 1305 statutes of the University of Padua to the new numbers is ambiguous: the book-seller "shall also put the name of the seller together with his cognomen and the price of the book on the trade book on the outside and in an obvious place and in plain letters, not by means of ciphers."[52] But this is also an isolated situation —

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[49] A description of the penalties follows. The text reads *QUOD NULLUS DE ARTE SCRIBAT IN SUO LIBRO PER ABACUM. Item statutum et ordinatum est quod nullus de hac arte audeat vel permictat per se vel per alium scribere vel scribi facere in suo libro vel quaterno vel in aliqua parte eius, in quo vel quibus scribat data et accepta, aliquid quo per modum vel licteram abbachi intelligatur, set aperte et extense scribat per licteram.* [ed. Marri, 1955, p. 72-73]. The legislation immediately follows prohibition of usury and precedes a requirement for notaries.

[50] The text does not necessarily even outlaw the use of "Arabic" numerals. As noted earlier, "abacus" in late Medieval times is a general term for computation by any method. Moreover, there is a plausible alternative interpretation of the phrasing — that members of the guild were not to record amounts by writing down the positions of the tokens on the abacus, a practice which was perhaps common. (Pictures of token layouts are common in Medieval arithmetic and geometry books, especially when Pythagorean numerology is concerned. See also Pullan [1969, p. 43 f.] for later examples).

The context makes clear that the legislation is concerned primarily with fraud. In fact, the "Arabic" numerals were probably no easier to falisfy than were Roman numerals — but dots recorded from the abacus could have been easily falsified. (The later Venetian example given by Menninger [1958 tr. 1969, p. 426-427], unfortunately uncited, does not refer to the numerals known in 1299, which would have been difficult to change.) Nor do we find here the phrasing characteristically applied to "Arabic" notation, making reference to the nine (or ten) symbols.

[51] And, as kindly indicated by an anonymous reviewer of an earlier version of this article, explicitly permitted by the Pisan *arte*. Unfortunately, the Pisan legislation seems to remain unpublished.

[52] [ed. Denifle, 1892]; see also Murray [1978, p. 171-2 and p. 455 n. 39]. The Latin text reads *Ponat eciam in libro venali extrinsecus et in evidenti loco et claris litteris non per zyphras nomen venditoris cum ipsius congnomine et precium libri.*

book-sellers in a university environment knew the new notation and used it often to number folios (it was more compact).[53] Additionally, book-sellers were notoriously crafty, and this is an academic community, not the usual commercial businesses. The legislation is that of a university, not a civil authority.

Thus, aside from two references (one uncertain and one in a special context), there is little evidence of the use of Arabic notation in commerce outside Pisa before the fifteenth century. And even that evidence is purely Italian. The new numeration does not spread significantly in European accounting contexts until the latter part of the fifteenth century. That this event occurred roughly contemporaneously with the development of printing and the spread of the usage of paper[54] is surely not a coincidence. However, other forces were also at work.

WHY WAS ARABIC NOTATION EVER ADOPTED?

The causes of the ultimate triumph of Arabic notation in European bookkeeping are complex. From the discussion thus far, the one conclusion which emerges inescapably is that it was not mere superiority as notation nor association with algorism which caused the change. Had these considerations been sufficient, Roman numerals would have been replaced even before Leonardo of Pisa. Leonardo's own prestige and works may have helped spread the notation (especially in Pisa), but that is questionable in light of the evidence and remains to be explored.

To be sure, the intrinsic qualities of Arabic numeration must have contributed to the eventual displacement of Roman notation. So, in all likelihood, did the increasing convenience of algorism as inexpensive writing materials became available. However, the first instances of commercial usage of the new system are on older, comparatively expensive materials, and do not use conveniences such as the pencil, a sixteenth-century innovation

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[53] On the use of "Arabic" numerals by book-sellers see Bischoff [1967, p. 67 f.]. For an outline of the history of folio numeration, see above all Rouse and Rouse [1979] p. 32-34.

[54] On the early history of paper, see still Blum [1932]. One should, however, be cautious about the impact of paper. By no means all the writing of the Middle Ages survives, partly because items not intended for long-term preservation were written on cheap, perishable media, such as wood or bark (see in general Clanchy [1979, esp. ch. 3-5]; for Medieval examples, *e.g.*, Liestøl [1968]; an excellent discussion of the technical issues with references to ancient examples is Bowman and Thomas [1983, ch. 2]).

(and even then apparently rarely used by bookkeepers). To complete the explanation of the triumph of Arabic notation, it is necessary to turn to Renaissance culture and education.

Accountancy and auditing were not directly subjects of university curriculum during the late Middle Ages, but were associated with universities, particularly (it seems from the published materials) in England.[55] The connection was with grammar and associated legalistic studies, especially the *ars dictaminis*, or art of business communication, and the institution which delivered the instruction was the grammar school associated with a university. In England, it seems that Oxford University was the center of this study (see particularly Richardson [1941]); in Europe, the older Italian universities (such as Bologna and Padua - see Rashdall [1936] and Bowen [1975, p. 134]) were the centers. It is important to understand the association of accounting with the legal and linguistic curriculum, not with mathematics or theology; thus Leonardo of Pisa's works never stood much chance of adoption by the commercial bookkeeper, who was rarely exposed to them (at least directly — except, again, perhaps in Pisa; this, of course, implies little about the spread of Arabic numerals, which is another issue).

Medieval accounting literature (as known above all from England) does not show a linear growth and development. It flourishes in the thirteenth and early fourteenth centuries, but by the end of the fourteenth century the literature is clearly in decline.[56] This decline appears immediately to precede the introduction of Arabic notation. The coincidence points toward events in the educational practices of the times, which in turn were expressive of profound cultural currents.

In the context of the early Renaissance (especially in Italy), two processes took place in education which affected numeration in accounting — the gradual dissociation of accounting from universities, and a revision of the university curriculum itself. The first of these processes was a change in the character of university education during the fifteenth century to reduce

[55] See above all Oschinsky [1971] and the literature there cited. See also Bennett [1974], Richardson [1939, 1941], and Baldwin [1976].

[56] See Oschinsky [1971, particularly p. 56 and 61-62]. That our knowledge of the timing applies to English sources is a matter for further research; however, since it is in a university context, the timing is probably not too badly in error. If anything, we should expect the change to have occurred somewhat earlier in Italy.

the teaching of bookkeeping and auditing in the grammar schools which were appendages of the universities. This change resulted in a weakening of the educational tradition which maintained the old connection among accounting, law, and "grammar".[57] By the sixteenth century, commercial arithmetic was taught entirely outside the university environment.[58]

However, it was not mere loss of old subjects of study that affected fifteenth-century accounting practice. The content of education, particularly at advanced levels, was changing. In a revolution instigated by such fourteenth-century figures as Petrarch, a new scholarship deliberately cast aside much Medieval learning and sought to return to the supposed purity and nobility of the Greek and Roman classics. On the one hand, this new vision of learning carried with it the risk of exposure to the attitudes of classical antiquity, distinctly contemptuous of practical affairs such as bookkeeping (scarcely mentioned in classical literature);[59] while on the other hand, it resulted in a distinct reworking of previous scholarship. Of particular importance to bookkeeping was a significant popularizing of algorism (see Smith [1908] and Karpinski [1925, ch. III]). Arabic numerals and algorism were seen as, on the one hand, new and distinct from Medieval learning,[60] and, on the other hand, as imbued with their own authenticity by virtue of having come from the East, the fount of wisdom.

Nowhere was the change more in evidence than in Pisa's

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[57] The change in European higher education in the fifteenth century has long been noted. See, *e.g.*, Graves [1923, particularly p. 106 f.], Butts [1973, ch. VI], Bowman [1975, ch. 8] — but Bowen probably dates the changes in curriculum too late. For details [particularly in fourteenth-century Italy] see Rashdall [1936, vol. 2]. Note also Rashdall's insightful comments in vol. 3 [p. 456-458]. Some caution is, however, in order; the details of changes in European education during the fifteenth century have not been put into a comprehensive framework. When this is done, it may well emerge that in at least many contexts the older, more "Medieval" methods and curricula survived or changed in their own distinctive ways.

[58] See, *e.g.*, Smith [1925, v. 2 p. 186-192]; see also the accounts of early bookkeeping texts in the volume edited by Littleton and Yamey [1956, esp. p. 185-214].

[59] Note, for example, that one of the few passages from classical literature in which a bookkeeper is explicitly mentioned is in Petronius's *Satyricon* [ed. Heseltine, 1930, p. 92], a picaresque work and in a context deliberately designed to show contempt for bookkeeping.

[60] This despite their long-standing presence in Europe; see particularly Murray [1978, p. 167-174].

neighbor, Florence, a city ruled by a commercial oligarchy (see, *e.g.*, Hay [1962, p. 116 f.]); the change was evident especially in its university. Although never a great university such as Padua or Paris, this university had several peculiarities, such as a chair of poetry, a professorship of Greek, and other curricular features which betoken the agenda of the new, humanistic education advocated by figures such as Petrarch and Boccaccio (see Rashdall [1936, p. 50-1]). As the complex relations of Pisa and Florence developed during the Renaissance, the university at Florence failed; but its heir was to be Pisa [Rashdall, *ibid.*, and p. 36]. Little is known about the mathematical curriculum at these universities, but in the context it would not be surprising to find that these schools aggressively advocated the new mathematics and new symbolism.

The fifteenth century, particularly in its latter half, was a time when innovation was in the air. The changes were not merely in the university curriculum, nor in the spread of paper and printing, but above all in a reconstruction of the organization of knowledge. The old locus of mathematical education, the quadrivium, began to change[61] into the subject now known as mathematics, while commercial reckoning went its own way, outside the university environment. Grammatical studies turned away from the traditional Medieval trivium to the new, "humanistic" model,[62] even a new script was introduced.[63] More than any superiority for computational purposes, it was this complex of educational and cultural changes which led to the introduction of Arabic numeration in books of account. Temporarily,

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[61] See, *e.g.*, Bowen [1975, p. 227-231, ch. 8]. "Mathematics" tends somewhat to be replaced by "music" in the new curriculum; "grammar" by "literature" (in a modern sense). The trend in fifteenth century mathematical instruction seems away from practical studies (see Rashdall [1936, esp. ch. XIV]; see also Kristeller [1963], Sarton [1953]. But the critical change was, of course, the development of a mathematics "pure" in a new sense, freed from a responsibility towards numerology. See above all Struik [1948, p. 112 f.] and Woodward [1906, p. 240-1]. Underlying this was a general tendency for knowledge to become more compartmentalized and specialized.

[62] For a comprehensive study, see Grendler [1989]. Grendler's coverage of the mathematical curriculum (ch. 11) unfortunately blurs the distinctions among different times and places; it also rests on the traditional view of Leonardo of Pisa.

[63] See, *e.g.*, Wardrop [19963]. The relationship of numeric notation to the advent of the new humanistic script remains to be explored. However, the timing does not seem quite coincident (the script seems a little later), and the contexts are distinct (humanistic script first in a literary context).

accounting was cut adrift from its traditional base in grammar and law.

In other words, the intrinsic qualities of Arabic numeration were insufficient to guarantee its acceptance in the commercial world. The notation had to wait until its rival, identified with a time-honored way of doing things, became sufficiently discredited. This happened as the intellectual culture of the early Italian Renaissance was spread to businessmen and bookkeepers (see Grendler [1989, esp. p. 309-310]). The adoption of Arabic notation, available in Medieval times, was truly a Renaissance phenomenon, not only in its timing but also because of the nature of the Renaissance.

THE CONNECTION BETWEEN MATHEMATICS AND ACCOUNTING

The breakdown of old distinctions in the educational system was to be only temporary, but it permitted Pacioli to attempt a grand synthesis. The *Summa de Arithmetica Geometria Proportioni e Proportionalità* is today remembered by historians of accounting primarily as the first printed account of double-entry bookkeeping; but the work was much more than that, and the entirety is significant. The title proclaims this work as an attempt at a comprehensive treatment of the entire mathematical knowledge of the time,[64] an attempt to unify all knowledge which could be expressed in mathematical terms, and an attempt to define the scope of such knowledge.

Furthermore, the *Summa* appealed to both conservatives and innovators — it tried to bridge the gap between the old learning and the new. Thus the *Summa* contains a discussion of such "new" topics as algebra and accounting, while also containing a treatise on "arithmetic" which is an adaptation of Boethius' *de Institutione Arithmetica*. Typical of the comprehensive, yet innovative, spirit of the *Summa* is also that the version of the *de Institutione Arithmetica* is in Italian, not Latin. Typical, too, is the fact that Pacioli, fully aware that he was not the innovator of double-entry, nevertheless uses Arabic numeration for his entries (except in dates! It is as if Pacioli were attempting to demonstration the interchangeability of the two systems of notation).

[64] A useful treatment of Pacioli from the mathematical viewpoint is Yushkevich [1964, p. 427 f.]. However see also Masi [1983].

That Pacioli did not introduce Arabic notation to books of account, yet used it in a book which had an ambitious program, attracts attention. Did this imply the final incorporation of accounting into the realm of mathematics?

Although Pacioli's work had a prescriptive character, his vision of the unification of things mathematical ultimately failed, perhaps because of the sheer size of the *Summa*. The introduction of the new notation was not a symptom of the domination of accounting by academic mathematics, but rather of the attempt to unify mathematics in the new cultural context. In arithmetic notation, Pacioli, a consummate scholar, reflects what he saw as the best practice of his day. The accounting part of the *Summa* soon became separated from the rest of the book, and took on a life of its own (which persists to this day),[65] even outside its native university context. Resting on both the authority derived from its integration with the rest of mathematics and on the fame of its author, the prestige of the *Summa*'s treatment of bookkeeping, in part, accounts for the separate life, as does the convenience of its clear, straightforward presentation. However, the separation also surely derives from the apparent irrelevance of most of the remainder of the *Summa* to the needs of working bookkeepers.

CONCLUDING COMMENTS

The survey of evidence given above shows that, on the one hand, Arabic numerals were widely known in Western Europe among scholars by at least the eleventh century and even among some bookkeepers by about 1300. Yet the general adoption of these numerals in commercial records is a phenomenon of the second half of the fifteenth century.

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[65] That life, of course, took above all the form of imitations. The view expressed here of Paciolo's purposes emphasizes the relations of the treatment of accounting to the rest of the work. Thompson [1991] argues that we should also emphasize the rhetorical and pedagogical character of the *Summa*, especially in its accounting material. Referring to Aho [1985] and Hoskin and Macve [1986], Thompson sees both double-entry in general and Paciolo's treatment in particular as responses to the cultural problem of assuring the credibility of accounting records, particularly in the light of hostility from certain quarters, such as the church. Thompson also points out that Paciolo's survey is profoundly allied to the works of Peter Ramus (early sixteenth century), particularly in the layout of the presentation. See the survey of English imitations in Gordon [1956]; more generally, see Melis [1950, p. 611 f.].

There can many explanations for a gulf between awareness and practice. In the case of the transition from Roman to Arabic numerals, a combination of cultural conservativism among bookkeepers and the comparative efficiency of Roman numerals and the arithmetic system associated with them were probably the main reasons for the slow adoption. Of these factors, cultural conservatism seems the more important, since demonstrations of the utility of Arabic numerals were readily available in at least a seemingly commercial context from the time of Leonardo of Pisa (1202) onwards.

The cultural conservatism of bookkeepers was maintained in part by the inherently greater credibility of well-understood methods and in part by an educational system which separated accounting from mathematics. Thus, in the West, academic mathematics has generally had little influence on the practice of accountancy. The segregation of the two disciplines has continued until the twentieth century. Pacioli, the first to attempt an explicit unification, was an imposing but exceptional figure. Shaped profoundly by its origins in grammar, rhetoric, and law, rather than in mathematics, Western accounting (like other traditions) has generally failed to employ sophisticated mathematical methods; the level of mathematics in even a mid-twentieth century textbook on the "mathematics of accounting" is no higher than second-year high-school algebra [Curtis and Cooper, rev. McCallion, 1961].

REFERENCES

Aho, James A., "Rhetoric and the Invention of Double Entry Bookkeeping," *Rhetorica* (Winter 1985): 21-43.

Antoni, Tito, *Il libro dei bilanci di una azienda mercantile del trencento*, Colombo Cursi, Pisa (1967).

Baldwin, John W., "*Studium et Regnum*: The Penetration of University Personnel into French and English Administration at the Turn of the Twelfth and Thirteenth Centuries," *Revue des etudes islamiques* 44 (1976): 199-215.

Ball, W. W. Rouse, *A Short Account of the History of Mathematics*, 6th ed., Macmillan & Co., Limited: London (1915).

Barnard, Francis Pierrepont, *The Casting-Counter and the Counting-Board*, Clarendon Press: Oxford (1916).

Baxter, W. T., "Accounting Roots and Their Lingering Influence," in Gaertner, James F., ed., *Selected Papers from the Charles Waldo Haskins Accounting History Seminars, Academy of Accounting Historians Monograph Four* (1983): 135-151.

Baxter, W. T., "Early Accounting: The Tally and the Checkerboard," *Accounting Historians Journal* 16 (1989): 43-83.

Beaujouan, Guy, "The Transformation of the Quadrivium," in Benson, Robert L. and Constable, Giles, eds., *Renaissance and Renewal in the Twelfth Century*, Harvard University Press: Cambridge, Massachusetts (1982): 463-487.

Bennett, J. A. W., *Chaucer at Oxford and at Cambridge*, University of Toronto Press: Toronto (1974).

Bigwood, Georges, *Les livres des comptes des Gallerani*, ed. Grunzweig, Armand, Académie Royale de Belgique, Brussels (1961).

Bischoff, Bernhard, "Die sogenannten >>griechischen<< und >>chaldäischen<< Zahlzeichen des abenländischen Mittelalters," in *Mittelalterliche Studien* 1 (1966): 67-73.

Bisson, Thomas, N., *Fiscal Accounts of Catalonia under the Early Count-Kings*, University of California Press: Berkeley (1984).

Blum, A., *Les premieres fabriques de papier en Occident*, C. van Oest: Paris (1932).

Bowen, James, *A History of Western Education*, vol. 2, St. Martin's Press: New York (1975).

Bowman, A. K., and Thomas, J. D., *Vindolanda: The Latin Writing-Tablets, Britannia Monograph Series No. 4*, Society for the Promotion of Roman Studies: London (1983).

Braudel, Fernand, *Civilisation matérielle, économie et capitalisme: XVe-XVIIIe siecle: Le jeux d l'échange*, Librairie Armand Colin: Paris (1979), tr. by Sian Reynolds as *Civilization and Capitalism: 15th-18th Century: Volume II: The Wheels of Commerce*, Harper and Row: New York (1982).

Bubnov, Nicolaus, *Gerberti postea Silvestri II papae opera mathematica (972-1003)*, R. Friedlander & Sohn: Berlin (1899).

Butts, R. Freeman, *The Education of the West*, McGraw-Hill: New York (1973).

Cantor, Moritz, *Vorlesungen über Geschichte der Mathematik*, B. G. Teubner: Leipzig (1984).

Carver, P. L., ed., *The Comedy of Acolastus Translated from the Latin of Fullonius by John Palsgrave*, Early English Text Society: London (1937).

Castellani, Arrigo, *Nuovi testi fiorentini del dugento*, G. C. Sansoni: Florence (1952).

Chatfield, Michael, *A History of Accounting Thought*, The Dryden Press: Hinsdale, Illinois (1974).

Clanchy, M. T., *From Memory to Written Record: England, 1066-1307*, Harvard University Press: Cambridge, Massachusetts (1979).

Crook, Welton J., *Abacus Arithmetic: How to Perform Some Calculations on the Chinese Abacus*, Pacific Books: Palo Alto (1958).

Crossley, John N., and Henry, Alan S., "Thus Spake al-Khwarizmi: A Translation of the Text of Cambridge University Library Ms. Ii.vi.5", *Historia Mathematica* 17 (1990): 103-131.

Cumont, Franz, *Astrology and Religion Among the Greeks and Romans*, Constable and Company Limited: London (1912).

Curtis, Arthur B., and Cooper, John H., rev. by McCallion, William James, *Mathematics of Accounting*, 4th ed., Prentice-Hall, Inc.: Englewood Cliffs, N.J. (1961).

Denifle, H., "Die Constitutionen der Juristen-Universität Paduas von 1331," *Archi für Literatur- und Kirchengischichte des Mittelalters* 6 (1892): 309-562.

de Roover, Raymond, "The Development of Accounting Prior to Luca Pacioli According to the Account-books of Medieval Merchants," in Littleton, A. C.,

and Yamey, B. S., eds., *Studies in the History of Accounting*, Street & Maxwell, Limited: London (1956): 114-174.

de Roover, Raymond, "The Organization of Trade," in Postan, M. M., *et al.*, eds., *The Cambridge Economic History of Europe*, vol. III, Cambridge University Press: Cambridge (1963).

Detlefsen, Michael, *et al.*, "Computation with Roman Numerals," *Archive for the History of the Exact Sciences* 15 (1975/1976): 141-148.

Düwel, Klaus, *Runenkunde*, 2nd ed., J. B. Metzler: Stuttgart (1983).

Fitz Nigel, Richard, *Dialogus de Scaccario: The Course of the Exchequer and Constitutio Domus Regis: The Establishment of the Royal Household*, ed. and tr. Charles Johnson with corrections by F. E. L. Carter and D. E. Greenway, Clarendon Press: Oxford (1983).

Flegg, Graham, ed., *Numbers Through the Ages*, Macmillan Education Ltd.: Houndmills, Basingstoke, Hampshire (1989).

Friedlein, G., *Die Zahlzeichen und das elementare Rechnen der Griechen und Römer und des christlichen Abenlandes vom 7. bis 13. Jahrhundert* (1869) (repr. Dr. Martin Sändig oHG: Wiesbaden, 1968).

Friedlein, G., "Victorii Calculus," *Bulletino di Bibliografica e Storia delle Scienze Materiali e Fisiche* 4 (1871): 443-463.

Gordon, Cosmo, "The First English Books on Book-keeping," in Littleton, A. C., and Yamey, B. S., eds, *Studies in the History of Accounting*, Street & Maxwell, Limited: London (1956): 202-205.

Graves, Frank Pierrepont, *A History of Education During the Middle Ages and the Transition to Modern Times*, The Macmillan Company: New York (1923).

Grendler, Paul F., *Schooling in Renaissance Italy*, The Johns Hopkins University Press: Baltimore (1989).

Hay, Denys, *The Italian Renaissance in its Historical Background*, Cambridge University Press: Cambridge (1962).

Heath, Sir Thomas, *A History of Greek Mathematics*, Clarendon Press: Oxford (1921).

Hill, G. F., *The Development of Arabic Numerals in Europe Exhibited in Sixty-Four Tables*, Clarendon Press: Oxford (1915).

Holmes, Urban Tigner, *Daily Living in the Twelfth Century Based on the Observations of Alexander Neckam in London and Paris*, University of Wisconsin Press: Madison (1952).

Hoskin, Keith W., and Macve, Richard H., "Accounting and the Examination: A Genealogy of Disciplinary Power," *Accounting, Organizations and Society* 11 (1986): 105-136.

Ifrah, Georges, *Histoire universelle des chiffres*, Éditions Seghers: Paris (1981).

Karpinski, Louis Charles, *The History of Arithmetic*, Rand McNally & Company: Chicago (1925).

Keyser, Paul, "The Origin of the Latin Numerals 1 to 1000," *American Journal of Archaeology* 92 (1988): 529-546.

Klingenberg, Heinz, *Runenschrift - Schriftdenken Runenschriften*, Carl Winter Universitätsverlag: Heidelberg (1973).

Kristeller, Paul Oskar, "Renaissance Platonism," in Werkmeister, William H., ed., *Facets of the Renaissance*, Harper & Row: New York 1963): 103-123.

Latham, Ronald E., *Dictionary of Medieval Latin from British Sources*, British Academy by Oxford University Press: London (1975 f).

Lemay, Richard J., "The Hispanic Origin of Our Present Numeral Forms," *Viator* 8 (1977): 435-462.

Leonardo of Pisa, *Liber Abbaci*, as *Liber abbaci* in Baldassarre Boncompagni, ed., *Scritti di Leonardo Pisano*, Tipografia delle Scienze Mathematiche e Fisiche: Rome (1857-1862).

Littleton, A. C., *Accounting Evolution to 1900*, American Institute Publishing Co., Inc.: New York (1933).

Littleton, A. C., and Yamey, B. S., eds., *Studies in the History of Accounting*, Street & Maxwell, Limited: London (1956).

Macve, Richard H., "Some Glosses on 'Greek and Roman Accounting'," *History of Political Thought* 6 (1985): 233-264.

Masi, Michael, *Boethian Number Theory: A Translation of the De Institutione Arithmetica, Studies in Classical Antiquity*, vol. 6, Editions Rodopi B. V.: Amsterdam (1983).

Melis, Federigo, *Storia della Ragioneria*, Dott. Cesare Zuffi: Bologna (1950).

Menninger, Karl, *Zahlwort und Ziffer*, Vandenhoeck und Ruprecht: Göttingen (1958), tr. by Paul Broneer as *Number Words and Number Symbols: A Cultural History of Numbers*, MIT Press: Cambridge, Massachusetts (1969).

Most, Kenneth S., "The Accounts of Ancient Rome," *Working Paper Series Volume 1*, No. 3, ed. E. N. Coffman, Academy of Accounting Historians: Richmond, Virginia (1974): 22-41.

Murray, Alexander, *Reason and Society in the Middle Ages*, Clarendon Press: Oxford (1978).

Nau, M. F., "Notes d'astronomie Syrienne," *Journal Asiatique* 16 (1910): 209-228.

Neugebauer, Otto, and Sachs, A., *Mathematical Cuneiform Texts, American Oriental Series*, vol. 29, American Oriental Society: New Haven (1945).

Neugebauer, Otto, *Astronomical Cuneiform Texts*, Published for the Institute for Advanced Study, Princeton, N.J. by Lund Humphries: London (1955).

Neugebauer, Otto, *The Exact Sciences in Antiquity*, 2nd ed., Brown University Press: Providence (1957).

Nussbaum, Frederick L., *A History of the Economic Institutions of Modern Europe*, F. S. Crofts & Co.: New York (1933).

Oschinsky, Dorothea, *Walter of Henley and Other Treatises on Estate Management and Accounting*, Clarendon Press: Oxford (1971).

Parker, Larry M., "Medieval Traders as International Change Agents: A Comparison with Twentieth Century International Accounting Firms," *Accounting Historians Journal* 16 (December, 1989): 107-118.

Petronius Arbiter, *Petronius*, ed. and transl. Heseltine, Michael, bound together with Seneca, *Apocolocyntosis*, Harvard University Press: Cambridge, Massachusetts (1936).

Pingree, David, "Mesopotamian Astronomy and Astral Omens in Other Civilizations," in Hartmut Kühne et al., eds., *Berliner Beiträge zum vorderen Orient* (proceedings of the XXV. Rencontre assyriologique internationale) (1982): 613-631.

Pounds, N. J. G., *An Economic History of Medieval Europe*, Longman Group Limited: New York (1974).

Pullan, J. M., *The History of the Abacus*, Frederick A. Praeger: New York (1969).

Rashdall, Hastings, *The Universities of Europe in the Middle Ages*, rev. Powicke, F. M., and Emden, A. B., Oxford University Press: Oxford (1936).

Richardson, H. G., "An Oxford Teacher of the Fifteenth Century," *Bulletin of the John Rylands Library* 23 (1939): 436-457.

Richardson, H. G., "Business Training in Medieval Oxford," *American Historical Review* 46 (1941): 259-280.

Rhodes, Walter E., "The Italian Bankers in England and Their Loans to Edward I and Edward II," in Tout T. F., and Tait, James, eds., *Historical Essays by Members of the Owens College, Manchester*, Longmans, Green, and Co.: London (1902): 137-163.

Robertson, A. J., *Anglo-Saxon Charters*, Cambridge University Press: Cambridge (1956).

Rouse, Richard H., and Rouse, Mary A., *Preachers, Florilegia and Sermons: Studies on the Manipulus Florum of Thomas of Ireland*, Pontifical Institute of Medieval Studies: Toronto (1979).

Sapori, Armando, ed., *I libri degli Alberti del Giudice*, A. Garzanti: Milan (1952).

Sarton, George, "The Quest for Truth: Scientific Progress During the Renaissance," in *The Renaissance*, Harper & Row: New York (1953) (repr. 1962): 55-76.

Schapiro, Meyer, "The Carolingian Copy of the Calendar of 354," *Art Bulletin* 22 (1940): 270-272.

Sezgin, Fuat, *Geschichte des Arabischen Schrifttums*, v. 5, E. J. Brill: Leiden (1974).

Shelby, Lon R., "Geometry" in Wagner, David L., ed., *The Seven Liberal Arts in the Middle Ages*, Indiana University Press: Bloomington (1983): 196-217.

Smith, David Eugene, *Rara Arithmetica*, Ginn and Company: Boston (1908).

Smith, David Eugene, *History of Mathematics*, 2 vols., Ginn and Company: Boston (1925).

Smith, David Eugene and Karpinski, Louis Charles, *The Hindu-Arabic Numerals*, Ginn and Company: Boston (1911).

Sombart, Werner, *Der moderne Kapitalismsus*, 6th ed., Duncker & Humblot: Munich and Leipzig (1924).

Thompson, Grahame, "Is Accounting Rhetorical? Methodology, Luca Pacioli and Printing," *Accounting, Organizations and Society* 16 (1991): 572-599.

Vogel, K., *Mohammed ibn Musa Alchwarizmi's Algorismus, Das frühste Lehrbuch zum Rechnen mit indischen Ziffern*, Aalen Osnabrück: Zeller (1963).

Wagner, David L., ed., *The Seven Liberal Arts of the Middle Ages*, Indiana University Press: Bloomington (1983).

Ward, Adolphus William, *A History of English Dramatic Literature to the Death of Queen Anne*, rev. ed. Macmillan and Co., Ltd.: London (1899).

Wardrop, James, *The Script of Humanism*, Clarendon Press: Oxford (1963).

Weis, William L., and Tinius, David E., "Luca Pacioli: Renaissance Accountant," *Journal of Accountancy* 172 (November, 1991): 95-102.

Yeldham, Florence A., *The Story of Reckoning in the Middle Ages*, George A. Harrap & Co., Ltd.: London (1926).

Yushkevich, A. P. (as A. P. Juschkewitsch), *Geschichte der Mathematik im Mittelalter*, tr. Ziegler, Viktor, Pfalz Verlag: Basel (1964).

Zerbi, Tommaso, *Le origini della partita doppia*, Dott. Carlo Marzorati: Milan (1952).

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AN ANALYSIS OF *THE TOWN OFFICER* (1791-1815): THE EARLIEST AMERICAN TREATISE ON MUNICIPAL ACCOUNTING?

Abstract: Recent research has produced the earliest known treatise on Accounting written by an American. Samuel Freeman's *The Town Officer* [1791] is significant in that it recommended double-entry fund accounting for municipalities. The paper analyzes and compares Freeman's objectives of "a plain and regular Method" to modern municipal accounting concepts as articulated by the GASB. Additionally, the entries and the accounts recommended by Freeman are analyzed and compared to modern municipal accounting evidenced in current textbook material. These analyses show *The Town Officer* to be a significant contribution to accounting literature not only for its 1791 publication date, but also for the similarity of its content to present day municipal accounting objectives and requirements.

Accounting historians have continually searched for the first accounting books published in America. Bentley and Leonard [1934] list William Mitchell's *New and Complete System of Bookkeeping by an Improved Method of Double Entry*, Philadelphia, 1796, as the first work on accounting by an American author. Potts [1976, p. 49] identified Mills' 1878 book entitled *Public Accounts* . . . as "The first known American treatise dealing with public sector accounting." Recent research [McMickle, Wenzel, and Jensen, 1986] has led to the discovery of *The Town Officer*, first published by Samuel Freeman in 1791. This previously unrecognized work which predates the aforementioned

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books should be added to the list of America's earliest writings on accounting.

Prior to its discovery in 1986, Freeman's 1791 book entitled,

> *The Town Officer, or the Power and Duty of, Selectmen, Town Clerks, Town Treasurers, Overseers of the Poor, Assessors, Constables, Collectors of Taxes, Surveyors of High Ways, Surveyors of Lumber, Fence Viewers and other TOWN OFFICERS. As contained in the Laws of the Commonwealth of Massachusetts. With a Variety of Forms, For the use of Such Officers. To which are added, The Power and Duty of Towns, Parishes and Plantations. And a "plain and regular METHOD" to keep ACCOUNTS of the Expenditures of Monies voted by a TOWN; upon an inspection of which, the State of its FINANCES may at any time by known,* (hereafter referred to as *The Town Officer*),

was not listed in any bibliography of American accountancy.[1] A preliminary examination of *The Town Officer* first appeared in a working paper at Memphis State University in 1986 [McMickle, *et al.*]. An annotated bibliographic reference to Freeman's work later appeared in *The Origins of a Great Profession* [McMickle and Vangermeersch, 1987, 67-73]. Finally, a brief review of the treatise and a detailed bibliography for each edition was presented in *The Birth of American Accountancy* [McMickle and Jensen, 1988]. Although the above sources all claimed Freeman's 1791 work to be the first American treatise on municipal accounting, the authors are unaware of any prior effort to describe or analyze in detail Freeman's "plain and regular METHOD" outlined in *The Town Officer*.

This paper is the culmination of an ongoing research project on *The Town Officer*. The study is limited to the examination of the one section concerning the keeping of town accounts. These accounts are analyzed and compared to current concepts and modern municipal accounting practices as evidenced in current textual material and GASB standards. Eight editions of this work were published. Based on a comparison of the 1793 edition to the 1791 edition, it was determined that the sections that dealt with town accounts were essentially identical. Access to the 1791 edition was limited to the *American*

[1] This title is very descriptive; examination of the full title leaves little doubt concerning the contents of this work.

Antiquarian's Society microfilm copy. Therefore, the 1793 edition, available in hard copy, was used for a major portion of the analyses.

To gain a perspective of the significance of this work, a brief biography of the author is given in this paper. This is followed by a chronological review of all eight editions of this popular publication. Next, are detailed analyses of the accounts in Freeman's "plain and regular Method" and their relevance to modern Municipal Accounting. Finally, some topics of historical significance to accounting for municipalities are examined in an attempt to gain further insight into the origin of accounting for municipalities.

SAMUEL FREEMAN, ESQ.

The author of *The Town Officer*, Judge Samuel Freeman, was born on June 15, 1743, the son of Judge Enoch Freeman. Samuel Freeman died in 1831 at the age of 88 [Drake, 1879; Wallace, 1968]. His birthright, it appears, was to be a public servant and a politician. He was a prolific writer who wrote and edited many works. A brief description of Samuel Freeman's political career and publishing activity follows so that the reader may gain some perspective concerning his background and its possible relationship to his publishing activity.

Freeman zealously supported the American Revolution and was active in early revolutionary struggles. He became the Secretary of the Cumberland County (Maine) convention in 1774. In 1775 he was an "industrious and useful" member of the Provincial Congress. Freeman's political motivation and connection, whether through his father or his own activity, were further evidenced in 1775 by his appointment as clerk to the newly reorganized court. He continued in this position for forty-five years. In 1775 Freeman was also appointed a Register of Probate in which capacity he served until he was appointed judge in 1804. He served as judge until 1820. His political activity included membership in the House of Representatives in 1776 and 1778. Freeman also served as Postmaster of Portland (Maine) from 1776 to 1805 [Drake, 1879].[2]

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[2] The *Biographical Directory of the American Congress 1774-1971* was checked and there is no indication that Samuel Freeman was a member of the United States House of Representatives. It is assumed, therefore, that he was a member of the Maine legislature.

Freeman's political activity did not prevent him from publishing. In fact, his tenure in public office may have inspired him to publish as a way to educate the town officers concerning the responsibilities and obligations of local government. It is reasonable to assume that his efforts also provided information to citizens about the intricacies of exercising their rights in using local government. Some of his publications include: *The Town Officer*; "American Clerk's Magazine" (1743-1831); *The Massachusetts Justice* (1803), of which there were eight volumes; and, "Probate Directory" (1803). He also edited the "Journal of Reverend Thomas Smith" published in 1821 [Drake, 1879].

CHRONOLOGY OF *THE TOWN OFFICER*

Freeman's first edition of *The Town Officer* was published in 1791. It was the first in a series of editions to contain a section on accounting for the finances of a town. It contained 178 pages, 23 of which dealt with town accounts. Due to its popularity, eight editions were ultimately published between 1791 and 1815. A printing history of *The Town Officer* is presented in Exhibit 1.[3]

EXHIBIT 1

Printing History of Samuel Freeman's *The Town Officer*

Date	Edition	Total Pages	Printer/Publisher	Place
1791	1st	178	Benjamin Titcomb	Portland, ME
1793	2nd	232	I. Thomas and E. T. Andrews	Boston, MA
1794	3rd	240	I. Thomas and E. T. Andrews	Boston, MA
1799	4th	281	I. Thomas and E. T. Andrews	Boston, MA
1802	5th	304	I. Thomas and E. T. Andrews	Boston, MA
1805	6th	342	J. T. Buckingham/Thomas and Andrews	Boston, MA
1808	7th	366	J. T. Buckingham/Thomas and Andrews	Boston, MA
1815	8th	372	J. T. Buckingham/Thomas and Andrews	Boston, MA

Source: Adapted with permission from *The Birth of American Accountancy* [McMickle, *et al.*, 1988, p. 63].

[3] Information concerning the location of various editions of *The Town Officer* and Freeman's other works was obtained and is available in *The National Union Catalog: Pre-1956 Imprints* [Mansell, 1971, p. 120].

Freeman considered the fourth edition of *The Town Officer*, published in 1799, "... to be a very improved edition." In addition to amending the law changes, he decreased the size of the "... part of the work which respects accounts, and which has been considered by some rather complex, is made more plain and concise, ... These improvements, and the consequent enlargement of the work, although it in some degree enhances the price, make it more valuable than any of the former editions" [Freeman, 1815, p. VI]. An important feature of Freeman's 1799 fourth edition is that it is the first time he used dollars instead of pounds sterling in labeling the amounts.[4] The section on keeping accounts for the town decreases in relative size from the first edition to the fourth edition, due to the use of illustrations in place of much of the narrative description. The size of the section on town accounts remained approximately the same from the fourth edition through the eighth edition.

The remainder of this paper will describe Freeman's "plain and regular METHOD" and evaluate whether this first book on keeping town accounts resembles the method used by today's municipalities. It is appropriate to begin the evaluation with a comparison of modern "Objectives of Financial Reporting" for local governments articulated in *Concept Statement No. 1* [GASB, 1987] and the "importance" of keeping town accounts as explained by Freeman.

FREEMAN'S "plain and regular METHOD"

Objectives of Financial Reporting

The Governmental Accounting Standards Board (GASB) states in part in *Concept Statement No. 1* that:

> 1. Financial reporting should assist in fulfilling government's duty to be publicly accountable and should enable users to assess that accountability. Financial reporting should:
>   (a) Provide information to determine whether current-year revenues were sufficient to pay for current year services.
>   (b) Demonstrate whether resources were obtained and used in accordance with the entity's legally

[4] The use of pounds sterling provides evidence of English influence on the development of municipal accounting practices in America. An interesting perspective on the evolution of municipal accounting in England is supplied by D. M. Livock [1965] in "The Accounts of the Corporation of Bristol: 1532 to 1835."

adopted budget, and demonstrating compliance with other finance-related legal or contractual requirements.

(c) Provide information to assist users in assessing the services, efforts, costs and accomplishments of the governmental entity.

2. Financial reporting should assist users in evaluating the operating results of the governmental entity. Financial reporting should:
   (a) Provide information about sources and uses of financial resources.
   (b) Provide information about how it financed its activities and met its cash requirements.
   (c) Provide information necessary to determine whether its financial position improved or deteriorated as a result of the year's operations [GASB, 1987, p. 25].

Freeman's objectives were expressed as follows (italics added for emphasis):

> As one of the great *objects of government is to guard and defend the property of its subjects*; as no publick (sic) measures engage the attention of a people more than those which affect publick use; and as nothing will ensure a cheerful acquiescence in such measures but an *assurance that the monies thus taken from them are applied to the uses for which they were designed*; it is of importance to all communities, that proper regulations should be established, *whereby it may clearly appear, that such monies are faithfully expended, and regularly accounted for*. Too much care cannot be taken in this business, as it relates to the raising and applying of taxes required for the support of the government, and the exigencies of a state; and it must be happy for the people of any state to have such a plan established, *as shall provide effectual checks upon the several officers through whose hands their monies are to pass; and as shall exhibit at any time, such a state of the expenditures thereof, as will satisfy every reasonable person who may inspect the same.*
>
> Whether such a plan has been adopted, or is wanted in this state or not, is not for me to enquire (sic). My design is to form a *regular plan for keeping the accounts of a Town, by which its inhabitants may at any time know whether the monies which they may have voted at any meeting, be raised, collected, and expended, agreeably to their views in voting them* [Freeman, 1793, p. 170].

It becomes readily apparent upon examination and comparison of *Concept Statement No. 1*, "Objectives of Financial Reporting" [GASB, 1987] and Freeman's description of the importance of keeping town accounts and subsequent regulations, that there exist striking similarities between the articulated purposes of municipal accounting in 1987 and 1791. Certainly, while Freeman's expression of the objectives may be slightly different from the GASB's, the substance and the content of both appear to focus on accountability, reporting, and control.

To meet the above stated objectives, Freeman enumerated seven regulations. Regulations one through five state, in part, that subsequent to a vote at a town meeting to raise money, the town clerk should make out two lists of accounts expressing the sums and the purposes of raising the money. He should give one list to the selectmen (representatives) and one to the assessor. These lists would be used to compare collections to appropriations. The assessor would certify to the selectmen and treasurer the money and the amounts charged to the collectors.[5] The regulations basically provide for control over the money appropriated. Procedures are also set out to account for the money appropriated but not expended. An interesting footnote suggests that "an estimate of the sums proposed to be raised, should be laid before the town, that the town may have opportunity to consider the same. . . ." [Freeman, 1793, p. 171]. This statement implies that a budget be presented to the citizens of the town for their approval.

Regulations six and seven state that at every annual meeting the selectmen should present to the town the state of their accounts where the accounts could be compared to the monies voted. These regulations, while specifically calling for annual reports, also indirectly paved the way for an audit of the municipal accounts and the financial affairs of the town. Another interesting footnote recommends that a law be passed that provided for a Town Accountant to keep the financial records of the town rather than the selectmen, whose responsibility for the accounts was previously stated. It appears that Freeman had second thoughts about the selectmen's ability or time to keep accounts, thus the recommendation for a Town Accountant.

[5] Freeman was recommending three lists in the eighth edition. The third list would be passed to the treasurer. The collectors would then certify the collections to the selectmen, assessor, and treasurer. Each would have his own list of "sums and purposes" to which collections could be compared.

Freeman's regulations, which were general in nature and provided system controls, laid the foundation on which Freeman built his specific set of rules of accounting for the monies voted by the town.

Freeman's suggested rules were present in the first three editions, 1791, 1793, and 1794, of *The Town Officer*, where he verbalized the prescribed accounting treatment shown in the examples that followed. In an effort to keep subsequent editions to a manageable size, he omitted this section and showed the examples directly following the regulations. This practice started with the fourth edition in 1799 and remained in effect through the eighth edition published in 1815.

The System of Town Accounts

The first and second editions of *The Town Officer* [1791 and 1793] explained the entries that were to be made before exhibiting the accounts. It is clear upon examination of these accounts that Freeman was aware of the fiduciary nature of government. His purpose in describing municipal accounting was to enable better control and to assure that the monies voted by the town and collected through taxes were expended for the purposes for which they were intended.

Freeman's "plain and regular METHOD" outlined in the 1791 and 1793 editions consisted of several Forms and fifteen Accounts. The Forms are listed in Exhibit 2. Forms I-III were analogous to modern day single column journals. In fact, by the eighth edition, the forms were called journals. Forms IV and VI were in the nature of charge and discharge financial reports.

EXHIBIT 2

Forms Recommended by Freeman's *The Town Officer*

Number	Title
I	Account of monies voted by the Town
II	Assessors' Certificate of the amount of monies assessed
III	Account of orders drawn by Selectmen on the Town Treasurer
IV	Exhibit of a Collector's bill
V	Selectmen's certificate to the Treasurer of the sums allowed to a Collector for his commission
VI	State of the Town's finances, as exhibited to the Town by the Selectmen

Source: *The Town Officer* [Freeman, 1793].

The fifteen Accounts recommended by Freeman are presented in Exhibit 3. It should be noted that the account order and titles were somewhat different by the eighth edition, how-

EXHIBIT 3

Accounts Recommended by Freeman's *The Town Officer*

Number	Title
I	Monies voted by the Town
II	Monies assessed
III	G. W., Collector
IV	D. N., Collector
V	Monies belonging to the Town, unappropriated
VI	Expenditures of monies voted for the support of schools
VII	Expenditures of monies voted for the support of the poor
VIII	Expenditures of monies voted for building a school house
IX	Expenditures of monies voted for payment of accounts allowed by the Town
X	Expenditures of monies voted for contingencies
XI	Expenditures of monies voted for commissions of the Treasurer and Collector
XII	Orders drawn by Selectmen upon the Town Treasurer
XIII	Treasurer of the Town
XIV	Expenditures of monies voted for the building of a work house
XV	Expenditures of monies voted for the building of a bridge

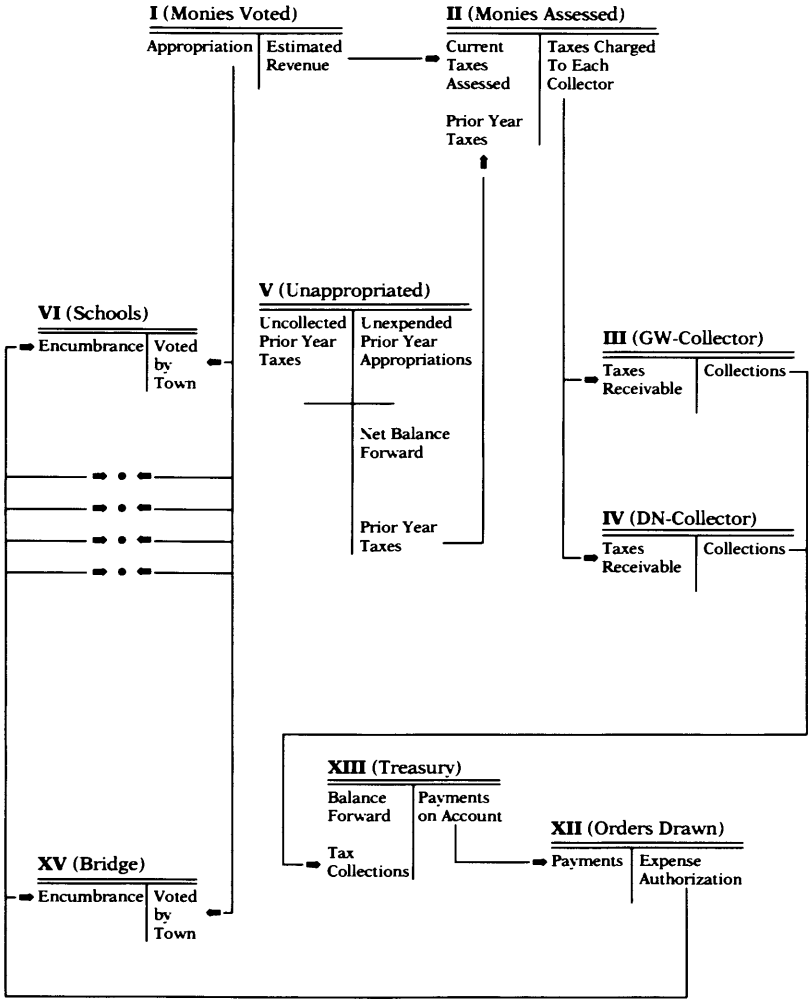
Source: *The Town Officer* [Freeman, 1793].

ever, they operated essentially the same way. A graphic overview of Freeman's recommended accounts and his "plain and regular" system is presented in Figure 1. This illustration was created by the authors to enhance the detailed narrative discussion of the operation of the Forms (Exhibit 2) and Accounts (Exhibit 3) presented next.

Authorized expenditures, based on the town budget, were recorded on Form I, "Accounts of monies voted by the Town."

FIGURE 1

The System of Accounts Recommended by Freeman's *The Town Officer*



Note The account numbers in Figure 1 correspond directly to those given in Exhibit 3; however, the account titles in Figure 1 are an abbreviated form of the titles given in Exhibit 3. Additionally, the debit and credit entries are a combination of Freeman's and current terminology in an attempt to emphasize the similarities of Freeman's "METHOD" to modern practice.

The Selectman (or the town accountant, if the laws and finances allowed) made the following entry:

Abbreviated account titles	*Acct #*	*Dr*	*Cr*
Monies voted by the town	I	xx	
Expenditures on monies voted for:			xx
the support of schools	VI		xx
the support of the poor	VII		xx
building a school house	VIII		xx
payment of accounts of the town	IX		xx
contingencies	X		xx
commissions for Treas/Collect	XI		xx
orders drawn by selectmen	XII		xx
building of work house	XIV		xx
building of a bridge	XV		xx

While the accounts were entitled *Expenditures*, their primary purpose was to record the budgeted appropriations. Under current practices, the entry would be made as follows:[6]

	Dr	*Cr*
Fund Balance	xx	
Appropriations		xx

In contrast to Freeman's use of the general ledger for each type of authorized expenditure, current practice is to credit the details of the appropriations to subsidiary ledger accounts.

The accounts and forms suggest that property taxes were the primary source of revenues. These taxes were assessed in advance and initially recorded on Form II, *Assessor's Certificate of amount of monies assessed*. The assessed taxes were entered as:

Abbreviated account title	*Acct #*	*Dr*	*Cr*
Monies Assessed	II	xx	
Monies voted by the town	I		xx

Freeman's entry for *Monies assessed* served essentially the same purpose as the entry for estimated revenues in modern municipal accounting. Under current practice the entry would be:

	Dr	*Cr*
Estimated Revenues	xx	
Fund Balance		xx

[6]Current practice for this entry and all subsequent entries is based on *Accounting for Governmental and Nonprofit Entities* [Hay and Wilson, 1992].

While towns in Freeman's period had one main revenue source, today most municipalities have multiple revenue sources. These multiple revenues are debited to subsidiary ledger accounts.

After posting the above entries, Account I, *Monies voted by the town*, had a zero balance. While not discussed, presumably any difference between the *monies voted* (Form I) and the *monies assessed* (Form II) would have to be posted to Account V. Account V, while entitled *Unappropriated town monies*, was essentially the Fund Balance. Thus, the end result would be the same as current practice where the initial Fund Balance is the difference between estimated revenues and appropriations.

Account I, *Monies voted by the town*, could also be considered as a single budgetary control account containing a debit for appropriations and a credit for estimated revenues. This differs only in form from the current practice where separate control accounts are utilized for estimated revenues and appropriations, both of which are supported by subsidiary ledgers.

The principal debit to Account II, *Monies assessed*, was for current assessed taxes, as discussed above. The account was also debited for uncollected taxes from prior years, as follows:

Abbreviated account title	*Acct #*	*Dr*	*Cr*
Monies assessed	II	xx	
Unappropriated town monies	V		xx

The uncollected prior years taxes were in the *Unappropriated town monies* account as a result of a previous year end closing entry, as discussed later.

Once all of the debits were posted to Account II, the entire balance was charged to the various collectors with the following entry:

Abbreviated account title	*Acct #*	*Dr*	*Cr*
G. W. collector	III	xx	
D. N. collector	IV	xx	
Monies assessed	II		xx

Thus, Account II is analogous to today's taxes receivable control account with Accounts III and IV representing the subsidiary accounts.

Each collector's tax receipts were delivered to the Treasurer and recorded as follows:

Abbreviated account title	*Acct #*	*Dr*	*Cr*
Treasurer of the town	XIII	xx	
G. W. collector	III		xx
D. N. collector	IV		xx

Additionally, the collectors made a periodic accounting to the Selectmen on Form IV, *Exhibit of Collector's Bill*. Finally, at the end of each year the balance of each collector's account, representing uncollected taxes, was closed to the *Unappropriated town monies Account*.

Specific expenditures approved by the town Selectmen were recorded on Form III, *Orders drawn by Selectmen on the Town Treasurer*. Form III was the source document for debts to the various Expenditure Accounts VI, VII, *etc*. For example, the approval of a specific expenditure for schools would be entered as follows:

Abbreviated account title	*Acct #*	*Dr*	*Cr*
Expenditures for support of school	VI	xx	
Orders drawn by Selectmen	XII		xx

Today this event would be recorded as:

Encumbrances	xx	
Reserve for encumbrances		xx

Therefore, Freeman's *Account XII* served the same purpose as today's *Reserve for Encumbrance*. Furthermore, the *Expenditure Accounts* contained both the appropriations and the approved expenditures. Current practice, as shown above and in earlier discussion, is to record the appropriations and encumbrances in separate accounts. Form notwithstanding, the purpose then, as it is today, was to provide a control over appropriations to prevent the Selectmen from approving more than the town voted for any particular purpose. The actual disbursements for approved expenditures were recorded as:

Abbreviated account title	*Acct #*	*Dr*	*Cr*
Orders drawn by Selectmen	XII	xx	
Treasurer of the town	XIII		xx

At the end of each year, the uncommitted appropriates, as represented by the balances in the various *Expenditure Accounts VI, VII, etc.*, were closed to the *Unappropriated town monies* (Account V). As a result, the balance in *Account V* was equal to the balance in *Treasurer of the town* (Account XIII). That is, based on current terminology, the cash account was equal to the Fund Balance and the cash was available for the following year's operations.

COMPARISON OF TOWN ACCOUNTS TO CURRENT PRACTICE

In summary, Freeman recommended the use of fifteen Accounts, two of which resembled subsidiary accounts. Even though Freeman did not use the term *Fund*, the General Fund in modern municipal accounting is similar to the "plain and regular METHOD" described by Freeman in 1791. The General Fund is one of seven types of funds recommended by the Governmental Accounting Standards Board [Hay and Wilson, 1991, p. 17]. The General Fund of a governmental unit is made up of the resources available to carry on the unit's operating activities. It is an independent fiscal and self-balancing accounting entity used to account for the flow of these resources. The General Fund entity contains, as a minimum, asset, liability, surplus (fund-balance), revenue and expenditure accounts. It also contains budgetary accounts for estimated revenue and appropriations.

By comparison, Freeman's accounts were also used to account for the resources segregated to carry on the town's operating activities. Freeman's "plain and regular METHOD" also contained revenue, surplus, expenditure, and asset accounts. For example, Account II, *Monies Assessed*, and Account XIII, *Treasurer of the Town*, represent Taxes Receivable and Cash, respectively. Account XII, *Orders drawn by Selectmen*, while analogous to Reserve for Encumbrances, essentially serves the same purpose as a liability account. Thus, Freeman's "plain and regular METHOD", while similar to modern day municipal accounting, was not as elaborate and required fewer entries.

Additionally, Freeman recommended the use of double-entry accounting on the modified accrual basis. Revenues were recorded when available and measurable (Form II) and expenditures were recognized when incurred and measurable (Form III). The "plain and regular METHOD" contained budgetary accounts for estimated revenues, appropriations, and described the concept of encumbrances. It is remarkable that a book written in 1791(1793) so closely describes contemporary accounting practices for municipalities.

SIGNIFICANT CONTRIBUTIONS

The purpose of *The Town Officer* was to propagate a knowledge of the laws of government to both the public servants and

the citizenry of Massachusetts because, "Perhaps the evils existing in society from an inattention to its laws, arise more from the want of knowing them, than from the want of a disposition to observe them:

> And when it is considered, that everyone who sustains an office is not able to furnish himself with the laws at large, ... it is not to be wondered at that a neglect of them should any where prevail [Freeman, 1815, p. 3].

The significance of *The Town Officer* to accounting historians and accountants in general is that this may very well have been the first American book that addressed accounting for a governmental entity of any type. The title clearly states that part of the content of The Town Officer is devoted to "...a plain and regular METHOD to keep ACCOUNTS of the EXPENDITURES of MONIES voted by a TOWN; upon an inspection of which, the State of its FINANCES may at any time be known." [Freeman, 1793, p. 170]. The title not only states its purpose as accounting for the governmental entity of a town, but also that the accounts should be in such order as to provide for an audit or an inspection such at that the financial condition of the town may be determined at any time.

Freeman recognized the fiduciary relationship of government to its citizens in his opening paragraph of the section on town accounts. This section was quoted in full above, therefore it will not be repeated here. Few differences exist between the modern General Fund and Freeman's "plain and regular METHOD." The entries he recommended, although fewer, were essentially modified accrual basis accounting. Although the term *Fund* is not mentioned, Freeman's method was self balancing to the extent that assets (*Treasurer's cash*, Account XIII) would equal *Fund Balance* (Account V, *Monies Unappropriated*) at the end of the accounting period. He made provision in the accounts for a budget (*Estimate*) and for an extraordinary amount of control over the town monies. With the system recommended by Freeman, an interested party could tell if the appropriations and the assessments were collected. Freeman also recommended that separate accounts be kept for specific expenditures. Finally, there are two places in *The Town Officer* where he recommended the audit of the town accounts. He states, "...[a] committee of the town as may be appointed to examine and adjust said accounts" [Freeman, 1793, p. 192]. An-

other reference to audit is made in the following footnote, "The treasurer's account should be settled by the selectmen, and settled annually, previous to the March or April meeting" [p. 193]. The significance of the first edition of *The Town Officer* is evident, as it was one of the first publications, if not the first, on municipal accounting in America.

SUMMARY AND CONCLUDING REMARKS

Judge Samuel Freeman's *The Town Officer* was one of the most useful books to eighteenth century Americans. It provided civil servants with a handbook of duties and power. It informed the citizens of their rights and responsibilities under the law; indeed, one of its stated purposes was to protect the public by imparting upon them certain knowledge of the law of the time. Later editions also included the *Constitution of the United States* as well as that of the Commonwealth of Massachusetts. However, the main purpose of this paper is to examine *The Town Officer* for its contributions to municipal accounting. It appears that Freeman's concept of town accounts resembles that of the modern day General Fund. His method was complete concerning the idea of the fiduciary role of government when accounting for its citizens' monies. Freeman recommended annual audits and provided for budgetary control. That many of Freeman's recommendations still pervade modern municipal accounting proves it to be a significant writing in the early history of American accountancy.

Future Research

The eight editions of Freeman's *The Town Officer* covered the period from 1791 to 1815. The book previously recognized as the first treatise on municipal accounting in America was published in 1878 [Potts, 1976]. Therefore, there appears to be a 63 year "gap" in the literature dealing with municipal accounting in America. Accounting historians should seek to fill this void through further research to discover previously undiscovered treatises on municipal accounting published between 1815 and 1878.

Finally, two questions are implied by the fact that Freeman was one of the first to discuss the importance of accountability for public "monies". First, were Freeman's recommendations for annual audits of municipal accounts ever implemented? Second, did Freeman's description contribute to the formalization

of keeping and/or auditing municipal accounts in Maine, New England, or the United States?

REFERENCES

Bentley, H. C. and R. S. Leonard, *Bibliography of Works on Accounting by American Authors*, New York: Augustus M. Kelley (1934), Reprint by Sentry Press (1970).

Drake, F. S., *Dictionary of American Biography*, Boston, MA: Osgood & Co. (1879).

Freeman, S., *The Town Officer*, Portland, ME: Benjamin Titcomb, AAS Copy, Microfilm (1791).

_____, *The Town Officer*, 2nd edition, Boston, MA: Thomas and Andrews (1793).

_____, *The Town Officer*, 3rd edition, Boston, MA: Thomas and Andrews, AAS Copy (1794).

_____, *The Town Officer*, 4th edition, Boston, MA: Thomas and Andrews, AAS Copy (1799).

_____, *The Town Officer*, 8th edition, Boston, MA: Thomas and Andrews (1815).

Governmental Accounting Standards Board, *Codification of Governmental Accounting and Financial Reporting Standards*, Stamford, CT: GASB (1990).

_____, *Concept Statement No. 1, Objectives of Financial Reporting*, Stamford, CT: GASB (1987): i-iii.

Hay, L. E. and E. R. Wilson, *Accounting for Governmental and Nonprofit Entities*, Homewood: Irwin (1992): 4-54.

Kennedy, L. F., *Biographical Directory of the American Congress 1774-1971*, Washington: U.S. Printing Office (1971).

Livock, D. M., "The Accounts of the Corporation of Bristol: 1532-1835," *Journal of Accounting Research*, Vol. 3, No. 1 (Spring 1965): 86-102.

Mansell, *The National Union Catalog: Pre-1956 Imprints*, London: Mansell Information/Publishing Limited Vol. 184 (1971): 120.

McMickle, P. L. & Jensen, P. H., *The Birth of American Accountancy*, New York: Garland Publishing (1988): 62-71.

_____, & Vangermeersch, R. G., *The Origins of a Great Profession*, Memphis, TN (1987): 69-73.

_____, Wenzel, L. & Jenson, P., "*The Town Officer*: The Earliest American Work on Municipal Accounting," Memphis, TN (1986): Working Paper Series WPS-12, Memphis State University.

Mills, E. S., *Public Accounts with Practical Suggestions for Keeping Them, and for Making Examinations, Settlements, Annual Financial Statements, and Official Reports*, St. Paul: The Pioneer Press Company (1878).

Potts, J. H., *An Analysis of the Evolution of Municipal Accounting to 1935 with Primary Emphasis on Developments in the United States*, Doctoral Dissertation, University of Alabama (1976).

Shipton, D. K. & Mooney, J. E., *National Index of American Imprints*, 1:A-M, Worcester, MA: American Antiquarian's Society and Barre Pub. (1969).

Wallace, W. S., *A Dictionary of North American Authors Deceased before 1950*, Toronto: Ryerson, Reprint Gale Research Co., Detroit (1968).

ILLUSTRATION 1

Title Page from the 2nd edition of *The Town Officer*, 1793

THE

TOWN OFFICER;

OR THE

POWER AND DUTY OF

SELECTMEN,	CONSTABLES,
TOWN CLERKS,	COLLECTORS OF TAXES,
TOWN TREASURERS,	SURVEYORS OF HIGH WAYS,
OVERSEERS OF THE POOR,	SURVEYORS OF LUMBER,
ASSESSORS,	FENCE VIEWERS,

AND OTHER TOWN OFFICERS.

AS CONTAINED IN THE

LAWS OF THE COMMONWEALTH OF *MASSACHUSETTS.*

WITH A VARIETY OF FORMS,

FOR THE USE OF SUCH OFFICERS.

To which are added,

THE POWER AND DUTY OF

TOWNS, PARISHES AND *PLANTATIONS.*

And a plain and regular METHOD to keep ACCOUNTS of the EXPENDITURES of MONIES voted by a TOWN; upon an inſpection of which, the ſtate of its FINANCES may at any time be known.

BY SAMUEL FREEMAN, ESQ.

PRINTED at *BOSTON*,
BY I. THOMAS AND E. T. ANDREWS,
PROPRIETORS of the WORK.
FAUST'S STATUE, No. 45, NEWBURY STREET.

MDCCXCIII.

ILLUSTRATION 2

Advertisement in the 1815 8th edition of *The Town Officer*

ADVERTISEMENT.

RESPECTING THE SECOND EDITION.

THE rapid sale of the first edition of this book, which evinces the general approbation it has met with, has induced the author to revise it for a second impression. Upon this revision, he has supplied such deficiencies, and made such corrections and amendments, as appeared to be necessary. He has also added several useful particulars and forms, which he found wanting, and made such alterations as were necessary to correspond with the laws of the commonwealth, passed since that edition was printed. The laws respecting the observation of the Sabbath, in particular, (by which the office of a Warden has become extinct,) is introduced as it has been lately passed by the legislature; and such additional as that law has annexed to the "Power and Duty of Fyre-wards," are inserted under that head. These improvements cannot fail to render it useful to persons of almost every description: but more especially to those who have any concern in town affairs.

THIRD EDITION.

THIS edition embraces the several laws respecting town affairs, which have been enacted since the impression of the second edition, particularly those which relate to the militia, the maintenance of grand jurors, the legal settlement of a person in any town, the relief and supports, employment, and removal of the poor. The power and duty of most of the town officers are more particularly set forth, and some new forms inserted. And an APPENDIX is added, containing the act for districting the commonwealth for the choice of members of congress, and the necessary forms for the execution of it.

FOURTH EDITION.

THIS is a very improved edition: Not only such alterations are made as amendatory and additional laws have rendered necessary, but the articles under the duty of selectmen, town clerk, town treasurer, assessors, constables and collectors of taxes, which consist of a greater number of particulars than that of the other officers, the several subjects wherof could not therefore so readily be found, are in this edition alphabetically arranged, stand-alone

ADVERTISEMENT.

fect of the work which respects accounts, and which has been considered by some rather complex, is made more plain and concise.

These improvements, and the consequent enlargement of the work, although it in some degree enhances the price, make it more valuable than any of the former edition.

FIFTH EDITION.

THIS edition is made conformable to the laws which have been enacted since the fourth edition was printed; some additional forms are added; and instead of the different laws books (all of which, very few, if any, are in possession of) the references are made to the year in which the laws were printed. The inspection laws are inserted at large. A table for receiving and paying gold coin is also inserted. Also the bill of rights, and the substance of the constitution of the commonwealth of Massachusetts, and other improvements made, without any addition to the price.

SIXTH EDITION.

INSTEAD of the "substance," the whole of the constitution of the commonwealth is here inserted. Some articles are differently arranged, and other, that were in several places, collected together and references made thereto. Some new laws are added in the Appendix, and such as have been repealed, left out.

SEVENTH EDITION.

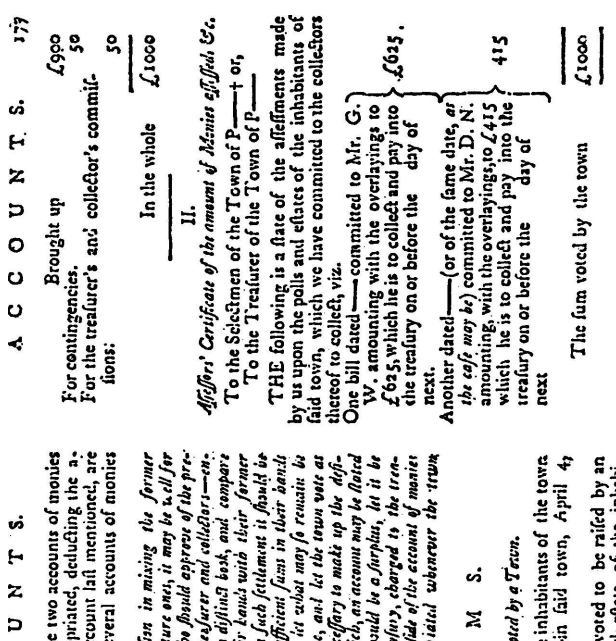
IN this edition, (besides the improvements that were judged useful, and which some new laws rendered necessary,) the table of crimes and punishments has been carefully revised and made conformable to the laws that have been enacted since the impression of the sixth edition, and gives a view of all the laws which are the subjects of it, that are now in force. The constitution of the United States is also added to this edition.

EIGHTH EDITION.

SUFFICE it to say, as to this edition, that it is made to conform to the laws that have been enacted since the publication of the former one. Some late Inspection and Election Laws are added to this edition.

ILLUSTRATION 3

Forms I and II



176 ACCOUNTS. 177

4. That the amount of the two accounts of monies voted, and monies unappropriated, deducting the abatements charged in the account last mentioned, are equal to the amount of the several accounts of monies expended.

NOTE. *To prevent confusion in mixing the former transactions of a town with future ones, it may be well for the inhabitants of any town, who should approve of the present plan, to settle with their treasurer and collectors—enter a state of their accounts in a distinct book, and compare the amount of the sums in their hands with their former vote for raising money. If on such settlement it should be found that there will not be sufficient sums in their hands to answer the purposes designed, let what may so remain be applied thereto so far as it will go, and let the town vote as much more money as will be necessary to make up the deficiency, of the expenditure of which, an account may be stated as in other cases. If there should be a surplus, let it be paid when collected into the treasury, charged to the treasurer, and entered on the credit side of the account of monies unappropriated, to be appropriated whenever the town should see fit.*

FORMS.

I.

Account of monies voted by a Town.

AT a legal meeting of the inhabitants of the town of P——holden at the——in said town, April 4, 179-.

The following sums were voted to be raised by an assessment upon the polls and estate, of the inhabitants of said town according to law, for the purposes hereafter expressed, viz.

For the support of schools.	£300
For the support of the poor.	250
For building a school house.	150
For the payment of accounts allowed by the town.	200
Carried over	£900

ACCOUNTS. 177

Brought up	£900
For contingencies.	50
For the treasurer's and collector's commissions:	50
In the whole	£1000

II.

Assessors' Certificate of the amount of Monies assessed, &c.

To the Selectmen of the Town of P——† or,
To the Treasurer of the Town of P——

THE following is a state of the assessments made by us upon the polls and estates of the inhabitants of said town, which we have committed to the collectors thereof to collect, viz.

One bill dated——committed to Mr. G. W. amounting with the overlayings to £625, which he is to collect and pay into the treasury on or before the day of next. } £625.

Another dated——(or of the same date, *as the case may be*) committed to Mr. D. N. amounting, with the overlayings, to £415 which he is to collect and pay into the treasury on or before the day of next } 415

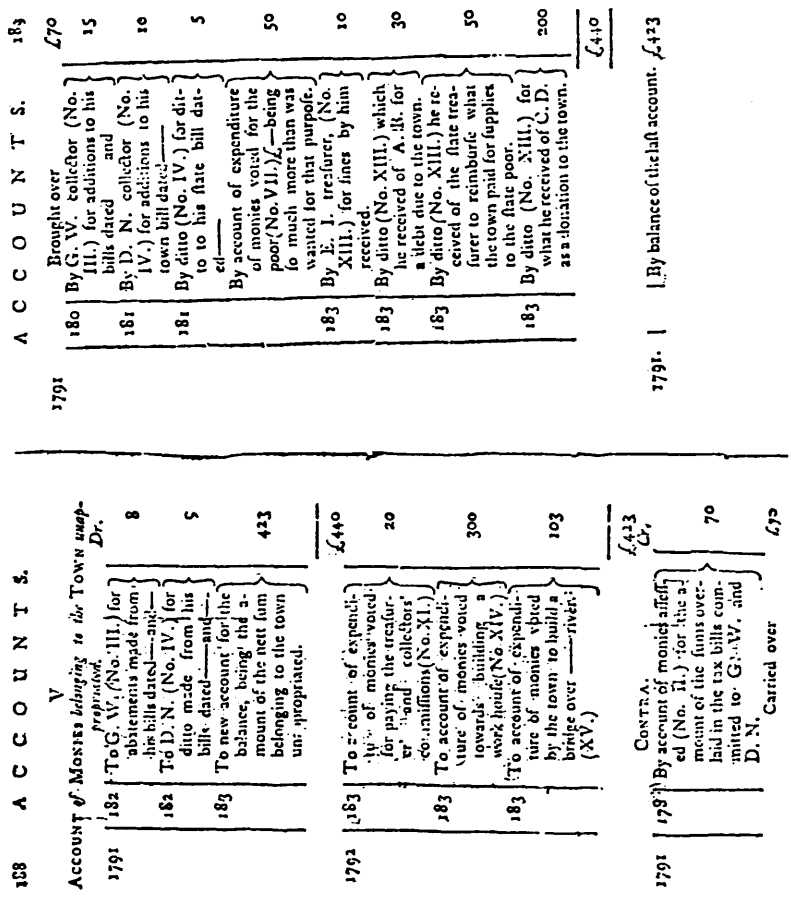
The sum voted by the town £1000

† If the selectmen should be assessors, this certificate will be thrown unnecessary. They ought however to enter the substance of it in their book.

Source: Samuel Freeman's *The Town Officer*, 2nd edition, 1793.

ILLUSTRATION 4

Account V "Monies belonging to the Town, Unappropriated"



ACCOUNTS. 183

ACCOUNT V. Monies belonging to the TOWN unappropriated. Dr.

1791	182	To G. W. (No. III.) for abatements made from his bills dated —— and ——	8
	182	To D. N. (No. IV.) for ditto made from his bills dated —— and ——	5
	183	To new account for the balance, being the amount of the nett sum belonging to the town unappropriated.	423
			£440
1792	183	To account of expenditure of monies voted for paying the treasurer and collectors' commissions (No. XI.)	20
	183	To account of expenditure of monies voted towards building a work house (No. XIV.)	300
	183	To account of expenditure of monies voted by the town to build a bridge over —— river. (XV.)	103
			£423

CONTRA. Cr.

1791	178[1]	By account of monies affirmed (No. II.) for the amount of the sums overlaid in the tax bills committed to G. W. and D. N.	70
		Carried over	£70

ACCOUNTS. 183

1791	180	Brought over	£70
		By G. W. collector (No. III.) for additions to his bills dated —— and ——	15
	181	By D. N. collector (No. IV.) for additions to his town bill dated ——	10
	181	By ditto (No. IV.) for ditto to his state bill dated ——	5
		By account of expenditure of monies voted for the poor (No. VII.) £—being so much more than was wanted for that purpose.	50
	183	By E. I. treasurer, (No. XIII.) for fines by him received.	10
	183	By ditto (No. XIII.) which he received of A. B. for a debt due to the town.	30
	183	By ditto (No. XIII.) he received of the state treasurer to reimburse what the town paid for supplies to the state poor.	50
	183	By ditto (No. XIII.) for what he received of C. D. as a donation to the town.	200
			£440
1791		By balance of the last account.	£423

Source: Samuel Freeman's *The Town Officer*, 2nd edition, 1793.

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AN AUSTRALIAN ATTEMPT TO INTERNATIONALIZE ACCOUNTING PROFESSIONAL ORGANIZATIONS

Abstract: In 1928, the beginnings were laid for the International Accountants Corporation and Bookkeepers Institute of Australasia. This was followed in a few years by the International Institute of Accountants. This was an ambitious move to internationalize the professional accounting organizations of the world from Australia.

There was an immediate reaction in the United Kingdom and then from the established Australian national professional organizations. The account and analysis of the subsequent events demonstrates how established organizations will respond to threats of this kind to their power and position.

An ambitious plan to internationalize the world accounting profession from Australia was aborted because of the defensive actions taken by the established organizations operating within Australia. The story of the International Accountants Corporation and Bookkeepers Institute of Australasia and the International Institute of Accountants provides a case study of how such organizations may be established and how the established professional organizations may seek to eliminate these competing groups as threats to their position.

NATURE OF ACCOUNTING ORGANIZATIONS

Professional associations of any kind are primarily political bodies organized to advance the interests of their members within the framework of the modern state. One approach to the study of such organizations is the functionalist approach which emphasizes the distinctive attributes of possession of esoteric knowledge, independence, altruism and self-discipline [Willmott, 1986, p. 557]. This approach is adopted here because the organizations involved promoted these attributes as a basis for

regulating the profession at that time. Altruism was a major part of the publicly avowed motives of the promoters even if their personal motives were more mercenary. The ambitious attempt to internationalize was too dispersed to be analyzed by the interactionist approach as a strategy for controlling an occupation as suggested by Willmott [1986, p. 558].

THE AUSTRALIAN PROFESSIONAL ENVIRONMENT

In spite of the creation of a bewildering array of accounting organizations in Australia over the last hundred years, the scene has been dominated by two professional groups and their antecedents. The first of these is the Institute of Chartered Accountants in Australia (ICAA) which, after a lengthy struggle, secured a Royal Charter in 1929. The British cultural influence was certainly a factor in seeking the charter and, even though that cultural influence is now less apparent, the charter still evokes an emotional response and constitutes a powerful symbol of the status of the ICAA. This symbolical power has been enhanced by legislation permitting amendment of the charter within Australia by the Governor in Council [Randall, 1987, p. 9].

The second dominant accounting organization is the Australian Society of Certified Practising Accountants (ASCPA) created as the Australian Society of Accountants (ASA) by merger in 1952 and 1953 of three organizations which existed at the time when the ICAA secured the Royal Charter. These were the Commonwealth Institute of Accountants, the Federal Institute of Accountants and the Association of Accountants in Australia.

All of the above organizations may be regarded as examples of what Parker [1989, p. 13] categorized as associations based on the British model with a conscious rejection of the alternative of constituting a branch of a British body. The events considered here represent an attempt to reverse that pattern with an avowed aim to export accounting organizations to the entire world.

INTERNATIONAL ACCOUNTANTS CORPORATION AND BOOKKEEPERS INSTITUTE OF AUSTRALASIA

In spite of the position outlined above during May, 1928, an association of accountants entitled the *Bookkeepers Institute of Australasia* was formed in Melbourne. The motivation of the promoters and the likely nature of the organization was readily apparent. According to the pamphlet issued to promote the or-

ganization, the Australasian president was Mr. E. S. Sayer. He claimed six different qualifications with a further eight lines devoted to detailing the meaning of these post nominals. It was after consulting with Mr. L. Brierley, who two years previous had formed the *Institute of Factory and Cost Accountants,* that Mr. Sayer formed the Bookkeepers Institute of Australasia with a view to making a financial gain. Mr. Brierley has expressed the opinion that the fact that Mr. Sayer was the president of this organization and that it was created for financial gain was not inconsistent with Mr. Sayer's occupation as a share salesman.[1,2] The objectives of the Bookkeepers Institute of Australasia were listed as being:

a. to raise the professional status of Clerks and Bookkeepers, to enable them to enjoy similar privileges as Fellows and Associates of Accountancy, Secretarial and Commercial Institutes,

b. to provide an Institute for those Clerks or Bookkeepers who do not want to sit or have no time to study for all the subjects for the Accountancy or Secretarial Institute examinations

c. to provide a Reference Library for Fellows or Associates

d. to provide special employment facilities for its members

e. to give a professional status to Clerks or Bookkeepers during the period (usually of some years) while they are preparing for Accountancy or Secretarial Institute Examinations [*The Bookkeepers' Institute of Australasia*, 1928].

On 15 April, 1929, the Bookkeepers Institute together with the International Accountants Corporation (the origin and objects of which are unknown) merged to be incorporated as the International Accountants Corporation and Bookkeepers Institute of Australasia (*the Corporation*). The objects laid down in

[1] Recollections of Mr. Brierley to John Gavens at Sydney, August 1986. Brierley, himself, promoted professional organizations as a source of income arising from secretarial services. This assessment of Sayer's commercial interests is supported by an entry in Sands & McDougall [1926] which states Sayer's occupation to be commission agent.

[2] Mr. Sayer promoted money making schemes by convincing potential investors to buy shares in the scheme.

the Memorandum of Association included those previously stated for the Bookkeepers Institute (as object (c)) and also included:

a. To acquire from Edgar Sheappard Sayer as Registered Trustee for a Guarantor the Institutes registered in Victoria and known as The International Accountants Corporation and Bookkeepers Institute of Australasia, and to conduct and carry on such Institutes as one Institute under the title of The International Accountants Corporation and Bookkeepers Institute of Australasia Limited.

b. To purchase, have, hold and dispose of any buildings to be used as Institute offices or part thereof or any other property whether personal or real which shall directly or indirectly be for the advancement of any or all of these objects.

c. To open up offices and/or appoint Registrars or Representatives of the Institute throughout the States of the Commonwealth and the British Empire and Foreign countries. [International Accountants' Corporation and Bookkeepers' Institute of Australasia, 1929].

Greater insight into the organization's objectives are provided by a brochure prepared by the Corporation, which states that the objects of the Corporation can be summarized as being "to provide professional and practical facilities and benefits, confer degrees and generally carry on the usual work of a professional body: but at an international level" [International Accountants' Corporation and Bookkeepers' Institute of Australasia, undated]. The brochure goes on to say:

> The Corporation sets out to create a permanent international unity between the professional people of commerce and industry of all nations . . . It has nothing to do with politics. Its members represent all shades of legal thought . . . It in no way touches upon religious or sectarian issues . . . The Corporation is not a pacifist organization but it is opposed to war on humanitarian grounds and believes in international efforts to outlaw war. It considers that one way to prevent war is to bring the people of the world into closer contact and union with each other, for better understanding, greater tolerance and mutual sympathy. It believes strongly in the national sentiment and national consciousness, but considers that at the same time there

> should be an international sentiment without prejudicing or detracting from one's own national patriotism. It also believes there should be more international economic cooperation throughout the world. The Corporation recognizes international humanitarianism and by intellectual cooperation of its members or by other means where practical, endorses the various widespread movements of humanitarian principles. It endorses the ideas of international law and considers the permanent Court of International Justice and the international arbitrations a form of security for the peace of the world and of value to all human, national and international relations.

The origin of this international *humanitarian* philosophy is unclear. This was a period which spawned movements with similar world humanitarian views. It was the period in which the Oxford Group, a movement which became the foundation for Moral Rearmament arose in England. The philosophy of the Corporation is consistent with a view that a changed social order might avoid a repetition of world war and its consequences. There was a New World order movement in the Presbyterian Church in Australia during this same time. The adoption of such personal attitudes was reflected in the life of the counsel of the Corporation, Mr. D. C. Robertson, who after a career as accountant and lawyer became a congregational pastor for the Presbyterian Church, although he was not authorized to dispense the sacraments [G. H. L., 1963]. Similarly W. T. Charge who was later President of the successor International Institute of Accountants (discussed later) was described in the Corporation's brochure, from which the objects were quoted above, as

> a keen internationalist in the professional field, visualising, per medium of an organization with Fellowships in different parts of the world, an influence which could be created towards a better understanding amongst peoples of different nations, was also a most enthusiastic leader in the British Empire, and all that it stood for. This was evident by his many activities, including that of the Royal Society of St. George, of which organization he was the Victorian President [The International Accountant, 1949].

The Corporation endeavoured to provide some tangible evidence of its international aspirations by publishing from Lon-

don *The International Accountants Journal*. This venture which commenced in September 1929 appears to have survived for only eleven issues. A search of library holdings in Australia failed to produce any copies of this journal. It is not possible therefore to comment on its contents or editorial style. However, *Year Books* Nos. 2 to 4 covering the years 1929 through 1932 are held by the ASCPA Library in Melbourne.

An alternative view of these organizations is that they were merely commercial ventures promoted for the financial gain of the promoters. There is not available written evidence to determine whether such explanations are substantial or apocryphal. It can be noted however that economic conditions were difficult and the importance of the income from secretarial services provided to such organizations has been raised in personal discussions between one of the authors and L. Brierley who was involved with similar competing professional organizations within Australia.

This new accounting body was not well-received by the existing accounting bodies in either Australia or England. Despite the fact that the Corporation was incorporated in Victoria, it first received publicity in England. An article in *The Accountant* in 1929, states:

> We have been favoured with the sight of a set of documents announcing the formation of 'The International Accountants Corporation and Bookkeepers Institute of Australasia, Incorporated'. This body seems to have been registered in Australia in April last, and is now broadcasting invitations to apply for membership without examination. The Head Office is in Melbourne, but branches are stated to exist in Straits Settlement, Boneo (sic), Cyprus, Fiji Islands, Papua, New Zealand, New Guinea Territory, etc. (sic) [*The Accountant*, 1929, p. 435].

It goes on to say,

> Long experience has taught us to regard the formation of self-styled associations of accountants with equanimity. But this case is particularly bad because in return for a payment of 5 pounds 3 shillings the promoters will confer what they call the degree of 'Incorporated Accountant'. Incidentally, as an additional attraction, they promise to obtain for their members, discounts on purchases from tradesmen, ranging from 5% to 37 1/2%. Our readers well know that the description

> 'Incorporated Accountant' has in this country been recognized by the law as attaching only to members of the Society of Incorporated Accountants and Auditors for the last 22 years . . . [*The Accountant,* 1929, p. 435].

This article by *The Accountant* was the first of many such articles published by the established accounting bodies to discredit the new body. *The Accountant* again discussed the Corporation on December 6, 1930, when it noted that it was possible to join this organization by simply filling out an application form and sending a check. It goes on to record:

> Life within the Institute can certainly not be dull for we are told that dinners, smoke nights, dances, lectures, social evenings, cinema and lantern talks and the like are held by the branches. It would be advisable to snap up these advantages quickly for there are dark hints that some day there might be an examination although the wind is tempered to the shorn lamb because for senior gentlemen examinations are held in camera. [*The Accountant*, 930, p. 764].

The Accountant takes comfort from the fact that there is apparently a "free mortuary benefit of 50 pounds per member".

Again, *The Accountant,* on April 11, 1931, discusses the Corporation. It notes that the Corporation's "International President and World-Chief Administrative Officer", Mr. E. S. Sayer, had now arrived in Great Britain and was making the office in London the International General Head Office of the Corporation. It also notes that due to the flush financial position of the Corporation at that time, entrance fees had been waived and it was now possible to join this body at the price of a mere annual subscription [*The Accountant*, 1931a, pp. 453-454].

While the international objectives purported to be behind the Corporation may seem preposterous, they had been sufficient to attract the attention of established professional bodies both in England and Australia. The events described in what follows demonstrate that the existing professional bodies did not consider it sufficient to simply hope that the Corporation would fade away. *The Accountant* rather began a concerted attack which was later taken up also by the professional organizations in England and Australia. While *The Accountant* was not the official journal of any of the professional organizations at the time, it held a prominent position as reflecting professional thinking and attitudes. Its editorial comment was potentially the

most power public media force on accounting matters at the time.

The Accountant continued its reference to the Corporation by quoting from a circular put out by the Corporation which stated "I desire to point out to you that unless there are very exceptional circumstances why you should not be admitted the application (for membership) will be passed if it meets our general requirements for age limit, practical experience and integrity standards." The circular points out that one of the advantages of membership of the Corporation is the fact that members have the right to plead before the Income Tax Commissioners. *The Accountant* dismissed this assertion by pointing out:

> s.137 of the Income Tax Act, 1918 says that the Commissioners must hear any member of an incorporated society of accountants, and as there is no difficulty whatever in securing incorporation, this advantage counts for nothing, except perhaps to emphasise the desirability of an early restriction being placed on this particular right of representation [*The Accountant*, 1931a, p. 454].

According to Mr. Brierley, the forerunner of the Corporation was colloquially known as the International *Institute of Accountants, Doctors, Dentists and Lawyers*! This is not surprising, considering the nature of the original president's occupation and the lax entrance requirements. Mr. Brierley supported the recollection of this opinion by asserting that, at the time, it was normal practice for share salesmen to promote their schemes first by selling shares to doctors as they were considered an "easy target". The promoters would then go to dentists, solicitors and so on according to a planned pattern using the fact that they had sold to the previous group as the major promotion factor [recollections to J. Gavens at Sydney, August, 1986].

The Accountant [1931a, p. 482] attempted to further undermine the professional standing of the corporation by reproducing a copy of the accounts of the Corporation for the year ended 22 April, 1930 and stating:

> Our readers will note with very considerable amazement, that, this copy of the published balance sheet of an organization purporting to represent accountants, reveals glaring errors in the additions of the balance sheet. We could hazard no explanation and we must leave the fact to speak for itself. We note amongst other

> things that the balance sheet contains no note as to the guarantee liabilities of the members, a more serious matter concerns the entry in the balance sheet for 'Stock, Yearbooks, etc, in hand' comprising nearly half the total assets. It is not at all clear to us, how, seeing that the total expenditure during the year on yearbooks and journals was only 359 pounds, there can be a stock of over 1000 pounds at the end of the year. Further, one of the claims of the organization is that it includes a very large number of members, but as the total revenue for the year from annual subscriptions was only 211 pounds, either there must be very few contributors or the individual annual subscriptions from a large number must be ridiculously small [*The Accountant*, 1931a, p. 454].

In an attempt to overcome the embarrassing position the Corporation now found itself in, a Special Supplement to the April 1931 journal was produced which included a redrafted balance sheet. However, *The Accountant* notes:

> The Corporation's explanations as to the errors in publishing the balance sheet, referring the matter to a printer's error, does not go the whole way, for although in the further print now sent to us a new item appears for 'Sundry Creditors' which corrects the liabilities side, yet even in the new print the additions on the asset side are wrong to the extent of one penny. It may be of course that the printer did not bother to insert odd half pence, but to say the least of it, in the annual accounts of an accountancy organization, such a presentation of the figures is exceedingly unusual. . . . we think it would be better if Mr. Sayer would refrain from interfering in the rather delicate situation of accountancy organization in this country. He proclaims his present interest in quite a number of international questions which should provide plenty of scope for his energies without introducing a quite unwanted organization [*The Accountant*, 1931b, p. 567].

The Accountant did not stop there. It records that:

> We are now interested to observe that the Corporation has issued this Special Supplement, nearly the whole of the matter in which, is devoted to a reply of our criticisms (article 22 April 1930). Mr. E. S. Sayer, who is the International President of the organization, commences by bringing forward his credentials, and we

> have been favoured by a copy of a booklet containing photographic reproductions of no less than 15 documents, introducing Mr. Sayer, signed by various persons in Australasia, from the Prime Minister of the Commonwealth down to the local Secretary of the Royal Life Saving Society ... in London, adulation of his wholesale type is looked upon as a rather dubious recommendation. We wish to observe in this place that we really find highly amusing the certificate included in this collection, signed by the Auditor of the Corporation and certifying as to Mr. Sayer's professional and academic qualifications [*The Accountant*, 1931b, p. 567].

As has already been pointed out, *The Accountant* could not be regarded as having launched its fusillade against the Corporation as the official outlet of any of the accounting professional organizations in the United Kingdom. However, a more official voice was added to the chorus of criticism. In May, 1931, the journal of the Society of Incorporated Accountants and Auditors, *The Incorporated Accountants Journal*, alluded to further problems being encountered by the Corporation:

> If there are any persons who consider that it will be to their advantage to pay fees to this Corporation for the right to place certain initial letters after their name, it would not appear to be any concern of ours provided that neither the corporation nor its members infringed the legal rights of the members of the society ... We are informed that by 'inadvertance', some literature emanating from the Corporation has been distributed intimating that members of the Corporation could describe themselves as 'Incorporated Accountants'. It has further been conveyed to us that the International President has expressed regret that this literature has got into circulation as it was supposed to have been destroyed ... Under these circumstances no useful purpose would be served by discussing further this Corporation and the doings of its International President, which are receiving some attention in other quarters [Society of Incorporated Accountants and Auditors, 1931].

The advocacy of the use of *Incorporated Accountant* would be justified by Mr. Sayer calling on the international ambitions of the Corporation. It remains unknown as to whether the issuing of this literature in Great Britain was intentional or not.

Sayer [1929], in the Corporation's *Year Book*, advised members residing in Great Britain not to use the term *Incorporated Accountant* and to heed the *local conditions*. However, he concluded:

> Members will be interested to know that highly placed legal advice has been secured on this question of the rights of members in Australia, in foreign countries, and elsewhere, to use the term 'Incorporated Accountant'. No institute has yet proved that it had an exclusive right in all foreign countries and in all parts of the British Empire to take to itself the term 'Incorporated Accountant' [Sayer, 1929].

Meanwhile, in Australia, a formal reaction was about to be launched by the established professional accounting organizations. Extracts of these articles were printed in the journals of the Commonwealth Institute, the Institute of Chartered Accountants, and the Federal Institute. Copies of the articles were also printed for distribution as leaflets, but prior to distribution, legal advice was received on October 6, 1931 to the effect that the Institute would lay itself open to an action for libel if the leaflets were distributed [Malleson, 1931a].

On October 17, 1931, W. Ross of Wilson, Ross & Co., wrote the Registrar of the Victorian Division of the Commonwealth Institute drawing that division's attention to a Mr. Stuber, who was the Victorian Registrar of the Corporation and at the same time was a member of the Commonwealth Institute. Ross [1931] noted that although the General Council was powerless to stop Stuber from holding such a position, it should record its disapproval in an attempt to discourage like examples.

Mr. Stuber would again raise the purported international aspirations of the Corporation as central to the position of the Corporation and its conduct. On December 12, 1931, Stuber, acting as Victorian Registrar for the Corporation, wrote to the Registrar of the Commonwealth Institute stating "I direct your attention to momentus changes in the administration of the Institute (Corporation) . . .". These "momentus changes" were detailed under three headings and included:

> Administration — autonomy for individual States,
> Personnel — previous administrators (with the exception of the International President) are not now concerned with the Institute in any executive capacity.
> Policy — 1) exemptions from examinations will not be

> granted except to those candidates who have passed similar examinations with some other approved body, for example, your own . . . .
>
> 2) A definite educational lecture policy is being embarked upon . . . .
>
> 3) . . . We are not a competitive body. In a world of insular and national prejudice, we are endeavouring to link up all accountants into an international body. We ask our members to consider membership of our Institute as subsidiary to their other degrees and by those means we trust to eventually become a connecting link between the provincial institutes throughout the world . . . [Stuber, 1931].

These "momentus changes' embarked upon by the Corporation appeared to be designed to give the body more credibility in light of the criticisms levelled at it by the publications in *The Accountant* and the subsequent republishing of those articles in Australian journals.

The Commonwealth Institute was obviously not impressed. At the Victorian Division's Council meeting on December 15, 1931, after the tabling of both Ross' and Stuber's letters, the minutes record that a motion was put that Mr. D. C. Robertson, who was a member of the Corporation, no longer be permitted to act as Counsel for the Institute. Further, legal opinion was sought as to whether "the acceptance of the office of secretary to a body which the Institute Council does not hold in high regard, by a member of the Institute constituted conduct on the part of such member, sufficient to warrant the Institute remonstrating with or reprimanding the offending member" [Malleson, 1931b]. The opinion received on December 16, 1931 stated that the Articles of Association do not sanction such an action on the part of the Council. Subsequently the motion in relation to Robertson was withdrawn and no motion was put in relation to Stuber. However, pressure was probably applied, as, on April 8, 1932, Stuber wrote to the Registrar of the Commonwealth Institute informing the Registrar that he had resigned the Victorian Registrarship of the International Accountants Corporation [Stuber, 1932].

These difficulties in Australia were apparently not going to interfere with the international aspirations of Mr. Sayer. Back in Europe, Mr. Sayer, who was recruiting members for the Corporation, was not oblivious to the criticisms of himself and the Corporation. In a *Supplement to the International Accountants*

Journal, January, 1932, Mr. Sayer justified the amount of time that he had spent overseas on behalf of the Corporation by claiming the number of members had now grown to 4,400 world wide. The *Supplement* indicates that the cost of Mr. Sayer's world tour had been more than offset by the additional members that had been recruited on that tour and dealt with criticisms that had been levelled at the Corporation. At the time of writing the *Supplement*, Mr. Sayer was holidaying in the south of France for health reasons [Sayer, 1932]!

INTERNATIONAL INSTITUTE OF ACCOUNTANTS (IIA)

Due to the amount of criticism that the Corporation had received in the U.K. and in Australia, and despite attempts by both Sayer and Stuber to improve the Corporation image, it was expedient for members of the Corporation to disassociate themselves from that body and to form new accounting bodies that had an appearance of respectability. In April, 1932, the International Accountants and Executives Corporation Ltd was incorporated in London. In August, 1932, the International Accountants and Executives Corporation of Canada was incorporated and in October, 1933, the International Institute of Accountants (IIA) was incorporated in New South Wales.

The English body subsequently changed its name to *the Association of International Accountants* (AIA) and is one of only two English accounting bodies formed since 1923 still in existence [see Smith, 1984]. However, the AIA membership has been steadily declining over recent years. In 1983, the AIA had 1,626 members making it one of the smaller of the professional accounting bodies in the UK. The members of the Canadian body were later, through mergers, to become members of a body of accountants recognized under statute [Norkett, 1984].

The IIA was to all appearances a new organization without any links with the Corporation. This view could be sustained with the evidence that an examination of the *1932 Corporation Yearbook* and the Register of Members made available to the ASA when the IIA merged with the ASA in 1955, revealed that only one individual from the national executive council of the Corporation was a member of the IIA at the time of absorption. A similar comparison revealed that of the Victorian executive council, only 1 out of 8 members of the Corporation was a member of the IIA and of the remaining three states with executive councils, Queensland, Western Australia and South Austra-

lia, no members of the executive councils were subsequently admitted to membership of the ASA.

This apparent independence was not so evident with respect to New South Wales. The comparison revealed that 7 out of 8 members of the New South Wales executive council of the Corporation in 1932 were registered members of the IIA in 1955. This may be consistent with the fact that the IIA was incorporated in New South Wales and that most IIA members were from New South Wales (see Appendix 2). There was likewise an executive council link in New South Wales. Mr. A. J. Williams, who was chairman of the executive council of the Corporation in 1932/33 and was a prominent member of the New South Wales executive council of the Corporation, became Chairman of the Council of the IIA. There is no record of any further involvement of Mr. Sayer. Nevertheless the extent of common contacts involving the Corporation and the IIA casts doubt on the status of the IIA as a new independent organization.

Paragraph 3 of the Memorandum of Association of the IIA states that the objectives of the IIA shall include:

a. to raise the status and advance the interests of accountants by the dissemination of professional knowledge and the inculcation of sound practices

b. to improve and elevate the technical and general knowledge of persons engaged or about to engage in the profession of accountants or auditors to provide for and regulate the training and education of students by lectures and other means, to test by examinations or otherwise, the qualifications of such students and other persons desirous of being enrolled as members of the Institute and to confer on such persons such titles and degrees as may be deemed expedient [International Institute of Accountants, 1933].

These first two objectives and the other objectives that followed were similar to the objectives stated in many other accounting bodies memoranda at that time. The international ambitions identified with the promoters of the Corporation appeared to be manifested in the ambitions of the promoters of the IIA. The ambition to cover the British Empire and other foreign countries was retained but the lofty ideals of international humanitarianism and prevention of war espoused by the

Corporation were not evident. It can only be concluded that the inflated objectives of the Corporation did not have the desired market impact. The authors have been unable to identify any evidence to document more precisely the motivation for this difference. The more restrained objectives of the IIA may have been judged more appropriate for securing acceptance as a serious professional organization. Williams certainly retained this outlook on the world long after this revision of the AII objectives. His editorial in *The International Accountant* (December 1939) declared:

> Whatever the result of the present world conflict, there will be considerable changes in the structure of society throughout the civilized world. A system which breeds extremes of poverty and wealth in an age when the productive forces have shown such efficiency that want should be unknown, cannot continue. There must be a better standard of living for the masses, if we are to avoid those revolutionary upheavals which are repugnant particularly to English speaking people.

Williams went on to discuss attempts to restrict membership of the accounting profession presumably by other unnamed organizations. He argued the necessity for examinations and then concluded:

> We trust that those who have been seeking to build a monopoly of public practice in this country will review their attitude in the light of more equitable considerations, and that fellow Australian accountants will at least have equality of opportunity.

Informational literature provided by the IIA stated that the IIA had both *International objectives* and *Australasian objectives*. The primary international objectives included:

> to provide a medium for practising and commercial accountants in Australasia, to have contact with their fellow practitioners in all parts of the world, to provide opportunities for intercourse between accountants within the British Empire and other countries, and to provide an Australasian link between international accountants throughout the world [International Institute of Accountants].

Assertions of this type were no more certain to lead to such an outcome any more than a strategy of securing associations

with prominent individuals. The Commonwealth Institute was still not impressed. In response to an inquiry by the Registrar of the Commonwealth Institute, the State Registrar of New South Wales wrote:

> there is no justification in the claim that the standard of that Institute (the IIA) is equal to that of the leading accountancy bodies in Australia. Many of its members in New South Wales are practically unknown in accountancy circles, probably the membership was built up in response to extensive advertising propaganda throughout Australia and South Sea Islands seeking members without examination. The International Institute claims to be worldwide. Its status however, in New South Wales is negligible. Unfortunately, several prominent citizens have accepted invitations to functions and have addressed members of the Institute. This appears to be part of the publicity scheme . . . The International Institute with its large membership may have come to stay. There is no law in New South Wales to prevent the formation of similar organisations [State Registrar, Commonwealth Institute of Accountants, 1935].

The fact that the IIA relied on associations with prominent citizens was apparently consistent with the strategy previously adopted by the Corporation. The Corporation in its *1930-1 Year Book* lists its Life Members as: the Governors of Victoria, New South Wales, Queensland, and South Australia; Premier of Tasmania; Speaker, House of Assembly, Tasmania; a Senator and Major General; and a Barrister at Law [International Accountants' Corporation and Bookkeepers' Institute of Australasia, 1931].

As some evidence of pretensions to be recognized as an international organization, the IIA published a journal entitled the *International Accountant* from 1934 until it ceased a separate existence in 1954. A limited holding of this journal, commencing with the August 1938 issue and comprising about half the issues, is held by the ASCPA library in Melbourne. The journal contained articles on international, national and domestic matters as well as on social activities of the members. A typical issue contained an editorial by A. J. Williams, details of meetings and balls, income tax law and practice, student problems, secretarial practice, examination notices and results, book reviews and usually an article on one of auditing, company law reform or management accounting. The international tone in-

cluded references to the Canadian and Indian bodies. Articles in this vein included "Accounting Profession in China" (February 1950), "Recent Developments in World Economics" (May 1950), and "International Tax" (August 1951). The journal thus provided some evidence of the aspirations to international status.

The IIA did not require acceptance by other accounting bodies to gain a degree of formal recognition. Without making any distinctions between legislation of the Commonwealth and the six States, the IIA in its publicity claimed an extensive list of official credits. It quickly gained recognition, alongside the other accounting bodies under a number of Acts — the Charitable Collection Act, 1934 (IIA recognized 1935); the Pastures Protection Act, 1934 (1936); Friendly Society's Act, 1913-1938 and Trust Accounts Act, 1923-1925 (1939); Cooperation Act, 1923-41 (1942); Auditor of Public Hospital Accounts (approved for appointment 1943); Local Government Act, 1919 (1940). In addition, the IIA did not fail to publicize the fact! On July 24, 1940, the IIA offered its assistance to the government in the war effort. This offer was accepted in September 1940 and possibly led to IIA members' qualifications being recognized by the Public Service (1943), the Department of Air (1942) and the Department of Army (1943). Furthermore, the IIA gained approval to be added to the institutes which had representation on the Regional Committee on Training in Accounting under the Ministry of Post-War Reconstruction. When the Public Accountants Registration Act, 1945 was passed in New South Wales and the Public Accountants Registration Act, 1946 was passed in Queensland, the IIA was one of the approved institutes under both Acts. In 1949, the Australasian Institute of Cost Accountants recognized the exams of the IIA as being an acceptable qualification for entry into its organization. Although this list of accomplishments might fall short of the grand international plans of the IIA, it was surely sufficient to establish that the IIA had to be taken seriously, within Australia at least. However, the change in emphasis would, in a relatively short time, lead to the demise of the IIA as an independent body.

Despite this degree of recognition, the Commonwealth Institute was still not impressed! In a letter to the New Zealand Society of Accounts in 1952, the General Registrar wrote:

> gradually the International Institute has acquired some degree of standing. While it is not simply highly regarded by the established institutes as indicated by its

> omission from the bodies which sponsored the Australian Congress of Accounting in 1949, it has by consistent political pressure obtained some official recognition. It was for instance recently added to the list of recognised bodies for the purposes of the audit provisions of the Victorian Companies Act and was previously recognised for the purposes of the Public Accountants Registration Acts of New South Wales and Queensland. Its membership in Victoria numbers about 100. Requests by this institute for copies of its annual report were met with little success. Little is known about its examinations which appear to attract very few candidates. Consequently this Institute grants no exemption for its examinations [General Registrar, Commonwealth Institute of Accounting, 1952].

With the advent of the Australian Society of Accountants in 1952, there seems to have been a change in attitude among the officials of the Australian professional organizations. Instead of fighting the pretender, the decision was apparently made to remove it through merger. Having conceded that the IIA was now well established, the ASA decided to control this body by absorbing its members and bringing them under the discipline of the ASA. The Executive Council minutes of the ASA in April, 1953 noted that, although it was considered doubtful that some members had adequate qualifications and experience, merger would be in the best interests of the profession.

The IIA did not enter the marriage with immediate alacrity. In a letter to the members of the IIA on September 17, 1953, Mr. Williams, who was still chairman of the Council, records:

> After mature consideration and acting under sound advice the Council decided to proceed with its independent activities feeling that its achievements in the profession in Australia are such that its continued activity as an independent body is in the best interests of all concerned [Williams, 1953].

However, the IIA Council shortly afterward changed its decision. On October 25, 1954, Williams again wrote to members informing them that an agreement was being entered into with the Society whereby members of the Institute would become members of the Society. The IIA was placed into liquidation soon after it was absorbed by the ASA.

A. J. Williams was founder and principal of A. J. Williams and Co public accountants in Sydney. He had a son who served

during World War II and remained overseas for some years before returning to his father's practice. In response to personal inquiries, he indicated he was unable to shed further light on his father's activities with the IIA. It may be surmised that the demise of the IIA marked an end to the international aspirations of the sponsors of both the IIA and the Corporation.

The Corporation had reverted back to the original name, the Bookkeepers Institute of Australasia, on August 17, 1933. Following a resolution of its members, it commenced liquidation on January 12, 1935 and ceased to exist.

PROFESSIONAL ORGANIZATIONAL RESPONSE

The professional organization response to these bodies with international pretensions had to find practical expression in events within Australia because that was their place of formation and incorporation. The actions taken may be regarded as indicative of a more general reaction by established organizations to the aspirations of the IIA regardless of the country involved.

The absorption of the IIA finally brought the Australia chapter of these claimed *international* accounting associations under the control of one of the major Australian accounting bodies. The accounting establishment had been unhappy about the existence of these upstart groups since 1928. Whether the IIA was a reputable or disreputable accounting body, however, is an issue outside the scope of this paper. The histories of these purported international accounting bodies provide examples of the process and problems of establishing a new accounting group. The point of concern to the existing organizations is that the creation of numerous accounting bodies without control over the quality of the members permitted to join those bodies can be harmful to the interests of the members of the existing organizations. The actions taken in response by the "established" accounting bodies illustrate some of the defenses available to those organizations when they perceive the newcomers as a threat.

The justification of such responses lies in the aims of most professional accounting organizations to control entry to the profession. While succeeding to control entry to their own organizations, this does not always mean they have a monopoly of the professional activity concerned. The absence of legislative restriction on accounting practice has left it open for relatively

free entry into the practice of the profession. To the extent that the established organizations can secure a monopoly of specific areas such as company auditing, they may establish a degree of monopoly. This means that action to inhibit or remove upstart organizations is vital if the established organizations are to retain their influence and limited control of the accounting profession.

The advent of these purported international accounting organizations did not initially present difficulty. The incorporation of a professional accounting body was a relatively straightforward process but "recognition" of that accounting body was more difficult to achieve. A key to establishing an accounting body was to attract membership. The Corporation sought to achieve this by offering few barriers to entry (examinations, qualifications) and low entrance fees. Another factor important in gaining recognition is to be seen to be a reputable body. The Corporation and IIA sought favorable publicity at all times, particularly in relation to their association with leading Australian politicians and citizens. A further means of obtaining recognition used by the IIA was to seek accreditation under various government Acts. By obtaining recognition under one Act, the Cooperation and the IIA were able to argue for recognition under other Acts. In addition, the offering of their members' services during the war effort assisted in their eventual recognition.

The defenses adopted by the "established" accounting bodies were numerous. It is difficult to believe that the editorial content of *The Accountant* was not fed by press releases from the established professional organizations. The publication of articles in "house" journals was aimed at discrediting the Corporation and was to the detriment of these international bodies due to the adverse publicity received. The evidence cited previously demonstrated that the Corporation seemed vulnerable to attack concerning its unprofessionalism due to errors in its financial statements on which the established accounting bodies were able to capitalize. It was also known that in Australia, the "established" accountancy bodies brought pressure to bear on their own members who were also members of the Corporation. Although it was doubtful whether members could have been disciplined, it appears some members with "dual" membership were "counselled" regarding their Corporation membership. It was also noted that the "established accounting bodies refused

to publicly acknowledge the IIA as an acceptable accounting body by not including it as a sponsoring body of the 1949 Australian Congress of Accounting. Furthermore, they recorded their refusal to provide exemptions for examinations taken by members of the IIA in considering applications by potential new members. The final defense adopted by the ASA of absorption of the IIA meant that the ASA could control existing IIA members and halt any further growth of this body.

POSTSCRIPT

The lessons to be learned from observation of this rather preposterous attempt purporting to internationalize the accounting profession remains applicable to current events. In conclusion, it is worth noting the extent to which the process of launching competing accounting professional organizations is still very much alive in Australia.

Accounting bodies have been and will be created regularly in Australia because there are few barriers to their formation, During the 1981 debate over the unsuccessful attempts to integrate the ASA and the ICA, Reid [1981, p. 13] noted "[T]he major fears I have of immediate integration is that those accountants not prepared to complete the entry requirements necessary to join the combined body will break away and form yet another association". Reid's fears have to some extent been realized. After the integration vote was defeated, the ASA moved to ensure its entrance requirements were more rigorous through the Associate Programme. The ASA entrance requirements therefore became more in line with the ICA's requirements. To fill the void, the Australian Institute of Taxation and Management Accountants Ltd (TMA) was formed during 1986. Like the ASA and ICA its members are required to be college graduates, but there are no examination entrance requirements nor is there any requirement to complete professional development. The TMA has attempted to establish itself by offering relatively low membership subscriptions, by advertising its existence to all registered tax agents and by offering prizes in accounting at certain tertiary institutions.

The ease with which bodies such as the Corporation, IIA and TMA can be established is a cause for concern due to the ability of unqualified persons to offer themselves as accountants claiming affiliations with these organizations, and the resultant confusion this creates in the minds of the public. As a result of

adoption of the Professional Schedule, the ASA introduced and heavily promoted the designation of CPA standing for Certified Practising Accountant. The success of this campaign led to the change of name in 1990 to the Australian Society of Certified Practising Accountants (ASCPA). In February, 1987, a previously unknown organization, the Federation of Australian Accountants offered mail-order CPA status to accountants, a status which the ASA believed (and proved in court) it had the sole right to use [Masanauskas, 1987]. As these recent events evidence, the techniques adopted against the Corporation and the IIA have not proven sufficient to deter further attempts at establishing competing organizations. Perhaps it may be concluded that only legislative intervention will have such an effect. To ensure that high standards of professional conduct are seen to be attached to the status of accountant, it is not too soon for the title "accountant" to be reserved by statute or for an accounting body to be recognized by statute, particularly to preserve the community authority vested in practicing accountants. The saga of attempts to achieve that protection is another story for another time.

REFERENCES

Australian Society of Accountants, *Extract of Executive Council Minutes* (April 1953).

The Bookkeepers' Institute of Australasia, *The Bookkeepers' Institute of Australasia*, undated, (promotional pamphlet approx. A4 size) (c. 1928).

"An Extraordinary New Body", *The Accountant* (Oct. 12, 1929): 435.

"An Extraordinary New Body", *The Accountant* (Dec. 6, 1930): 764.

General Registrar, Commonwealth Institute of Accountants, *Letter to "Secretary, New Zealand Society of Accountants"*, Melbourne (January 2,1 932).

"The International Accountants' Corporation", *The Accountant* (April 11, 1931): 435-454, 482.

"The International Accountants' Corporation", *The Accountant* (May 2, 1931): 567, reprinted in *The Accountant in Australia* (July 1, 1931): 359-360.

International Accountants' Corporation and Bookkeepers' Institute of Australasia, *Memorandum and Articles of Association*, Melbourne (1929).

International Accountants' Corporation and Bookkeepers' Institute of Australasia, *International Accountants Year Book No. 3, 1930-31*, London (1931).

International Accountants' Corporation and Bookkeepers' Institute of Australasia, *International Accountants' Corporation*, London, undated (c. 1929).

International Institute of Accountants, *International Institute of Accountants' Handbook*, Sydney, undated (c. 1933).

International Institute of Accountants, *Memorandum and Articles of Association*, Sydney (1933).

G. H. L., "David Claude Robertson", *The Australian Bar Gazette*, 1 (October 23, 1963) and "The Late David Claude Robertson", *The Melbourne Graduate*, XIV (October 1963): 1.

Malleson, Stewart & Co., *Letter to "Registrar, Commonwealth Institute of Accountants"*, Melbourne (October 6, 1931).

Malleson, Stewart & Co., *Letter to "Registrar, Commonwealth Institute of Accountants"*, Melbourne (December 16, 1931).

Masanauskas, John, "Accountants Win Injunction on Qualification", *The Age* (June 13, 1987) and also "Court Dismisses FFA Appeal", *The Age* (December 10, 1987).

Norkett, P., *The Financial Times Accounting Year Book*, London, Financial Times Business Information (1984).

"Obituary, The Late Mr. W. T. Charge", *The International Accountant* (September 1949): 218.

Parker, Robert H., "Importing and Exporting Accounting: The British Experience", in Hopwood, Anthony G., *International Pressures for Accounting Change*, Prentice Hall, New York (1989).

Randall, Kenneth, "Accountants Chart a Change of Course", *The Professions* (January 16, 1987).

Reid, R. M., "A period of testing?", *The Chartered Accountant in Australia* (1981): 13.

Ross, W., *Letter to "Registrar, Victorian Division Commonwealth Institute of Accountants"*, (October 17, 1931).

Sands & McDougall, *Directory of Victoria*, Melbourne (1926).

Sayer, E. S., "The Term 'Incorporated Accountant'", *International Accountants Year Book No. 2, 1929 and Diary for 1930*, Melbourne (1929): 91-92.

Sayer, E. S., "Special Private and Confidential Report for Members of the Corporation in Australia and New Zealand from Founder and International President, Mr. E. S. Sayer", *Supplement to International Accountants' Journal* (1932).

Smith, G. C., "Sixty Years Behind the Society of Company and Commercial Accountants", *The Australian Accountant* (October 1984): 782-784, (reprinted from *Accountants Record*).

Society of Incorporated Accountants and Auditors, "International Accountants Corporation", *The Incorporated Accountants Journal* (May 1931).

State Registrar, Commonwealth Institute of Accountants, *Letter to "Registrar, Commonwealth Institute of Accountants"*, Sydney (April 11, 1935).

Stuber, J. R., *Letter to "Registrar, Commonwealth Institute of Accountants"*, Melbourne (December 2, 1931).

Stuber, J. R., *Letter to "Registrar, Commonwealth Institute of Accountants"*, Melbourne (April 8, 1932).

Williams, A. J., *Letter to "Members, International Institute of Accountants"*, (September 17, 1953).

Williams, A. J., *Letter to "Members, International Institute of Accountants"*, (October 25, 1954).

Willmott, Hugh, "Organising the Profession: A Theoretical and Historical Examination of the Development of the Major Accountancy Bodies in the U.K.", *Accounting Organizations and Society*, No. 6, (1986): 555-580.

APPENDIX

INTERNATIONAL INSTITUTE OF ACCOUNTANTS

DISSECTION OF 1954 MEMBERSHIP

State	Total	Fellows	Associates	Specials	Honorary
New South Wales	217	92	81	33	11
Victoria	85	50	18	4	13
Queensland	45	25	18	—	2
West Australia	17	8	7	—	1
South Australia	13	9	3	—	2
Tasmania	7	4	2	—	1
Overseas	62	12	50	—	—
	446	200	179	37	30

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CHINESE DOUBLE-ENTRY BOOKKEEPING BEFORE THE NINETEENTH CENTURY

Abstract: This paper examines the origination and evolution of Chinese double-entry bookkeeping from the fifteenth century to eighteenth century. It demonstrates that Chinese merchants and bankers invented some types of double-entry spontaneously around the late fifteenth and early sixteenth centuries. Several different versions of Chinese double-entry existed and evolved throughout this period to the nineteenth century. Chinese versions of double-entry are similar to Italian-style bookkeeping, although Chinese experience was independent of the dissemination of the Western methods.

INTRODUCTION

Double-entry bookkeeping, with "Debit" and "Credit" as entry direction labels, prevails throughout most of the world. It is widely believed that the invention of double-entry bookkeeping brought about the birth of modern accounting [Littleton, 1966; Ten Have, 1976; Robertson, 1978; Parker, 1984]. In fact, this bookkeeping method constitutes the foundation of modern accounting over the past six centuries. Even in today's high-tech, information-revolution era, double-entry bookkeeping remains the core of the EDP accounting system.[1] The significance and implications of double-entry bookkeeping have been recognized by much research and accounting literature [Kat, 1930; Littleton and Yamey, 1956; Thomson and Yamey, 1958; Winjum, 1971; Lee, 1973; Most, 1972, 1976; Kojima, 1975; Williams, 1978].

Although there is no clear answer about when and by whom double-entry bookkeeping was invented, most authorities

[1] Professor Yuji Iriji has explored the potential of triple-entry bookkeeping. Although the idea of triple-entry bookkeeping is admirable, it is far from perfect in a practical sense. As well, the underlying principles of triple-entry are stemmed from that of double-entry. Thus, it could be regarded as an extended application of the double-entry bookkeeping system.

agree that it was initiated in some Italian city-states, such as Genoa, Venice, and Florence, etc., between the thirteenth and fifteenth centuries [Yamey, 1947; Chatfield, 1977, ch. 3, 4].[2] The Italian-style double-entry bookkeeping was first summarized by an Italian priest Luca Pacioli in 1494 and translated or introduced into other European countries between the sixteenth and seventeenth centuries. It was spread to the Far East and the rest of the world later [Nobes, 1984].

However, it is insufficient to assert that double-entry bookkeeping was solely invented in Italy, because there is much evidence to suggest that double-entry method was in use in China around the turn of the sixteenth century. This has not been addressed in the Western accounting literature. In fact, Chinese merchants and bankers developed various forms of Chinese-style double-entry methods since the late fifteenth century; these forms evolved independently of Western influences.

This paper presents an examination of Chinese-style double-entry bookkeeping before the nineteenth century.[3] Its purpose is to demonstrate how the double-entry methods were invented and what are the major characteristics of Chinese-style double-entry bookkeeping. The paper commences with a brief summation of ancient bookkeeping in China. It examines the transition of single-entry to double-entry bookkeeping around the sixteenth century and the later developments. The structure of two major forms of Chinese-style double-entry methods, *Longmen Zhang* and *TianDi He Zhang* are illustrated separately. Finally, a brief summary follows.

ANCIENT BOOKKEEPING IN CHINA

In the five-thousand-year history of China, bookkeeping has evolved with remarkable achievements. China's ancient record keeping techniques reached a stage that could match the developments in other ancient civilizations in the world. Particularly significant was the development of the Ancient World's most sophisticated governmental accounting system during the *Shang*

[2] Some accounting historians believe that the double-entry system has even been used by Romans much earlier. See Most (1986) *Accounting Theory*, p. 33.

[3] Most of the historical data on Chinese accounting are adapted from the books by Chinese accounting historian, Guo Daoyang, *History of Chinese Accounting* (Chinese version) Vol. I, 1982 and Vol. II, 1988 (Chinese Finance and Economics Publishing House, Beijing). Professor Guo's excellent work is appreciated and acknowledged.

Dynasty (1600-1100 B.C.).[4] Historical data reveals that the budgetary accounts, expenditure control, periodic reporting (with the interval of 10-days, each month or year, etc.) and government auditing, were in existence in Chinese governmental accounting since the *Zhou (Chou)* Dynasty (1100-300 B.C.) [Fu, 1977; Guo, 1982]. Even before the sixteenth century, many innovative accounting techniques, such as account classification, journals and ledgers, monetary unit (currency translation), posting and closing, trial balance, accounting reports, and account checking, were developed in various Dynasties [Guo, 1982]. For record keeping, although the single-entry remained dominant in practice, it evolved and gradually became standardized. Some basic characteristics of bookkeeping in ancient China emerged:

1) Account Classification — various books of account have been maintained to account for the major categories of government revenues and expenditures;
2) Entry Directions (Labels) — Chinese characters *Ru* (In) and *Chu* (Out) were applied as the labels to indicate the nature of transactions, i.e., *Ru* was used, in front of the description, in recording revenue transactions (receipts), *Chu* was recorded with the expenditure transactions (disbursement); Entries to the books usually included entry directions (labels), description, and amount (quantity) of the transaction;
3) Single-Entry — every transaction was recorded with one entry in the books, i.e., only the movement of the property of the state treasury [either *Ru* (In) or *Chu* (Out)] was recorded;
4) Journalization — transactions were recorded in the journals sequentially;[5] and
5) Account Closing and Trial Balance — books were closed regularly, while a trial balance was prepared using the *Sanzhu Jiesuan* (Three-pillars Balancing) equation;[6] *Ru* (In) - *Chu* (Out) = *Yu* (Balance)

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[4] See Guo, D. *History of Chinese Accounting* (1982) ch. 2. Also, M. Chatfield (1977) *History of Accounting Thought* (Revised version), ch. 2; and Skinner, R. M. (1987) *Evolution of Accounting Standards*, ch. 2.

[5] In Chinese, the journal recording is called *Liushui Zhang*, (Running water recording), it is an image of a stream flowing as transactions were maintained in the books sequentially.

[6] The name of the trial balancing method was after the fact that the equation contains three major components (i.e., *Three-pillars)*.

All transactions were first recorded according to either *Ru* (In) or *Chu* (Out) direction. At the end of the accounting period, all entries were summarized and transferred into accounting reports in terms of the three major categories of transaction. The reports were balanced and checked before being submitted to the higher authorities. If the equation was not equal, errors or mistakes in the records surfaced and account checking would follow. Obviously, the *Three-pillars Balancing* method not only examined the recording accuracy, but also reflected the philosophy of a feudalist society: all properties belonged to the paramount ruler — Emperor or the State (Dynasty). The purpose of governmental accounting was to keep track of the flows of state's properties. *Ru* (In), *Chu* (Out), and *Yu* (Balance) were sufficient for this purpose and no profit calculation was necessary.

TRANSITION OF SINGLE-ENTRY TO DOUBLE-ENTRY

Compared to governmental accounting, the private accounting (commercial and industrial accounting) progressed slowly in China. The lack of private right and the poor state of commerce, owing to the nature of the feudalist economy, hindered the development of private-sector accounting in China. Although the concept of "profit" appeared in Chinese literature as early as the *Han* Dynasty (206 B.C.-220 A.D.), the method of profit determination did not exist until the fifteenth century [Guo, 1982, p. 232]. Record keeping in the private sector was very crude and simple, governmental accounting techniques were dominant in the early days.

However, historical data does indicate some progress of bookkeeping in the private sector since the late *Tang* Dynasty and early *Song (Sung)* Dynasty (960-1279) as the societal attitude changed gradually toward "Commercialism." During these eras, two significant innovations occurred: "Journals and Ledgers System" and "Four-pillars Balancing." As commercial and trading activities burgeoned in the *Tang* and *Song* Dynasties, individual wealth and private business grew remarkably. Pedlary and fairs, family workshops, pawn-broking and banking, trade associations, as well as the technologies in salt-making and iron-smelting were developed. Eventually, the paper

currency and credit system were introduced.[7] Credit sales and purchases became popular: merchants traded with each other in exchange for contracts and commercial notes, guaranteed by mediators, and collected money when the contract was due.

As commerce expanded and the volume of credit sales and purchases increased, the traditional ledgerless bookkeeping became unsatisfactory in handling the diverse transactions. A need developed for a better method of recording the various claims and the settlements between merchants and mediators. Hence, the "Journals and Ledgers System" was developed. Merchants and mediators established three levels of book to keep track of their transactions. When a transaction occurred, it was immediately recorded in the *Caoliu* (memorandum). The recordings were then entered in the *Riqing Bu* (i.e., general journal) at the end of each business day; some subsidiary journals were used if there was significant volume of transactions. Finally, journal entries were summarized and copied to a *Tenqing Bu* (similar to a summary general ledger) every 10 days or month [Guo, 1982, p. 429-430]. Such a structure of books is very similar to the then Italian-style account system, but it was very simple and remained in the form of single-entry bookkeeping. However, the invention of the "Journals and Ledgers System" provided the way for the development of double-entry bookkeeping.

"Four-pillars Balancing," called *Shizhu Jiesuan* in Chinese, is another significant innovation in Chinese bookkeeping during this period. It differed from the "Three-pillars Balancing" by dividing the "Balance" component into *Jiuguang* (Old trust) and *Shizai* (Real existence), while maintaining the other two components, i.e., *Ru* (In) and *Chu* (Out), as *Xinshou* (New receipt) and *Kaicu* (Disbursement) respectively. Thus, this bookkeeping emphasized the net increases in the current period and the separation of carrying forward balances at the beginning and ending dates of the period. This development certainly enhanced the accountability of business activities, since the brought forward balance (old trust) was also a factor in measuring current performance. Also, the separation of the beginning and ending balances of inventory would promote the concept of profit or loss measurement in business activities.

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[7] The government in Northern *Song (Sung)* Dynasty (960-1127) started to issue paper currency *Jiaozi* and coins [Rugoff, 1964, p. 104; Cotterell and Morgan, 1975, p. 46]. According to Guo's study, *Jiaozi* is the earliest paper currency in China and in the world [Guo, 1982, p. 367].

As the "Four-pillars Balancing" replaced the "Three-pillars Balancing," the equation for trial balancing changed as follows:[8]

1) *Jiuguang* (Old trust) + *Xinshou* (New receipt) = *Kaicu* (Disbursement) + *Shizai* (Real existence)

Or:

2) *Xinshou* (New receipt) − *Kaicu* (Disbursement) = *Shizai* (Real existence) − *Jiuguang* (Old trust)

There have been some past debates in Chinese literature concerning when the "Four-pillars Balancing" was invented. According to the Chinese accounting historian Guo Daoyang, the above-mentioned two trial balancing equations based on the "Four-pillars Balancing" had been widely applied in governmental and private-sector accounting in Northern *Song* Dynasty around the eleventh century [Guo, 1982, p. 401-403]. He found evidence that the method was in use even earlier in late *Tang* Dynasty (900-950), since the books of the *Jingtu* (Clean Land) Temple in Central China in 925 displayed a complete records being segregated by the four-pillars components [Guo, 1982, p. 352-354]. Therefore, it is safe to assert that the method was originated in the late *Tang* Dynasty and early *Song* Dynasty (tenth to twelfth centuries) and it prevailed in business and governmental accounting since then.

Originally, both the innovations of the "Journals and Ledgers System" and "Four-pillars Balancing" remained within the framework of single-entry bookkeeping; however, they became one of the antecedents for the transition to double-entry bookkeeping in China.

As the commercial and trading activities grew, the economic structure of business changed significantly and some elements of capitalist production emerged after the *Ming* Dynasty (1363-1644).[9] As merchants became wealthier, they began to expand and establish handicraft workshops or family plants, small

[8] There are four components (the four major categories of transactions) in the equation of trial balancing, that is why the method was called "Four-pillars Balancing."

[9] According to many Chinese historians, even though there is no official capitalist society in Chinese history, the elements of capitalist production were in place in China since the *Ming* Dynasty [see Guo Moruo, *The History of China* (1976); Fang Wenlan, *Treaty of Chinese History* (1978); Ebrey P. B., *Chinese Civilization and Society* (1981); and Guo Daoyang, *History of Chinese Accounting* (1982)].

mining and manufacturing ventures in coal extraction, spinning, textile, and soap-making, etc. This, in turn increased the need for pooled capital, which then stimulated the demand for banking and pawn-broking. Varied banking entities emerged in the private sector around the fifteenth century. *Qianzhuang* (Credit unions), *Danpu* (Pawnshop), *Piaofen* (bank) emerged to participate in various kinds of banking business such as customer deposits, commercial notes, loans, mortgages, currency exchanges, discounts, inter-bank transfers, and pawn-broking, etc. The old-style single-entry bookkeeping became inadequate to keep track of the complicated and increased number of transactions among merchants and bankers. New bookkeeping techniques were required. As a result, *Sanjiao Zhang* (Tripod bookkeeping) or *Pojiao Zhang* (Lame bookkeeping) appeared around the mid fifteenth century [Guo, 1988, p. 110-111].

Sanjiao Zhang became a significant innovation from traditional Chinese single-entry bookkeeping. It maintained the same structure of the three primary books (i.e., memorandum, general journal, and general ledger), with an emphasis on journalization. Usually, merchants or bankers would establish three major general journals, i.e., *Huoqing Bu* (Sales and Purchase Journal), *Yinqing Bu* (Cash Journal) and *Wanlai Bu* (Transfer/ Personal Account Journal) to record the business transactions, respectively.

Transactions were entered in those journals daily from *Caoliu Bu* (memorandum). The folios of the journal were divided into upper and lower sections on each page. All *Shou* ("Receipt" or "From") entries were recorded on the upper section, while all *Fu* ("Pay" or "To") entries on the lower section.[10] The posting to the Book of General Ledger and the Summary of Trial Balances followed the "Four-pillars Balancing" method.

The fundamental difference between the *Sanjiao Zhang* and the traditional single-entry bookkeeping is the separate recording treatment of different transactions or events: "Transactions involved with claims or transfers must be recorded in *Shou* (Receipt) and *Fu* (Pay) entries in two related journals or ledgers simultaneously; other transactions be only recorded in one direction." In other words, for the claims or transfers, the recording rule is "One entry in *Shou* (Receipt), another in *Fu* (Pay);

[10] *Shou* (Receipt) and *Fu* (Pay) were designated entry labels in record keeping in the private sector. Correspondingly, *Ru* (In) and *Chu* (Out) were applied in governmental accounting in ancient China.

the amount in two directions should be equal." For cash sales and purchases, however, the cash dimension was omitted while only its corresponding dimensions were recorded in the Sales and Purchases Journal. The journals were summarized every five days, using the "Four-pillars Balancing" method to determine the ending balance of cash in the period.

Apparently, the recording of transfer and claim transactions were double-entry (recording two dimensions), which is similar to the Italian-style bookkeeping. However, the recording of cash transactions remained single-entry (recording one dimension). That is why the method was called "Tripod (Three legs) or Lame Bookkeeping" in Chinese literature.

Although *Sanjiao Zhang* was a mixture of double-entry and single-entry in nature, its invention was a significant step forward in the evolution of Chinese bookkeeping.

1) Its dual recording of the transfer and claim transactions could enhance the control of all claims and transfers;
2) The adoption of dual entry directions — *Shou* (Receipt) and *Fu* (Pay) helped the understanding of the substance of business transactions and facilitated account summarization, posting, and trial balancing;
3) The method promoted the understanding of the relationships among assets, liabilities, and capitals, and provided an insight into the logic of the trial balancing method: Total of *Shou* (Receipt) should be equal to Total of *Fu* (Pay); and
4) It provided an important basis for the later development of other double-entry bookkeeping.

However, *Sanjiao Zhang* did not overcome the disadvantages of the traditional single-entry method. In particular, no integrated account system was utilized. The significance of earning (profit or loss) and its calculations were either ignored or calculated by very crude method of "Total of receipts (inflow) compared against total of disbursements (outflow)." Thus, at best, profit could not be determined with any accuracy. In addition, the mixture of double-entry with single-entry could lead to recording errors; such mistakes were difficult to detect and correct.

Gradually, these potential problems became recognized in practice and led to a more advanced bookkeeping method —

Longmen Zhang ("Embankment Bookkeeping") which was invented by merchants and bankers to replace the *Sanjiao Zhang* in the late *Ming* Dynasty (1570-1640). This innovation kept accounting apace with the business developments that were occurring in China during this period.[11]

LONGMEN ZHANG

Longmen Zhang is a form of double-entry bookkeeping and was originated by bankers but spread into commercial and industrial businesses later.

Book System

Longmen Zhang utilized the basic book system of the *Sanjiao Zhang*, but it incorporated more secondary classifications in journals and ledgers. In addition to subsidiary general journals such as Purchases Journal, Sales Journal, Cash Journal, and Transfer/Personal Account Journal, some subsidiary ledgers were used with the *Tenqing Bu* (Book of General Ledgers). Usually four special general ledgers (i.e., Purchases Ledger, Sales Ledger, Inventory Ledger, and Miscellaneous Ledger) were used. In addition, the *Longmen Zhang* emphasized the use of the general ledgers: to conduct account classification and summarization for various types of business transactions; to perform *Helong* (Closure of Embankment) in trial balancing; and to close accounts and prepare periodic reports.

Account Classification

In *Longmen Zhang*, four categories of account were designed:

Jin (inflow) — to record all revenues and receipts, such as sales, commissions, and other gains;

Jiao (outflow) — to record all expenses and losses, such as operating expenses, cost of goods sold, depletion and losses, tax expenses, etc.;

Cun (stocks) — to record all inventories (assets) of the entity; and

[11] There is no definitive evidence about when *Longmen Zhang* was invented in Chinese literature. However, the majority of historians agree the method appeared in the late *Ming* Dynasty and the early *Qing (Ch'ing)* Dynasty around 1570-1680 [Guo, 1988, p. 114-116].

Gai (claims) — to record all capital and liabilities, which represent the claims against the inventories (assets) in *Cun* category.

Thus, all entries in the journals were posted to general ledgers and then transferred to a Summary of Trial Balances, based on the four categories of account. Accordingly, the four categories of entries occupied different sections of the books, as *Jin* (inflow) and *Cun* (stocks) were recorded in the upper section while *Jiao* (outflow) and *Gai* (claims) were recorded on the lower section.

Recording Method

In *Longmen Zhang,* the record keeping was based on double-entry. In other words, the entry directions for each transaction were *Shou* (Receipt) and *Fu* (Pay): by making an entry in *Shou* and another in *Fu*, the amount in the two sides should be equal. Every transaction was usually recorded twice on the corresponding journal books. *Shou* (Receipt) entry was recorded on the upper section while *Fu* (Pay) entry on the lower section. For example:

1) if a transaction resulted in 500 (money units) from sales, the receipt was recorded on the upper section of the folio on Sales Journal and the same amount was recorded as Cash in Deposit or Cash on Hand on the lower section of the same page;

2) if the entity incurred expenses of 200 (money units) for operations, one entry was recorded on the upper section of the Miscellaneous Journal and the same amount was shown as cash payment (disbursement) on the lower section of the page; and

3) if the transaction was a purchase on credit terms, two entries were recorded as purchase and payable respectively in the Purchases Journal. The records are illustrated in Exhibit 1.

All entries in the journal books were summarized and posted, following the same entry directions, to the general ledgers periodically. From the general ledger, the account report (Summary of Trial Balances) was prepared at the end of each accounting period.

EXHIBIT 1

Illustration of Journal Recording*

Sales Journal

(year)
(month)
(date) *Shou* Sales to A 500
Fu Cash on Hand 500
(or: *Fu* Cash in Deposit 500)
.....
.....

Miscellaneous Journal

(year)
(month)
(date) *Shou* Cash on hand 200
Fu Shop maintenance 200
.....
.....

Purchase Journal

(year)
(month)
(date) *Shou* Due to Mr. B 300
Fu Purchase 300
.....
.....

*In traditional Chinese writing, the order is from top to bottom and from right to left. As well, lunar calendar was used on the books and the year was usually following the title of individual emperor's reign.

Determination of Earning (Profit or Loss)

Merchants calculated the cost of goods sold before closing the books at the end of each period. Two kinds of inventory practices prevailed around the sixteenth century:

1) Appraisal of inventory — the cost of goods sold in current period was determined by an appraisal of inventory at the ending date, based on the formula as below:
   Cost of Goods Sold = Total Purchases + Ending Balances − Beginning Balances
2) Highest price method — the cost of goods sold was determined by using the highest price of merchandises purchased in the period:
   Cost of Goods Sold = Highest purchase price × units of goods sold

In practice, the highest price method was more popular because the method would understate periodic earning and the capital amount of the entity. This is certainly an early example of the conservatism convention being applied that apparently benefited merchants.

The earning determination was proceeded in the Summary of Trial Balances through comparison of two pairs of major general ledger categories: *Jin* (inflow) vs. *Jiao* (outflow) and *Cun* (stocks) v. *Gai* (claims). Hence;

1) Sum of *Jin* − Sum of *Jiao* = Earning (profit or loss).

If the balance was positive, it represented a profit; a negative balance indicated a loss.

2) Sum of *Cun* − Sum of *Gai* = Earning (profit or loss).

Again, a positive balance represented a profit and a negative balance indicated a loss.

Trial Balancing

A crucial component of the *Longmen Zhang* was its procedure of trial balancing which was called *He Longmen* (closure of embankment). Its purpose was to examine the accuracy of record keeping and earning determination. Thus, a special book called *Longmen Bu* (Trial Balance of Totals) was set up (or using separate folios on the Summary of Trial Balances) at the end of the period (usually every month). All entries in the books of general ledger were transferred into the *Longmen Bu*, with all *Shou* (Receipt) entries shown on the upper section and all *Fu* (Pay) entries shown on the lower section, in terms of the four major categories of account, i.e., *Jin* (inflow), *Jiao* (outflow), *Cun* (stocks), and *Gai* (claims). Thus the total of *Shou* should have equaled the total of *Fu*. *He Longmen* (closure of embankment) was achieved through the equation of:

Jin (inflow) − *Jiao* (outflow) = *Cun* (stocks) − *Gai* (claims).

The idea of *He Longmen* was to match the two sides of the equation, which would indicate the accuracy of record keeping and earning determination.[12] If there was a difference (a "mar-

[12] It is clear that the *He Longmen* was named by means of image. The *Longmen* (embankment) was constructed from the two ends separately, and completed when the embankment was closed. Analogically, transactions were

gin") in the two sides (the two sides of the equation did not match), the difference was called *Longmen Buhe* (failure of closing embankment), which indicated a clerical error or a calculation mistake and thus finding the error in the books was required.

The *Longmen Zhang* has made significant contributions to the advance of Chinese bookkeeping since the sixteenth century:

1) The double recording for all transactions represented a better reflection of the economic substance and account articulations among the four major categories of transaction (i.e., the course and results of the operation);

2) It advanced the concept and the use of profit and earning determination, since the profit (loss) could be derived from the margin of either revenue and expense accounts (nominal accounts) or stocks and claims (real account), which further assisted an understanding of the relationships among assets, liabilities, capitals and earnings; and

3) It developed a built-in mechanics of record checking based on the variance balancing method that could detect the clerical errors or mistakes more effectively.

However, the *Longmen Zhang* remained a primitive form of double-entry bookkeeping. Its main problem stemmed from the lack of an integrated account system. Particularly, the links between nominal and real accounts were indistinct and the use of nominal accounts was not fully understood. Also the limited number of general ledgers in use seemed insufficient for a comprehensive accounting of financial positions and operating results. Hence, in addition to the relatively low level of production in economy, these weaknesses may also be attributed to the slow popularization of the *Longmen Zhang* in the later years. This method became surpassed by another form of Chinese double-entry bookkeeping, *TianDi He Zhang*, in the eighteenth century.

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initially recorded in *Jin* (inflow) and *Jiao* (outflow) as well as in *Cun* (stock) and *Gai* (claims) respectively. Only when the margins of the two sides were matched, the bookkeeping was completed.

TIANDI HE ZHANG

TianDi He Zhang is also called *Shijiao Zhang* (Quadruped Bookkeeping) in Chinese literature. It is a modified version of the *Longmen Zhang* and emerged in commercial and industrial businesses in the mid *Qing (Ch'ing)* Dynasty around early eighteenth century [Guo, 1988, p. 298-299].

A major improvement of *TianDi He Zhang* is the application of a broader account classification along with the integration of increased general ledgers and subsidiary general ledgers in order to record more complicated commercial and industrial transactions. As summarized by some Chinese accounting historians, the book system of *TianDi He Zhang* can be diagrammed as Exhibit 2.

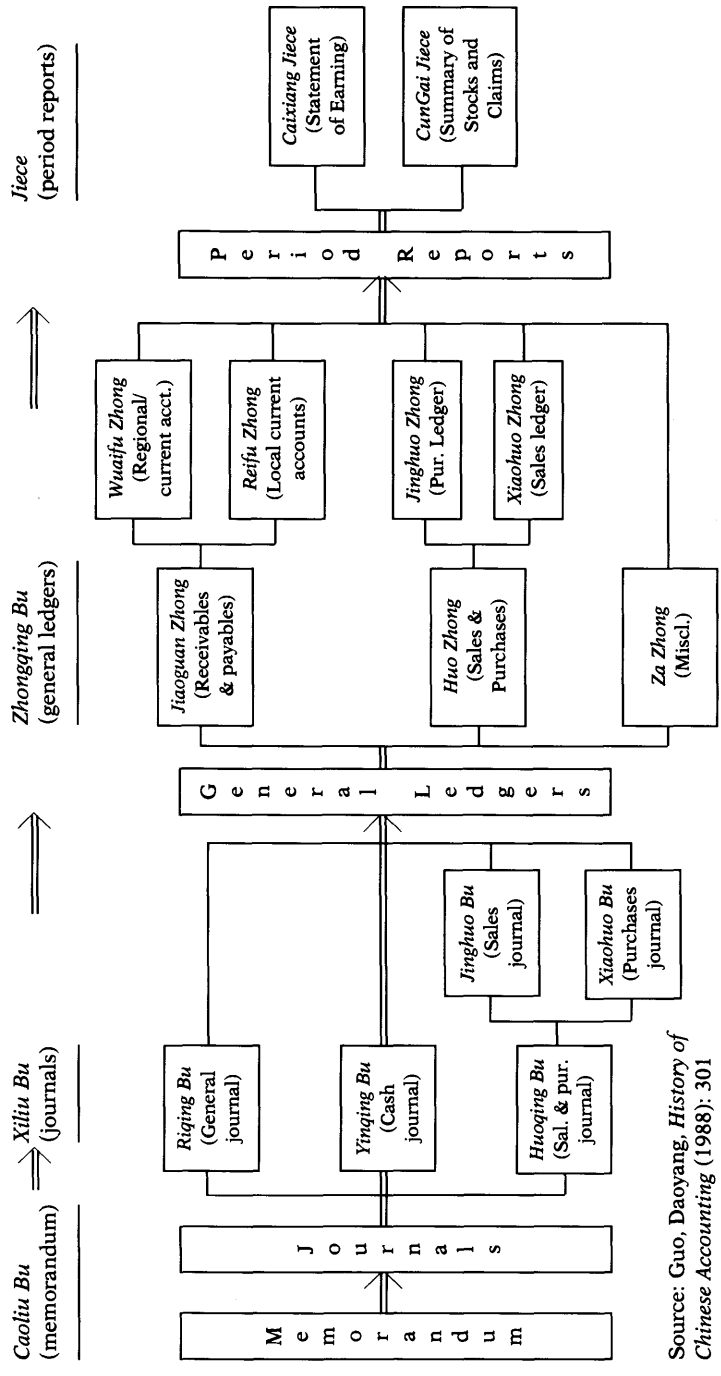
General ledgers became the most significant component of the record keeping system from which a larger number of subsidiary ledgers could be incorporated. For the small businesses, only one Book of General Ledger and a few subsidiary ledgers were maintained to record the various transactions separately. For those large entities with greater volume and complexity of business transaction, several books of general ledger (i.e., Current/Personal Accounts, Sales and Purchases, Cash Account, and Miscellaneous Accounts, etc.) and a varied level of subsidiary ledgers were utilized. There is no doubt that this innovation of the ledger keeping not only improved the calculation of cost of goods sold and earning determination, but also provided a necessary basis for the preparation of two major accounting reports, i.e., *Caixiang Jiece* (Statement of Earnings) and *CunGai Jiece* (Summary of Stocks and Claims) at the end of each period.

It is interesting to note that the general ledger of Miscellaneous Accounts should be interpreted in a broad sense because it contained all general ledger accounts other than the Current (Personal) accounts, Sales and Purchases, and Cash. Thus, various operating expenses, losses, taxes, properties or fixed assets, retained earnings, capitals and owner transactions, and reserves, were all recorded in the ledger of Miscellaneous Account. Various secondary or subsidiary ledgers were maintained for the purpose of costs (expenses) control and earning calculation. Apparently, the ledger served as a controlling general ledger used to accumulate the operating expenses or expenditure, to record the capital transactions and the distribution of profit or loss [Guo, 1988, p. 303].

The techniques of record keeping under the *TianDi He*

EXHIBIT 2

Books System of *TianDi He Zhang*



Source: Guo, Daoyang, *History of Chinese Accounting* (1988): 301

Zhang, fairly similar to that of the *Longmen Zhang*, were double-entry bookkeeping. All transactions must be simultaneously recorded in two corresponding accounts in the journals or ledgers with opposite directions, i.e., *Shou* (Receipt) and *Fu* (Pay).[13]

The major difference between the *Longmen Zhang* and *TianDi He Zhang* is in the aspect of trial balancing. The latter focused on the *Cunchu Jiece* (Summary of Stocks and Claims) to prepare the trial balance. Hence, the balances of *Cun* (stocks) accounts and *Gai* (claims) accounts were summarized at the end of the period. The two sides were balanced by the earning of current period:

Cun (stocks) = *Gai* (claims) + Earning (profit or loss)

Apparently, profit or loss was used as a weight to balance the two sides of the Summary of Stocks and Claims. If the record keeping was correct, the total amount in the two sides must be equal with the addition of profit or loss, which was called *TianDi He* (matching of Heaven and Earth) [Guo, 1988, p. 299]. The significance of the procedure is that, by applying *TianDi He Zhang*, merchants and bankers recognized that the earning accounts were only temporary and that they must be closed and transferred into the Summary of Stocks and Claims (real accounts) to reflect the net changes of stocks (assets) of the period.

Nevertheless, the *TianDi He Zhang* is very similar to the Italian-style double-entry bookkeeping. It was a relatively advanced Chinese version of double-entry method utilized before the nineteenth century. However, the method was imperfect. Some of the weaknesses were: insufficient classification of journal and ledger accounts; lack of distinctive separation between capitals vs. liabilities, and capitals vs. earning, as well as relatively overelaborate and imprecise techniques in journal entries and posting. These problems may explain why the *TianDi He Zhang* was unable to compete with the imported Italian-style

[13] In practice, some merchants separated cash and non-cash transactions in record keeping. For cash transactions, only the corresponding side of cash receipt and disbursement was initially recorded on Cash Journal, while the record of cash side was omitted. However, at regular interval, the total cash receipts, payments, and balance in the period were summarized and posted to the book of general ledger periodically [Guo, 1988, p. 306]. In fact, such a procedure of "Simplification of cash journal entries and periodical sum-transfer to general ledger" remains a form of double-entry.

double-entry bookkeeping and failed to survive after the mid nineteenth century.

SUMMARY

This paper has examined the evolution of Chinese bookkeeping before the nineteenth century, with an emphasis on the development of double-entry bookkeeping in China. This historical review demonstrates that Chinese bankers and merchants invented double-entry bookkeeping spontaneously around the late fifteenth and early sixteenth centuries. Although there were several versions and recording techniques, the underlying principles of Chinese double-entry bookkeeping were similar to the Italian-style bookkeeping developed in Europe at about the same time. It should be mentioned that the origination of Chinese versions of double-entry bookkeeping, unlike the development in to other European countries originated from Italian practices, occurred independently of the Italian version and other Western disseminations.[14]

Chinese versions of double-entry bookkeeping should be a subject of interest to the accounting community throughout the world. As evidenced by Chinese experience, the emergence of double-entry was a process of evolution rather than revolution. A relative advanced level of single-entry techniques was a precondition (although not a sufficient condition) for the invention of double-entry bookkeeping. The transition from single- to double-entry was evolutionary and took a fairly long period. A hybrid form of single-entry and double-entry was an important step in the transition process.

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[14] Although historical data demonstrate Chine has long been involved in some kinds of cultural and commercial exchange with other countries (Southeast Asia and Middle East in particular) in history [Li, 1971; Garraty and Gay, 1972; Cotterell and Morgan, 1975; and Kublin, 1988], there is no sufficient evidence at present to indicate the existence of the influence from Europe or Middle East on the origination of Chinese-style Double-entry. Actually, according to Chinese accounting historians, the Italian-style double-entry bookkeeping was first adopted by a Chinese commercial bank, China Communication Bank, in 1897 when the bank hired Britons to design and implement a new accounting system [Guo, 1988, p. 333]. The first Chinese book introducing the Italian-style bookkeeping was written by Cai Xiyong, a Chinese scholar who has studied in Japan for several years, and published in China in 1905 [p. 314-315]. However, whether there was a link between the earlier Chinese-style Double-entry and that in the central Europe or elsewhere is still unknown, which may be worthy of further historical study in future.

The invention of double-entry bookkeeping in China is a result of the societal and economic progress, especially it was relating to the levels of development in business, productivity, and technology. The need for new recording methods stemmed from the increased credit-debt relationships. This, along with the need to determine periodic earning (profit or loss), seemed to be the motivating force for the transition of single-entry to double-entry. As the volume and complexity of the commercial and industrial activities grew, double-entry bookkeeping became a necessary device to keep track of the expanded business transactions and to produce more complete and accurate information about the operations.

Although double-entry bookkeeping underwent notable improvement in China after the late fifteenth century, the Chinese-style double-entry techniques remained in a primitive state. Both the *Longmen Zhang* and *TianDi He Zhang* were far from perfect by modern standards. This was determined by the relatively low level, comparing to the West, of productivity and technology in the Chinese economy. The lack of large-scale commercial and industrial productions before the nineteenth century might have hampered the further progress of Chinese double-entry bookkeeping.

The significance of Chinese experience, however, is substantial as it provides interesting insights into the invention of double-entry bookkeeping. Hence, this study promotes the advance of accounting knowledge since today's existing literature contains insufficient coverage of the antecedents and the evolution of the double-entry bookkeeping in the world.

REFERENCES

Brown, R. G. and Johnston, K. S., *Paciolo on Accounting*, New York: McGraw-Hill (1963).

Chatfield, M., *History of Accounting Thought*, Huntington, NY: Robert E. Krieger Publishing Co. (1977).

Cottrell, A. and Morgan, D., *China: An Integrated Study*, London: Harrap & Co. (1975).

Ebrey, P. B., *Chinese Civilization and Society: A Sourcebook*, London: The Free Press (1981).

Eldridge, H. J., *The Evolution of the Science of Bookkeeping*, London: Gee and Company (1954).

FitzGerald, C. P., *The Southern Expansion of the Chinese People*, London: Barrie & Jenkins (1972).

Fu, Phillip, "Governmental Accounting in China During Chao Dynasty (1122 B.C.-256 B.C.)," *Journal of Accounting Research* (Spring 1974): 40-51.

Garraty, J. A. and Gay, Peter, *The Columbia History of the World*, New York: Harper and Row (1988).

Guo, Daoyang, *History of Chinese Accounting* (Chinese Version) Vol. I (1982); Vol. II, (1988), Beijing: Chinese Finance and Economics Publishing House.

Guo, Moruo, *The History of China*, Beijing: People's Publishing House (1976).

Jack, S. M., "An History Defence of Single-Entry Bookkeeing," *Abacus* 2 (December 1966): 137-158.

Kats, T. A., "Surmise Regarding the Origins of Bookkeeping by Double-Entry," *Accounting Review* 5 (December 1930): 311-316.

Kojima, Osamu, *Historical Studies of Double-Entry Bookkeeping*, Kyoto: Diagakudo Shoten (1975).

Kublin, Hyman, *China*, Boston: Houghton Mifflin Company (1972).

Lau, Amy H. and Yang, J., "Auditing in China: Historical Perspective and Current Developments," *The International Journal of Accounting* 1 (Spring 1990): 53-62.

Lee, G., "The Development of Italian Bookkeeping: 1211-1300," *Abacus* 9 (December 1973): 137-155.

_____, "The Coming of Age of Double Entry: The Giovanni Farolfi Ledger of 1299-1300," *The Accounting Historians Journal* (Fall 1977): 79-95.

Li, Dun J., *The Ageless Chinese: A History*, New York: Charles Scribner's (1971).

Littleton, A. C., *Accounting Evolution to 1900*, New York: Russell & Russell (1966).

_____ and Yamey, B. S., *Studies in the History of Accounting*, Richard Irwin: Homewood, Ill. (1956).

Most, K. S., "Sombart's Positions Revisited," *The Accounting Review* 47 (October 1972): 722-734.

_____, "How Wrong Was Sombart?" *The Accounting Historian* (Spring 1976): 1, 6.

_____, *Accounting Theory*, Toronto: Holt, Rinehart and Winston (1986).

Needham, J., *Science and Civilization in China*, Cambridge: Cambridge University Press (1954).

Nobes, C., *The Development of Double Entry: Selected Essays*, New York: Garland Publishing (1984).

Parker, R. H., "Reckoning, Merchants' Accounts, Bookkeeping, Accounting or Accountability? The Evidence of the Long Titles of Books on Accounts in English 1543-1914," in (Parker, ed.) *Papers on Accounting History*, New York: Garland Publishing (1984).

Pen, Xingwui, *Chinese Monetary History*, Beijing: People's Publishing House (1958).

Peragallo, E., *Origin and Evolution of Double-Entry Bookkeeping*, American Institute Publishing Co. (1938).

Rugoff, Milton, *Marco Polo's Adventures in China*, New York: American Heritages Publishing Co. (1964).

Skinner, R. M., *Accounting Standards in Evolution*, Toronto: Holt, Rinehart & Winston (1987).

Ten Have, O., *The History of Accountancy*, Bay Books: Palo Alto, CA (1976).

Thomson, H. W. and Yamey, B. S., "Bibliography of Bookkeeping and Accounts — 1494 to 1650," *Journal of Accounting Research* 9 (1958) 239-257.

Williams, J. J., "A New Perspective on the Evolution of Double-Entry Bookkeeping," *The Accounting Historians Journal* (Spring 1978): 29-39.

Winjum, J. O., "Accounting and the Rise of Capitalism: An Accountant's View," *The Accounting Review* (October 1971): 333-350.

Yamey, B. S., "Notes on the Origin of Double-Entry Bookkeeping," *The Accounting Review* 22 (July 1947): 263-272.

_____, "Fifteenth and Sixteenth Manuscripts on the Arts of Bookkeeping," *Journal of Accounting Research* 5 (Spring 1967): 51-76.

_____, *The History Development of Accounting: A Section of Papers* (1978).

Yuji, Iriji, "A Framework for Triple-Entry Bookkeeping," *The Accounting Review* (October 1986): 745-759.

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GOVERNMENT/BUSINESS SYNERGY: EARLY AMERICAN INNOVATIONS IN BUDGETING AND COST ACCOUNTING

Abstract: This paper examines certain interactions between American government and business which resulted in important innovations in the areas of budgeting and cost accounting early in the twentieth century. The evidence suggests that budgeting methods were initially developed by municipal reformers of the Progressive era and were subsequently adapted by business for planning and control purposes. In like fashion, standard costing and variance analysis were significant cost accounting techniques born to an industrial environment which came to contribute markedly to a continuing improvement of governmental budgeting procedures.

Budgeting is a major tool of business and government in the contemporary world. Its central role in planning and control is so well established that it is difficult to remember that, unlike double-entry accounting, budgeting is a very recent innovation. Budgeting in the United States is barely a century old, introduced and refined in the first three decades of the twentieth century as a product of governmental and business synergies. This paper examines the early history of municipal budgeting with particular reference to the interaction between governmental reformers and scientific management specialists of the period. The importance and value of budgeting as a control mechanism was initially appreciated by a host of Progressive era municipal figures at the turn of the century. With the passage of time, this lesson was communicated to the world of business. However, early governmental budgets were limited in their effectiveness, particularly as a planning device, until pur-

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poseful cost accounting became integrated into the systems. Accounting techniques, such as standard costing and variance analysis, were initially developed in the United States by the engineering profession, but were later communicated to government from industrial practice.

The early history of municipal budgeting in the United States occurred against the political backdrop of the Progressive movement. For the three decades between 1890 and 1920, reformers fought an ongoing battle against corruption, bossism, unbridled plutocracy, and the general erosion of traditional values. Many of these efforts were focused on American cities, branded by such epithets as "America's most conspicuous failure" and "the most corrupt in Christendom" [Holli, 1974, p. 134]. Political remedies designed to return "honest men" to government through openness in the municipal process and the elimination of cronyism and ward politics were articulated [Upson, 1926, p. 136; Hays, 1971]. Budgeting for control purposes was a concept pivotal to the activities of the numerous groups and individuals dedicated to the reform of municipal governance.

During the same time, new techniques of production and scientific management were being developed within the industrial sector. The new accounting techniques which accompanied the scientific management innovations of Frederick W. Taylor were sweeping, particularly in the areas of standard costing and common costs allocation. The synergies between governmental budgeting, business cost accounting, and engineering advances in standard costing formed the foundation of modern cost and budget procedures in both the private and public sectors.

GOVERNMENTAL BUDGETING: EARLY HISTORY

Though there is evidence of rudimentary budgeting activity in both the Chinese [Fu, 1971, p. 41] and Roman [Brown, 1905, pp. 30-40; Rogers, 1932, p. 186] civilizations, the real antecedents of American governmental budgeting were English. Stourm [1917, pp. 10-3] traced a prohibition on unlicensed spending from the *Magna Carta* to the *Petition of Right* in 1628. A more modern linkage to control the British Crown's power to tax was evinced by the "national budget" in 1760 [Theiss, 1937, p. 43]. There are divergent views as to precisely when in the nineteenth century municipal accounting in general and budgeting in particular became effective in England [Holls, 1896, p. 229;

Haskins, 1901, p. 308; Theiss, 1937, p. 44]. Notwithstanding, a time lag ensued as serious beginnings were not in evidence in the United States until the early twentieth century. British governmental budgets remained a yardstick by which to measure nascent American efforts [Powers, 1909, pp. 261-2].

Uniform municipal accounting efforts predated budgeting advances in this country by at least a decade. In 1894, the National Municipal League (NML) was founded as a capstone organization to a number of state and local reform societies [Fleischman, 1987, p. 297]. An early emphasis of the NML was uniformity in municipal financial reporting. Different accounting methods were frequently in evidence among various departments of the same municipality [Hartwell, 1899, p. 127; Haskins, 1901, p. 312]. In 1899, a proposed municipal program appeared featuring reporting schedules (model forms) of NML design [Rowe, 1899]. Shortly thereafter in 1901, the Committee on Uniform Municipal Accounting and Statistics was established under the leadership of E. M. Hartwell. Reports appeared yearly until 1905, citing municipalities which had adopted the NML's model forms. Hartwell [1905, pp. 223-5] listed 28 papers on uniform municipal accounting which had appeared in the NML *Proceedings*, between 1896 and 1904. The Committee's efforts to effect standardization received a boost from the U.S. Department of Labor and the Census Bureau. In 1898, Congress asked the Department of Labor to gather comparative statistics on cities, an onerous task which would have been reduced an estimated 90% if the NML forms had been universally employed [Hartwell, 1901, p. 256]. The Census Bureau took up the cudgels in 1903, sponsoring a conference of auditors, comptrollers, and expert accountants on the subject [Woodruff, 1904, p. 119]. Commencing in 1904, papers written by Census Bureau personnel regularly appeared in the NML's *Proceedings*. These articles, outlining the contribution uniformity could provide in terms of comparability and accountability, were most often written by LeGrand Powers, the Bureau's Chief Statistician [Powers, 1905; 1908; 1909; Hole, 1912].

It was at least a decade after the municipal reform movement started before interest in the subject of budgeting began in earnest. In 1900, budgeting remained virtually unknown in the United States [Stewart, 1950, p. 7]. Henry Bruere of the influential New York Bureau of Municipal Research had never heard the term "budget" until it was brought to his attention by Thorstein Veblen, his economics professor at the University of

Chicago [Dahlberg, 1966, p. 149]. As late as 1917, journals still put quotation marks around the word *"budget"* in a municipal context [*Ibid.*]. An "expense budget" was mentioned in the NML *Proceedings* in 1900, but only as a basis for determining tax levies [Henderson, 1900, p. 252]. Haskins [1901, pp. 302-14] in his lengthy article on Chicago's municipal governance, did not even mention budgeting as a potential reform area. It was not until 1908 that the regular contributors to the *Proceedings* began to address budgeting issues [Chase, 1908, p. 339; Powers, 1909, pp. 260-70]. Nine papers on budgeting appeared in the *Proceedings* between 1909 and 1912 [Stewart, 1950, p. 128]. In 1909, the NML established the Committee on City Finance and Budgets, replaced four years later by a successor group, the Committee on Municipal Budgets and Accounting [*Ibid.*, pp. 128-9].

The United States is the only major nation whose history features an initial establishment of budgetary systems at subnational governmental levels [Chatfield, 1977, p. 194]. Early budgeting reform was oriented toward controlling the increasing costs of municipal government precipitated by political corruption [Rightor, 1916, p. 406; Cleveland and Buck, 1920, p. 70]. The Tweed Ring in New York City remains the classic example of the jobbery associated with the spoils system, ward politics, and rampant political patronage. Buck [1926, p. 4] related the story of a court house with an estimated value of $250,000 constructed for a modest eight million dollars of municipal funds. New York Comptroller Prendergast [1912, pp. 47-8] observed, "it was this uncontrolled and uncontrollable increase in the cost of government that... became the soil in which the budget idea finally took root and grew."

The first serious article on budgeting in the NML *Proceedings* appeared in 1908. Chase [1908, p. 339] described how municipal budgets, where they existed at all at that time, were little more than departmental estimates of the following year's expenses with justifications provided only if increases from the previous year were requested. Appropriations were typically of the "mongrel" or lump-sum variety with unrelated expenses amalgamated into single line items. For example, the 1911 budget of Philadelphia committed $25,000 for "postage, ice, files, incidentals, meals, repairs, advertising loans, and entertainment of city and visiting officials" [Sands and Lindars, 1912, p. 139]. Since estimates had very little basis in fact and were slashed substantially to benefit favored special interest groups, departments regularly encountered financial shortfalls. In these in-

stances "special revenue bonds" were issued to cover year-end deficits [Sait, 1913, p. 48]. Given these methods, early budgeting was little more than a "license to spend" [Rightor, 1916, p. 406].

Budgeting literature is replete with commentaries identifying the problems of these early days. An obvious shortcoming was the lack of control, either by a responsible executive, an accountable department head, or an involved citizenry. Municipal budget making was most frequently in the hands of a select few. Appropriations were typically the end result of special-interest-group log-rolling, a political rather than an accounting event [Powers, 1909, p. 260; Beard, 1912, p. 145]. Departmental estimates were seldom correlated with actual needs nor were comparisons made with previous years. Budgets were passed in piece-meal fashion, and as such were little more than departmental appropriations rather than an expenditure plan for the entity as a whole. The pivotal relationship between revenues and expenditures and the effects of spending on a city's credit or debt structure were rarely considered [Powers, 1909, pp. 262-3; DeWitt, 1915, p. 321].

For urban reformers of the early Progressive period, the answer to these criticisms was the "segregated" or "classified" budget. The idea was to group departmental expenditures according to function [Bruere, 1913, pp. 183, 190-1; Schiesl, 1977, pp. 106-7]. It was here that the early uniform municipal accounting efforts of the NML and the Census Bureau became linked to the budgeting movement. Chase, in an address reported in the *National Municipal Review* [1915, p. 185], spoke of the process by which municipal governments, commencing with Newton, Massachusetts in 1900, had extended the categories of the model forms to the budgeting function. This modicum of standardization addressed the comparability issue that Powers [1909, pp. 267-70] had identified as a shortcoming of early budgeting. Now with a functionally universal chart of accounts for many American cities, projected expenditure numbers could be conveniently compared not only with past years, but with other entities as well.

A primary agent in implementing this change was the municipal research bureau [Fleischman and Marquette, 1986, pp. 73-4]. The first and most influential was founded in New York City when in 1906 three young reformers (Cleveland, Bruere, and Allen) formed the New York Bureau of Municipal Research (NYB). The NYB was generously supported by philanthropists of the magnitude of Andrew Carnegie, J. P. Morgan, and John

D. Rockefeller [Gill, 1944, pp. 16-7; Dahlberg, 1966, pp. 166-7]. The impact of the NYB on New York's budgeting process was immediate and continuous, advances which were not hidden under a bushel. Herman Metz, the enlightened New York City Comptroller, endowed a fund for disseminating "handbooks" to three hundred U.S. municipalities popularizing the new methods. The NYB also established a graduate training school for municipal government officials in 1911. Graduates accepted posts throughout the country and contributed to the movement toward improved municipal budgeting in the following decade.

The NYB was also instrumental in harnessing popular support to the reformers' cause through the agency of the "budget exhibit." An alliance with an informed and vigilant citizenry was essential to early budgeting progress. The NYB sponsored the first budget exhibit in 1908. Intended as an exposé of corruption and inefficiency, New Yorkers were informed that the city had paid $.60 each for six-cent coat hooks, and had then hired two full-time workers for an entire month to install 165 of them [Woodruff, 1908, p. 154]. Subsequent exhibits in 1910 and 1911 were attended by crowds in excess of one million people. The NYB had found a way to turn budgeting into news, and the resulting press coverage brought throngs of citizens to see how the city was spending their money. The idea of the budget exhibit spread to over twenty other American cities during the next decade [Upson, 1915, p. 67].

The proselytizing efforts of the NYB spawned an abundance of municipal research bureaus around the country. An article in the 1916 *National Municipal Review* listed 25 of these good government agencies [Rightor, 1916, p. 637]. Budget making became a primary emphasis [Bureau of Municipal Research, 1916, p. vii]. The NML's "model program" in 1899 had been a source of inspiration for the uniform municipal accounting movement. In 1915, a second municipal governance paradigm appeared with more explicit budget provisions. In particular, detailed estimates were mandated not only for current expenses but for permanent improvements as well. Comparative budget numbers with past and future years permitted planners a better understanding of the city's financial position [Woodruff, 1919, pp. 208-9].

An interesting new feature of the 1915 program was a recognition of the value inherent in state supervision [*Ibid.*, pp. 205-6]. State governments proved significant allies as municipal budgeting improved. Rowe [1899, p. 109] observed how some

states examined the local accounts of constituent municipalities at an early date. The lead of Minnesota and Wyoming was mentioned as an important contributing factor to the early history of the uniformity movement. Ohio, in 1902, became the first state to mandate that its cities adopt the NML's standard forms for municipal reporting [Fleischman and Marquette, 1987, p. 86]. Hole [1912, p. 687] of the Census Bureau paid tribute to those states whose bureaus of accounting had prescribed forms to assist in budget making comparability. By 1920, 44 of the 48 states had either adopted or introduced budgeting legislation, following the lead of Wisconsin and California [Cleveland and Buck, 1920, p. 118]. Buck [1926, pp. 5-6], who literally wrote the book on municipal budgeting, paid homage to state research bureaus and laws for assisting the advance of scientific budgeting.

However, a similar assist was not forthcoming from the national level. President Taft, though imbued with the budgeting spirit, was unable to achieve enabling legislation. He appointed Frederick Cleveland, a founding father of the NYB, to lead his Committee on Economy and Efficiency in 1911. Subsequently, Taft wrote an introduction to Cleveland's budgeting monograph in which he espoused the idea in best Progressive rhetoric that governmental budgeting was essential to the elimination of "invisible government" [Cleveland and Buck, 1920, p. xiii]. However, it was not until 1921 that the first national Budgeting and Accounting Act was passed.

The early history of municipal budgeting can be divided chronologically into two distinct periods with 1914 being the watershed. Uniformity and comparability, as previously described, were the watchwords of the first phase. It was also a time when urban reformers came to realize that even honest, well-intentioned officials could not by themselves guarantee efficient governance [Woodruff, 1919, pp. 262-3]; the so-called "goodness fallacy" as Allen [1913, pp. 10-2] eloquently put it. It was a developmental stage in which governmental reformers functioned as "slaves to system," wherein the best of intentions could not diminish the red tape leading inexorably to inefficiency and waste [DeWitt, 1915, pp. 320, 331-32].

The report of the NML's Committee on Municipal Budgets [1914, pp. 218-22] summarized the state of the art at the watershed. The major points, though providing few earthshaking advances, reflected a useful two decades of progress: (1) the annual municipal budget was to act as the foundation of the finan-

cial system; (2) budgeting was essentially an executive act; (3) the budget was to be comprehensive and classified by the organizational units of government and function; (4) the budget was to be itemized in the greatest practical detail; (5) the budget was to be made comparable with the previous year's, particularly with regard to revenues and expenditures; (6) budgetary categories were to distinguish capital outlays from maintenance/operations; and (7) the budget was to serve as the basis for the annual appropriation act.

BUSINESS BUDGETING AND COST ACCOUNTING

Chatfield [1977, p. 196] observed that "cost accountants helped systematize budgeting by establishing a system of records within which standard costs could be developed and routinely compared with actual results." Traditional accounting history texts (Chatfield, Garner, Littleton, Solomons) have dated the advent of meaningful cost accounting from the mid-1880s, an aspect of the scientific management movement. Inspired by the insights of Frederick W. Taylor, a variety of new productive methods and managerial approaches were introduced to American industrial enterprises. A cost accounting literature appeared for the first time featuring works from both sides of the Atlantic. Accounting theorists articulated many good costing ideas, particularly standard costing and variance analysis [Metcalfe, 1885; Garcke and Fells, 1887; Norton, 1889]. However, it was the engineering profession that was more instrumental in the development of standards. *The Transactions of the American Society of Mechanical Engineers* took the lead in communicating details about standard costing systems which could be used for planning and control purposes [Epstein, 1978, p. 2]. Tsuji [1975, p. 23], in tracing the contributions of three industrial engineers during the early 1900s, noted how many engineers advocated "engineer's accountancy" in preference to "accountant's accountancy." Although Tsuji [*Ibid.*, p. 28] found examples of forecasts, standards, expected versus actual cost comparisons, and, most importantly, the extension of these ideas to administrative costs, he did not find the use of the word "budget."

Accountants, on the other hand, were unimpressed by cost accounting and generally considered "cost-keeping" and "cost-finding" the work of others [Epstein, 1978, p. 3]. Advances in cost accounting techniques may have been hampered by the prevailing opinion that such systems were properly treated as

business secrets to be hoarded and used for competitive advantage. The secrecy explanation for cost accounting's late development has been frequently claimed [Garner, 1954, p. 30; Chatfield, 1977, p. 104; Wells, 1978, p. 62], a characterization which Fleischman and Tyson [forthcoming, p. 8] found fallacious at least during the British Industrial Revolution. *The Journal of Accountancy (JA)* [1908-9, pp. 333-4] reprinted an article from the *Engineering Record* which contended there was no secrecy among large contracting firms with regard to costing despite the industry's highly competitive nature.

Recent research in American cost accounting history has suggested an earlier timetable for sophisticated cost accounting. Chandler [1977] found origins in the golden age of American railroading; Johnson [1972] at the Lyman textile mills in New England around 1850; and Hoskin and Macve [1988] at the Springfield Armory in the 1840s. Edwards [1989; 1991] and Fleischman/Parker [1991] have detailed purposeful eighteenth century costing during the British Industrial Revolution.

Though norm-based standards were a feature of earlier times, the transition to variance analysis and, inevitably, to budgeting did not predate the 1890s. An early business budget was presented by H. M. Lane at a New York meeting of the American Society of Mechanical Engineers in 1896. Lane provided a format for developing and examining actual and standard production costs on a month-by-month and year-to-date basis. The system was designed to provide managers with an early warning of deviations from planned levels of cost and production. From an historical perspective, Lane's contribution appears to have been a major step forward in using cost data for purposes of planning and control. To his contemporaries, however, caught up as they were in scientific management's frenzy of time and motion studies, it seemed woefully inadequate. In the discussion which followed his presentation, Lane was told that engineers should strive for a system which focused attention to deviations, not monthly, but:

> . . . on the very day when they occur, and where (the manager) can know at six o'clock at night whether he earned a dollar for the company or lost one, and the exact spot where it was lost too, that he may regain it the next day [Lane, 1897, p. 227].

This enormous faith in the possibilities of the scientific method ensured the continued development of standard costing.

It would be many more years, however, before the concept of budgeting was extended beyond the manufacturing process, and twenty years before the word "budget" began to appear regularly in the business literature.

Though standard costing was an innovation of industrial engineers and accountants, there is ample evidence to suggest that budgeting was a lesson conveyed from government to business during the 1920s. At the 1922 conference of the National Association of Cost Accountants (NACA), Stephen Gilman of the International Accountants Society claimed that "the modern business budget is an inheritance from the municipal and governmental budget" [NACA *Yearbook*, 1922, p. 263]. At the same meeting, W. O. Cutter, the Comptroller of U.S. Rubber Company in New York, acknowledged that "no mention is made of the use of the budget in industry because it has been the custom until recently to consider a budget only something which had to do with government finances" [Cutter, 1922, p. 237]. Walter Vieh [1925, p. 173], writing for *JA* began his article, "Why the Budget?" by admitting that "most of us think of budgets as having something to do with public finance or with the successful management of a household." Resistance to business budgeting could, in fact, be attributed to "a reluctance to subject . . . business to methods which seem . . . to be of governmental origin" [Bruere, 1925, p. 664].

Although Solomons [1952, pp. 45-9] cited de Cazaux (1825) in France and Hess (1903) and Bunnell (1911) in this country as precursors of business budgeting, the initial introduction of the "budget idea" to U.S. business came from the general business literature of the post-World War I period. During 1921, J. O. McKinsey, a Chicago CPA, published a series of nine articles in the newly established journal, *Administration*. These articles provided a cogent rationale for business budgeting, followed by an in-depth development of a master budget. He also described the importance of the budget committee and internal lines of authority and responsibility for effective budgetary control [McKinsey, 1921 a-i].

Beginning in 1920, trade associations were becoming active in introducing budgeting to U.S. business. The first volume of *The Accountants' Index* [1920] listed only four trade association articles on the application of budgeting to the construction, retail dry goods, engineering, and iron production industries. In the *1921-22 Supplement*, by contrast, there appeared 55 trade association articles on budgeting, ranging from the casket

manufacturers' association to the ice cream trade journal. Likewise, the overall emphasis was shifting away from literature on government budgets (over 100 articles in 1920; approximately 50 in 1921-2) to business budgets (fewer than a dozen in 1920; in excess of 140 in 1921-2). When *The Accountants' Index* published a *Second Supplement* for 1923-27, the shift was nearing completion with almost 300 references to business budgeting and a mere 40 on governmental topics. Despite this emerging business literature, it was still not an *accounting* literature. Most articles were to be found in journals aimed at management (e.g., *Administration, Factory,* and *100% Management*) or industrial engineering (e.g., *System* and *The Bulletin of the Taylor Society*).

An examination of *JA* during the first two decades of the twentieth century demonstrates how business budgeting developed from earlier governmental efforts. *JA* began publication in late 1905. From 1905 to 1916, there were only a dozen articles on the subject of budgeting, each referring to governmental budgeting and each authored by a municipal finance expert. The word "budget" appeared in *JA* as a major subheading for the first time in 1914 in an article discussing the need for a national budget to curb runaway spending by the federal government.

Remarkably, from 1916 to 1922 there were no major index headings for "budget" or "budgeting" in *JA*. Cost accounting papers appeared; standard costing papers appeared with continuing frequency; but the word *"budget"* disappeared. Then in 1924, an article was published discussing the implementation of budgeting for a newspaper [Lazarus, 1924]. This paper was one of a series of writings describing the installation of budgets in different industries. The series, sponsored by the Metropolitan Insurance Company, was based on surveys of policy-holders regarding their budgeting practices. The results were then summarized and distributed to all policy-holders as a customer service. The series began in the early 1920s with the pamphlets being codified into book form several years later [Bruere and Lazarus, 1926]. Unfortunately, these early writings on business budgeting failed to receive much attention in mainstream accounting literature. It is also interesting to note that even the Metropolitan Insurance Series was written by experts in *governmental* budgeting. This pattern in the accounting literature supports Theiss' [1937, p. 53] general point that the thrust of budgeting literature was entirely governmental through the conclusion of World War

I, and that business budgeting as a significant topic only appeared thereafter.

The elements were all in place for budgeting to emerge as a major management tool. The idea and the basic structure had been provided by governmental accountants. The concept that costs could be measured, standardized, and routinized had long been a part of business practice. Industrial engineers had added systems for collecting and allocating cost data, and had brought these methods center stage in the literature. By 1920, NACA could point to 69 industries in which unified standards had been articulated for price-fixing purposes [Chatfield, 1977, pp. 183-4]. Coupled with the efforts of the trade associations, the outpouring of literature was impressive. Yet, accountants and accounting journals continued to manifest little interest in the budget. As late as 1922, a NACA conference participant, George Lamb of Haskins and Sells, complained that the "literature is almost barren as regards budgets" [NACA *Yearbook*, 1922, p. 267].

The primary agent responsible for changing this state of affairs and introducing accountants to the budgetary process was the NACA. Although there is no mention of budgeting or budgets in the first two volumes of the NACA's *Official Publications*, the third (1921-22) contained an article by J. O. McKinsey describing the relationship between budgeting and cost accounting [NACA *Official Publications* #8]. In his article, McKinsey described the manner in which costs are fed into the budgetary planning process and described the advantages of coordinating the various segments of a business through the budgeting mechanism. McKinsey was only trying to gain the accountants' cooperation, however; he was not advocating that accountants become budget analysts. In his book, *Budgetary Control*, published in 1922, McKinsey complained that data provided by the accounting department were not sufficiently timely to be useful in the budgeting process [1922, pp. 40, 292-3]. McKinsey was not alone in thinking that this was not accountants' work. At this point, even the accountants were awaiting the innovation of the "budgetary engineer" [Cutter, 1922, p. 237].

Throughout the 1920s, NACA worked to popularize budgeting through official publications and speakers at its annual conferences. A full session was devoted to budgeting at both the third (1923) and the fourth (1924) meetings. At the latter conference, a session was also dedicated to the work of trade associa-

tions in disseminating cost data and budgetary techniques.

From 1923 to 1927, nine additional articles on budgeting appeared in the NACA *Official Publications*. Nevertheless, a notable chairman at the 1927 conference, Arthur E. Andersen of Chicago, opened his session by confessing that budgeting was an area where "our knowledge and experience is all too limited . . ." [NACA, *Yearbook*, 1927, p. 236]. In this same session an interesting change could be noted in the attitude of J. O. McKinsey. McKinsey, the keynote speaker in Andersen's budgeting session, now argued that accountants *should* assume major responsibility for the budget [McKinsey, 1927, p. 242].

Interestingly, McKinsey had provided a major tool for movement in that direction with the publication of his book *Budgetary Control*. McKinsey [1922a, p. iii] offered his book as "the first attempt . . . to present the subject [of budgeting] as a whole." "In the past," he continued:

> . . . budgetary control has been considered primarily in connection with governmental units. . . . As a consequence many people have come to think of budgetary control as an instrument for governmental administration. Not only is this the popular view but practically all the literature on budgetary control is confined to a discussion of governmental budgets [*Ibid.*, p. 4].

The state of the art, as described by McKinsey, included only a small number of firms practicing budgeting in an informal manner. Most did not use it at all [*Ibid.*, p. 12]. The book focused on the planning aspects of the budget process. Indeed, of six goals of "scientific" budgeting, only one related to expenditure control [*Ibid.*, p. 422]. The book was highly praised in a *JA* review [Oakey, 1923], with McKinsey being congratulated for a thorough and cogent explication on how business enterprises could benefit from detailed budgeting. That cost accountants had not made much use of earlier published works in business budgeting could be verified by examining the discussions on the topic published in the NACA *Yearbook*. "Mr. McKinsey's splendid book is the first real effort that has been made in this important subject.. . . Professional accountants have something new to think about" [NACA *Yearbook*, 1922, p. 267].

The earliest articles on business budgeting to appear in major accounting journals concurred that business budgeting did not mature until after the end of World War I [Rogers, 1932, p. 186; Theiss, 1937, p. 49]. It is clear that the war effort, with

governmental demands for increased productivity and standardized products and processes, furthered the development of an atmosphere where routine budgeting could flourish.

Research into the corresponding relationship between British government and industry during the same period has corroborated the impact of war materiel contracting on improved cost accounting methods [Loft, 1990]. Still, it was not until the Great Depression that cost control in the United States became a matter of supreme importance to business management. A similar reaction had occurred during the recession of 1920-21, but many businesses which had adopted budgets for survival dropped them with the return of prosperity [Sweet, 1922, p. 225]. While early business budgeting had attempted the control of marginal, *"discretionary"* spending like advertising and charitable contributions [Theiss, 1937, p. 48], the Depression made budgeting a matter of business survival.

By the early 1930s, production budgeting had become a well established technique. Sophisticated sales budgets were prepared which incorporated estimates of market share, industry outlook, and macro-economic business cycle activity [Rogers, 1932, p. 193]. Distribution and administrative costs were not merely budgeted, but allocated back to products and departments. Rudimentary flexible budgets were introduced into management literature with works by an unnamed factory manager at Penberthy Injector [1922], Maynard [1928], and Drucker [1929].

Like government, business had learned that "there can be no effective control of . . . costs unless there is a proper classification of accounts" [Rogers, 1932, p. 196] with costs recorded by line item in the department that incurred them. In the final analysis, business developed financial budgets for short and long-term planning, for cash flows, and for capital acquisitions. This trend toward business budgeting was supported by the financial community. Banks often gave superior credit ratings to businesses that had instituted budgeting; credit organizations endorsed this new idea for financial planning; and, as previously described, insurance companies distributed instructions on the implementation of budgets as a form of institutional advertising [Theiss, 1937, p. 52].

COST ACCOUNTING ADVANCES IN MUNICIPAL GOVERNMENT

Accounting historians have recognized the contribution of industrial engineering and cost accounting in introducing to government performance standards previously developed in the business sector [Chatfield, 1977, p. 195]. These linkages between business and municipal governance became more pronounced in the second stage of the early history of municipal budgeting. It was not until the later Progressive era (circa 1914) that urban reformers began to stress in the literature the lessons that could be learned from the private sector. From the onset of the organization, the NYB was closely tied to the business community, both ideologically and financially [Bureau of Municipal Research, 1913, pp. 203-5]. It was a stated ideal that citizens should have the same quantity and quality of information about their city as stockholders were provided for the companies in which they invested [Dahlberg, 1966, pp. 203- 4]. Bruere [1913, p. 103] wrote of the NYB's goal of "bringing city business methods up to the level of best private business methods. " Rightor [1916, pp. 403-4] observed that one of the dominant features of budgeting recently was the increased interest and involvement of citizens generally and businessmen specifically. In a 1920s retrospective, a prime mover in the municipal reform movement identified the modern city as a great business corporation where success is linked to systems modeled on private business [Upson, 1926, pp. 135-6].

A transition to a greater business orientation was reflected by two new directions in the reform movement's leadership. First, academicians and public affairs students ceased operating as the driving force in municipal reform as had been the case [*JA*, 1908-9, pp. 333-4; Cleveland and Buck, 1920, pp. 70-1]. The early leadership gave way to municipal officials better positioned in authority roles to effect change. Second, there developed an appreciation for the fact that budgeting improvement could only take place in the presence of centralized, executive leadership, be it a mayor or city manager, representing the city as a whole [Beard, 1912, p. 148; Cleveland and Buck, 1920, pp. 70-1]. Only in this way could the preparation of the annual budget be an accounting rather than a political event. An interesting example of this realization was the effort of Comptroller Metz of New York to establish control of the budgeting process. Even with the standardization of forms for the city, he found that his

office was not empowered to furnish adequate control. A number of conferences with financial and accounting officers from private enterprises were held, resulting in the establishment of executive, as opposed to legislative, responsibility for the budgeting process [Bureau of Municipal Research, 1913, pp. 203-5; Dahlberg, 1966, pp. 152-3].

The lag between business and governmental record-keeping was brought out forcefully in a NYB examination of the financial reports of 75 cities. The NYB concluded, "if the books of private corporations were kept with the looseness displayed by the municipalities, no expert accountant would or could certify to the correctness" [Howe, 1969, p. 328]. The cure lay in adopting efficiency measures from the private sector. Bruere [1913, p. 117] listed "veritable shibboleths" of efficiency, including standardizing, systematizing, coordinating, and controlling. The NYB [1916, p. vii] introduced a survey of municipal governance activities by indicating that administrative efficiency would be badly hamstrung in the absence of a cost accounting system and scientific budget making. Cleveland was convinced that in business every aspect of administration was controlled by cost accounting [Schiesl, 1977, p. 99]. Standard costing was that aspect of the industrial sector's accounting methodology upon which reformers focused attention. As early as 1912, Beard [1912, p. 128] identified it as a primary concern for municipal research bureaus.

During the first stage of municipal budgeting history, there was considerable interest in the classification of expenses and the comparison of expenditure levels with past years. In the second phase, the shortcomings of these approaches became evident. The utilization of past expenditures as a measure of future needs could be a meaningless exercise [Sands and Lindars, 1912, p. 146]. Costs taken in isolation, without any indication of physical outcome, were just not helpful [Beard, 1912, p. 127]. Instead, the clarion call for standard costing was frequently sounded [Prendergast, 1912, p. 51; Bruere, 1913, p. 26; Munro, 1916, p. 461; Upson, 1926, p. 148; Dahlberg, 1966, p. 205]. Municipal reformers came to accept this lesson transmitted from the business world. Even where profit was not a motivation, standard costing was able to fulfill the function of guaranteeing that the city was receiving fair value for its dollar [Buck, 1926, p. 193]. Moreover, the use of standards provided a mechanism for defending budgetary estimates and establishing

individual responsibility for expenditures at the department level and below [Taussig, 1912, pp. 59, 62].

The degree to which municipalities actually responded to these new directions is difficult to measure. The evidence is much more sporadic and anecdotal during the decade of the 1910s. Fox [1977, pp. 78-80] was convinced that the efforts of the Census Bureau, commencing in 1910, to sell the concept of "correlating unit cost with unit output" produced notable results, though specific details were not provided. Fleischman and Marquette [1988, pp. 138-43] charted advances in Cincinnati and Dayton, 1912-14, in the areas of centralized purchasing and the standardization of costs and specifications. Sands and Lindars [1912, p. 276] chronicled the development of output standards in Milwaukee. Gill [1944, p. 44] credited Cincinnati (1912), Dayton (1914), and Detroit (1918) with the adoption of new procedures in purchasing, competitive bidding requirements, standardized specifications, contract requirements, and centralized storage.

DENOUEMENT

With the close of the Progressive era, traditionally dated 1920 with the termination of the Wilson presidency, it is not at all clear that progress had been universally made on the adaption of business methods, particularly cost accounting, to municipal governance. Munro [1921, p. 381] observed that too little attention had been focused on the functioning mechanism of city government, compared with the successes of efficiency engineers in the world of business. Buck [1926, pp. 56-7], as late as 1926, was still talking futuristically about the benefits of cost accounting in aiding the budget making process, particularly in terms of determining efficiency. He was rather critical of the lag in municipal costing behind the industrial sector [*Ibid.*, p. 194]. Other municipal experts of the 1920s had visions of budget making refinements yet to come. Cleveland and Buck [1920, p. 71] discussed the possibilities of utilizing budgets for planning purposes to complement what by then had become reasonably effective control mechanisms. Upson [1926, p. 151] was satisfied that municipal officials had learned many cost accounting techniques, but that a logical next step was the "correlation" of these methods with the budgeting process.

A most depressing commentary on the state of municipal budget making was provided in *The Accounting Review* in 1934.

Morey, a leading specialist of that decade, described "a most pressing need for an improved and uniform classification of expenditures." He anticipated a cost accounting system as "clearly forward-looking in character" [Morey, 1934, p. 323]. A National Committee on Municipal Accounting had recently been organized which Morey felt confident would rectify the difficulties of earlier efforts which "lacked coordination or unification" [*Ibid.*, p. 325].

Recorders of municipal governmental accounting history have underscored the contribution of business practice to urban reform during the Progressive era. Fox [1977, pp. 87-9], for example, though unwilling to accept a business ancestry to the centralized, functionally departmentalized government structure as traditionally thought, did acknowledge the legacy of cost accounting. Potts [1978, p. 535] observed during the 1900-20 period an "overemphasis on the similarities between commercial enterprises and governmental operations," resulting in an attempted imposition of identical accounting systems. What appears to have been lacking in these analyses is the interactive nature of developments in the budgeting area. While there were serious questions as to the degree of implementation, governmental theorists and activists were outspoken in propagandizing the benefits business-derived standard costing and centralized purchasing methods could provide in the budgeting process. However, just as integral a part of the synergy were the basics of budgeting, widely adopted into business practice subsequent to their development in municipal government during the century's first two decades.

It is difficult to understand the fervor with which the budget idea swept through this country. In 1908, when the NYB asked an editor to allocate regular space in his daily newspaper to matters of city finance, he replied, "It can't be done. We do not *make* news; we *print* news" [Cleveland & Buck, 1920, p. 72]. Only four years later, belief in the value of governmental budget making had reached the level of a secular religion. The following quote from Prendergast [1912, pp. 55-7] will provide some idea of the lofty heights to which budget making was expected to take its user:

> Budget making is the force uniting men into groups and blending smaller groups into larger ones. It makes a social group out of all who keep their budgets in the same way and creates an economic morality that pre-

> vents the aggressions of individuals from injuring members of the group. . . . The fundamental change separating industrial nations from their primitive predecessors is the rise of budgetary concepts . . .

There were, of course, still numerous advances and innovations to be made — sophisticated flexible budgeting, program budgeting, zero-based budgeting, and an array of statistical and analytic techniques for deriving and tracking budgeted data. However, by 1930, the budget was definitely well on its way to becoming the powerful administrative tool in use today. As Professor Reed of the University of Michigan observed concluding his book on municipal governance — budgeting, virtually unknown in American city government twenty years ago, "is now practically universal" [Reed, 1926, p. 334].

REFERENCES

Accountants' Index, Vols. 1-4 (1920-1931).

Allen, William H., *Efficient Democracy*, New York: Dodd, Mead & Co. (1907).

Beard, Charles A., *American City Government*, New York: Arno Press (1912).

Brown, Richard, *History of Accounting and Accountants*, Edinburgh: T. C. & E. C. Jack (1905).

Bruere, Henry, *The New City Government*, New York: D. Appleton & Co. (1912).

Bruere, Henry, "Budgeting — Realistic Method of Business Control," *Forbes* (August 15, 1925): 663-664, 686.

Bruere, Henry and Lazarus, Arthur, *Applied Budgeting*, New York: A. W. Shaw Co. (1926).

Buck, Arthur E., *Municipal Finance*, New York: Macmillan (1926).

Bureau of Municipal Research, *Handbook of Municipal Accounting*, New York: D. Appleton & Co. (1913).

Bureau of Municipal Research, *Citizen Agencies for Research in Government*, New York: Bureau of Municipal Research (1916).

Chandler, Alfred D., *The Visible Hand: The Managerial Revolution in American Business*, Cambridge: Harvard University Press (1977).

Chase, Harvey S., "Municipal Accounting as the Basis for Publicity of Municipal Affairs," *Proceedings of the National Municipal League* (1908): 337-347.

Chatfield, Michael, *A History of Accounting Thought*, Huntington: Kreiger Publishing (1977).

Cleveland, Frederick A. and Buck, Arthur E., *The Budget and Responsible Government*, New York: Macmillan (1920).

Committee on Municipal Budgets, "Report," *National Municipal Review* (1914): 218-222.

Cutter, W. O., "How Executives Make Use of Budgetary Information," NACA *Yearbook: Proceedings of the Third International Cost Conference* (1922): 237-241.

Dahlberg, Jane S., *The New York Bureau of Municipal Research*, New York: New York University Press (1966).

DeWitt, Benjamin P., *The Progressive Movement*, Seattle: University of Washington Press (1915).

Drucker, A. P. R., "Budgeting and the Sales Quota," *The Accounting Review* (September 1929): 175-180.

Edwards, John R., "Industrial Cost Accounting Developments in Britain to 1830: A Review Article," *Accounting and Business Research* (Autumn 1989): 305-317.

Edwards, John R. and Newell, Edmund, "The Development of Industrial Cost and Management Accounting Before 1850: A Survey of the Evidence," *Business History* (January 1991): 35-57.

Epstein, Marc J., *The Effect of Scientific Management on the Development of the Standard Cost System*, New York: Arno Press (1978).

Factory Manager, Penberthy Injector Company, "A Budget that Meets the Test of Changing Volume," *Factory* (June 1922): 635-637.

Fleischman, Richard K. and Marquette, R. Penny, "The Origins of Public Budgeting: Municipal Reformers During the Progressive Era," *Public Budgeting and Finance* (Spring 1986): 71-77.

Fleischman, Richard K. and Marquette, R. Penny, "Municipal Accounting Reform c. 1900: Ohio's Progressive Accountants," *The Accounting Historians Journal* (Spring 1987): 83-94.

Fleischman, Richard K., "Foundations of the National Municipal League," *The Journal of Accountancy* (May 1988): 297-298.

Fleischman, Richard K. and Marquette, R. Penny, "Chapters in Ohio Progressivism: The Cincinnati and Dayton Bureaus of Municipal Research and Accounting Reform," *Ohio History* (Summer-Autumn 1988): 133-144.

Fleischman, Richard K. and Parker, Lee D., "British Entrepreneurs and Pre-Industrial Revolution Evidence of Cost Management, *The Accounting Review* (April 1991): 361-375.

Fleischman, Richard K. and Tyson, Thomas N., "Industrial Revolution Cost Accounting Historiography: The State of the Art," *Economic History Review* (forthcoming): 1-32.

Flesher, Tonya K. and Flesher, Dale L., "James 0. McKinsey," *The Accounting Historians Journal* (Fall 1985): 117-128.

Fox, Kenneth, *Better City Government*, Philadelphia: Temple University Press (1977).

Fu, Phillip, "Governmental Accounting in China During the Chao Dynasty (1122 BC-256 BC)," *Journal of Accounting Research* (Spring 1971): 40-51.

Garcke, Emile and Fells, J. M., *Factory Accounts, Their Principle and Practice*, London: Crosby, Lockwood & Son (1887).

Garner, S. Paul, *Evolution of Cost Accounting to 1925*, University, Alabama: University of Alabama Press (1954).

Gills, Norman N., *Municipal Research Bureaus*, Washington: American Council on Public Affairs (1944).

Hartwell, Edward M., "The Financial Reports of Municipalities, with Special Reference to the Requirement for Uniformity," *Proceedings of the National Municipal League* (1899): 124-135.

Hartwell, Edward M., "Report of the Committee on Uniform Municipal Accounting," *Proceedings of the National Municipal League* (1901) ; 248-254.

Hartwell, Edward M., "Report of Committee on Uniform Accounting and Statistics," *Proceedings of the National Municipal League* (1905): 206-234.

Haskins, Charles Waldo, "The Municipal Accounts of Chicago," *Proceedings of the National Municipal League* (1901): 302- 314.

Hays, Samuel P., "The Politics of Reform in Municipal Government in the Progressive Era," in Kennedy, D. M. (ed.), *Progressivism: The Critical Issue*, Boston: Little, Brown & Co. (1971): 87-108.

Henderson, Harry B., "Uniform Accounting and State Examination of Public Accounts," *Proceedings of the National Municipal League* (1900): 247-256.

Hole, Morris J., "Municipal Finance Reports," *National Municipal Review* (1912): 686-689.

Holli, Melvin G., "Urban Reform in the Progressive Era," in Gould, Lewis L. (ed.), *The Progressive Era*, Syracuse: Syracuse University Press (1974): 131-151.

Holls, "State Boards of Municipal Control," *Proceedings of the National Municipal League* (1896), 228-231.

Hoskin, Keith W. and Macve, Richard H., "The Genesis of Accountability: The West Point Connections," *Accounting, Organizations and Society* (1988): 37-73.

Howe, Frederic C., *The Modern City and Its Problems*, College Park, Maryland: McGrath Publishing Co. (1969), reprint of 1915 edition.

Johnson, H. Thomas, "Early Cost Accounting for Internal Management Control: Lyman Mills in the 1850s," *Business History Review* (Winter 1972): 466-474.

Journal of Accountancy, "The Improvement in Municipal Accounts," (February 1909): 333-334, reprinted from *Engineering Record* (February 6, 1909).

Lane, H. M., "A Method of Determining Selling Price," *Transactions of the American Society of Mechanical Engineers* (1897): 221-227.

Lazarus, Arthur, "Budgeting for the Newspaper," *The Journal of Accountancy* (September 1924): 174-182.

Littleton, A. C., *Accounting Evolution to 1900*, New York: American Institute Publishing Co. (1933).

Loft, Anne, *Coming Into the Light*, London: Unwin Brothers, Ltd. (1990).

Maynard, Henry W., "What the Standard Costs and the Flexible Budget Are Doing for the Reduction of Costs in the Manufacturing Department," NACA *Yearbook: Proceedings of the Ninth International Cost Conference* (1928): 300-308.

McKinsey, James O., "Budgetary Control and Administration," *Administration* (January 1921a): 73-82.

McKinsey, James O., "The Sales Budget," *Administration* (February 1921b): 195-209.

McKinsey, James O., "The Production Budget," *Administration* (March 1921c): 358-367.

McKinsey, James O., "The Purchases Budget," *Administration* (April 1921d): 456-476.

McKinsey, James O., "Budgetary Control of Plant and Equipment," *Administration* (May 1921e): 645-658.

McKinsey, James O., "The Expense Budget," *Administration* (June 1921f): 813-823.

McKinsey, James O., "Budgeting the Advertising Program," *Administration* (July 1921g): 15-22.

McKinsey, James O., "Estimated Balance Sheet and Estimated Statement of Profit and Loss," *Administration* (August 1921h): 227-244.

McKinsey, James O., "Organization and Procedure for Budgetary Control," *Administration* (December 1921i): 793-798.

McKinsey, James O., *Budgetary Control*, New York: Ronald Press Co. (1922a).

McKinsey, James O., "Relation of Budgetary Control to Cost Accounting," NACA *Official Publications #8* (January 1922b).

McKinsey, James O., "The Accountant's Relation to the Budgetary Program," NACA *Yearbook: Proceedings of the Eighth International Cost Conference* (1927): 237-247.

Metcalfe, H., *The Cost of Manufactures*, New York: John Wiley & Sons (1885).

Morey, Lloyd, "Principles of Municipal Accounting," *The Accounting Review* (December 1934): 319-325.

Munro, William B., *Principles and Methods of Municipal Administration*, New York: Macmillan Co. (1916).

Munro, William B., *The Government of American Citites*, New York: Macmillan Co. (1921), reprint of 1912 edition.

National Association of Cost Accountants, *Yearbook: Proceedings of the International Cost Conference* (1921-1928).

National Association of Cost Accountants, *Official Publications*, New York: NACA (1921-1928).

Norton, George P., *Textile Manufacturers' Bookkeeping for the Counting House, Mill and Warehouse*, London: Simplin, Marshall, Hamilton, Kent (1889).

Oakey, Francis, "Book Review of Budgetary Control," *The Journal of Accountancy* (January 1923): 65.

Potts, James H., "The Evolution of Municipal Accounting in the United States: 1900-1935," *Business History Review* (Winter 1978): 518-536.

Powers, LeGrand, "Nature and Aims of State Central Control of Municipal Accounts and Financial Reports," *Proceedings of the National Municipal League* (1905): 244-247.

Powers, LeGrand, "The Bureau of the Census as an Agent of Municipal Reform," *Proceedings of the National Municipal League* (1908): 328-336.

Powers, LeGrand, "Municipal Budgets and Expenditures," *Proceedings of the National Municipal League* (1909): 258-272.

Prendergast, William A., "Efficiency Through Accounting," in Johnson, Emory R. (ed.), *Efficiency in City Government*, Philadelphia: American Academy of Political and Social Science (1912): 43-56.

Purcell, Helen E., "Editorial," *School and Society* (December 9, 1916): 899-901.

Reed, Thomas H., *Municipal Government in the United States*, New York: Century Co. (1926).

Rightor, C. E., "Recent Progress in Municipal Budgets and Accounts," *National Municipal Review* (1916): 403-410, 631-637.

Rogers, Della M., "Development of the Modern Business Budget," *The Journal of Accountancy* (March 1932): 186-205.

Rowe, L. S., "Public Accounting Under the Proposed Municipal Program," *Proceedings of the National Municipal League* (1899): 104-117.

Sait, Edward M., "Research and Reference Bureaus," *National Municipal Review* (1913): 48-53.

Sands, Herbert R. and Lindars, Fred W., "Efficiency in Budget Making," in Johnson, Emory R. (ed.), *Efficiency in City Government*, Philadelphia: American Academy of Political and Social Science (1912): 138-150.

Schiesl, Martin J., *The Politics of Efficiency*, Berkeley: University of California Press (1977).

Solomons, David, *Studies in Costing*, London: Sweet & Maxwell, Ltd. (1952).

Stewart, Frank M., *A Half Century of Municipal Reform*, Berkeley: University of California Press (1950).

Stourm, Rene, *The Budget*, translated by Thaddeus Plazinski, New York: D. Appleton & Co. (1917).

Sweet, Homer N., "Budgets — Their Construction and Use," NACA *Yearbook: Proceedings of the Third International Cost Conference* (1922): 219-225.

Taussig, B. J., "Results Obtainable Through Reorganization of Accounting Methods," in Johnson, Emory R. (ed.), *Efficiency in City Government*, Philadelphia: American Academy of Political and Social Science (1912): 57-63.

Theiss, Edwin L., "The Beginnings of Business Budgeting," *The Accounting Review* (March 1937): 43-55.

Tsuji, Atsuo, "Shades of the Past: Budgeting in the Early 1900s," *Managerial Planning* (March-April 1975): 23-29.

Tyson, Thomas N., "Accounting for Labor in the Early Nineteenth Century: The U.S. Arms Making Experience," *The Accounting Historians Journal* (June 1990): 47-59.

Tyson, Thomas N., "The Nature and Environment of Cost Management Among Early 19th Century U.S. Textile Manufacturers," *Proceedings of the Accounting History Research Methodology Conference*, Oxford (1991): 1-38.

Upson, Lent D., "The Value of Municipal Exhibits," *National Municipal Review* (1915): 65-69.

Upson, Lent D., *Practice of Municipal Administration*, London: Century Co. (1926).

Vieh, Walter F., "Why the Budget?" *The Journal of Accountancy* (September 1925): 173-179.

Wells, Murray C., *Accounting for Common Costs*, Urbana: Center for International Education and Research in Accounting (1978).

Woodruff, Clinton R., "A Year's Disclosure and Development," *Proceedings of the National Municipal League* (1904): 118-121.

Woodruff, Clinton R., "American Municipal Tendencies," *Proceedings of the National Municipal League* (1908): 152-160.

Woodruff, Clinton R. (ed.), *A New Municipal Program*, New York: D. Appleton & Co. (1919).

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INCOME SMOOTHING IN ACCOUNTING AND BUSINESS LITERATURE PRIOR TO 1954

Abstract: The origin of income smoothing in literature has been attributed to different authors in recent years. However, the attributions have been made based on research using a simple analysis of the term "income smoothing". This study considers the modern concept of income smoothing rather than simply the term itself. Using this approach, income smoothing is either explicitly or implicitly recognized and discussed in literature long before the aforementioned authors. A lack of awareness has been the primary reason for modern income smoothing research overlooking the earlier literature on the subject. This awareness can be ascribed to weak citation analysis. Therefore, researchers should be more cautious in how they use citation analysis.

INTRODUCTION

Several authors in recent years have made explicit references to the origin of income smoothing in literature. Cushing [1969], Dascher and Malcom [1970], and Imhoff [1981] made statements that Gordon, Horwitz and Meyers [1966] were the authors of the first empirical study of income smoothing. Imhoff [1981] also identified Hepworth's article [1954] as being the first theoretical discussion of income smoothing. Archibald [1967], Ronen, Sadan and Snow [1977], Eckel [1981], Gamble and O'Doherty [1985], and Dharan [1987] attribute the origin of the recognition of income smoothing to Hepworth [1953], and White [1970] attributes the smoothing hypothesis to Gordon [1964]. None of these attributions are correct if the concept of income smoothing rather than the term, *income smoothing*, is considered. Modern authors generally take the broad-based, flexible view that income smoothing is management action

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taken with the intent of reducing the volatility of publicly reported accounting income.[1] Management may engage in *"accounting"* or *"artificial"* smoothing which is, given the non-accounting results of operations, the selection of accounting methods that will reduce the volatility of the reported accounting income time-series. Or management may engage in *"real"* smoothing which includes all other non-accounting management action having the objective of minimizing the volatility of reported accounting income.

There were references to the smoothing properties of various accounting practices as early a the late nineteenth century.[2] Furthermore, Johnson and Meade [1906], Warshaw [1924], Paton [1932], Cotter [1940], and Devine [1942] all discussed the theoretical implications of smoothing, and Miller [1944] tested for smoothing behavior many years before Gordon, Horwitz and Meyers [1966] conducted their study. The most important cause of post-1965 authors' failure to recognize earlier discussions of the smoothing properties of certain accounting methods and the benefits obtained from less volatile accounting income time-series is that the specific term *"income smoothing"* probably was not used prior to 1950. The Appendix identifies the various terms that authors of the literature reviewed in this article used to describe management action to reduce fluctuations in accounting income. Notice in the Appendix that Miller [1944] used the term *"profit smoothing,"* but the specific term, *"income smoothing"* is not used in the publications reviewed in this article until Moonitz used it in 1953, the same year it was used by Hepworth. This suggests that the term may have been used in some earlier publication not reviewed in this article or that the term may have entered the literature via an academic conference shortly before 1953. Even though use of the term *"income smoothing"* is not historically accurate, it is used throughout this paper as a substitute for those terms identified in the Appendix to describe the effect of reducing the volatility of income time-series.

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[1] See for example, Doupnik and Evans [1988], Moses [1987], Trueman and Titman [1988], and Hand [1989].

[2] The term *"accounting practices"* as used in this paper includes all of the various accounting techniques that might be used to reduce the volatility of reported accounting income time-series. These include, for example, changes in accounting estimates, judgments about accruals such as the allowance for bad debts, and recognition and classification of extraordinary items.

This paper documents a frequent and continuing recognition of income smoothing properties and management preferences for smooth accounting income time-series in accounting and business literature from the beginning of the twentieth century up to the publication of Hepworth's 1953 article. Exhibit I lists thirty-four works from 1893 to 1953 which contain some sort of reference to the smoothing properties of an accounting method or to an accounting practice used in such a way as to dampen the fluctuations of reported income.

The literature reviewed in this study was identified by citation analysis of Devine [1942] supplemented by the collection of references to the smoothing of earnings noted in the course of other historical research by the author. Thus, only a portion of the body of accounting literature was examined in the identification of these references and that portion of the literature does not constitute a systematically-selected random sample. Therefore, the author does not infer that the 1893 reference in this paper is the earliest consideration of income smoothing in the literature. Nor can one make inferences about the relative frequency with which income smoothing was considered in the pre-modern literature. Enough references are identified, however, to state with certainty that consideration of income smoothing was common. Also, it is not too unreasonable to assume that the relative frequencies of classifications in Exhibit I are representative of the appearance of income smoothing considerations in the literature as a whole.

The headings of Exhibit I reflect the context within which income effects are discussed. Even though depreciation and other revenue and expense items are *"income related incentives,"* to the extent that they are classified under the *"Secret Reserves"* heading, they are so classified because the focus of the source publication is on the balance sheet.

The review of the literature that follows is organized by the context within which smoothing is discussed. The first section of the literature review is a discussion of papers that focus on the balance sheet and secret reserves that result in reducing the volatility of income time-series. The second section examines the LIFO base-stock inventory method debate as it related to income smoothing. The focus of the literature shifted from the balance sheet to the income statement during the period that LIFO was being discussed extensively. The final section of the literature review discusses the use of statistical analysis in the literature that is reviewed. In general, the type and frequency of

EXHIBIT I

Context of Income Smoothing by Reference and Accounting Method

Reference	*Secret Reserves*			*Income Related Incentives*	
	Capital vs. Revenue Expenditures	Depreciation	Other	LIFO and Other Base-Stock Inventory Methods	Other
Matheson (1893)	X				
Dicksee (1895)	X				
Dicksee (1903)		X	Bad debts and other reserves		
Johnson and Mead (1906)	X				
Dickenson (1907)	X				
Knight (1908)		X	Bad debt reserves, Contingencies, Carrying inventory below cost, Classing "Reserves" as Accounts Payable		

EXHIBIT I (CONTINUED)

Reference	*Secret Reserves*			*Income Related Incentives*	
	Capital vs. Revenue Expenditures	Depreciation	Other	LIFO and Other Base-Stock Inventory Methods	Other
Joplin (1914)			Writing down assets, Contingencies, Valuing inventories at lower than cost, Reserves classified as accounts payable		
Page (1916)		X	Base stock inventory methods		
Paton and Stevenson (1918)			X		
Washaw (1924)				X	
Crunder and Belcher (1930)					Depreciation, Amortization of Extraordinary Losses
Nash (1930)					Depreciation
Polak (1930)					Depreciation
Dicksee (1931)	X	X			Contingencies, Goodwill

et al.: Accounting Historians Journal, 1992, Vol. 19, no. 2

EXHIBIT I (CONTINUED)

Reference	*Secret Reserves*			*Income Related Incentives*	
	Capital vs. Revenue Expenditures	Depreciation	Other	LIFO and Other Base-Stock Inventory Methods	Other
Paton (1932)					Charges to "surplus," Depreciation, depletion and similar accruals
Kohler (1933)					Charges to "surplus"
Daniels (1934)					Depreciation
Anderson (1935)					Charges to "surplus," Reserve accounts
Davis (1937)				X	
Sweet (1937)				X	
Nicherson (1937)				X	
Committee on Federal Taxation, American Institute of Accountants (1938)				X	
Sanders, Hatfield, and Moore (1938)				X	Reporting inventories at other than ledger amounts, contingency and future loss recognition
Gilman (1939)				X	

EXHIBIT I (CONTINUED)

Reference	*Secret Reserves*			*Income Related Incentives*	
	Capital vs. Revenue Expenditures	Depreciation	Other	LIFO and Other Base-Stock Inventory Methods	Other
Cotter (1940)				X	
Committee on Accounting Procedure (1942)					Reserves for war contingencies
Devine (1942)				X	
Miller (1944)					Reserves for war contingencies
Committe on Accounting Procedure (1946)					Reserves for war contingencies
Committee on Accounting Procedure (1947 A)					General purpose contingency reserves
Committee on Accounting Procedure (1947 B)					Inventory reserves
Kohler (1947)	X				
Stans (1948)					Reserves
Moonitz (1953)				X	

use of empirics corresponds with that found by Buckmaster and Theang [1991] in their study of pre-1950 empiricism in accounting literature. However, most of this description of empiricism is directed toward Miller's [1944] formal tests for income smoothing. Miller's article is far more "modern" in its use of inferential statistics than any of the work included in the Buckmaster and Theang sample. A discussion of some of the implications of recognition of the early income smoothing literature follows the literature review. The paper closes with some speculation on the determinants of GAAP that are consistent with the literature review and some comments on the use of citation analysis in accounting history research.

SECRET RESERVES

The first use of the term, *income smoothing*, that is found in this study did not occur until the mid-twentieth century. Perhaps the term was not used earlier because the balance sheet was the primary focus of the early references. Yet consideration of the impact of methods and practices on the "profit and loss account" generally crept into discussions. In England, there was a widespread attitude among investors that accounting income for a period measured the proper amount of resources to be distributed as dividends for that period and corporate directors apparently felt pressure to make such distributions [Johnson and Meade, 1906; Yamey, 1960]. One way that management reduced pressure for dividend distributions was to create a *reserve fund* by charging *"Earned Surplus"* (appropriated retained earnings). But these *reserves* were obvious to the reader of a balance sheet, so management created *secret reserves* in order to avoid distributing firm assets as dividends. Dicksee [1903, p. 49] defines a *secret reserve* as being created when "a Reserve is deliberately accumulated in excess of the estimated loss that is likely to occur under that particular heading." Joplin [1914, p. 409] commented a few years later that "the chief reason [for secret reserves] is to provide, out of excessive profits of prosperous years, a fund which can be drawn upon to increase the profits of less prosperous ones the idea being to prevent fluctuation in the affairs or standing of the company, and to obtain as nearly as possible a uniform status of conditions." Joplin's objective in his article was to discuss the auditors' responsibility with regard to secret reserves. He felt that such practices were necessary to avoid excessive dividend payments, but that the auditors should

disclose the existence of such *reserves*. Otherwise stock would be undervalued and current stockholders deprived of their due return.

Secret reserves were created by crediting a contra asset account, a liability, or by failing to record assets and/or writing them off as expenses or directly to surplus (retained earnings). The underlying assumption giving rise to this practice was the idea that this "excess" of net assets represented assets that could be distributed without affecting in the current level of operations, but if these assets were distributed there would be no cushion in less prosperous years for dividends. This idea of relating dividend payments to current income was apparently retained by some managers and accountants for a surprisingly long time. As late as 1942, The Committee on Accounting Procedure [1942] deemed it necessary to state that reserves for war contingencies were not to be used for smoothing income in order to equalize dividends.

Recording unusually large amounts of depreciation in good years was one way of creating *secret reserves*. Matheson [1893, p. 44] observes, "while in average or normal years of working a moderate rate of depreciation may suffice for mere physical deterioration, advantage should be taken of prosperous years to write down liberally [through depreciation charges] the book value of the plant." Joplin [1914] also comments on excessive write-downs of assets as a method of creating secret reserves. Matheson [1893] indicated that the railroads tended to recognize depreciation in proportion to income and to omit depreciation in years with low earnings. Paton and Stevenson [1918, p. 509] also noted this practice because "a rather even flow of income is desired by security holders," but that the ICC had forced railroads to adopt a regular depreciation charge. Knight [1908, p. 191] emphasizes the importance of systematic depreciation and warns that there should be "no omission of [depreciation] charges because profits happen to run exceptionally low" in his general, normative discussion of depreciation. Knight's [1908] and Dicksee's [1903] rationale was that systematic charges were necessary to insure that sufficient funds were available for plant and equipment replacement. Dicksee [1903, p. 3] went a bit further. In a seemingly contradictory position to those that suggested varying depreciation in proportion to income, he stated, "By no other means [systematic and reasonable depreciation] is it possible to reasonably assure a fairly stable income, revenue, or profit, that may properly be divided, or

otherwise taken out of the business, without detriment to its continued permanence." However, varying depreciation in proportion to income was still considered desirable by some accountants many years later. Nash [1930] argued that the reserve-recognition depreciation method was superior to straight-line depreciation because the flexibility in computing charges against income permitted public utilities more stable income and the ability to maintain credit.[3] He maintained that the more stable income results in lower investment risk and more stable employment. This reduced risk and more stable employment permits reduced cost of capital and labor costs which, in turn, leads to lower cost to utility customers.[4] Note that the focus of Nash's analysis is more modern than previously cited papers in that the discussion is on the income effects rather than secret reserves.

Two additional papers [Crunder and Belcher, 1930; Polak, 1930] presented at the 1929 International Congress also had an income measurement orientation and recognized the smoothing properties of depreciation. Polak recommended increased depreciation charges in good years, but insisted that regular depreciation charges continued to be made in bad years. Crunder and Belcher advocated systematic depreciation charges independent of revenue charges and saw the smoothing benefit arising from spreading the replacement cost over the estimated useful life of the assets as opposed to charging the entire cost of the asset to expense in the year of acquisition. Also, Crunder and Belcher classified extraordinary losses as *extraordinary depreciation* and indicated that telephone companies typically charged such losses to *Suspense* and amortized them over a number of years in order to minimize the impact of such losses on a single period.

Paton [1932, p. 261] reiterated the position that he and Stevenson had taken in 1918 against varying depreciation charges in order to smooth income. One of the five accounting problems of the Depression identified by Paton was preferential

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[3] Littleton, *et al.* [1929] noted that Nash attributed the underlying assumption supporting retirement reserve systems to be flexibility permitting stability of income and maintenance of credit in their review of papers presented at the 1929 Congress.

[4] Daniels [1934] explicitly identified The Detroit Edison Company as a company following the policy of varying depreciation with income during this later period.

recognition of operating expenses. He attacks the practice of recognizing "depreciation and similar accruals only when income is high enough to maintain previous levels." In the next issue of the *Accounting Review*, Kohler [1933] compared the position that Paton had taken in this article with the position Hoxey had taken in a speech before Massachusetts accountants. While Paton opposed writedowns of assets in order to "make fat years pay for lean," Hoxey favored charging the decline in value due to price changes directly to earned surplus and putting other value losses in a "deferred depreciation" account and removing the deferral when the firms' become more prosperous. Kohler is skeptical of Hoxey's proposals and agrees with Paton that businesses' volatility should not be obscured by accounting methods. Kohler's is most concerned, however, with the widespread practice of using direct charges to earned surplus to manage accounting income.

The literature indicates that, to say the least, firms were extremely flexible in capitalize/expense decisions for plant and equipment-related costs. Dicksee [1895] takes exception to firms' practice of expensing repairs in the early periods of use of plant and equipment and, when major repairs are required, capitalizing and depreciating the cost of the repairs over a period of several years. At the turn of the century, maintenance (repairs) of railroads was frequently included in capital accounts of English railroads. Johnson and Meade [1906] accuse western U.S. railroads of just the opposite — the tendency to charge large amounts of capital expenditures to expense in periods of high profits. They admitted that such a practice might be justified to avoid the demands of stockholders for dividends, but were indignant because they believed that the primary incentive for the practice was to manipulate securities prices. Dickenson [1907] was another author that was particularly concerned with the flexibility of railroad maintenance and repair costs. He called for regulatory guidance and noted that, not only were these costs a significant portion of railroad costs, but such costs could be particularly effectively used for manipulating accounting profits.

Johnson and Meade [1906] were unusual among the references in this paper in that they discussed real smoothing as well as accounting smoothing. They noted that it was a practice around the turn of the century for some railroads, particularly railroads in the South, to vary repairs with profitability. The railroads in question followed the practice of overly extensive

repairs in good years and inadequate repairs in bad years. Devine [1942] provides the only other identification of a real smoothing practice in this paper; that of altering the level of manufacturing operations in order to smooth income.

Goodwill amortization provided another convenient smoothing device. Matheson [1893, p. 27] suggested goodwill as "a legitimate object to which to apply the surplus profits of a prosperous year." Joplin [1914] indicated that firms also create secret reserves by making excessive provision for bad debts and by valuing inventories at below cost. Dicksee [1931] suggested that accounting practices can be used to minimize bad times. Dicksee suggested that "the ups and downs of the firm" can be minimized if the firm provides adequate *"reserves"* for future *"losses"* by charges to income when times are good. He implied that this is necessary to avoid euphoria and weakening of managerial control.

Arthur Andersen [1935] took exception to firms using *"Reserves for Contingencies"* to smooth income. This is opposite to the position taken by Dicksee [1931]. The shifting focus from the Balance Sheet to the Income Statement might account for a portion of the divergence of positions. Even when Dicksee discussed smoothing practices, he was primarily concerned with Balance Sheet accounts and avoiding dividend distributions that might impair the position of the firm as a going concern. Andersen, on the other hand, was concerned that accounting report the results of transactions and explicitly stated that *"equalizing"* earnings is misrepresentation.

The Committee on Accounting Procedure [1942, p. 116] took an official position against using *Reserves for War Contingencies* as a smoothing device with their statement in *Bulletin No. 13*, "It has long been established in accounting that reserves may not be used for the purpose of arbitrarily equalizing the reported income of different accounting periods." The Committee also invoked this prohibition in *Bulletin No. 26* [1946], by specific reference to *No. 13*.

Most likely as the result of the shifting emphasis from the Balance Sheet to the Income Statement, the term, *"secret reserves"* seems to have been abandoned for the most part by the 1930s. For example, Sanders, Hatfield, and Moore [1938, p. 16] discuss some practices that had traditionally been identified with creating secret reserves, but these practices are referred to as practices "undertaken for the purpose of averaging profits over the years, so as to make a better showing in the lean years

than the facts warrant." The specific practices referred to by Sanders, *et al.*, were valuing inventories at less than ledger amounts, combining part of *"surplus"* with Accounts Payable, and charging contingency reserves with large amounts.

Consider the previous discussion and findings in relation to a recent assertion in the historical literature: Dailey [1984] identified income smoothing as one of the elements of his *"Proactive Phase"* for the period, 1931-1940, but not for the period, 1900-1931 or for the periods following 1940. This assertion is in error since it appears that income smoothing was as important during the earlier period or later periods as it was in the 1931-1940 period. A careful reading of Dailey's text suggests that this inference was drawn from Paton's 1932 article on accounting problems during the Depression. The methods to which Paton was objecting are those same methods that are discussed extensively in the pre-1930 publications cited in this paper.

LIFO AND OTHER BASE-STOCK INVENTORY METHODS

The Warshaw [1924] article was explicitly directed towards promoting a base-stock inventory method because of its smoothing properties.[5] The article had as the central theme, income measurement, and utilized real data. Warshaw identified several incentives for income smoothing that result from using a "normal stock" inventory method. He suggested the conventional incentives of stockholder and creditor satisfaction, but emphasized the idea that the smoothing properties of base-stock inventory methods would dampen business cycles. The argument is:

> The leveling of inventory gains and losses, with the comparative stability of yearly profits which this method brings about ... exerts a subconscious effect upon business policy which is very desirable. Prices of manufacturing articles are kept in more proper relation to prices of raw material. The management is not elated by apparent profits or depressed by apparent losses. Such elation and depression are responsible for most business follies. The normal stock inventory auto-

[5] Page [1916] was actually the first of the references in this paper to promote base-stock inventory methods because of their income smoothing effects, but his discussion was framed in terms of avoiding having to report fluctuations in inventory profits. His paper reflects a myopic focus on capital maintenance and avoiding the distribution of inventory profits as dividends.

> matically creates a reserve that strengthens the basis for credit, gives stability, and makes expansion safe. Moreover, it has the great advantage of being a concrete suggestion for mitigating the severity of business cycles [Warshaw, 1924, p. 34].

Warshaw used the business cycle idea to argue that base-stock inventory methods should be acceptable for income tax purposes since, if tax rates are stable, the same amount of taxes will be collected over time.

Some years later, Davis [1937] repeated some of Warshaw's arguments for base-stock inventories. These incentives are stockholder satisfaction, better management decisions, and tax savings. Davis added the reduction in stock market volatility to the list of incentives. However, his arguments about management decisions and tax savings went further than Warshaw's. Davis' management decision argument revolved around the timing and amount of dividends. FIFO companies show larger profits in periods of rising prices (assuming no change in production). Stockholders expect dividends from these higher profits, but more cash is required to maintain the more costly inventories. Therefore, no cash is available for dividends except in periods of large losses which leads to under-distributions of dividends and excessive investment in production facilities by firms.

Davis extended the tax savings idea through consideration of inequitable taxes and taxes on undistributed earnings. There was no "loss carryback or carryover" provision in 1937, when he pointed out that companies would have to pay more taxes (unjustly) because methods acceptable for tax purposes cause many firms to move from high profitability to loss years back to high profitability; obviously, smoother income would decrease the total tax bill for these companies. In addition, there was an undistributed profits surtax in 1937 which resulted in inventory profits being taxed even though distribution of this portion of the income would be from operating capital.

The AIA Committee on Taxation [1938] made an explicit, direct appeal to the Treasury Department for tax law revisions that would permit more industries to use LIFO. The Committee's rationale was that any method that minimizes fluctuations in tax collections without affecting total collections should be acceptable. They pointed out that LIFO had this effect by removing inventory profits and producing a steadier stream of profits.

Cotter's *Fools Gold* [1940] was an extensive elaboration of the ideas in Warshaw [1924] and Davis [1937]. The book originally appeared as a series of articles published in *Barron's* in August and September of 1939. Cotter's objective was to demonstrate the economic advantages of the smoothing properties of LIFO. The primary advantages he attributed to the smoother income time series were: (1) dampening of business cycles, (2) avoidance of over-expansion of credit, (3) avoidance of demands for excessive dividends by stockholders in prosperous times, and (4) better information for pricing decisions by management.

Nickerson [1937] was another supporter of base-stock inventory methods because of their smoothing properties. However, he objected to base-stock methods because original cost was not disclosed and described a "reserve" method which he felt would provide the benefits of both proper disclosure and the income smoothing properties of base-stock methods.

Sweet [1937], in response to Davis, rejected Davis' contention that base-stock inventory methods were useful for determining dividend policies. Since the usefulness of base-stock methods was attributed solely to their smoothing properties, Sweet rejected income smoothing as being relevant to dividend policy. He asserted that an important function of management was to formulate a sound dividend policy over a number of years, not a policy dependent on a single year's income. Gilman [1939] falls into the *"opponent"* category of those discussing base-stock inventory methods. He attributed the origin of this family of methods to the desire to *"stabilize"* income, but saw no merit to smoothing, hence the base-stock methods, other than to reduce taxes. Devine was another author that was skeptical of the merit of the smoothing properties of base-stock inventory methods. His book, *Income Valuation and Periodic Income* [1942], was intended to be a normative evaluation of inventory methods and the methods' impact on accounting income; however, he did not take a position on the merit of the methods. Accordingly, he reviewed the merits of base-stock inventory methods suggested by others.[6] He was skeptical of most of the suggested benefits of smoothing, particularly those benefits re-

[6] Devine also indicated that the use of inventory market values in the extractive industries, percentage-of-completion accounting, and the timing of inventory markdowns are practices used to smooth income.

lating to dampened business cycles and improved management. Devine did suggest that since the market seems to discount accounting income time-series in setting market prices, smoother income will result in more stable securities prices.

Moonitz [1953] vigorously attacked the use of LIFO taking the position that all of the original arguments in favor of LIFO were no longer valid by 1953. Although he did admit that firms could reduce their tax bill through the use of LIFO's smoothing effect, he was opposed to such "nonexistent stability" of earnings and inventory. In addition, he opposed the unjust shifting of the tax burden to FIFO users.[7]

The clustering of references around the Treasury Department's acceptance of LIFO for tax purposes and the change in tone after the acceptance is consistent with a modified statement of Watts and Zimmerman's "Market for Excuses" [1978]. The modified hypothesis is that a determinant of the content of accounting literature (theories) is the self-interest of those affected by accounting. The finding in this paper about some of the early smoothing literature is consistent with this modified "market for excuses" hypothesis; particularly because the base-stock references cluster around the 1939 tax ruling that made LIFO an acceptable income tax practice. Those articles and books preceding the acceptance of LIFO for tax purposes argued the merit of base-stock inventory methods with one exception. Those works favoring base-stock methods recognized the tax effect, but their primary appeal was to the public good through cycle-dampening and rational management. After the acceptance of LIFO for tax purposes, three of the four authors that recognize the smoothing effects are, at best, skeptical of the merit of base-stock inventory methods. Sanders, Hatfield, and Moore [1938] were a fourth set of authors who imply that base-stock methods exist in order to smooth income, but they do not make any evaluative comment.

[7] It is interesting to note that Moonitz gave the effect on accounting-income-based management bonuses and potential violation of bond covenants as reasons why companies continued using FIFO rather than LIFO. This is, of course, twenty-five years before Watts and Zimmerman [1978] proposed the "management bonus hypothesis" and the "bond covenant hypothesis."

EMPIRICISM

Warshaw [1924] was the first of the authors referenced to use real data.[8] National Lead Company used the base-stock inventory method over a period that included 1913-1923. Annual profits of National Lead from 1915 through 1923 were compared with what they would have been if "average cost" and lower-of-cost-or-market had been used in inventory. Also, National Lead inventory and income time-series were compared with those of "10 large industrial companies which suffered inventory losses in the year 1921." Crunder and Belcher [1930] were the next authors to use actual data in their work. Various statistics on the depreciable assets of U.S. telephone companies were used in their extended discussion of estimating useful lives and adequacy of depreciation reserves. Cotter [1940], like Warshaw, used some descriptive statistics to make his points and relied heavily on National Lead Company's financial statements. Davis [1937] also used real data to bolster his argument for base-stock inventory methods as a smoothing device. He draws upon the (graphic) relationship of reported income and inventories from 1926 through 1934 to illustrate the effect of price movements on reported accounting income.

Daniels' [1934] monograph was a survey of the annual reports of 294 corporations with the object of identifying financial accounting practices. He observed depreciation charges varying with levels of income as well as several other earnings management practices. Some of these other practices such as the write-down of plant assets and arbitrary charges to "surplus" probably would have the effect of smoothing income as well as increasing income, but Daniels does not comment on the smoothing effect of practices other than that of varying depreciation charges with income.

Miller's article, "Reserves for War Contingencies and Post-war Adjustments" [1944], is important in both the history of income smoothing and empiricism in accounting literature. The article is apparently unknown by modern authors of income smoothing studies, but it appears to be the seminal modern income smoothing study. Miller's primary objective was to test for the use of *Reserves for War Contingencies* as a profit smoothing device and to discuss his results in the context of normative

[8] The term, *real data*, is used in the sense that it is data that describes real firms or data that is reported by real firms in contrast to data that is created to describe fictitious firms or reports.

theory. The study is similar to the income smoothing studies of the late 1960s and different from most other accounting empiricism prior to the 1960s in that Miller tested a hypothesis using classical inferential statistics.

Reserve for War Contingencies was a very frequently used account and there were many in the accounting profession that felt that it was an account that was particularly suited for *"profit smoothing."* Smoothing was not considered theoretically sound accounting during this period, thus Miller wanted to determine if the *Reserve for War Contingencies* was in fact being used as a smoothing device. Two sets of companies were used in the study. The first set consisted of the first forty companies listed alphabetically in 1941 on the New York Stock Exchange with assets in excess of $100 million. Miller identified fifteen possible smoothers from this set of companies for the years 1939 through 1942 but, unfortunately, he did not indicate how he identified these companies. Then, "in order to obtain a further impression of whether there is any relationship between the profitability of an enterprise and the size of its provisions for war contingencies and postwar adjustments," Miller identified forty companies that had made sufficient progress in contract renegotiation proceedings to be able to set up provisions for renegotiation settlements from a set of 1942 financial statements of sixty-six companies "known to be subject to renegotiation" [p. 249]. Thirty of the forty companies had charges to the *Reserve or Postwar Adjustments* in 1942 and these thirty companies provided the data for the remaining analyses.

Miller made a scatter diagram with one dimension being the ratio of net income after taxes and renegotiation to operating expenses and the other dimension was reserve provisions as a percentage of net sales. He then concluded that the scatter diagram indicated that there was no clear evidence to support the hypothesis that the greater the profitability, the greater the provision for war contingencies and postwar adjustments as a percentage of net sales. Next, Miller regressed net income as a percentage of the excess profits tax on reserve provisions as a percentage of net income. Although the correlation coefficient was .426 (significant at .05), Miller concluded, "these data do not afford any convincing support for the belief that, in general, the greater the amount of net income after taxes and renegotiation in relation to a corporation's excess-profits-tax credit, the larger will be the share of that net income devoted to reserve provisions" [p. 250].

Of course, there were significant design problems with the Miller study; however, these problems do not reduce the importance of this study. Rather, the significance of the Miller study is that it was a smoothing study in the hypothetico-deductive style which some authors have stated did not appear in the literature until 1967. By contrast, the Stans' [1948] article is more typical of empiricism in the 1940s and 1950s. Stans criticized the use of reserves, particularly contingency reserves, as smoothing devices and relied on a few anecdotes to support his position.

Seven of the thirty-four works discussed in this paper utilized actual financial data in some fashion. This is consistent with the Buckmaster and Theang [1991] assertion that the use of real data in pre-1950 accounting literature was common. Miller's [1944] article is, however, an outlier. Buckmaster and Theang did not find applications of inferential statistics in their sample of early empiricism.[9] For the other six papers which this study found to have used actual data, the analysis of data in these papers was similar to data used in other accounting literature prior to 1950.

DISCUSSION

Modern authors frequently state that income smoothing recognition was absent from accounting and business literature prior to the publication of Hepworth [1954]. This belief along with some other misconceptions about the origins of certain characteristics of income smoothing literature are easily dispelled. Thirty-four articles or books originally published between 1893 and 1953 in which income smoothing was either explicitly or implicitly considered have been identified and discussed. Income smoothing was central to early twentieth century debates about capital maintenance and secret reserves. Then, in the second quarter of the twentieth century, the smoothing characteristics of base-stock inventory methods were promoted as a primary advantage of LIFO and other variations of base-stock methods. Regulators (the APB) and other accounting authors focused on the "bad accounting practice" of arbi-

[9]The Miller paper is also an outlier in relation to other accounting literature of the period in that Miller has provided references to relevant, related literature. This sort of documentation was woefully inadequate in most accounting literature until well past 1950.

trary use of charges to "Reserves" immediately following World War II.

The literature reviewed in this paper focuses on two different types of accounting issues. The earliest literature focused on the use of secret reserves to minimize the volatility of income time-series. Variations of the type of behavior that created secret reserves continued to be discussed throughout most of the period encompassed by this paper, but the term "secret reserves" disappears. For example, Polak's [1930] recommendation that greater depreciation be charged in good years, Paton's [1932] attack on varying depreciation and accruals with the level of income, Andersen's opposition to the use of "Reserve for Contingencies" for equalizing income, and the Committee on Accounting Procedure's [1942, 1946, 1947A, 1947B] prohibition of the use of "Reserves" as a smoothing device are discussed within the context of accounting income measurement. Articles written prior to 1920 dealing with identical and similar behavior were written in the context of creating secret reserves. Of course, the ultimate use of the secret reserves was to smooth accounting income. The change in context roughly corresponds to the more general change in emphasis by accountants from the balance sheet to the income statement.

The literature sampled in this study does not contain adequate clues to unravel the relative roles of managers and accountants in the creation of secret reserves during the first fifty years of this century. However, Johnson and Meade [1906] identify non-accounting action apparently motivated by the desire to reduce the volatility of income time-series. This action would have been initiated by management. If the actions were in fact taken with the objective of smoothing income, then it is likely that management directed accountants to make accounting choices as well that would reduce income volatility.

As a consequence, the more arbitrary-appearing smoothing methods such as varying depreciation with income, arbitrary writeoffs of goodwill, and arbitrary expense charges to "Reserves" have disappeared from the list of acceptable practices. This disappearance of the more arbitrary-appearing practices suggests at least two determinants of GAAP. First, the dominance of the public accounting profession in determining GAAP during the pre-FASB era facilitated the rejection of methods that left auditors most exposed to legal and regulatory penalties. Because auditors prefer less legal exposure, the elimination of methods that appear arbitrary may seem advantageous. Con-

sider, for example, Dickinson's [1907] early appeal to the ICC for regulations specifying the proper treatment of railroad maintenance costs. Similarly, Andersen [1935] and the Committee on Accounting Procedure [1942, 1946, 1947a, 1947b] attacked the use of "Reserves" for smoothing income. Briston [1981, p. 59] argues, "The [standard-setting] process is dominated by auditors and by large accounting firms. As a consequence, the standards tend to reflect what is convenient for auditors to audit rather than what is most useful for those for whom the information is intended. In other words, there is a tendency towards law rather than economics, and towards rigidity rather than judgment. Another likely dominant variable that would have a very high correlation with auditors' desire to minimize legal exposure is the movement towards professionalization as recently described by Hines [1989]. Arbitrary practices do little to enhance public confidence and reduce the appearance of professionalism.

The rejection of the more arbitrary practices corresponds with the appearance of the second accounting issue related to income smoothing, the campaign to promote LIFO. The primary stimulus for the LIFO campaign appears to have been the tax consequences of the smoothing properties of LIFO. Income tax rates had become large enough by 1920 for management to be seriously concerned with tax policy. Then we find the series of articles promoting LIFO. After LIFO becomes acceptable for tax purposes in 1939, authors lose their enthusiasm.[10]

Recently Bricker [1988] made a plea for more recognition of early research in modern literature. It is not always clear whether the failure of modern authors to cite earlier work on the same subject is due to lack of awareness of the early work or the irrelevance of the early work. The statements of modern authors cited in the introductory paragraphs of this paper provides strong evidence that lack of awareness has been the determinant in the case of modern income smoothing research.

An important aspect of this paper is the demonstration of a weakness of citation analysis for research in accounting history. Gamble and O'Doherty [1985] advocated citation analysis for an accounting history research and demonstrated its application

[10] The position that the only valid argument for LIFO is that it reduces tax payments by smoothing income was stated forcefully by Devine [1941] and Moonitz [1953]. Devine reviewed the arguments advanced for LIFO. Also, LIFO was suggested as a surrogate for replacement cost accounting [Broad, 1948].

with income smoothing. As indicated earlier in this paper, they found no references earlier than Hepworth and concluded that he was the first writer to recognize smoothing. Yet the long history of income smoothing in accounting literature has been documented here. At least two factors contributed to Gamble and O'Doherty's failure to recognize the earlier literature. First, accounting articles before 1960 were generally very poorly documented. Also, a number of different terms were used for the phenomenon of concern, management attempts to reduce the volatility of accounting income. Based on the sampled papers, it appears that Moonitz [1953] and Hepworth [1953] are the first authors to use the term, " smoothing of income" or "income smoothing."

As a final conclusion, the failure of citation analysis to identify early smoothing papers and research should not be interpreted as invalidating the position of Gamble and O'Doherty [1985] and Previts, Parker, and Coffman [1990] and others that promote citation analysis as a tool for accounting history research. Rather, researchers should be cautious in how they use it, especially when working with pre-l96O accounting literature.

REFERENCES

Andersen, Arthur, "Present-day Problems Affecting the Presentation and Interpretation of Financial Statements," *Journal of Accountancy* (November, 1935): 330-344.

Archibald, T. R., "The Return to Straight-Line Depreciation: An Analysis of a Change in Accounting Methods, *Empirical Research in Accounting: Selected Studies*, (1967): 164-180.

Bricker, R. J., "Knowledge Preservation in Accounting: A Citational Study," *Abacus* (September, 1988): 120-132.

Briston, R. J., "Commentary on 'The Setting of Accounting Standards: the Contribution of Research'," in Bromwich, Michael and Anthony Hopwood, *Essays in British Accounting Research*, London: Pitman Publishing Limited (1981): 59-62.

Broad, S. J., "The Effects of Price Level Changes on Financial Statements," *1948 Proceedings of the Twenty-Ninth International Cost Conference*, N.Y.: National Association of Cost Accountants (1948).

Buckmaster, Dale and Kok Foo Theang, "An Exploratory Study of Early Empiricism in U.S. Accounting Literature." *The Accounting Historians Journal*, 18, 2 (December, 1991): 54-84.

Committee on Accounting Procedure, American Institute of Accountants, "Accounting for Special Reserves Arising Out of the War," *Accounting Research Bulletin No. 13* (January, 1942).

Committee on Accounting Procedure, American Institute of Accountants, "Accounting for the Use of Special War Reserves," *Accounting Research Bulletin No. 26* (October, 1946).

Committee on Accounting Procedure, American Institute of Accountants, "Accounting Treatment of General Purpose Contingency Reserves," *Accounting Research Bulletin No. 28* (July, 1947).

Committee on Accounting Procedure, American Institute of Accountants, "Inventory Reserves," *Accounting Research Bulletin No. 31* (October, 1947).

Committee on Federal Taxation, American Institute of Accountants, "The Last-in, First-out Inventory Method," *The Journal of Accountancy* (November, 1930): 310-314.

Cotter, Arundel, *Fools Profits*, New York: Barron's Publishing Company, Inc. (1940).

Crunder, Allan B. and Donald R. Blecher, "The Straight-Line Depreciation Accounting Practice of Telephone Companies in the United States," *International Congress on Accounting, 1929*, N.Y.: International Congress on Accounting (1930): 351-403, reprinted by Garland Publishing, Inc. (1982).

Cushing, Barry, "An Empirical Study of Changes in Accounting Policy," *Journal of Accounting Research* (Autumn, 1969): 196-203.

Dailey, M. J., "Cyclical Aspects of Twentieth Century American Accounting," *The Accounting Historians Journal*, 11, 2 (Fall 1984): 61-76.

Daniels, Paul and Robert Malcom, "Corporation Financial Statements," *Michigan Business Studies*, VI (1934): 1-232.

Dascher, Paul and Robert Malcom, "A Note on Income Smoothing in the Chemical Industry," *Journal of Accounting Research* (Autumn, 1970): 253-259.

Davis, Albion R., "Inventory Valuation and Business Profits: The Case for A Cost or Market Basis," *N.A.C.A. Bulletin* (December, 1937): 400-409.

Demski, Joel S., "Positive Accounting Theory: A Review," *Accounting, Organizations, and Society*, 13, 6 (1988): 623-629.

Devine, Carl, *Inventory Valuation and Periodic Income*, New York: The Ronald Press Company (1942).

Dharan, B. G., "The Effect of Sales and Collection Disclosures on Cash Flow Forecasting and Income Smoothing," *Contemporary Accounting Research* (Spring, 1987): 445-419.

Dickenson, Arthur Lowes, "Treatment of Maintenance and Depreciation Accounts in the Classification of Accounts by Interstate Commerce Commission," A communication submitted to Professor H. C. Adams, March 8, 1907, reprinted in Gary Previts (ed.), *Early 20th Century Developments in American Accounting Thought: A Pre-Classical School*, New York: Arno Press (1978).

Dicksee, Lawrence R., *Depreciation, Reserves, and Reserve Funds*, 1903 ed., London: Gee and Co., reprinted by New York: Arno Press (1976).

Dicksee, Lawrence R., "Popular Fallacies XII: Good Times and Bad Times," *The Accountants Journal* (March-July 1931): 537-539, reprinted in Richard Brief (ed.), *Dicksee's Contribution to Accounting Theory and Practice*, New York: Arno Press (1980).

Dicksee, Lawrence R., "Profits Available for Dividend," in *Four Lectures Delivered to the Institute of Chartered Accountants in England and Wales During the Years 1894 and 1895*, London: Gee & Co., reprinted in Richard Brief, editor, *Dicksee's Contribution to Accounting Theory and Practice*, New York: Arno Press (1976): 39-60.

Doupnik, Timothy and Thomas G. Evans, "The Functional Currency Determina-

tion: A Strategy to Smooth Income," *Advances in International Accounting*, 2 (1988): 171-182.

Dyckman, Thomas R. and Stephen A. Zeff, "Two Decades of the Journal of Accounting Research," *Journal of Accounting Research*, 22, 1 (Spring, 1984): 225-297.

Eckel, N., "The Income Smoothing Hypothesis Revisited," *Abacus*, 17, 1 (1981): 28-40.

Gamble, G. O. and B. O'Doherty, "How Accounting Academicians Can Use Citation Indexing for Analysis and Research," *Journal of Accounting Education* (Fall, 1985): 123-144.

Gilman, Stephen, *Accounting Concepts of Profit*, New York: The Ronald Press Company (1939).

Gordon, Myron, Bertrand Horwitz, and Philip Myers, "Accounting Measurements and Normal Growth of the Firm," in Robert Jaedicke, Yuji Ijeri, and Oswald Nielson (eds.), *Research in Accounting Measurement*, Sarasota, Fla.: American Accounting Association (1966): 221-231.

Gordon, Myron, "Postalates, Principles, and Research in Accounting," *The Accounting Review* (April, 1964): 251-263.

Hand, J. R. M., "Did Firms Undertake Debt-Equity Swaps for an Accounting Paper Profit or True Financial Gain?" *The Accounting Review*, LXIV, 4 (October, 1989): 587-624.

Hepworth, Samuel R., "Smoothing Periodic Income," *The Accounting Review*, XXVIII, 1 (January, 1953): 32-39.

Hines, Ruth, "The Sociopolitical Paradigm in Financial Accounting Research," *Accounting. Auditing, and Accountability Journal*, 2, 1 (1989): 52-75.

Imhoff, Eugene A., Jr., "Income Smoothing: An Analysis of Critical Issues," *Quarterly Review of Economics and Business*, 21, 3 (Autumn, 1981): 23-42.

Johnson, J. F. and E. S. Meade, "Editorial: Maintenance Expenses and Concealment of Earnings," *Journal of Accountancy*, 1, 5 (March, 1906): 410-412.

Joplin, J. Porter, "Secret Reserves," *Journal of Accountancy* (December, 1914): 407-417.

Knight, Alfred, "Depreciation and Other Reserves," *The Journal of Accountancy*, 5, 3 (January, 1908): 189-200.

Kohler, Eric, "Editorial," *The Accounting Review*, 8, 1 (March, 1933): 80-82.

Kohler, E. L., "How Much Depreciation?" *Illinois Society of CPAs Bulletin* (December, 1949): 4-9.

Littleton, A. C., Lloyd Morey, David Himmelblau, and F. E. Ross, "The International Congress on Accounting," *The Accounting Review* (December, 1929): 234-246.

Matheson, Ewing, *The Depreciation of Factories, Mines, and Industrial Undertakings and Their Valuation*, London: E and F. N. Spon (1893), reprinted New York: Arno Press (1976).

Miller, Herbert E., "Reserves for War Contingencies and Postwar Adjustments," *The Accounting Review* (July, 1944): 248-253.

Moonitz, Maurice, "The Case Against LIFO as an Inventory-Pricing Formula," *The Journal of Accountancy*, 95 (June, 1953): 682-690.

Moses, 0. Douglas, "Income Smoothing and Incentives: Empirical Tests Using Accounting Changes," *The Accounting Review*, LXII, 2 (April, 1987): 358-375.

Nash, L. R., "Depreciation Accounting Methods for Public Utilities, " *International Congress on Accounting, 1929*, New York: International Congress Ac-

counting (1930), reprinted New York: Garland Publishing, Inc. (1982).

Nickerson, Clarence B., "Inventory Reserves as an Element of Inventory Policy," *The Accounting Review* (December, 1937): 345-354.

Page, Edward D., "Balance Sheet Valuation," *The Journal of Accountancy* (April, 1916): 241-254.

Paton, W. A., "Accounting Problems of the Depression," *The Accounting Review* (December, 1932): 258-267.

Paton, W. A. and Russel A. Stevenson, *Principles of Accounting*, New York: The Macmillan Company (1918).

Polak, W. J., "Theories of Depreciation," *International Congress on Accounting, 1929*, N.Y.: International Congress on Accounting (1930): 447-463.

Previts, G. J., L. D. Parker, and E. N. Coffman, "An Accounting Historiography: Subject Matter and Methodology," *Abacus*, 26, 2 (1990): 136-158.

Previts, Gary, "Some Traditions of the American Accounting Discipline," in Buckley, John W. (ed.), *The Impact of Accounting Research on Policy and Practice* (1981): 115-40.

Ronen, J., Simcha Sadan, and Charles Snow, "Income Smoothing: A Review," *The Accounting Journal*, 1, 1 (Spring, 1977); 11-26.

Sanders, T. H., H. R. Hatfield, and V. Moore, *A Statement of Accounting Principles*, New York: American Institute Publishing Company (1938).

Stans, Maurice H., "Weaknesses in Financial Reporting Caused by Improper Use of Reserves." *The Journal of Accountancy* (March, 1948): 190-195.

Sweet, Homer N., "The Case for a Cost or Market Basis," *N.A.C.A. Bulletin* (December, 1937): 400-409.

Warshaw, H. T., "Inventory Valuation and the Business Cycle," *Harvard Business Review* (October, 1924): 27-34.

Watts, Ross and J. Zimmerman, "The Demand for and Supply of Accounting Theories: The Market for Excuses," *The Accounting Review*, LIV, 2 (April, 1979): 273-305.

Watts, R. and J. Zimmerman, *Positive Accounting Theory*, Englewood Cliffs, N. J.: Prentice-Hall (1986).

Watts, Ross L. and Jerold L. Zimmerman, "Towards a Positive Theory of the Determination of Accounting Standards," *The Accounting Review*, LIII, 1 (January, 1978): 112-134.

White, Gary, "Discretionary Accounting Disclosures and Income Normalization," *Journal of Accounting Research* (Autumn, 1970): 260-273.

Yamey, B. S., "The Development of Company Accounting Conventions," *The Three Banks Review* (September 1960): 3-18, reprinted in Yamey, B. S., *Essays on the History of Accounting*, New York: Arno Press (1978).

APPENDIX

Terms Used to Identify Income Smoothing

Reference:	*Term*
Matheson (1893)	Did not use a substitute term, but discussed depreciation in proportion to profit.
Dicksee (1895)	Did not use a substitute term, but objects to the practice of expensing repairs during early years of use and then capitalizing them when they become large. (p. 50)
Dicksee (1903)	"fairly stable income" (p. 3)
Johnson and Meade (1906)	"accommodating maintenance expanses to the fluctuations in earnings" (p. 411)
Dickinson (1907)	"Operating charge . . . increased in times of prosperity and reduced or even temporarily abandoned when Surplus Income is insufficient." (p. 9)
Knight (1908)	Did not use a substitute term, but insists that if capital replacement is to occur, depreciation cannot be omitted just because profits for the period are low. (p. 191)
Joplin (1914)	"making the profits of the business appear to be regular" (p. 409)
Page (1916)	Described smoothing effect of methods, but did not use a substitute term.
Paton and Stevenson (1918)	"even flow of income" (p. 509)
Warshaw (1924)	"leveling gains and losses" (p. 31) "stabilizing profits and losses over a period of years (p. 34)
Crunder and Belcher (1930)	"substantially equalizing the effect" (p. 380)
Nash (1930)	"Stability of Income" (p. 312)
Polak (1930)	"partly counterbalances the shocks of market [for the firm's production] fluctuations and renders stabler the existence of the enterprise." (p. 463)
Dicksee (1931)	Described smoothing effect of methods, but did not use a substitute term.
Paton (1932)	"making fat years pay for lean years" (p. 261)
Kohler (1933)	"stable statistics" discussed within the context of accounting income.
Daniels (1934)	"equalizing income" (p. 41)
Andersen (1935)	"equalizing earnings" (p. 342)

Reference:	*Term*
Davis (1937)	"stabilizing indicated profits" (p. 392)
Nickerson (1937)	"hidden reserves which have been used to bolster earnings during lean years" (p. 351)
Sweet (1937)	"make-believe stability" (p. 400)
Committee on Federal Taxation, AIA (1938)	"steady stream of profits" (p. 313)
Sanders, *et al.* (1938)	"averaging profits over the years" (p. 16), "equalizing profits over period of prosperity and depression" (p. 15)
Cotter (1940)	"earnings stable in comparison with other concerns" (p. 17)
Committee on Accounting Procedure, AIA (1942)	"arbitrarily equalizing the reported income of different accounting periods." (p. 116)
Devine (1942)	"leveled income" (p. 115)
Committee on Accounting Procedure, AIA (1944), (1947A) (1947B)	"equalizing reported income" (pp. 215, 232, 257 respectively)
Miller (1944)	"profit smoothing" (p. 248)
Kohler (1947)	"profits-equalization" (p. 7)
Stans (1948)	"profit equalization" (p. 192)
Moonitz (1953)	"smoothing of profits" (p. 686) "relative stabilization of profit" (p. 686) "assigns a nonexistent stability to profit" (p. 690)

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REVIEWS

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REVIEWS OF BOOKS AND OTHER PUBLICATIONS

Edward J. Kane, *The S & L Insurance Mess: How Did It Happen?* (Washington, D.C.: The Urban Institute Press, 1989, 180 pp., $29.95 [orig.]; $10.95 [paper text edition]).

Lawrence J. White, *The S & L Debacle. Public Policy Lessons for Bank and Thrift Regulation* (New York: Oxford University Press, 1991, 224 pp., $24.95).

Martin Mayer, *The Greatest-Ever Bank Robbery. The Collapse of the Savings and Loan Industry* (New York: Charles Scribner's Sons, 1990, 352 pp., $24.95).

Continuing Research on the Savings and Loan Crisis: A Review Essay

by James Schaefer
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The Savings and Loan crisis has been in the news since 1989. Apparently the seriousness of the situation cannot be overstated, as many have suggested that the thrift industry has been destroyed. The magnitude of the crisis has resulted in numerous articles and books. The topics of these writings have ranged from detailed chronologies of the entire industry (from its inception to the present) to abuses by specific people at individual thrifts.

Vol. 18, No. 1 of *The Accounting Historians Journal* included a review essay of three books on the crisis. *Thrifts Under Siege*, by R. Dan Brumbaugh [1988], analyzed the economic forces battering thrift institutions and suggested the need for dramatic reform of thrift and commercial banking. Brumbaugh was one of the first writers to devote significant attention to RAP, or regulatory accounting principles. *Other People's Money* [1989], by Paul Zane Pilzer, provided a discussion of the history of the industry and insight into the regulatory problems in-

volved. *Inside Job* [1989], by Stephen Pizzo *et al.*, investigated dozens of failed thrifts and suggests the involvement of organized crime.

This review examines three more books, two of which are written by economists. Edward J. Kane occupies the Everett D. Reese Chair of Banking and Monetary Economics at Ohio State University. Kane has researched and taught the subject of deposit insurance for over ten years. His work was sponsored in part by the Urban Institute. Lawrence J. White is Professor of Economics at New York University and has served as one of the three Board Members of the Federal Home Loan Bank Board, the regulator of and provider of depositor insurance (through the FSLIC) to the thrift industry. The third author is Martin Mayer, who has written over ten books on business and finance, as well as numerous other works of fiction and nonfiction. He once served as a commissioner on the President's Commission on Housing and was also assigned to the Commission's finance committee.

AN ECONOMIC PERSPECTIVE

Economists tend to view transactions differently than accountants. For example, most economists would use market value instead of historical cost as a basis for measuring assets. Economists also would include all sources of positive and negative future cash flows as assets and liabilities and not omit certain "off-balance sheet" items from the net worth equation. When economists speak of "costs," they are normally referring to opportunity costs instead of the direct monetary expenses involved in any activity. Hence economists and accountants who decide to measure the same phenomenon may arrive at very different results.

One of the common denominators of Kane and White is their dissatisfaction with the accounting principles used by thrifts. While neither author holds accountants responsible for the crisis, throughout their books both are critical of accounting. A recurring theme in Kane is that federal authorities have systematically used accounting discretion to understate the depth and breadth of industry problems. Kane states, "federal regulators and federal politicians let accounting gimmicks" hide the massive red ink generated by the thrift industry [p. 1]. White also says the economic insolvency of the FSLIC and certain thrifts was systematically covered-up by "smoke-and-mirrors"

accounting [p. 92]. White repeatedly refers to accounting as a "backward-looking" framework [e.g., pp. 41, 113, 225, 226] and stresses the importance of net worth based on market values instead of historical cost. Both authors believe that accounting should be changed to a market basis, with White stating that this is the most important reform needed [p. 225].

Kane and White are in the mainstream of current economic literature in their call for market value accounting [*e.g.*, see Mishkin, 1992]. Both believe the use of historical cost is indefensible and see no major problems in implementing market-value accounting. While both acknowledge how RAP replaced GAAP for thrifts, they apparently miss the significance of RAP being developed outside of the formal accounting standard-setting process. They do not recognize the accounting profession's previous attempts to deal with inflation (*e.g., SFAS No. 33*). They also do not mention the exceptions to valuing an asset at historical cost under GAAP, such as the LCM rule for inventories, short-term investments in marketable equity securities, etc.

However, both books offer thoughtful, well-reasoned information useful to accounting historians interested in learning more about the crisis. They both explain:

1) the process by which individual thrifts became insolvent due to a combination of external forces beyond the control of management.
2) the incentive for federal regulators and politicians to procrastinate in dealing with the problem.
3) the inherent problems with federal deposit insurance as it has been structured, especially level-based premiums.
4) their conclusions (reached individually) that fraud was not a major factor in the crisis.

Both Kane and White offer a wealth of tables relevant to the crisis. For example, Kane's Table 2-3 [pp. 34-37] chronicles the major federal laws affecting savings institutions from 1932-1987. White, in Table 3-1 [pp. 26-32], details the various depository institutions and their regulators.

MAYER'S PERSPECTIVE

Mayer's book is an attempt to explain how the S & L situation developed, what is likely to happen next, and what should be done. While it should be of interest to accounting historians, often it reads like a popular account of the crisis. The author

relies heavily on stories, some old and some new, as well as anecdotes. For example, by page nine he is already repeating the oft-told episode of Don Dixon's abuses while in control of Vernon Savings and Loan. However, beginning on page 13, he presents a story new to the literature as he recounts his witnessing of an attempt by former Democratic party chair Robert Strauss to change a *Wall Street Journal* story. The story was critical of the Bank Board's decision to allow the withdrawal of $268 million from First Gibraltar Savings by its owners. At the time, the thrift reportedly was paying more on deposits than it was earning on loans and was undercapitalized. Mayer claims that Strauss urged the Bank Board to approve the withdrawal while at the same time hiding the transaction from the public. Mayer is bipartisan in his criticism of public officials, as he also discusses actions of Reagan Administration officials such as Donald Regan and other politicians including Senator Edward Kennedy, Representative Joseph Kennedy, and Governor Michael Dukakis.

Accounting historians' primary interest in Mayer will be his stories and views of the accounting profession's involvement in the crisis. Implicit in his writing is the profession's vulnerability on both the accounting principles used by thrifts and the audit failures. He gives examples of both and frequently names CPA firms who were involved. His significant views include:

1) the accounting profession could have stopped "the atrocious theft from the government's insurance funds . . . " [p. 19].
2) "CPAs who took big fees to certify the books (for thrifts guilty of abusive practices) were really co-conspirators" [p. 13].
3) "if a client paid an auditor enough money, the auditor was quite willing to do lots of things the FSAB condemned" [p. 73].

Compared to Kane and White, Mayer's reasoning is elementary if not flawed. Mayer states that deposit insurance is "the crack cocaine of American finance" without a satisfactory development of this analogy. Similarly he suggests that deposit insurance "draws remarkably unattractive characters to the operation of banks and thrifts" [p. 20], again without a satisfactory development. His understanding of how accounting functions also is questionable, as he states "in double-entry bookkeeping, every asset must be matched with a liability" [p. 67].

To Mayer's credit, however, he understands the development of RAP better than most, if not all, writers of the crisis. While not presenting a thorough discussion of how RAP were developed largely outside of the FASB, in passing he describes how the Bank Board developed accounting principles which "virtually guaranteed a profit" [p. 69] while being inconsistent with GAAP in material aspects. Moreover, he is the only one of these authors to devote attention in any detail to the role of the independent auditors in the crisis.

CONCLUSION

Market-based accounting may soon replace the historical cost model for all public accounting. In January 1992, the FASB issued Statement No. 107, "Disclosures about Fair Value of Financial Instruments," which will require all companies to disclose in footnotes the estimated current value of their financial instruments, both assets and liabilities. The rule applies to all publicly owned entities, including banks, thrifts, and other financial institutions. The move to market-based accounting may not stop at disclosure, as SEC Chairman Breeden has previously admonished FASB Chairman Beresford for a disclosure solution, stating that the SEC believes that the "profession must begin a serious and sustained review of the prospects for market-based accounting applied more broadly in the financial statements of reporting companies" [Muth, 1991, p. 12].

The issue of whether or not management is to blame for the thrift crisis is important to the accounting profession. If the crisis is indeed a result of fraudulent and dishonest management practices, the profession is vulnerable to criticisms such as Mayer's that it could have stopped the crisis. However, students of the crisis may not be convinced that management fraud and dishonesty are responsible, although a government report suggests that criminal activity was a central factor in many thrift insolvencies [General Accounting Office, 1989]. While a deposit guarantee system may invite abusive practices, studies have not shown such practices to be widespread. Moreover, the occurrence of thrift failures in clusters (*e.g.*, Texas) and the finding of the incompetent or dishonest management among failed thrifts does not mean the entire industry is afflicted with such management. It is not surprising to find a high incidence of bad real estate loans in economically depressed areas. Also thrifts which have survived the crisis due to adequate capital levels and sound

management policies tend not to call attention to themselves.

Neither thrift management nor the accounting profession was responsible for: 1) implementing more favorable accounting treatment of items such as loan loss deferrals for thrifts; 2) increasing the ceilings on deposit insurance while reducing regulatory supervision; 3) raising interest rates to record levels in the 1980s, creating unfavorable interest rate spreads; or 4) causing the high levels of inflation during this period.

The accounting profession is vulnerable on two fronts, audit failures and a lack of action. Kane, White, and Mayer all mention the problems regulators had in monitoring the thrift industry in the 1980s. This placed even more responsibility on the thrifts' independent auditors, whose function is to attest to the fairness of financial statement presentation. Unfortunately, little progress has been made in determining what caused these audit failures and what corrective action is necessary. As Denzil Causey stated in a recent editorial:

> The year 1991 was a milestone marking the first public recognition of the declining fortunes of accounting firms, continuing loss of credibility for CPAs, and no action by the AICPA or regulatory authorities such as the SEC and State Boards of Accountancy to address the real problems of the profession . . . Perhaps 1991 is most surprising for remedial actions that never took place. Banks continued to fail and some failures continued to be surprises. People continued to ask where were the auditors [1992, p. 4].

REFERENCES

Brumbaugh, R. Dan, Jr., *Thrifts Under Siege*, Cambridge, MA: Ballinger Publishing Company (1988).

Causey, Denzil, "No Leadership for a Declining Accounting Profession," *Accountant's Liability Review* (January 1992): 4.

Financial Accounting Standards Board, "Disclosures about Fair Value of Financial Instruments," *Statement of Financial Accounting Standards, No. 107* (1992).

Mishkin, Frederic S., "An Evaluation of the Treasury Plan for Banking Reform," *Journal of Economic Perspectives* (Winter 1992): 133-153.

Muth, Robert F., "Missed the Target," *United States Banker* (October 1991): 12.

Pilzer, Paul Zane, *Other People's Money*, New York: Simon & Schuster (1989).

Pizzo, Stephen, Mary Fricker, and Paul Muolo, *Inside Job: The Looting of America's Savings and Loans*, New York: McGraw-Hill and Company (1989).

U.S. General Accounting Office, *Thrift Failures. Costly Failures Resulted From Regulatory Violations and Unsafe Practices*, 1989, Report to Congress, GAO/AFMD-89-62.

H. S. Cobb, Ed., *The Overseas Trade of London Exchequer Customs Accounts 1480-1* (London: London Record Society, 1990, 220 pp., $38).

Reviewed by
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The London Record Society was founded in 1964 for the purpose of publishing "transcripts, abstracts, and lists of primary sources for the history of London, and generally to stimulate interest in archives relating to London [p . 219]. This book, which is the 27th volume published by the Society, contains an extensive introduction that familiarizes the reader with the London custom, practices and the types of custom officials during the fifteenth century.

The main part of the book carefully chronicles the foreign trade that took place in the port of London between September 29, 1480 and September 29, 1481. The imports and exports are listed in chronological order and any custom duties levied are cited. For example, Entry 7 for October 2 states: "From the ship of John Pache called *Anne* of Colchester: William Grenewolt, H 2 lasts soap, 12 pounds. Arnold van Stalle, H 1 roll Herford linen cloth, 12 pounds.

The book lists 224 ships entering and 215 ships leaving the port of London during the one year time period covered. The reason why fewer ships were recorded leaving the port than entering is explained by being "partly due to the omission from the Petty Custom account of the wool fleets which sailed in December 1480 and July and September 1481 with over 7000 sacks of wool" [p. xxxviii]. It is interesting to note that customs were levied not only on imported goods but also goods exported by alien merchants. The main purpose of levying custom duties was to collect funds for the Crown rather than to achieve some economic goals.

An extensive *Glossary and Index of Commodities* is included which defines the terms used in the listing and deciphers the English language in use in the fifteenth century. Without the glossary, the book would be of very limited use. Few readers would know that "gipsers" are purses, pouches or wallets suspended from a belt, or that a "last" is a type of measure equal to 12 barrels.

This book will be of primary interest to historians of the London trade during the fifteenth century. Accounting histori-

ans will benefit mostly from the *Glossary* if used as a reference when researching English accounting records of this period.

The *Overseas Trade of London Exchequer Customs Accounts 1480-1* appears to be a fine addition to the collection of volumes published by the London Record Society. Although H. S. Cobb is listed as the "editor" of this volume, Cobb contributed a great deal more considering the meticulous work done in the *Introduction* and the *Glossary and Index of Commodities*.

M. J. R. Gaffikin, *Accounting Methodology and the Work of R. J. Chambers* (New York, Garland Publishing, Inc., 1989, 236 pp., $53)

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Professor Gaffikin is worried about the intellectual status of the accounting discipline. He fears that it lacks a sound theoretical base and that its practitioners have paid insufficient attention to fundamental issues, especially methodological ones. He agrees with Sterling that accountants have recycled rather than resolved issues and fears that "accounting, as a separate intellectual discipline, is in danger of losing its identity" [p. 5]. Having been persuaded by Kuhn, Lakatos, Feyerabend and others that methodological issues are to be addressed philosophically and historically, through the study of the work of actual theorists, Gaffikin focuses on the work of R. J. Chambers, whose concerns parallel and pre-date his own. He "sets out to determine the basis of sound methodology espoused in the philosophical, economic and accounting literatures, and [his study] is especially [directed to Chambers' work]. Conclusions [concerning *what Chambers saw* as the basis of sound methodology and *how this matches current opinions* in the general methodological debate] . . . are provided" [p. 4, original emphasis]. Chambers is of interest as a seminal figure, "who has attempted to add substance to accounting theory" [p. 5]. Nevertheless, Chambers has failed (so far) to persuade academics or practitioners to accept his solution to the lack of rigor in the development of accounting theories and practices. Gaffikin is interested in this response and seeks, through an historically-based methodological critique of Chambers' work, to explore

whether its non-acceptance can be explained on methodological grounds.

Like Chambers, Gaffikin takes seriously the view that the epistemological claims of accounting theoreticians can (should?) be assessed by reference to philosophy in general and the philosophy of science in particular. Accordingly, chapter 2 provides a historical review of twentieth-century philosophy of science. It traces the rise and fall of *The Received View* (the incorporation of logical positivism and logical empiricism into the hypothetico-deductive model of scientific explanation). The work of "post-empiricist" philosophers (Kuhn, Lakatos, *etc.*) is also reviewed. Gaffikin uses it to illuminate the difficulties of the Received View and of re-constructing a response to "Cartesian anxiety". That is: where can we find "an Archimedean point upon which we can ground our knowledge" [Bernstein, 1983, cited on p. 32]. Gaffikin (ostensibly quite deliberately) leaves the reader wondering whether such a project is still possible.

In chapter 3, Gaffikin selectively reviews the disparate methodological themes incorporated into economics "in the last two centuries". He traces the impact (and non-impact) of philosophy on economics and identifies methodological positions which have influenced Chambers and the accounting literature generally. For Gaffikin, economics is a discipline in crisis. Positive economics in particular has not come to grips with philosophical critique of the Received View, while both accounting and economics are at risk because of the crisis in philosophy. "If there is no scientific method — or no *one* scientific method — what does it mean for disciplines such as economics and accounting?" [p. 67, original emphasis].

Chapter 4 describes "the development of Chambers's main theses ... [in particular "his notions of methodology"] ... by describing his environment and then determining how it became reflected in his writing" [pp. 69, 115]. It identifies personal, professional and intellectual influences on Chambers' career and traces the gradual emergence of Chambers' theory of continuously contemporary accounting over a period of twenty years. Gaffikin makes the point that Chambers consciously sought to clarify and rigorously pursue a methodological position, utilizing the economics and the philosophy of science available to him. As to the latter, Chambers' turned to (what was later called) the Received View.

In chapter 5, Gaffikin present a critique of Chambers' meth-

odology, based partly upon his earlier review of the philosophy of science. Gaffikin briefly acknowledges that Chambers' work suffers from the limitations of the Received View [p. 144]. However, this point is not pursued (possibly to avoid repetition). He focuses instead on the deficiencies of philosophical theories as bases for evaluating Chambers' work [see pp. 132-144]. One result is that is the reader is left (deliberately?) in doubt as to whether continuously contemporary accounting has been [or should have been, or could have been] rejected on 'sound' methodological grounds. Chapter 5 also identifies the influence of particular economists on Chambers [pp. 144-150]. However, Gaffikin's critical remarks are mostly reserved for the proponents of positive accounting theory who have taken on board, more or less, the same methodological limitations as the proponents of positive economics [pp. 152-159]. Nevertheless, Gaffikin makes the point that Chambers shares a great deal of common methodological ground with the positive accountants. Thus, readers *might* be prompted to reflect upon the present dominance of 'positivist' methodologies in accounting — if they can be persuaded to take an interest in 'methodology' rather than 'method'. (In this context, it is ironic that the *Accounting Review*'s reviewer has claimed that Gaffikin's book "will not appeal to a large number of readers of this journal" [Anthony, 1991, p. 660]).

In chapter 6, the stakes are raised still higher. By now the crises in the philosophy of science and economics (and thus in accounting) are taken for granted. Gaffikin is already persuaded of the demise of the *possibility* of discovering "the quintessence" of a "scientific method" which might rescue the accounting discipline. He is an opponent of methodological monism and considers that development of "objective, value-free theories" is "merely an empty dream" [p. 163]. He now pays more attention to the argument that the epistemological and ontological bases, and possibly the aims of the "social sciences" are quite different from those of the "natural sciences". Fleeting references are made to critical theory, hermeneutics, phenomemology, ethnomethodolgy and the emerging 'radical' accounting literature. As well as generating some further criticisms of Chambers' work [see pp, 187-200], Gaffikin highlights the possibility of 'post-Cartesian anxiety' in accounting and other disciplines. How are we to avoid the pitfalls of relativism and pluralism — or just plain sloppiness — in the absence of definitive standards

of intellectual achievement? Is this our worst nightmare or our best opportunity?

Gaffikin succeeds in raising issues relevant to contemporary accounting academicians by means of an historical analysis of the work of one theorist. He also succeeds in identifying problems that a neo-Chamberian theory of accounting will need to overcome; and he points towards some possible solutions. Some reservations are in order. Gaffikin denies that rejection of continuously contemporary accounting can be explained on methodological grounds. He claims that it has been rejected for "political, historical, institutional, psychological and sociological" reasons [p. 200]. These reasons are not spelled out. While pursuit of those reasons may reasonably be regarded as a separate project, Gaffikin at times gives the impression that he intends to account more fully for the non-acceptance of CoCoA (*e.g.*, see the synopsis). Second, Gaffikin claims to have "demonstrated that Chambers has presented the most ambitious revision of accounting" [p. 200]. While Chambers may indeed have done so, Gaffikin has not analyzed the work of other writers (*e.g.*, Sterling) in sufficient depth to clinch his point. Third, some readers will probably quibble about the choice of "alternative" theories highlighted in the final chapter. Why, for example, is there not more mention of Foucault's critique of the "will to knowledge" and of the darker side of the "human sciences"? On a more prosaic level: the book would have benefited from another round of proof-reading and an index would have been useful.

Notwithstanding these reservations, this book is recommended to those interested in the work of R. J. Chambers, and is of more general interest as an attempt to grapple with the philosophy of science, economics and "alternative" theories so as to illuminate both the past and present state of discipline of accounting.

REFERENCE

Anthony, J. P., Review of M. J. R. Gaffikin, *Accounting Methodology and the Work of R. J. Chambers, Accounting Review* (1991): pp. 659-660.

Richard Mattessich, Ed., *Accounting Research in the 1980s and its Future Relevance*, (The Canadian Certified General Accountants' Research Foundation, 1991, 277 pp., $30 Can.).

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This book constitutes an anthology of research in accounting in the 1980s. It includes six reprinted articles together with a comprehensive Commentary by the editor on research in the 1980s and an Index of names.

The Commentary is well written and represents a very valuable overview of the areas of research in accounting. Mattessich divides his Commentary into eleven sections complemented by an extensive Bibliography. Generally, in these sections, he adequately presents the main issues related to a particular research theme, indicating authors that made important contributions to the area during the decade. In each appropriate section, Mattessich also describes the general content of the paper(s) chosen for reprint, and the main arguments of the author(s).

In the Commentary's first section, Mattessich highlights financial, economic and social problems of the 1980s in the United States and Canada, together with the shortcomings of accounting in helping to prevent or solve these problems.

In the second section, Mattessich stresses the need for having an historical perspective on accounting to have some knowledge of the history of ideas. He mentions a number of books, monographs and articles that have such a perspective, including publication and citation analysis. He emphasizes the research of Denise Schmandt-Besserat which offers evidence that "it was accounting which gave rise to writing as well as abstract counting, and not the other way around" [p. 4].

In section three, Mattessich comments on the controversy between basic analytical research in managerial accounting and the practice oriented approach with its case methodology, field studies and field experiments. An article by Kaplan, published in *Accounting, Organizations and Society* in 1986, "The Role for Empirical Research in Management Accounting", was chosen to support this area of research.

In section four, Mattessich deals with organizational and behavioral accounting which he divides in three areas supported by tables presenting dominant assumptions (reprinted from Chua [1986]), *The Accounting Review*). The first area, be-

havioral accounting, is complemented by a review article, "Behavioral Research on the Production and Use of Financial Information", from Richardson and Gibbins, published in Ferris, ed., *Accounting Research: A Critical Analysis* in 1988. The other two areas discussed by Mattessich are the Interpretative perspective and the Critical-Radical perspective in organizational accounting.

The area of positive theory and financial accounting is dealt with in the fifth section. Mattessich refers to Watts and Zimmerman's book *Positive Accounting Theory* and to numerous authors who have criticized that approach. He then contrasts the two perspectives in research related to security prices: the older standard returns model and the newer cross-sectional valuation perspective. A table of "Sample Research [1980-1988] on the Relationship Between Earnings and Stock Returns" from Lev's [*Journal of Accounting Research*, 1990] paper "On the Usefulness of Earnings and Earnings Research: Lessons and Directions from Two Decades of Empirical Research" is included in this section. The new perspective is surveyed in the reprinted article of Atiase and Tse, "Stock Valuation Models and Accounting Information: A Review and Synthesis" [*Journal of Accounting Literature*, 1986]. Mattessich concludes this section by commenting on Ohlson's reprint-paper "A Synthesis of Security Valuation Theory and the Role of Dividends, Cash Flows, and Earnings" [*Contemporary Accounting Research*, 1990].

In section six, Mattessich puts in evidence the importance of inflation accounting in the academic community by listing a number of the many books that were written on current value accounting. He also gives potential reasons for the failure of the implementation of accounting for changing prices and comments on the results obtained by some researchers which seem to indicate that no inflation accounting model supplies information superior to the historical cost model. The reprint-article, selected for its excellence, is Thornton's "Current Cost Disclosers and Nondisclosers: Theory and Canadian Evidence" [*Contemporary Accounting Research*, 1986].

Agency-Contract theory is dealt with in the seventh section. Mattessich cites numerous authors of surveys of agency theory and details the content of the article by Baiman chosen for reprint: "Agency Research in Managerial Accounting: A Second Look" [*Accounting, Organizations and Society*, 1990]. Mattessich discusses the paper by Morris [*Accounting and Business Research*, 1987], "Signalling, Agency Theory and Accounting Policy

Choice", which compares the axiomatic basis of signalling theory and agency theory. A table from Eisenhardt's article "Agency Theory: An Assessment and Review" [*The Academy of Management Review*, 1989] summarizes empirical agency-contract studies. Finally, Mattessich concludes this part with a discussion of an article by Noreen, "The Economics of Ethics" [*Accounting, Organizations and Society*, 1988].

In the eighth section of the Commentary, Mattessich reviews the different areas in the field of auditing research based on a paper written by Scott, "The State of the Art of Academic Research in Auditing" [*Journal of Accounting Literature*, 1984] and some recent publications. Citing a number of authors, he discusses topics such as statistical sampling theory, decision theory, auditor independence, the conflict arising from management advisory services, application of agency theory to auditing.

The ninth section is devoted to international accounting research. Although no reprint-paper from this area appears in the anthology, Mattessich refers to a review article by Bindon and Gernon, "International Accounting Research" that was published in *Advances in Accounting* in 1987. Further, a number of noteworthy books are signaled.

In section ten, other areas of research in accounting which deal with the reality behind accounting variables, axiomatic foundations or models, analytical framework for accounting theory, matrix accounting and its relationship to expert systems in accountancy are discussed. The contribution of Ijiri's work on triple-entry bookkeeping is also commented upon.

In the epilogue, Mattessich says that the course of accounting research during the 1980s was "predominantly consolidating and puzzle-solving" [p. 36]. He criticizes the neglect of foundational and normative issues in the decade for the emergence of fads, and finds the research too fragmented and lacking a holistic approach.

Overall, for a reader interested in knowing what was written in the various areas of accounting research in the 1980s and by whom, this book is an invaluable reference. It constitutes a good organizer of the accounting literature. An impressive number of papers and books are mentioned and put in a well developed perspective. The review articles chosen for reprint are appropriate. However, two articles were selected in financial accounting while none represented areas such as auditing or international accounting. Ohlson's reprint-paper was probably chosen for its relevance to the future in that it provides a synthesis

of the theory of security valuation for multiple-date settings with uncertainty and offers interesting results following the development of an appropriate model framework.

For the interested reader, a few noteworthy articles were not mentioned: in the financial area, two papers by Ou and Penman [1989] deal with accounting measurements and their ability to predict future earnings and stock returns; in the auditing area, an article by Bédard [1989] provides a critical review of the research related to expertise in auditing. Finally, since research in accounting education is only briefly mentioned in the preface to the volume, a reader interested in this developing area of research could refer to the extensive reviews by Rebele and Tiller [1986] and by Rebele, Stout and Hassell [1991], the latter having been published after Mattessich's book.

REFERENCES

Bédard, J. , "Expertise in Auditing: Myth or Reality?", *Accounting, Organizations and Society* (1989, No. 1/2): 113-131.

Ou, J. A. and S. H. Penman, "Accounting Measurement, Price-Earnings Ratio, and the Information Content of Security Prices", *Journal of Accounting Research* (Supplement 1989): 111-144.

Ou, J. A. and S. H. Penman, "Financial Statement Analysis and the Prediction of Stock Returns", *Journal of Accounting and Economics* (1989): 295-329.

Rebele, J. E. and M. G. Tiller, "Empirical Research in Accounting Education: A Review and Evaluation", in A. C. Bishop, E. K. St. Pierre and R. L. Benke (Eds.), *Research in Accounting Education*, pp. 1-54, Harrisonburg, VA: Center for Research in Accounting Education, James Madison University, 1986.

Rebele, J. E., D. E. Stout and J. M. Hassell, "A Review of Empirical Research in Accounting Education: 1985-1991", *Journal of Accounting Education*, (Fall 1991): 167-231.

Maurice Moonitz, *Selected Writings* (New York: Garland Publishing, Inc., 1990, 608 pp., 2 volumes, $170)

Reviewed by
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In this age of accounting specialization, it is easy to forget that until the 1950s financial accounting periodicals were dominated by the writings of a few individuals. Those few were prolific: Paton, Kohler, Littleton, May and a dozen or so others contributed hundreds of articles to the leading accounting periodicals.

These authors recognized few subject limitations. Just as they might be asked to teach any course in the accounting curriculum, they considered themselves qualified to express judgments on a wide range of accounting issues. However, the evidential content of their articles was typically weak; and, though they were often persuasive, they settled few accounting controversies. Anthologies of their writings are of interest mainly as period pieces which show the state of accounting thought at various times in the past.

This collection includes about fifty short works written by Maurice Moonitz between 1939 and 1987, including nearly all his published articles and a monograph on changing prices and financial reporting. The original magazine pages were photocopied, resulting in a variety of page formats and type styles, but the text is easily readable. Preceding the reprinted articles are a current bio-bibliography and Moonitz's "Guided Tour Through the Contents" which explains the background of many of his writings.

Like his predecessors, Moonitz published on a wide variety of topics. Included in this collection are articles on LIFO, depreciation, economics, fund flows, pension accounting, auditing standards, curriculum choices, and of course postulates and principles.

But two differences are evident between Moonitz's writings and those of earlier "Accounting Pioneers". First, Moonitz wrote repeatedly about certain areas of general interest as problems in those areas became acute. Second, he returned to those seminal topics again and again, even after many years, to update his thinking in light of new developments. This is true of consolidated financial statements, his dissertation topic at UC Berkeley (first article 1939, last in 1983); of financial reporting, where the articles also span 40 years; of price level accounting, on which articles appear between 1948 and 1974; and on accounting principles, on which eight articles lead up to and follow from the publication of *Accounting Research Studies 1 and 3*.

Most of the problems Moonitz attacked are of perennial concern to accountants. None has been resolved; probably they never will be. However, one result of Moonitz continually updating his ideas is a series of direct connections between his articles and the current literature on those topics. The AICPA's view on accounting principles traces directly back to *ARS 3*. *FAS 33* has been allowed to lapse, but inflation continues, and Moonitz posed the revaluation alteratives still being considered,

as he posed the essential problems of formulating and enforcing audit standards.

This collection is recommended to *AHJ* readers for its contemporary, not its historical interest.

Richard Vangermeersch, Ed., *Relevance Rediscovered, Volume II* (Montvale, New Jersey: Institute of Management Accountants, 1991, 448 pp., $39.95).

Reviewed by
Lamont F. Steedle
Towson State University

The second volume of *Relevance Rediscovered*, an ongoing anthology published by the Institute of Management Accountants (IMA), was eagerly anticipated. An earlier review of the initial volume termed it a success in meeting its stated goal of providing exposure to great ideas of the past as a means of solving today's management accounting problems. [Steedle, p. 98]. After finishing Volume II, perhaps with heightened expectations resulting from satisfaction with the initial volume, this reader was a bit disappointed.

Relevance Rediscovered is published by the IMA (formerly the National Association of Accountants) to commemorate the organization's 75th anniversary in 1994. In its early years the group, then known as the National Association of Cost Accountants (NACA), published both a semi-monthly bulletin of journal articles and a yearbook of papers and presentations from the annual conference. Each volume in the anthology comprises a decade's worth of these works; 25 are chosen to represent a sampling of the period. Therefore, the organization and content of Volume II is virtually identical to the first volume, except that these articles were written from 1929 to 1939.

The most noteworthy aspect of the volumes continues to be the introductory comments written by the series editor, Richard Vangermeersch. He provides an introduction to both topic and author and piques the reader's interest with some attention-getting questions. Vangermeersch also again includes in the introduction his ten reasons why the past literature should be studied, with updated examples relevant to the works included in Volume II. Reading the introduction and reviewing its pertinent parts prior to reading each of the individual articles is highly recommended.

It is in measuring the collective contribution of the 25 individual works that Volume II falls a bit short. While six of the 25 articles in Volume I met this reviewer's subjective criterion of having practical applicability to current management accounting problems, only three such articles were found in Volume II: (30) "Inter-Departmental and Inter-Branch Transfers of Products — At Cost or Market Price?" by B. A. Brady, V. W. Collins and J. B. Heckert, which includes three related presentations (with audience comments) on existing transfer pricing practices; (35) "A Cost Accountant Reduces Cost and Improves Quality in a Hosiery Mill" by Dwight M. Allgood, a detailed case study of a cost and quality control program; and, (47) "Practice in Applying Overhead and Calculating Normal Capacity" by the NACA Research and Technical Service Department, a survey of existing practices in the application of overhead.

Readers should not, however, pass up Volume II. The anthology continues to be a useful resource in providing a perspective of the times and the existing thoughts and concerns of leading accounting theorists and management accounting practitioners. In fact, one speculates that perhaps the economic climate and government regulatory activity of the 1929-1939 period influenced what was studied and published, thus making the overall contribution of the collected works a little less relevant to the problems of today than the writings of the preceding volume. Perhaps the major contribution of the complete series will be derived from comparing the individual volumes (and ten-year periods) to one another rather than from comparing the individual works to the problems of today.

REFERENCE

Steedle, Lamont F., Review of *Relevance Rediscovered, The Accounting Historians Journal* (June 1991): 98-99.

The Accounting Historians Journal
Vol. 19, No. 2
December 1992

AD HOC REVIEWERS IN RECENT MONTHS

Tom Robinson
University of Miami at Coral Gables

Maurice Moonitz
University of California at Berkeley
(emeritus)

George Staubus
University of California at Berkeley
(emeritus)

John W. Durham
Fort Hays State University

Dale Buckmaster
University of Delaware

Laurie Henry
University of Mississippi

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the literature of Accounting History

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Basil Yamey

for his publication

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1980 — Gary John Previts and
Barbara D. Merino
1981 — H. Thomas Johnson
1982 — Williard E. Stone
1983 — Richard P. Brief
1984 — Esteban Hernández-Estéve
1985 — Edgar Jones
1986 — Leonard Spacek
1987 — Ernest Stevelinck
1988 — Peter L. McMickle and
Richard G. Vangermeersch
1989 — Greg P. Whittred
1990 — Anne Loft
1991 — Philip D. Bougen

ANNOUNCEMENT

ANNOUNCEMENT

ANNOUNCEMENT

CONTEMPORARY ACCOUNTING RESEARCH

Volume 9, Number 1
Fall, 1992

Contents

Articles

ANNOUNCEMENT

CONTEMPORARY ACCOUNTING RESEARCH

Volume 9, Number 1
Fall, 1992

Contents — Continued

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BIOGRAPHICAL RESEARCH IN ACCOUNTING

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DECEMBER 3-4, 1993

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