

Accounting Historians Journal

Volume 38
Issue 2 December 2011

Article 11

2011

Accounting Historians Journal, 2011, Vol. 38, no. 2 [whole issue]

Follow this and additional works at: https://egrove.olemiss.edu/aah_journal



Part of the [Accounting Commons](#), and the [Taxation Commons](#)

Recommended Citation

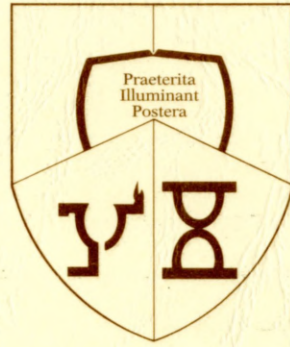
(2011) "Accounting Historians Journal, 2011, Vol. 38, no. 2 [whole issue]," *Accounting Historians Journal*: Vol. 38 : Iss. 2 , Article 11.

Available at: https://egrove.olemiss.edu/aah_journal/vol38/iss2/11

This Article is brought to you for free and open access by the Archival Digital Accounting Collection at eGrove. It has been accepted for inclusion in Accounting Historians Journal by an authorized editor of eGrove. For more information, please contact egrove@olemiss.edu.

et al.: Accounting Historians Journal, 2011, Vol. 38, no. 2 [whole issue]

Published by
The Academy of Accounting Historians



The
Accounting
Historians
Journal

December 2011
Volume 38, Number 2

Research on the Evolution of Accounting
Thought and Accounting Practice

The Accounting Historians Journal

Volume 38, Number 2

December 2011

2011 OFFICERS

President

James McKinney
University of Maryland
PH: (301) 588-3266
Email: jmckinney@rhsmith.umd.edu

Vice-President - Partnerships

Robert Colson
Grant Thornton - Retired
Email: rcolson@gmail.com

President-Elect

Joann Noe Cross
University of Wisconsin Oshkosh
PH: (920) 424-1311
Email: crossj@uwosh.edu

Secretary

Stephanie Moussalli
Rhodes College
PH: (901) 843-3223
Email: moussalli@rhodes.edu

Vice-President - Communication

Yvette Lazdowski
Plymouth State University
PH: (603) 253-9339
Email: yjlazdowski@plymouth.edu

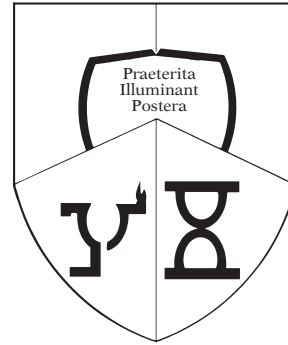
Treasurer

Jennifer Reynolds-Moehrle
University of Missouri-St. Louis
PH: (314) 516-6764
Email: jreynolds.moehrle@umsl.edu

2011 TRUSTEES

Eugene H. Flegm (Bonita Springs, FL), Emeritus, Honorary
Malcolm Anderson (Cardiff University), 2009-2011
C. Richard Baker (Adelphi University), 2010-2012
Salvador Carmona (Instituto de Empresa, S.L.), 2010-2012
Deirdre Collier (Farleigh Dickinson University), 2011-2013
Dale Flesher (University of Mississippi), 2010-2012
Oktay Guvemli (Marmara University, Retired), 2011-2013
Karen Hooks (Florida Atlantic University), 2011-2013
Yannick Lemarchand (Universite de Nantes), 2010-2012
Marta Macias (Carlos III University of Madrid), 2009-2011
Cheryl McWatters (University of Alberta), 2010-2012
Hiroshi Okano (Osaka City University), 2009-2011
Gary J. Previts (Case Western Reserve University), 2010-2012
Gregory Waymire (Emory University), 2011-2013
Charles Wootton (Eastern Illinois University), 2009-2011
Henri Zimnovitch (Universite Paris-Sud 11), 2010-2012
Mary S. Stone (The University of Alabama), Corporate Agent

In addition to publishing the Accounting Historians Journal, the Academy publishes The Accounting Historians Notebook, sponsors research events and conferences, including the World Congresses of Accounting Historians, and maintains a comprehensive website. Annual membership dues include subscriptions to both publications, special conference pricing and full access to the website and are \$50 (U.S.) for individuals, \$30 (U.S.) for retired individuals, \$100 (U.S.) for institutions and libraries and \$10 (U.S.) for students. Inquiries concerning membership, publications, and other matters relating to the Academy (other than the submission of manuscripts to the Accounting Historians Journal) should be addressed to Tiffany Welch, The Academy of Accounting Historians, Weatherhead School of Management, 10900 Euclid Avenue, Cleveland, OH, USA 44106-7235.



The
Accounting
Historians
Journal

December 2011
Volume 38, Number 2

AHJ EDITORIAL STAFF

CO-EDITOR

Richard K. Fleischman
John Carroll University (Emeritus)

CO-EDITOR

Christopher Napier
Royal Holloway, University of London

EDITORIAL BOARD

Marcia Annisette, York University
Trevor Boyns, Cardiff University
Kees Camfferman, Vrije Universiteit
Salvador Carmona, Instituto de Empresa
Garry D. Carnegie, Royal Melbourne Institute of Technology
Ignace DeBeelde, University of Gent
John R. Edwards, Cardiff University
Dale L. Flesher, University of Mississippi
Warwick N. Funnell, Universities of Wollongong
Michael J.R. Gaffikin, University of Wollongong
O. Finley Graves, University of North Texas
Esteban Hernández-Esteve, Madrid, Spain
Thomas A. Lee, University of Alabama
Richard V. Mattessich, University of British Columbia
Cheryl S. McWatters, University of Ottawa
Barbara D. Merino, University of North Texas
Marc Nikitin, University of Orléans
David Oldroyd, Durham University
Lee D. Parker, University of South Australia
Chris Poullaos, University of Sydney
Paolo Quattrone, Instituto de Impresa Business School
Gary J. Previts, Case Western Reserve University
Alan J. Richardson, York University
Mary S. Stone, University of Alabama
Tomo Suzuki, University of Oxford
Thomas N. Tyson, St. John Fisher College
Richard G. Vangermeersch, University of Rhode Island
Stephen P. Walker, Cardiff University
Joni J. Young, University of New Mexico
Stephen A. Zeff, Rice University

The *Accounting Historians Journal* is a refereed, scholarly journal published semiannually in June and December, printed by the Birmingham Printing and Publishing Company, 3101 6th Avenue South, Birmingham, AL 35233. ISSN 0148-4182. *AHJ* does not assume responsibility for statements of fact or opinion made by its contributors.

ACCOUNTING HISTORIANS JOURNAL

Volume 38, Number 2

December 2011

CONTENTS

Articles

- Accounting on English Landed Estates during the
Agricultural Revolution – A Textbook
Perspective 1
John Richard Edwards
- Farmers, Politics, and Accounting: The History of
Standard Values – An Accounting Convenience or
Political Arithmetic? 47
Jill Hooks and Ross E. Stewart
- Too Young to Have a History? Using Data Analysis
Techniques to Reveal Trends and Shifts in the Brief
History of Accounting Information Systems 75
Frank A. Badua and Ann L. Watkins
- In Defense of Pacioli 105
Alan Sangster, Greg N. Stoner, and Patricia McCarthy
- Two-Currency, *Nostro* and *Vostro* Accounts:
Historical Notes, 1400-1800 125
Basil S. Yamey
- Earnings Management among Firms during the
Pre-SEC Era: A Benford's Law Analysis 145
Jeffrey J. Archambault and Marie E. Archambault

ACCOUNTING HISTORIANS JOURNAL

Statement of Policy

The *Accounting Historians Journal* is an international journal that addresses the development of accounting thought and practice. *AHJ* embraces all subject matter related to accounting history, including but not limited to research that provides an historical perspective on contemporary accounting issues.

Authors may find the following guidelines helpful.

1. Authors should provide a clear specification of the research issue or problem addressed and the motivation for the study.
2. Authors should describe the method employed in the research, indicating the extent and manner in which they intend to employ the methodology. Manuscripts are encouraged that draw on a variety of conceptual frameworks and techniques, including those used in other social sciences.
3. Manuscripts that rely on primary sources should contain a statement specifying the original materials or data collected or analyzed and the rationale used in selection of those source materials. Authors should provide the reader information as to how these source materials may be accessed.
4. Authors who use a critical or new theoretical framework to examine prior historical interpretations of the development of accounting thought or practice should include a discussion of the rationale for use of that framework in the manuscript.
5. In performing all analyses, authors should be sensitive to and take adequate account of the social, political, and economic contexts of the time period examined and of other environmental factors.
6. While historians have long debated the ability to assign causation to particular factors, we encourage authors to address and evaluate the probable influences related to the problem or issue examined.
7. Authors should clearly state all their interpretations of results, and the conclusions they draw should be consistent with the original objectives of and data used in the study. Interpretations and conclusions should be clearly linked to the research problem. Authors also should state the implications of the study for future research.

ACCOUNTING HISTORIANS JOURNAL

Guide for Manuscript Submission

Manuscripts for review should be submitted by e-mail attachment to vollmers@umit.maine.edu and formatted in Microsoft Word. The identity of author(s) should not appear on the attached file — only on the accompanying e-mail transmission. Additional correspondence may be sent to Professor Gloria Vollmers, DPC 342, College of Business, Public Policy and Health, University of Maine, Orono, ME, 04469; phone: (207) 581-1979; Fax: (207) 581-1956. There is no submission fee, although authors are urged to consider joining The Academy of Accounting Historians by completing the membership application form on the inside of the back cover. Papers which have been published, accepted for publication elsewhere, or are under consideration by another journal are not invited. The *Accounting Historians Journal* will accept a variety of presentation formats for initial submission as long as the writing style is reflective of careful scholarship. Notwithstanding, authors should attend to the following guidelines:

1. An abstract of approximately 100 words on a page that includes the article's title but no identification of the author(s).
2. A limited number of content footnotes.
3. A limited number of tables, figures, etc., appended at the conclusion of the text, but whose positioning in the narrative is indicated.
4. References are to appear in brackets within the text. Specific page numbers are mandatory for all direct quotes but are optional otherwise.
5. A bibliography of all references cited in the text.
6. Manuscripts should not exceed 10,000 words in length.

Upon acceptance or an invitation to revise and resubmit, authors will be sent a style sheet which must be followed conscientiously for all subsequent revisions of the paper. Once the article is accepted, the editor will request the submission of a diskette prepared in Microsoft Word. If time permits, authors will be sent galley proofs. However, the inclusion of additional material will be severely limited.

Authors will be provided with 3 copies of the *AHJ* issue in which the manuscript is published. Reprints may be ordered by arrangement with the publisher.

NOTE FROM THE CO-EDITORS

This is the last issue for the current editors after nine years (non-consecutive) for Dick and three years for Christopher at the helm. Thanks go to the editorial board for the members' years of service, to the contributing authors for their faith in the journal, to the Academy of Accounting Historians for its generous funding support, and to a multitude of *ad hoc* reviewers without whose expertise the task would have been much more difficult.

We hope that the *Accounting Historians Journal* and the Academy remain perceived as an economically rational, quality investment for the modest sum of \$50 per annum.

All the best of luck to the incoming editor, Professor Gloria Vollmers, whose contact information appears on the previous page.

Accounting Historians Journal
Volume 38, Number 2
December 2011
pp. 1-45

John Richard Edwards
CARDIFF BUSINESS SCHOOL

ACCOUNTING ON ENGLISH LANDED ESTATES DURING THE AGRICULTURAL REVOLUTION – A TEXTBOOK PERSPECTIVE

Abstract: The agricultural revolution has been portrayed as the time when landowners began to display a capitalist mentality. This paper seeks to add to our knowledge of the use of accounting for managerial purposes during this period by exploring the content of treatises advocating different ways of accounting on landed estates. Two research questions are addressed. The first is the degree of inter-relationship between accounting methods – charge-and-discharge accounting (CDA) and double-entry bookkeeping – that have been presented in the literature as distinct in terms of their objectives and operation. The second objective is to assess the extent to which CDA could be used by management and landowners for performance assessment purposes and, following on from that, to reflect on whether the demise of CDA was an inevitable consequence of demands for more useful management information.

INTRODUCTION

The British Agricultural Revolution had its beginnings in the 16th century and had run its course by the middle of the 19th century [Overton, 1996]. It was a period which saw the rise of the “capitalist farmer” [Tawney, 1967, p. 403; Bryer, 2006] and a transformation in agricultural practices which massively increased productivity and output. Radical farming innovations included the enclosure of land, increased mechanization, new systems of crop rotation, and selective breeding.¹ It was also a period which saw landowners exploit the mineral content of their terrain. Bettye [1993, p. 83] summarizes some of the outcomes as follows:

¹ For a review of the dating, nature, causes, and structure of the agricultural revolution, see Bryer [2006].

Acknowledgments: I wish to express my gratitude to Richard K. Fleischman and the two anonymous referees for their helpful suggestions for the improvement of earlier drafts of this paper.

Eighteenth-century agriculture in England became the most productive in the world, rents rose accordingly, and with additional income derived from military or naval service, political office, coal mines, rapidly increasing trade with all parts of the world, colonial plantations or investment in industry, the large landowners had wealth to lavish upon their estates and houses as never before.

The job of estate accounting officers was to provide landowners and themselves with the information required to manage landed estates through this period of change. The principal focus of British historiographical studies devoted to accounting for management dates from the commencement of the industrial revolution [Boyns and Edwards, 2007]. Far less attention has been given to agricultural, mercantile, and, indeed, industrial accounting during the preceding centuries. This paper addresses part of that lacuna through an examination of the system of accounting recommended for adoption on landed estates where forms of charge-and-discharge accounting (CDA) remained *in situ* for centuries before being superseded by double-entry bookkeeping (DEB). In doing so, we address two research questions. First, we explore the degree of inter-relationship between CDA and DEB, which have been principally presented in the literature as distinct systems in terms of their objective and operation. Second, we assess the extent to which CDA might be used for purposes of performance assessment by landowners and their managers and, following on from that, speculate whether its demise was inevitable. As with the treatises studied, this paper principally focuses upon “the highest level of the estate’s financial administration” [Harvey, 1994, p. 111] – the statement of charge and discharge. But this was often at the apex of an extensive system of record keeping which comprised numerous “subsidiary records of account” that would be used to micro-manage the estate [see also Lee, 1991]. The broader system of estate record keeping also encompassed surveys of possessions and revenues which: (i) identified the resources, e.g., rental income, that the lord of the manor could expect to receive, and (ii) could be used to help fix a price when estates came up for sale, e.g., the disposal of church lands by Henry VIII based on so many years purchase of the rental value (see below).

The objectives of this paper are pursued through a review of the available secondary sources both within and outside accounting’s historiography and through the study of relevant didactic texts written and published during a period (1660-1788)

when estates continued to dominate wealth production, when merchants were extending British trade and influence worldwide, and, by the end of which, the country was undergoing social and economic transformation wrought by industrial revolution. It is not contended that the accounting literature of this, as with any other period, can be equated to accounting practice. The books examined have a strong normative flavor but, in numerous respects, they also claim to portray systems in practical operation. Given the background of some of the authors (see below), it is possible to speculate that the texts might provide a guide to actual practice, but further research is needed to discover whether procedures outlined in treatises can be considered a tolerable surrogate for the “real thing.” Whereas Harvey [1994, p. 93] draws attention to the role of treatises and formularies in achieving “extraordinary uniformity” in early manorial accounting, Fleischman and Tyson [2004] have shown that Thomas Affleck’s “how to do” book on accounting at slave plantations was never put into practice in either the manner or to the extent Affleck advocated. The remainder of the introduction to this paper draws attention to the durability of CDA and the importance of land as a source of income and wealth to the nobility and the gentry of England during the late middle ages and early modern period.

Not Exclusively an Historical Phenomenon: In ancient times [Carmona *et al.*, 2008], and much later, systems of accounting did not engage with the written word. A “visual and oral system” of exchequer accounting [Chatfield, 1977, p. 23] originated in 12th century England [Stone, 1993; Jones, 2008, p. 355] wherein the sheriff accounted for collection of the king’s revenues based on procedures that became known as CDA. It was initially made operational through the use of tallies, the checkerboard, counters, and the spoken word; arrangements which had particular attraction in a less literate society [Baxter, 1980, 1983, 1989]. A written system of CDA was also in use for exchequer accounting purposes in the 12th century [Stone, 1993, pp. 5-8] and was widely adopted by the priories and monasteries of England from the 13th century onwards [Noke, 1981].² The CDA was initially presented as a continuous narrative³ which over time was replaced by the columnar format (Figure 1). CDA domi-

² Jones [2008, p. 355] examines the spread of CDA between the 12th and 15th centuries.

³ For examples, see Stone [1993, pp. 6-7, 16]. Stone also traces the development of the columnar format, with cash amounts reported in “linear money columns” and the transition in language from Latin to English.

nated accounting on landed estates to such an extent that it is now commonly referred to as “manorial accounting” [e.g., Noke, 1981, 1991; Stone, 1993; Harvey, 1994; Dobie, 2008, p. 142]. Therein, agents, stewards, reeves, and bailiffs demonstrated the discharge of financial responsibilities through a statement which was the subject of audit and, for entities with diverse operations, consolidated to produce an account covering the entire estate. It was also in use by the 14th century to help administer self-governing boroughs [R. Jones, 1985, p. 202], and it achieved widespread application within local as well as central government [Colquhoun, 2009].

FIGURE 1 Charge and Discharge Statement

Abstract of the Accompts of John Morewood, Receiver of the Rents and Profits of the Mannor of Grub-Street; and Stock thereupon: *Viz.*

CHARGE		<i>l. s. d</i>
1682. Sept. 29.	To Arrears then due, as by Particulars in the First Column, Page 23.	42: 0: 0
1683. Sept. 29.	To the Years Rent-Roll of that Estate, as by the Second Column, Page 23.	592: 0: 0
Casual Profits.	To Sale of Wood, as by a Bill of Particulars given to my Lord.	87: 17: 0
	Received by Amercements,	1: 4: 11
	Received by Copy-hold Fines,	14: 7: 6

The Accompt of Stock thereupon is as followeth

Given in Charge		Sold for	
		<i>l. s. d</i>	
14 Oxes cost,	49: 0: 0	14 Sold	76: 15: 0
12 Cows,	36: 0: 0	5	22: 7: 6
6 Bullocks,	15: 0: 0	6	21: 16: 8
20 Weathers,	9: 0: 0	20	14: 17: 0
56 Ewes,	28: 0: 0	56	50: 4: 0
1 Colt,	1: 15: 0	1	3: 5: 0
10 Pigs,	6: 0: 0	10	12: 15: 0
1 Bull,	3: 15: 0	8 Calves sold	7: 18: 0
1 Ram,	1: 10: 0	Wool sold	7: 10: 0
	150: 0: 0	Butter and Cheese sold	22: 13: 10
			240: 2: 0
Valuation of Stock unsold	Rest unsold	7 Cows valued	21: 0: 0
		1 Bull	3: 0: 0
		1 Ram	1: 5: 0
	Increas'd	10 Lambs, besides 30 sold	2: 10: 0
		2 Calves, besides 8 sold	1: 10: 0
			29: 5: 0
		Total Charge	1.1006: 16: 5

DISCHARGE

		<i>l. s. d</i>	<i>l. s. d</i>
Yearly Payments	Salary to my self,	20: 0: 0	
	Salary to the herdsman,	8: 0: 0	
	A Years Quit-Rent,	13: 6: 8	
	The Stewards Fee,	2: 0: 0	
	The Poor Rate, 52 Weeks at 8d.	1: 14: 8	
			45: 1: 4

Uncertain Payments	A levy for the Church,	1: 6: 8	
	Two C'nstables Levies,	1: 13: 4	
	Charges of keeping Courts,	1: 5: 0	
	Twelve Mon. Tax on the Rents 59 <i>l.</i> at 9 <i>d.</i> per pound,	22: 4: 0	
	Paid a Bill for Hedging and Ditching,	8: 11: 0	
	Paid a Bill for Repairs,	12: 2: 4	
	Paid another for Carpenters Bill,	5: 16: 0	
			52: 18: 4
Cattle	Paid for three Loads of Hay,	2: 10: 0	
	Paid for 100 Sheep at 8 <i>s.</i> each,	40: 0: 0	
	Paid for 19 Bullocks at 3 <i>l.</i> each,	57: 0: 0	
	Charges of driving,	1: 15: 0	
			101: 5: 0
Ready Money to my Lord, and by his Order	23 December 1682.	50: 0: 0	
	1 March,	50: 0: 0	
	28 Ditto 1683.	100: 0: 0	
	26 April,	50: 0: 0	
	23 May,	43: 0: 0	
	3 June,	15: 0: 0	
	24 Ditto,	50: 0: 0	
	16 August,	20: 0: 0	
	10 November,	34: 19: 4	
			412: 19: 4
	Thus for the Costs		612: 4: 0
Lost Land in hand	Lost by Barth. Cutler's Death, part of 5 th Column,		11: 1: 0
Arrears to be charged on next Account	As by the 6 th Column, Page 23.		184: 0: 0
	Of Rent, as by the 5 th Column,	106: 0: 0	
	Of Wood, 87 <i>l.</i> 17 <i>s.</i> : Of which receiv'd 23 <i>l.</i> 10 <i>s.</i> 7 <i>d.</i>		
	Rest due,	64: 6: 5	
	Of Cattle unsold, as in the Charge, besides the New Stock aforesaid,	29: 5: 0	
			199: 11: 5
	Which evens the Charge		1.1006: 16: 5

Source: Montage [1683, pp. 24-25]

Despite CDA's widespread replacement by DEB, even today it is not only of historical significance. Baxter [1980, p. 70], born in the first decade of the 20th century, was trained in CDA during his apprenticeship in Edinburgh: "Scots law and accounting continued obstinately to prefer it, rather than double-entry, for various kinds of semi-legal reckoning such as testamentary trusts, 'judicial factories,' charities, etc." He further reported that CDA continued to be used in Scotland in 1980, albeit "by a dwindling number" of solicitors. U.S. writers, including the practitioner and educationalist Charles Sprague, emphasized the use of CDA by executors during the first decade of the 20th century, and the practice remained popular into the 1950s [Hay, 1956, p. 632; Todd, 1966].

By the middle of the 20th century, by no means all authors and institutions shared an appreciation of the continued application of CDA, even in the restricted locale of executorship accounting [Hay, 1956; Todd, 1966]. An initiative which militated against the survival of CDA in England and Wales occurred with the publication in August 1949 of Recommendation on Account-

ing Principles XIV entitled “The form and contents of accounts of estates of deceased persons and similar trusts” [reproduced in Zeff, 2009]. In this, the Institute of Chartered Accountants in England and Wales drew attention to the fact that executorship accounts were kept either on the cash basis or on the accruals basis using DEB. Recommendation on Accounting Principles XIV was unequivocal on this issue. “The only satisfactory way” of providing all the information required for the proper administration of an estate, including the preparation of a balance sheet, “is to keep the books on ordinary double-entry principles” [reproduced in Zeff, 2009, p. 78].⁴

CDA nevertheless continues to have a role in estate accounting and financial reporting in some countries. In Scotland, for example, curators (usually solicitors) are appointed by the court to act as the legal representative of persons (e.g. children) lacking the mental capacity to make decisions for themselves. *Notes for the Guidance of Curators* [2000] continues the longstanding requirement [Erskine, 1769, pp. 87-88] to demonstrate accountability through an “Account of Charge and Discharge.” In the U.S., Ratcliffe’s [1999] review of “Estate Accounting and Financial Reporting” points to the absence of regulations guiding estate accounting in that country and identifies the charge/discharge statement as a viable option. The illustrative statement demonstrating disposition of the “Estate of E.H. Sherman” is an accruals-based version of CDA that contains all the standard nomenclature of a classic charge/discharge statement presented in vertical format.⁵

Exploiting Landed Estates: The development of a “capitalist mentality” involving a focus on profit and invested capital and the reallocation of resources to achieve highest returns is often associated with the commercial revolution [Bryer, 2000a, b]. This is understandable given the fixed nature of the landowners’ capital and legal restrictions on their ability to sell property

⁴Even today there are no regulations guiding the preparation of trust and executorship accounts in Britain. Russell *et al.* [2005, p. 292] acknowledge variation which includes “receipts and payments accounts.” Illustrative sets of accounts contained in appendices 9, 11, and 12 treat the trusts and estates as entities accounted for in accordance with DEB procedures, including a balance sheet and income-and-expenditure account.

⁵See also *PPC’s Accounting and Reporting for Estates and Trusts* which contains advice on CDA statement presentations <http://ria.thomsonreuters.com/estore/detail.aspx?ID=AETQ&productinfo=Table%20of%20Contents&SITE=prof>. Grant Thornton [1996] contains the CDA statement as part of the 1995 Compilation Report prepared for the William P. Lear family trust.

[Napier, 1991, p. 164].⁶ Despite limitations on their ability to transfer capital to an alternative use, however, there is evidence of landlords demonstrating a concern to employ resources in the most effective manner. Some historians believe it possible to detect a capitalist spirit among landowners and, indeed, consider the pursuit of profit to be a driving force in the agricultural revolution. Bryer [2006, p. 370] strongly supports this view based on an analysis of the “limited evidence we have of farmers’ accounts from the seventeenth to the late nineteenth century.”

The way in which English landowners sought to exploit the income-producing potential of their land varied between the broad alternatives of farming the properties or renting them out. Up to the 13th century, “the bulk of [estate] income was received in the form of fixed rents” [Oldroyd and Dobie, 2009, pp. 101-102]. Then, for about 100 years (c.1270-1380), landowners reclaimed “the demesne and [undertook] its direct management” (p. 102). The position again reversed during the late middle ages (the 14th and 15th centuries) as “many estates, both lay and ecclesiastical, abandoned the direct farming of their own lands, leasing farms or even whole manors to tenants and commuting labour services for payments in money or kind” [Betty, 1993, p. 29].⁷ In the 17th and 18th centuries, the gentry and aristocracy “normally let the greater part of their estate to tenant farmers,” but many of them also had, sometimes very large “home farms run predominantly for the needs of the household” [Habakkuk, 1953, p. 93]. In choosing between the different ways in which land might be employed, there is little doubt that the desire to increase income and wealth played its part.

During the later Middle Ages, “profits from monastic estates and the income derived from pilgrims went to fund the building of even larger churches and cloisters, complete with elaborate decorations and rich furnishings” [Betty, 1993, p. 38]. Moving forward to 17th century manorial estates, Betty [1993, pp. 76-77; see also Tawney, 1941; Bryer, 2006] comments:

Although some landowners regarded their estates merely as a source of social status and political power, and others could lavish upon their property the wealth which they had acquired elsewhere, many depended

⁶However, Habakkuk [1953, p. 98] contends that there were fewer institutional impediments to buying and selling land in England than in Continental Europe because strict settlements could be set aside by acts of Parliament and estates certainly did come up for sale.

⁷Harvey [1994] studies the implications of these organizational changes for the form and content of CDAs.

on the income of their estates for their livelihood and were eager to exploit sources of profit which their lands could provide.

Sir John Oglander of Nunwell in the Isle of Wight emphasized in the mid-17th century the need for a country landowner to have other sources of income from industry, trade, or a profession. Otherwise "it is impossible for a mere country gentleman ever to grow rich or raise his house....By only following the plough he may keep his word and be upright, but he will never increase his fortune" [quoted in Bettey, 1993, p. 79]. It was during the 17th century that landowners increasingly sought to enhance their wealth by exploiting the industrial and mineral potential of their estates. "Sussex gentry families such as the Smiths, Fullers and Evelyngs encouraged the iron industry of the Weald in Kent." Those who greatly augmented their wealth through coal mining included the Dudleys and Foleys in the Black Country, the Willoughbys of Wollaton, and the Lowthers in Cumberland. Landowners who also made money by diversifying into port development included Lowther at Whitehaven in the 1680s, the Curwens in Workington in the 18th century, and the Butes in south Wales in the 19th century.

The remainder of this paper is structured as follows. First, the existing literature is reviewed to reveal our present understanding of the role and potential of CDA, its persistence over time, and the eventual transition to DEB. Contemporary treatises are then examined to see how they might throw further light on these issues and contribute to our understanding of the relative contribution of the two systems to the management of landed estates. This is followed by a discussion of the evidence and some concluding remarks.

ROLE AND POTENTIAL OF CDA⁸

Historians have been too much inclined to categorize CDA in terms of a narrow stewardship role, even though it must be acknowledged that the bulk of charge/discharge accounts may have been entirely cash-based and intended to serve only that purpose. The early accounting history literature placed particular stress on the personal accountability aspects of CDA: "The lord's incentive for keeping accounts arose from his need to check on the integrity and reliability of these stewards, to

⁸ For a review of CDA outside England and for more on the relevant literature relating to its history in that country, see Oldroyd and Dobie [2009].

prevent loss and theft” [Chatfield, 1977, p. 25; see also Forrester, 1978, p. 54]. Littleton [1933, p. 260], the well-known early accounting historian, is not alone in dismissing CDA as having as its sole purpose verification of the honesty of “persons charged with fiscal rather than managerial responsibility.”

As is the case elsewhere in accounting historiography, more recent research (including a growing awareness of relevant work by economic and social historians) has caused earlier characterizations of CDA to come under challenge. Studies have shown that manorial and monastic accounting sometimes went beyond concerns with personal accountability, although this might occur outside (even if drawing upon) the CDA framework [Kirk, 1892; Stone, 1962; Dobie 2008, 2011].⁹ For example, it has been shown how in the 13th century the monks of Norwich Cathedral Priory took steps to inform themselves of profit or loss [Stone, 1962], while a concern to discover the financial results of husbandry might involve inspection of “the docket of the particular official who managed the demesne” [Finberg, quoted in Jack, 1966, p. 155]. Smith [quoted in Jack, 1966, p. 156] reveals that clerics at Canterbury Cathedral Priory went “further than the Norwich accounts by supplying the yearly value of agricultural produce as a basis for calculating all receipts in hand.” If a valuation of an estate was required, inventories were made [Jack, 1966, pp. 155-156; Chatfield, 1977, p. 25] while “sometimes an account narrative was interrupted to make room for estimates of what might have been earned if a different course of action had been taken” [Chatfield, 1977, p. 25].

It therefore seems reasonable to conclude that, even though there were limitations in the managerial potential of CDA as operated on many (perhaps most) manors and monastic estates, it could include information which could enable principals to monitor and manage their affairs.¹⁰ These, and his own findings, caused Dobie [2008, p. 142] to conclude that research into CDA has focused excessively on agency relationships between

⁹Jack [1966, p. 155] informs us: “Some of the very early surviving accounts, like some later valors, have notes on the bottom of the roll giving an estimate of the value which bears little relation to the money account, and it is quite likely that more had estimates of this sort before they were clipped or rubbed away.”

¹⁰Jack [1966, p.154] also reminds us that a concern with efficiency and even profitability does not need to be evidenced by accounting calculations. Here, the audit was important in evaluating and thereby helping to ensure “the success of the lord’s exploitation of his estates.” The auditor would “examine the fields to see how much was sown and whether it had been well done; examine the stock and the increase and investigate deaths and barrenness; inventory the grange; examine the equipment.”

the lord of the manor and stewards responsible for managing agricultural properties and to argue the need for “a broader focus considering the medieval accounting records of monastic houses as one of a variety of elements of financial management and control.”

A role beyond narrow definitions of stewardship is also demonstrated by the application of CDA to early industrial ventures [Oldroyd and Dobie, 2009, pp. 108-110]. As the landed class began to exploit the industrial potential of the properties they occupied, CDA was employed by, for example, the Willoughbys of Wollaton, Nottinghamshire in their 15th and 16th century colliery accounts [Lee, 1991], by the Midlands-based Foley family who turned charcoal ironmakers in the 17th century [King, 2010], and on the industrial estates of northeast England in the 18th century [Oldroyd, 2007]. At Wollaton, for example, evidence of the use of data for performance assessment includes four weekly comparisons of cash-based inflows and outflows to reveal the profit (*proficuis*) and, in Lee’s estimation, to enable judgments to be reached about whether “mining was worth continuing” [Lee, 1991, pp. 61, 64, 72].

The system of charge/discharge in operation at Magdalen College, Oxford in 1812 (and which continued in place till 1882) was designed to enable identification of the agricultural surplus that determined the annual dividend payable to fellows [Jones, 1991, p. 144]. Magdalen’s accounting structure also incorporated features often presented as comparative advantages of DEB, namely an interlocking mechanism that ensured the arithmetic accuracy of the record and involved in some cases the “double” entry of accounting transactions:

For instance total gross income from the Corn Book would be entered in the Indentura Magna. When received, individual items were cleared by an X in the bursar’s copy (the working copy), unpaid amounts being listed as year end debtors in the Transmissio. Each sub-system had similar control elements. At the year end the whole system was reconciled back to cash in hand and at bank (p. 154).

Napier [1991, p. 173] concludes that the system of CDA used to account for the Marquis of Bute’s territories in the 19th century, with its focus on rental entitlements and cash flow, “would have provided a clear and accessible overview of the current financial position of the estate” and therefore did not detract from its usefulness for managerial purposes. Further,

the “owner’s capital investment in the land was regarded as fixed and permanent, and cash flows provided a good measure of return” (p. 174). It is nevertheless hard to fully accept the dismissal of one of the key outputs of DEB:

Statements of assets and liabilities were of little meaning to a life tenant, as the principal asset – the land – would in all probability have been inherited or come into the family through marriage, and thus not have a meaningful cost, while it would be effectively inalienable by the life tenant, and thus not have a meaningful market value (p. 173).¹¹

Although statements of net cash position provided by CDA are undoubtedly invaluable in assessing liquidity, for someone who is seen to be under “social and family pressure” to “improve and expand the estate” (p. 164), it is difficult to see that a balance sheet would be anything other than helpful. However, it is only in relation to “more directly commercial activities,” for example, the investment in Cardiff Docks, that Napier acknowledges the absence of a check on capital investments as possibility detrimental to decision making (p. 174).

Persistence of CDA: DEB was not available in England when religious and secular institutions began to account for their affairs based on charge/discharge. When it did become available, the move from CDA to DEB did not occur quickly. It is known that some English merchants began to use DEB in the 16th century [e.g., Vanes, 1974], and there were certainly sufficient books published from then onwards encouraging merchants to do so [Edwards, 2011]. There were also early industrial companies employing DEB in the 17th century [e.g., Edwards and Boyns, 1992; King, 2010] and, by the late 18th century, many large industrial organizations were accounting for their affairs in that manner. In local and central government, it was the 19th century that saw a transition from CDA to DEB [Coombs and Edwards, 1996; Edwards and Greener, 2003]. Bryer [2006, p. 388] reports *An Encyclopaedia of Agriculture* contemporary reference to 19th century gentlemen farmers often using DEB, but CDA certainly continued in use on at least a few large English estates into the 20th century [Parker, 1975, p. 6].

Jack [1966] is convinced that those responsible for installing and operating accounting systems should not necessarily be

¹¹ Also, as noted above, estates did come up for sale with a market valuation based on rental value [see also Clerke, c. 1712, p. 2; Jack, 1966, pp. 155, 177; Oldroyd, 2007, pp.133-134].

criticized for ignoring the “modern [system of] bookkeeping” [Hayes, 1739, title page], disseminated from Italy in the centuries following the publication of Pacioli’s *Summa* in 1494. Why not? The following is one possible reason:

If they were unlikely to move towards DEB, it may be partly because the idea of capital had little meaning: their land was their capital, it was fixed, *immovable*, and the only way they could calculate its value was by working *from* the return, by rating total value at so many times the annual net produce [Jack, 1966, pp. 155,157].

The persistence of CDA cannot, of course, be seen as irrefutable evidence of its utility compared with DEB. Inertia or, perhaps, path dependency might help to explain the absence of change, while lack of competition might mean that failure to employ a better accounting technology had no significant impact on the ability of an entity to survive or even prosper, although it might do less well than would otherwise have been the case. It is also likely that, with the steward often starting working life as a clerk on an estate, the scope for cross-fertilization of ideas and practices from industry to estates would have been limited. A further explanation for lack of change might draw on cultural factors. Here, there is a possibility that the gentleman-landowner might consider an accounting system closely associated with “trade” as inappropriate for recording the financial affairs of the aristocracy, even though English landowners are thought to have been more commercially orientated than their Continental counterparts [Habakkuk, 1953, p. 98]. Lemarchand [1994] reveals a prejudice against mercantile accounting within governmental circles in late 18th century France with the following comment attributed to the politician and financier Count Mollien (1758-1850), born Nicolas François, son of a trader:

Determined...to introduce a small portion of what is known as double entry bookkeeping into the public affairs that I am to manage, I was wise enough not to brag about this innovation....People would have jumped at this, saying that it was beneath the dignity of a public administration to borrow methods from trade [quoted in Lemarchand, 1994, pp. 137-138].

However, “after a long period of competition between the two systems, DEB gained the upper hand [in France] and was increasingly adopted by most large industrial concerns from around 1810-30” [Lemarchand, 1994, p. 120]. Lemarchand attri-

butes the eventual success of DEB to the fact it could do all that CDA offered and more. It provided measures of performance, profit, and financial position.

Explaining the Transition from CDA to DEB: How best to explain the transition from CDA to DEB has been the subject of disagreement between proponents of traditional and “new” ways of writing accounting’s history. Napier [1998, p. 691] takes Keenan to task for presenting the changeover as an example of “natural selection” in accounting, with “evolution” occurring because the new system proved more fit for purpose. This characterization of accounting change resonates with the teleological approach to historical inquiry which equates change with progress. Napier’s further concern is that, in the evolutionary approach, “rationales and motivations become secondary to a documentation of the practices themselves.” This has probably sometimes been the case and, where it occurs, will result in stories which “tend to underexplain, that is, leave key questions unanswered.”

Keenan [1998, p. 657] presents the history of CDA as “an example of both the continuing success and the eventual failure with which a system may adapt, or be adapted, to changing circumstances of its use.” The demise of CDA occurred during the 19th century in Keenan’s estimation because:

- DEB is better suited to recording large volumes of transactions.
- CDA is “ill adapted to reporting summarily on complexes of widely dispersed and stratified relationships” associated with the advent of the large-scale corporation [Keenan, 1998, p. 660]. Napier [1998] interprets this as referring to the absence of a P&L account and balance sheet.
- DEB is more “mysterious” and, therefore, better served the professionalization objectives of newly created accounting organizations [Keenan, 1998, pp. 658-662; see also Napier, 1998, p. 692].

Research findings to date relating to the first two identified factors (the third explanation is based on events outside the timeframe of this paper) are inconclusive. The number of transactions undertaken by an entity certainly has implications for the degree of complexity required from its record-keeping system. This issue featured in discussions concerning the possible replacement of CDA by DEB at Glasgow University in the 1770s. Investigators reached the following conclusion: “The complex,

laborious and expensive mode of keeping accounts which may be necessary in complicated mercantile business is not necessary nor proper nor useful in accounts as plain and simple as the college ones indisputably are" [quoted in Forrester, 1978, p. 57].

Although hardly a ringing endorsement for DEB, the inference must be that the case for its adoption increases with organizational complexity. Consistent with this, Jones [1992, pp. 59, 67] attributes the transition from CDA to DEB in English local government to the fact that "the [previous] charge/discharge account increasingly demanded subsidiary books of account [which included rent books, day books, books of loan transactions as well as cash books] to the point where these needed to be linked in a structured way." The need to record the transactions contained in subsidiary books would not disappear under DEB, but Jones' conclusion is that they could be more effectively incorporated within a self-balancing system of DEB. In contrast, Stone [1993, p. 15] reports that a "well structured [CDA based] accounting organization and system," comprising a range of books, had been developed by the Seventh Earl of Northumberland by 1564. Jones [1991] reports an interlocking system of CDA at Magdalen College, Oxford, in the early 19th century, while Napier's [1998, pp. 692-693] study of the Bute archive covering that era caused him to conclude: "Double-entry in itself has no comparative advantage in handling large numbers of transactions," although he does concede that the DEB framework "could be regarded as integrating into a systematic whole."

Turning to Keenan's second explanation, the comparative reporting potential of the two systems, R. Jones [1985, p. 208; see also Coombs and Edwards, 1994, p. 176] found that DEB superseded CDA in English local government because it was able to generate additional measures of performance and financial position. Coombs and Edwards [1994] found that the preparation of a P&L account and balance sheet by local authorities gained pace as they created the kinds of trading undertakings (supplying transport, water, gas, and electricity) for which counterparts existed in the private sector. For these, profit needed to be measured to discover whether the following policy objectives were being achieved: "that the trading department should break even; contribute to the relief of the general rate; or benefit from a certain level of subsidy" [Coombs and Edwards, 1994, p. 172]. Therefore, one would imagine that the owners of landed estates in earlier times would wish to exploit the reporting potential of DEB as that system became available to them.

As noted above, it is not possible to sustain the argument that the aristocracy was uninterested in DEB because for them profit was unimportant.¹² While landowners might delegate management to an army of stewards, bailiffs, reeves, and agents, they remained reliant on the income from land to finance the conspicuous consumption and lifestyle which marked them out as people of substance and to provide them with “the foundation of [their] social and political influence” [Napier, 1991, p. 164; see also Stone, 1965, chapter 10]. So although the term profit maximizers might not apply to them to the extent that it did to the merchants of the commercial revolution and the capitalists of the industrial revolution, it was still important for them to make best use of their resources, within the constraints placed upon them by law, custom, and the nature of their investment, in order to maximize their prestige [Beckett, 1986, p. 320; Napier, 1991, p. 164].

But was there necessarily absent from CDA the ability to provide landowners and their agents with information relevant to assessments of performance and financial position? The next section interrogates the contemporary literature on estate accounting to help answer this question.

CONTEMPORARY LITERATURE

The contemporary literature on estate accounting studied in this paper (Table 1) is not intended to cover all relevant treatises although it does include all non-DEB texts that have come to the attention of this author to date. Other DEB texts that include coverage of estate accounting as well as merchant accounting [e.g., Peele, 1569; Hayes, 1739; Clare, 1740; Dodson, 1750; Mair, 1773] do not engage with significant issues uncovered by those included in this study.

The 14 treatises examined were penned by 13 authors whose decision to write about accounting on landed estates might signal an involvement with such institutions. Among the five teacher-authors, a connection is quite likely in the case of Donn whose career also encompassed work as a mathematician and surveyor [Baigent, 2004]. Hamilton had direct experience of business through involvement in the management of his father’s paper

¹²Napier [1991] points out that, despite industrialization, estates remained massive ventures by contemporary standards in the 19th century. They would have dominated wealth production even more so in preceding centuries when “society continued to be rooted in the soil and rich and poor alike were equally dependent on the profits and produce of agricultural estates” [Betsey, 1993, p. 15].

mill [Bywater and Yamey, 1982]. Snell practiced as an accountant which might have brought him into contact with the landed class. Little is known about Lazonby, while Stevenson [1762, preface] engagingly admits: "I am at a Loss upon that Subject, as I never had an Estate of my own to manage, nor ever had the Management of one for another, and I could not meet with any Gentleman who kept his Acco^{ts}. in the Manner I proposed."

One might imagine an association with the land in the case of Abraham Liset who styled himself "gentleman," while the six remaining authors certainly had direct knowledge of estate accounting and/or management. Stephen Monteage, who wrote separate books demonstrating the use of CDA and DEB on landed estates, was initially a merchant, but after the Restoration of the monarchy in 1660, he became a steward in the service of the second duke of Buckingham [Melton, 2004; see also Bywater and Yamey, 1982, pp. 127-130]. His first book, at the time circulating in manuscript form, "caught the eye of the scrivener bankers Robert Clayton and his partner John Morris, who brought Monteage into their mortgage banking operations and estate management" [Melton, 2004]. After "many years of close involvement in all aspects of the scriveners' elaborate hierarchy of financial operations, Monteage published the fruits of his experience in 1683 as *Instructions for Rent-Gatherers' Accompts*."¹³ North [1714, p. 10] is known to have "lived the life of a country gentleman" [Parker, 1997, p. 33] and addressed his peers as follows: "I write not to Artists,¹⁴ but only to Persons of considerable Degree and Fortune." His book [North, 1714, p. 75] claims to describe "the several Methods of Accompt, which I have observed in use, from the meanest to the greatest Estates and Dealing." George Clerke describes himself as a "Steward to a person of quality" (Table 1); Edward Laurence and Thomas Lovett were land surveyors; Corbyn Morris interested himself in accounting matters "upon becoming possessed of a small patrimonial landed estate" [Morris, 1759, p. i].

We can therefore conclude that a good number of the authors whose works are studied here were describing systems that they had seen in operation or, from their knowledge of how estates operated, believed to be the best way of doing accounting in that locale.¹⁵

¹³The treatise was dedicated to Sir Robert Clayton.

¹⁴"a worker in a skilled trade, a craftsperson," *Oxford English Dictionary*, online

¹⁵The absence of any clear association between authors' occupational background and the favored method of accounting for landed estates is acknowledged.

TABLE 1
Authors and Occupations

Author	Title and place of publication	Year	Occupation*
Abraham Liset	<i>Amphithalami, or, the accomptants closet being an abridgment of merchants-accounts kept by debtors and creditors.</i> London	1660	Gent.
Stephen Monteage	<i>Debtor and creditor made easie.</i> London	1675	Merchant
Stephen Monteage	<i>Instructions for rent-gatherers accompts.</i> London	1683	Merchant [Monteage 1675]
Thomas Richards	<i>The gentlemans auditor: or a new and easie method for keeping accompts of gentlemens estates.</i> London	1707	Unknown
Charles Snell	<i>Accompts for landed-men: or; a plain and easy form which they may observe, in keeping accompts of their estates.</i> London	c.1711	Teacher
George Clerke	<i>The landed-man's assistant: or. The steward's vade mecum. Containing the newest, most plain method of keeping the accompts of estates.</i> London	c.1712	Steward to a person of quality
Roger North	<i>The gentleman accomptant: or, an essay to unfold the mystery of accompts. By way of debtor and creditor, commonly called merchants accompts.</i> London	1714	A person of honour
Edward Laurence	<i>The duty of a steward to his Lord, represented under several plain and distinct articles.</i> London	1727	Land surveyor
Thomas Lazonby	<i>Merchants accounts: or, the Italian method of book-keeping.</i> York	1757	Schoolmaster
Corbyn Morris	<i>A plan for arranging and balancing the accounts of landed estates.</i> London	1759	Customs administrator and economist [Murdoch, 2004]
William Stevenson	<i>Book-keeping by double entry.</i> Edinburgh	1762	Teacher
Thomas Lovett	<i>Treatise on estate management.</i> Unpublished	c.1770	Surveyor [Lovett, c.1770: 16]
Benjamin Donn	<i>The young shopkeeper's, steward's, and factor's, companion: containing ... A new and expeditious method of keeping a set of books, in a retail trade, by double entry,</i> 2 nd edition. London	1773	Teacher [Donn, 1765]
Robert Hamilton	<i>An introduction to merchandise [containing] book-keeping in various forms.</i> 2 nd edition. London	1788	Professor of philosophy

* title page of book except where otherwise stated

The 14 texts display considerable diversity concerning recommended accounting practices. This is unsurprising as among the inter-related factors affecting the appropriate content of the accounting records are their intended purpose, the nature of the activities being recorded and reported upon, and the status of the individual maintaining the accounting record. The idea that an accounting system for landed estates helps to keep track of resources belonging to landowners is uncontroversial.¹⁶ The requirement that accounting information should also prove useful for the purpose of performance assessment imposes additional demands and, as stated above, it is the purpose of this paper to discover whether the systems recommended in the literature were considered capable of fulfilling that role. Concerning the nature of the activities undertaken, we have seen that there were time-cycles when landowners mainly rented their properties and others when direct farming played a large role. One might expect that, given a concern with performance assessment,¹⁷ the landowner/farmer would require a more elaborate accounting system than the rentier. Direct farming entailed decisions about what livestock to keep, what crops to plant, and whether to exploit woodlands and minerals underground; whereas the amounts of rent receivable would be known in advance although subject to periodic adjustment as the result of rent reviews.

The texts now interrogated sometimes fail to state, explicitly, the purpose of their accounting system, the activities undertaken (though these can be inferred from the content of numerical illustrations), or precisely who is making the record. These limitations on our ability to interpret, successfully, the significance of their content are acknowledged.

CDA: An early text explaining the operation of *CDA* to account for landed estates (see Table 1) was published by Stephen Monteaige in 1683. Because it deals with many of the salient features of *CDA* and because Monteaige is known to have been fully

¹⁶Richards [1707, introduction] claimed to have “erected this Scheme for auditing and keeping Accompts” because the possession of estates by gentlemen “make them Prey to all about them.” Laurence’s text was designed to help noblemen and gentlemen counter “Ignorance and Slothfulness of some [tenants and stewards], and the Knavery and Wickedness of others” [Laurence, 1727, preface; see also Lovett, c. 1770, pp. 1-2].

¹⁷It is not suggested that *CDA* or even *DEB* were the only, or even the principal, sources of data available to landowners for performance assessment purposes. Lovett [c.1770; see also Laurence, 1727] contains advice on how farming should be undertaken, rates of pay for all kinds of workers, expected yields from farming, how long individual tasks should take, how much they should cost, what the profit might be, and which use of the land was expected to prove most profitable.

familiar with the practice of estate accounting, its content is first discussed. Further noteworthy features of CDA-based estate accounting revealed in other treatises are then considered, followed by a review of two texts which might be classified as CDA except that the illustrations indicate that the records are kept by the lord of the manor. Demonstration of personal accountability from an agent to a principal is therefore absent from these two texts.

Instructions for Rent-Gatherers' Accompts: Monteage [1683, p. 5] describes CDA, as "more Proper for the Persons for whose Use it is designed (viz., Receivers and Bayliffs of a middle Capacity)" than his book on DEB published eight years earlier (see below). The 1683 text addresses the reporting requirements of "Persons, who either manage or rent a Farm of 100*l.* a year, or upwards" and commends it to them for its "Plainness and Brevity." He also provides an insight to the changing role of estate managers on a late 17th century estate and how this affects the nature of their accountability when adding: "My Purpose is here to present you a mixt Accompt of a Rent-Gatherer; who also manages a Stock of Cattle, Sheep, &c. upon Lands in hand: *A thing which happens upon most Estates, since the Fall of Land in every County*" (p. 10, emphasis added).

In texts on landed estates, accounts are typically made up to Lady Day. This is "because Tenants most usually enter upon Farms at that Season of the Year; And Gentlemen of the greatest landed Estates who are called by parliamentary or other Business to London in the Winter, generally return between Lady-Day and Midsummer to the Country" [Morris, 1759, p. 18].¹⁸ This logic is not followed by Monteage whose illustration covers the year to Michaelmas 1683. It commences with a bilaterally arranged cash book, headed "Cash Debtor" and "Cash Creditor" [Monteage, 1683, pp. 14-21], kept by the "Receiver of the Rents and Profits of the Manor," John Morewood (p. 26). Monteage (p. 22) makes clear his conviction that adequate accountability needs to go beyond cash accounting:

¹⁸In Britain, the Feast of Annunciation of the Virgin Mary, Lady Day (March 25), was one of four quarter days that coincided with religious festivals. The others were Midsummer Day (June 24), Michaelmas (September 29), and Christmas (December 25). Lady Day was New Year's Day up to 1752 when, following the move from the Julian to the Gregorian calendar, it was replaced by January 1. As a quarter day which did not fall within or between the seasons for ploughing and harvesting, it was, traditionally, the day on which year-long contracts between landowners and tenant farmers would begin and end.

But though this Accompt thus stated, may be fairly copied, and given to your Lord; yet this is not the Accompt he ought to be satisfied with, especially to the Charge: For what cares he to see how and in what Parcels each Tenant paid his Rent? That which will better satisfie him, is to see at one view each Tenant's Accompts, charged and discharged; and what remains due by any of them.

To address these needs, the scheme advocated by Monteage (p. 11) embodies accruals accounting in a number of significant ways. A central accounting record is the annual rent roll which for the Manor of Grub-Street totaled £592. For reporting purposes, these rental entitlements are set out in a tabular format which contains exactly the same information as would appear in double-entry-based ledger accounts – the opening balance owing, amount due for the year, amount received, closing balance owing, and “Lands in hand.” The last item (totaling £184) reveals the opportunity cost to the landowner of five “unlet” properties which he farmed himself [Monteage, 1683, p. 23; see also Clerke, c.1712, p. 48; Morris, 1759, p. 25; Lovett, 1770, p. 22].

Turning to the record of Morewood's farming activities, the opening “Stock upon the Ground of Lean Cattle, &c.” [Monteage, 1683, p. 12] is valued at £150, with some items stated at cost and others at a valuation. The recommended record also provides details of proceeds during the year from the sale of “each Part of the Stock” (p. 24): Oxen; Cows; Bullocks; Weathers; Ewes and Lambs; Pigs; Butter and Cheese; Calves; Wool; and Colt¹⁹ (p. 25).

Having “particularized” details of the rent, animals etc., Morewood draws upon them to provide “a final Demonstration and Ballance of the whole Years Transaction” (p. 25). The CDA is presented in vertical format and titled: “Abstract of the Accompts of John Morewood, Receiver of the Rents and Profits of the Mannor of Grub-Street; and Stock thereupon: *Viz.*” (Figure 1). The charge consists of:

- arrears of rent at the beginning of the year;
- total rent due for the year;
- casual profits from sale of wood, from ameracements (penalties) and copy-hold fines;

¹⁹ Monteage [1683, p. 25] adds: “I might have brought into this Accompt some Examples of Plow's Lands, and Stock of Corn; but it would have swelled this Paper: An ingenious Person will from This know how to methodize That.”

- the “stock” of animals, with sales proceeds reported for animals sold (cost shown inset) and those unsold reported at the figures brought forward. Valuations are placed on the “Increas’d” stock, i.e. lambs and calves born during the year that remain unsold.

The discharge consists of: “yearly payments” (e.g., salary of Morewood and the poor rate); “uncertain payments” (e.g., cost of keeping Courts, hedging and ditching, and a carpenter’s bill); cattle (payments for hay and for purchasing 100 sheep and 19 bullocks); “ready money” (paid over to the lord of the manor); and the closing balances (consisting of: loss of rent due to death of one of the tenants; land in hand; rent arrears; owing for wood sold; and the unsold livestock appearing under the “charge”).

Monteage (p. 28) discusses the content of the accruals-based charge/discharge statement and explains the advantage of this form of presentation: “Let the Bayliff be fully charged not only by what he hath received, but by all else given him in charge; and there is no fear, but he will hammer out his Discharge.” The CDA clearly serves as a statement of stewardship, and it is one encompassing the agent’s obligations based on full financial accountability unconfined to cash transactions. It also provides much more. The principal is able to discern information relevant for performance assessment. Indeed, in numerous respects, he has all the usual benefits of being able to review income and expenditure rather than only receipts and payments. Moreover, he can compare these figures with those for previous years and is advised of the manor’s worth to the extent it consists of the value of livestock and amounts receivable. There is no explicit statement of profit or loss in the charge/discharge statement, but Monteage (p. 32), in an additional report, sets out accruals-based income and expenditure relating to “Stock” (livestock) and “Lands in hand” (the cost the unlet land). The outcome is a deficit of £67. 3s. which “wants to make up the Charge, which is clearly lost” by choosing to farm five of his properties (p. 32). Monteage appears relaxed about the level of the deficit: “And ‘tis well the Loss is no greater than 67*l*. I have seen othergues [different] losing Accompts in keeping Lands in the Lord’s Hands.”

Other Authors: Laurence [1727;²⁰ see also Lovett, c.1770, pp. 17-21] demonstrates the operation of a strict cash-based CDA, but his book is of particular interest because it illustrates the

²⁰Estate accounting comprises 46 of 212 pages of text.

important exercise he would have undertaken periodically as a surveyor to determine rental charges. A “survey” of all the farms in the manor states the various pieces of land comprising the farm and for each piece of land, the number of acres occupied and whether it is arable enclosed, common arable, pasture, or meadow. Then, based on a value per acre which differs according to the type of land surveyed, the yearly value of each piece of land and the farm as a whole is computed. New values differ from the old because of “improvement” as the result of initiatives mounted by the steward [Laurence, 1727, p. 95]. The stated aim is to produce a figure for rent which is fair to both landlord and tenant. The consequential increase in rents provided English landlords with an incentive to improve their properties and again distinguished them from their continental counterparts [Habakkuk, 1953]. A practical example is provided by Oldroyd [2007, pp. 10, 23] who reveals that the anticipated increase in future cash flow provided a sufficient incentive for William Cotesworth of Gateshead, who “rose from the ranks of tallow chandler to landed gentleman in around ten years” to enhance his estate.

The other noteworthy feature of Laurence’s system is that the CDA is presented as an “Accompt-Current” in bilateral format headed debtor and creditor. But it is identical to a charge/discharge statement in the sense that it sets out transactions relevant to the financial relationship between two individuals. Laurence does not explain why he summarizes the estate’s transactions in what is captioned: “An Abstract; or, an Accompt-Current stated by way of Debtor and Creditor from all the foregoing Particulars, in order to shew the exact Balance” [Laurence, 1727, pp. 154-155]. However, it is a good example of an intermingling of CDA and DEB terminology and practice which abounds within the treatises examined.

As with Monteage [1683], Corbyn Morris [1759, p. 10] presents the initial record of transactions in cash-book format. Also consistent with Monteage is Morris’ dissatisfaction with cash-book-based accounting because when transactions “are all blended together without Assortment ... the Total Amount of the gross Receipts or Disbursements from any Branch is not obvious to the Landlord.” A much fuller record appears in an “Entry Book” which shows, separately, the transactions for each of the various “Branches of the Estate,” with inflows on the left-hand page and outflows on the right. Here, income is shown “gross” (Figure 2), not only in the case of rentals (i.e., the total receivable for the period) but also from exploiting the produce of the

land at a lead mine on Antry Moor, a coal works on Lee Heath, and from Langley Woods (i.e., for each of them the sales value of produce extracted during the year is presented). This enables the fictitious landowner, Henry Seymour, to review “the Branches both of *fixed Rent* and *casual Produce*, which would otherwise fall into separate Cases,...ascertained in the same uniform Manner” (p. 19).²¹ Transactions are finally summarized in “An Abstract” which “exhibits a succinct State of all the Branches in the Period given” (p. 26). It does this by taking the information from the Entry Book and presenting it as a tabular charge/discharge statement. The presentation of rentals in this manner has been discussed above, so the focus here is on an example (income from the coal works on Lee Heath) of “casual produce” to demonstrate the range of information made available in the entry book when read in conjunction with the charge/discharge statement. For ease of presentation, the information provided for the coal works on Lee Heath is set out in vertical format (Figure 2) rather than the tabular presentation employed by Morris to facilitate comparisons to be made with the various other “branches” of activity.

FIGURE 2*
**Coal Works on Lee Heath in Entry Book and Abstract,
 Year to Lady-Day 1759**

ENTRY BOOK: GROSS RECEIPT			
Branch of the Estate			Gross Income in this Period
COAL-WORKS on LEE-HEATH			
<u>John Humphries, Agent for Henry Seymour Esq.</u>	£. s. d		£. s. d
Coal raised in the Period, viz. 2200 Tons: Whereof sold			
1800 Tons, at 7s per Ton	630 0 0	}	770 0 0
Unsold 400 Tons estimated at the End of this Period, at 7s per Ton	140 0 0		
Gross Receipt and Steward's last Balance			Gross Receipt in this Period
Arrear of Stock being 250 Tons of Coals, left under the Care of John Humphries at the Commencement of this Period, then estimated at 6s. 8d. per Ton		83 6 8	£. s. d
Then [25 March 1759], and before received of John Humphries for Coals sold during this Period, viz.			
250 Tons old Stock	} At 7s. per Ton, as per his Monthly Accounts,		717 10 0
1800 Tons this Year's Stock			
2050 Tons			

²¹Morris (p.20) draws readers' attention to the fact that the system demonstrated might omit details, with “The numerous Particulars being supposed to be delivered at large in proper separate Accounts.”

ENTRY BOOK: DISBURSMENTS	£. s. d	
Repaid to John Humphries one Half Year's Land-Tax by him paid, due at Lady-Day 1758 as per Receipt	4 0 0	} 90 0 0
Repaid to John Humphries one Half Year's Land-Tax by him paid, due at Michaelmas 1758 as per Receipt	4 0 0	
Then [25 March], and before repaid to John Humphries one Year's Poor's Rate by him paid, due at Michaelmas 1758 as per Receipt	2 0 0	
Then [25 March], and before repaid to John Humphries for Tools, Engines, Repairs, &c. by him paid during this Period, as per Receipts	80 0 0	
<hr/>		
ABSTRACT. Charge upon each Branch during the period	£. s. d	
Arrears at the Commencement of this Period		
John Humphries. Agent for Henry Seymour Esq.	83 6 8	
Increase of commencing Arrears during this Period	4 3 4	
Gross income in this period	770 0 0	
TOTAL	857 10 0	
<hr/>		
ABSTRACT. Discharge of each Branch during the period		
Taxes charged to the Landlord	10 0 0	
Repairs and other Burdens	80 0 0	
Net receipts from the productive Branches	627 10 0	
Arrears at the end of this Period	140 0 0	

Source: Morris [1759, pp. 14-15, 25]

*most dates omitted

The following information can be gleaned from Figure 2 relevant to performance assessment as well as personal accountability.

- coal in the hands of the agent at the beginning of the period stated at an estimated value which appears to be last year's selling price
- quantity of coal raised during the year classified into that sold and the balance remaining in stock at the end of the period
- "gross income [created] in this period" as the result of valuing coal raised during the year at selling price
- "gross receipts" from sales, with quantities of opening stock sold and coal extracted during the year sold separately identified
- proceeds from the opening stock of coal sold, distinguishing between the opening carrying value and the extra revenue arising from the rise in selling price during the year.
- disbursements

- an accruals-based net-profit figure for the period, reported under the heading “net receipts from the productive branches”

This article has already indicated the difficulty of neatly classifying accounting systems recommended for use on landed estates as either CDA or DEB. Part of the reason for this is because accounting systems had not yet quite metamorphosed into the distinctive categories that we understand today. Indeed, even a stated focus on DEB might prove misleading. For example, Lazonby's book on *Merchants Accounts: or, The Italian Method of Book-keeping* incorporates a substantial section on “Gentleman's Accounts” [Lazonby, 1757, title page]. The illustration provided by Lazonby contains much of the form of DEB – e.g., the term “journal” is used to describe the collection together of entries that are posted to a cash book presented in accordance with debit/credit terminology – but little of the expected substance. The system, which is fundamentally CDA, comprises a detailed rent roll and the following records kept in bilateral format: ledger accounts detailing (accruals basis) rental transactions with each tenant; a cash book (showing running balances in an extra column on the credit side of the account); and a “balance-book” which contains (i) a summary of rental transactions for each of the four manors and for the estate as a whole and (ii) an “Account current” which reports cash transactions entered into by Mr. Honestman (the steward) on behalf of Sir A.B. Baronet. Lazonby's claim that the system “shews the Gentleman what his estate is worth yearly neat money” (p. 85) refers only to the provision of a record of the total rents receivable. His further claim that the two accounts in the balance book prove the accuracy of the underlying records for rentals and cash is correct, but the system falls short of the interlocking characteristics required to justify the description DEB.

Cash-Book Accounting: In *Accompts for Landed-men*, the prominent writing master and accountant, Charles Snell [1711], presents a system consisting of a rent roll and a cash book. It was common practice for rents to be wholly or partly paid “in kind,” and this arrangement was the subject of formal rental arrangements in Snell's illustration. The opening “Survey” of the lord of the manor's estate includes the following examples: “Two Quarters of Oats and my own small Tithes” allowed as £2 part payment of the £82 payable by John Dunkin for the Parsonage of Nottingham; a boar valued at £2 in addition to £120 payable in cash by Andrew Reynolds for a manor house and 160 acres of

land (p. 4). Snell (p. 3) also shows how, during the year, allowable costs (e.g. repairs and taxes) incurred by a tenant would be offset against gross rent due. The cash book illustration concludes with a summary of monthly receipts and payments to reveal “how much the Gentleman’s Estate Produces Yearly more than he Expend.”

The professed motivation for the treatise written by George Clerke [c.1712, preface], who describes himself as “Steward to a person of quality,” is that he “had perused and canvas’d the Variety of Methods after the Italian Model of Debtor and Creditor, &c. and found’em intricate and meandrous, foreign to the Scheme of a Country Gentleman’s Affairs.” The system he describes is also cash book-oriented but contains a broader coverage than that of Snell. Given its title, *The Landed-man’s Assistant: or. The Steward’s Vade Mecum* is clearly intended to describe an accounting system which might be operated by either the landowner or his steward although, in the illustration provided, the cash book is kept by the lord of the manor. It is clear that there are subsidiary records which may have been maintained on a charge/discharge basis, since each list of monthly cash outflows contains details of payments “as per Book of Household Expences”, “as per Book of Workfolk’s Wages,” and “as per Petty-Cash-book” (p. 22).

Clerke’s system is distinctive in commencing with an inventory of the lord’s estate. Such surveys were an important source of information in managing estates and, as noted above, in fixing a sale price because, as Scorgie [1996, p. 240] points out, “since time immemorial, the generally agreed value of land has been based on its yield.” Indeed, Scorgie provides numerous 15th and 16th century examples from both legislation and practice to show that 20-years’ purchase was a common multiple. Clerke’s [c.1712, p. 2]²² illustration is consistent with this practice – tenanted properties in each of three manors and a parish are valued at “20 Years Purchase.” The grand total is described as “the Value of my Estates and Lands” (p. 12), to which is added “ready Cash,” stocks of animals and grain, arrears of rent and loans, and from which is subtracted borrowings. Such an inventory is, of course, the first step in operating a system of

²²Monteage [1675, n.p.] also uses 20-years’ purchase. The substantial property purchases made by the merchant John Smythe between 1543-1554 occurred at the peak for monastic land sales “for a price equal to about twenty years’ annual income” [Vanes, 1974, p. 25; see also Bettey, 1993, p. 54]. The use of a 20-year multiplier probably reflects the fact that 5% was for a long while the maximum legal rate of interest [Oldroyd, 2007, p. 133].

DEB, but it plays no further part in Clerke's cash-based accounting system.²³

A further interesting feature of Clerke's (pp. 46-47) text is the effective use of the tabular format which is employed to present the main components of monthly cash inflows and outflows. Rental data equivalent to that which would appear in accruals-based ledger accounts are also presented as a tabulation, and Clerke (p. 48) rounds things off by explaining the relationship between the nine columns in the form of a "Proof" of the figures. Clerke (p. 49) demonstrates an awareness of the value added by accruals-based data when observing: "I might add an Accompt Sales of each Part of the Stock, Cattle, Corn, & what Sold, Encreas'd, and what Remains, but being easie to be drawn, I leave it to your Discretion." The content of texts which demonstrate the use of DEB to account for landed estates is next examined.

DEB: Publications promoting the application of DEB to rural activities are more numerous than those advocating the use of CDA. The best known book principally devoted to a study of the contribution DEB might make to the administration of a landed estate, the treatise published for Roger North in 1714, is first examined.

The Gentleman Accountant: The system described by North [1714, pp. 106-109] is based squarely on DEB, although he acknowledges that inputs to that system may be provided by charge/discharge statements or other records prepared by the steward. North argues that DEB "will be as profitable to a Man of Estate, as to one of a gainful Profession" (p. 10), but its contribution is different in the important respect that for the trader it helps "in *getting*" an estate whereas for the landed gentleman it helps "in *preserving* an Estate" (p. 10, emphasis added). Implicit in this statement is the assumption that the merchant is starting from an inferior financial position whose occupational *raison d'être* must therefore be to make money.

The reason why "Persons of Quality and Fortune" are encouraged to adopt DEB is because they "have as many Branches in their accomptable Business, as most Traders have" (p. 87). A "Cash-Accompt will not serve the turn," whereas DEB enables a gentleman to

²³The 1303 accounts of the Benedictine House of Jarrow include a report on inventories followed by a cash-based CDA [Stone, 1993, p. 8].

willingly know at all Times, what every Tenant owes; what the Discompts are upon his Farms, and the net Payments of Rent; how Interest goes; whether he receives, or pays more; and what is due either way; how his Steward's or Bailiff's Accompt stands; *what his Managery of Corn, Grazing, Dairy, and Sheep yields him*; and in general, at one, two, or three, &c. Years end, whether his Estate advances, or is Retrograde, and by how much (p. 87, emphasis added).

North's conviction that estate accounting should be based squarely on the principles of DEB may possibly be traced to his brother Dudley who was an extremely successful Levant merchant [Grassby, 2004; Parker, 1997, pp. 46-47].

Like many authors advocating a new way of doing accounting, North [1714, p. 251] denigrates the system that he seeks to supplant. His critique of the use by gentlemen of CDA is by no means convincing. While agreeing that an overall statement of charge/discharge provides "as true and just an Accompt, as can be with any Art framed." North criticizes it as deficient "because it answers no Question, but upon the *Summa Totalis*, not the How? What? And where?" However, he concedes that the *Summa Totalis* is merely a compilation of "Species and Subdivisions" which can be inspected to discover the various components of the charge and discharge (pp. 252-253). And although he insists that "The Accompt by Dr. and Cr. Gives all that a Check Accompt can express, and more" (p. 253), his focus seems to be on structure rather than content. In the main, North appears to favor DEB because it is written up on a regular basis rather than being "done at Leisure," (p. 254) and because it provides information based on a better accounting framework and a more convenient format (p. 253ff).

North's flawed attack on CDA extends to the tabular formats which were used to present rental income and to enable comparisons to be made over time and between different sources of revenue [e.g., Clerk, c.1712, pp. 46-49; Morris, 1759, p. 26]. While rejecting their utility for presenting financial information, North [1714, p. 259] nevertheless agrees that "Tabular Arithmetick...serves to bring a world of Accompts into a little room." Indeed, he recommends the "Tabular Method of keeping a Check upon" what laborers are doing each day on a weekly basis (p. 261). Its potential for the effective control of labor is explained in full (p. 263):

The Knowledge that such an Accompt as this is kept, is sufficient to keep Men to true Reckoning, lest they loose

their Credit and their Work; but it helps very much also in other Respects; for if it be duly distinguish'd, as to the Taken or Day Work, it gives a true Accompt, what the Men can do; and Bargains may be made with them by Lump, or Measure accordingly; the doing which reasonably and well, is the greatest Difficulty in Country Business; the Men that work, know exactly; but those that employ them, cannot know any thing of new Work, nor commonly put out, but by some such Means as this; so the Advantages of Workmen is very great; and as they find the Master Ignorant, they will propose outrageously, which nothing corrects, but a Demonstration, that they and their Work are understood.

Other Authors: An early published demonstration of accounting for landed estate by DEB is Abraham Liset's *Amphithalami* [1660].²⁴ Liset's illustrative accounting system focuses on the affairs of Sir John Ireland who was a merchant as well as a landowner. Liset employs only a ledger to record Ireland's financial affairs and, in the absence of subsidiary records, would not be capable of handling large numbers of transactions easily. Liset distinguishes carefully between capital and revenue. For example, there is removed from the "Several ships at sea" account, a loss of £5,700 (initial carrying value plus cost of fitting out the ship for its voyage) that resulted from "the Fortune, [being] taken in her Voyage to the Levant by the Spaniards." This enabled the operating profit generated by the remaining two ships to be identified²⁵ and transferred to the "Gain and loss" account. Lee [1981, p. 544] speculates that Francis Willughby's accounts (1672-1682) may have been based on the model outlined by Liset given certain similarities and the fact that it was "the only known English book available" which applied DEB to account for an estate.

Some authors of treatises on DEB indicate that the system they describe is also applicable to landed estates. For example, Webster [1719, p. 1] describes the "Italian manner of Debtor and Creditor" as "not only practis'd by the Merchant, whose business is most extensive, and comprehends the greatest variety, but is also allow'd the best method for the Steward and Publick Accomptant." Monteaige [1675] demonstrates a "one system fits

²⁴Personal accounts for the stewards of the household and of the manors, which serve as accounts of charge and discharge, are incorporated within the system of DEB which, therefore, provides an audit trail for transactions entered into by stewards in the absence of a waste book or journal.

²⁵Accounts are opened for each category of property with all related income and expenditure initially posted to that account.

all” philosophy through the ingenious device of combining the affairs of all identified users into a single DEB-based illustration. In targeting the country gentleman as a possible client for the “best [bookkeeping] method used by merchants” (title page), Montage (preface) acknowledges that he might be entering uncharted territory: “Yet the Subject is not so limited, but that greater Achievements may be built thereupon, not unworthy of Gentlemen, Noblemen and Princes, who in foreign Countries have not distained to manage Transactions in this Method.” The implication is that the English aristocracy might shy away from an accounting technology that suffered the taint of trade, and Stone [1965, p. 355] acknowledges that “Elizabethan and Early Stuart peers would have been astonished and disgusted to find themselves described as men of business.” But the landed gentleman and the merchant did not occupy entirely separate spheres. “If a peer restricted himself to a director’s role rather than a manager’s, demesne farming, the opening-up of mineral resources, the starting of metallurgical industries, the development of urban property, participation in privateering, trading, and colonizing companies were all entirely respectable activities” [Stone, 1965, p. 336].

Also, it might be imagined that the successful merchant who gained social as well as economic upward trajectory would have remained loyal to the accounting system that helped him acquire the paraphernalia that now marked him out as a country gentleman. Some treatises on DEB, although principally directed at merchants, accord landed estates separate treatment. Stevenson [1762] devotes the latter part of *Book-keeping by Double Entry* to a system for landowners comprising two sets of books, one focusing on the estate “Greenside” (belonging to Sir James) as a separate entity and the other on the accountability of “A.B. Factor” to Sir James. The entity-based records are in classical form, consisting of a memorial or waste book, a journal, and a ledger. The starting point is an inventory of Laird’s personal estate which includes household items (furniture, jewelry, and plate) as well as animals, crops, loans, debtors, rents outstanding, and amounts owing. It does not include property valuations. Notable features of the treatment of transactions undertaken during the year include charging cattle and sheep consumed to a “Family expences” account (ledger fo. 2), together with all other costs of running the household. Total family expenses are transferred to a P&L account, which collects a number of other small items, such as the opening valuation of a horse that died during the year. The balance of the P&L account, captioned “this

Year's Expence in living," is transferred to the "Personal Estate of Greenside" ledger account, with the title emphasizing the entity rather than personal status of these records. Credited to the capital account are sales proceeds from crops and animals supplied by tenants in partial satisfaction of their rental obligations. Quantity columns are used to track movements of individual crops (e.g., corn) but, as values are listed in a single column, only an overall profit figure is reported. Closing balances of animals are measured using beginning of the year figures.

Stevenson's treatment of rentals does not fully comply with the accruals concept. The opening inventory includes a statement of rentals due for the forthcoming year in cash and in kind, with the cash element treated as an asset. Payments subsequently received are, therefore, not recognized as income for the year. The rental element payable-in-kind is not fully satisfied and, as no values are attached to balances of crops reported as outstanding in the closing "Balance" account (ledger, fo. 7), the expectation that a DEB framework would provide an accruals-based measure of profit is further compromised.

A separate ledger (no waste book or journal), also kept on a double-entry basis, records the accountability of A.B. Factor to Sir James. It is cash-based and, therefore, reveals a more restricted view of transactions undertaken during the year.

Donn's [1773, pp. 18-33] "essay on book-keeping, as applied to the business of a steward" starts by making the valid point that, where a steward is required to "conduct his Books without an Account of Stock," he is being "considered a Kind of Factor;" and "the Lord will lose the Satisfaction of feeling the real Value of his Estates" (p. 18). Donn therefore recommends that the steward should be required to account as a merchant's clerk. That is, the steward should maintain entity-based accounts conforming to "the true Italian Principles." That the system was also intended to serve as a record of personal accountability is evident from the following comment: "we may begin the Waste-Book, by taking an Inventory of all the real and personal Estate of the Lord, which is committed to the Care of the Steward" (p. 18). To make the recommended system of DEB operational, an opening valuation is placed on the properties as well as on animals and crops. Donn demonstrates an element of process costing with unthreshed corn valued, when threshed, for transfer to the granary.²⁶ The ledger accounts for farm produce contain

²⁶The valuation of transfers at a figure above cost results in an understatement of closing stock given that it is treated here as a balancing item.

columns for quantities. The P&L account is charged at cost with the value of wheat and oats taken by the family from the granary. The intention that the accounts should be capable of providing measures of entity performance and position as well as a record of the steward's personal accountability is carried through to the "Balance" account which contains entries for: "To Cash, remaining in the Hands of J. Trusty, Steward," "By Stock, the neat Estate of J. Rich, Esq. under the Care of John Trusty, Steward."

Hamilton [1788, pp. 488-491] devotes (without illustration) four pages of a text stretching to 576 pages to a discussion of a "Land-stewards accompts." Hamilton acknowledges the need for a degree of flexibility in the form the books should take, possibly reflecting recognition of existing custom. For example, he proposes that "The ledger should be kept on the principles of double entry, tho' the form need not be rigidly observed" (p. 488), and we have seen that to be the case in a number of the texts examined. It is recommended that accounts should be arranged to show profits from activities. For example, the account for the farm should show opening and closing values of "the stock of cattle, &c" together with relevant expenses and "the quantity and value of its produce" so as to reveal "gain or loss" (p. 489). Revenues should be recognized not only when produce is sold, but also as the result of valuations placed on items "sent to the granary and transferred to accompt of corn, or delivered for the use of the family."

Concerning the treatment of what would today be called capital expenditure, support for accruals accounting takes a further dimension: "If a sum of money, suppose £500 be expended to improve the farm, which the proprietor does not expect to draw back in less than 10 years," then £50 should be written off each year "till it [the balance] be exhausted" (p. 490). Hamilton (p. 491) emphasizes the importance of matching costs with related revenues: "If no returns be expected for several years, the allowance is not diminished till the time when benefit was expected." The amount then charged each year, however, should take no account of the new venture's level of profitability: "This [accounting], however, should be regulated by the hopes entertained when the money was expended, and not by the success of the improvements; and then the balance of the farm-accompt, in successive years, will show how far the improvements have exceeded or fallen short of expectations" (p. 490).

Combined CDA/DEB: Richards' [1707, title page] scheme

“for keeping [the] Accompts of Gentlemens Estates” is designed to enable data generated under a system of charge/discharge to serve as journal entries to a “Ledger [which] is kept after the *Italian* manner, by double Entries.” The accounting detail therefore appears in a portfolio of charge/discharge statements with the ledger reporting information in summary form. Although employing DEB, the system does not demonstrate the operation of accruals accounting. It is assumed that all amounts due to the lord are actually received and no inventory is made of closing assets or liabilities. Therefore, the “Balance” account reports a cash-based increase in value during the year (illustration fo. 3), with the cash-orientation of *The Gentlemens Auditor* signaled by the title page which announces a system “whereby may at any time be seen what they [the gentlemen] save or spend, get or lose to a Farthing.”

DISCUSSION AND CONCLUDING REMARKS

Historically, CDA and DEB have often been portrayed as alternative systems for users to choose between. For example, as Baxter [1980, p. 69] put it: “The account charge/discharge system was a competitor of the double-entry accounting system.” This idea is based on the notion that CDA and DEB are fundamentally different from one another. Cash-based CDA culminates in a statement of cash flows demonstrating personal accountability; accruals-based DEB generates accounting reports consisting of a P&L account and balance sheet that might be used for performance assessment and decision making. Even if CDA was always cash-based, it should not, of course, be dismissed as a primitive system that was naturally set aside as accounting “evolved” towards its present enhanced state [cf. Keenan, 1998; Napier, 1998]. The case for cash-flow accounting is powerful [Lee, 1984, 1993; Lawson, 1992], and it is unnecessary, therefore, to rehearse the virtues of a cash-based CDA. Until the 1970s in Britain, corporate published financial reports were squarely based on two financial statements – the P&L account and the balance sheet. Among the plethora of accounting statements which have been added to and discarded from the corporate report in recent decades, the cash-flow statement has been the most enduring and for many the most important innovation.

It is also known that CDA was not always strictly cash-based, and a prior literature drawing attention to the potential of CDA has been discussed. This paper has also studied texts written between 1660-1788 that advocate approaches to ac-

counting for landed estates employing CDA, DEB, or features of both systems. This has enabled us to examine in a systematic manner the similarities and differences between the ways in which those accounting systems might assist property management. In reviewing the evidence presented in this paper, it is not the intention to judge whether one system was superior to the other. The aim is to better understand what one system could do that the other could not.

Asset Valuation and Profit Measurement: In evaluating the evidence presented in this paper, it is useful to engage with comment from Bryer on the significance of accounting for economic development. He [2006, p. 370; see also Bryer, 1994] observes that “In Marx’s theory, England’s agricultural revolution was [in] the vanguard in its transition from feudalism to capitalism.” Marx believed that the revolution “took hold” from around 1670 and was carried through to its conclusion from about 1750 [Bryer, 2006, p. 368], and this timeframe fits in well with the dating of textbook publications studied here. Whereas, in Bryer’s estimation, the “feudal mentality pursued the direct appropriation of surplus labour,” the “capitalist mentality pursues the rate of return on capital employed in production by extracting surplus value from the sale of commodities or services produced by wage labour” and, for this purpose, requires the preparation of balance sheets and P&L accounts (p. 370). The texts studied in this paper, those advocating the use of CDA as well as treatises promoting DEB, reveal some evidence of a capitalist mentality.

Most, but not all, of the texts promoting DEB show how to compile the kind of information relevant to performance measurement that would be expected from it today. A calculation of profit is a natural outcome from a system of DEB and, in the texts examined, there are usually separate ledger accounts recording profits arising from different activities. This typically required the bookkeeper to attach valuations (cost or estimated) to one or more of properties, livestock, and crops. There are also examples of values placed on goods taken for personal consumption and threshed corn transferred from the barn to the granary, while Hamilton [1788] reveals the essence of a capitalist mentality [Bryer, 2006, p. 382] when recommending that landlords write off the cost of improvements to properties over the period of expected benefit. In the “balance” account that rounds off this entity-oriented accounting system, assets and liabilities are valued to enable identification of the landowners “neat Estate” [Donn, 1773, p. 33]. But this paper has also

revealed that recommended systems of DEB did not always apply the accruals concept to any significant extent [esp. Richards, 1707], and did not necessarily do so very well [Stevenson, 1762].

Authors of DEB texts proclaimed their system's superiority. Donn [1773, p. 18] believed DEB to be better because it provided the landlord with "the Satisfaction of feeling the real Value of his Estates." North advocated DEB because it provided a wide range of information relevant to performance assessment and decision making. However, it was noted that his criticisms of CDA were not utterly convincing. His critique focuses largely on cash accounting which, as we have seen, is not the inevitable foundation of charge/discharge accounting. Also, he acknowledged the availability among subsidiary records – the "Species and Subdivisions" of the system [North, 1714, p. 251] – of information equivalent to that found in DEB.

So what can be learned from the treatises examined in this paper about the potential of CDA beyond its concern with narrow personal accountability? Concerning the nature of the operations undertaken by landowners, all text-book illustrations deal with the collection of rents, and most also recognize the need to measure the farming transactions of the landlord which, according to Monteage [1683, p. 10], is "A thing which happens upon most Estates, since the Fall of Land in every County." Four publications [Monteage, 1675, 1683; North, 1714; Morris, 1759], two illustrating CDA and two DEB, contain detailed treatment of the financial implications of direct farming.

An important feature of DEB is the use of ledger accounts to report results from different activities. North [1714, p. 87] advocates use of DEB on the grounds that landowners "have as many Branches in their accomptable Business, as most Traders have." However, authors of texts on CDA showed that results by activity could be comfortably incorporated within the basic accounting structure [Morris, 1759] or in the form of memorandum records [Monteage, 1783].

Concerning the choice between cash and accruals accounting, three non-DEB texts (Snell and Clerke's cash-book system and Laurence's CDA, see Table 2²⁷) were entirely cash-oriented, but the remainder apply at least some elements of accruals accounting. Monteage [1683, p. 22] insists that landowners should not "be satisfied with" cash-based accounting and, under his and other charge/discharge systems, landowners are provided with data that enable them to review income and expenditure as well

²⁷Table 2 does not include Hamilton [1788] which contains no numerical illustrations.

TABLE 2
Content of Texts

	Liset 1660	Montague 1675	Montague 1683	Richardson 1707	Snell 1711	Clerke c.1712	North 1714	Laurence 1727	Lazouby 1757	Morris 1759	Stevenson 1762	Lovett c.1770	Dunn 1773
<i>Accounting system</i>	DEB	DEB	CDA	CDA/DEB	Cash book	Cash book	DEB	CDA	CDA	CDA	DEB	CDA	DEB
CDA presentation			vertical	vertical			bilateral	bilateral	bilateral	bilateral		bilateral	
DEB											yes		no
Waste book	no	yes	no	no	no	yes	yes				yes		yes[1]
Journal	no	no	no	no	yes	yes	yes				yes		yes
Ledger	yes	yes	yes	yes	yes	yes	yes				yes		yes
Profit and loss account	yes	yes	yes	yes	yes	yes	yes				yes		yes
Balance sheet	yes	yes	yes	yes	yes	yes	yes				yes		yes
Rent roll or equivalent	no	no	yes	yes	yes	yes	no	yes	yes	yes	no	yes	yes
<i>Presentation features</i>													
Tabular in part	no	no	yes	no[2]	no	yes	no	yes	no	yes	no	yes	no
Bilateral cash book	yes	yes	yes	yes	yes	yes	yes	no[3]	yes	yes	yes	yes	yes
Cash book headings	debtor/ creditor	debtor/ creditor	debtor/ creditor	dir/ cr	receipts/ payments	debtor/ creditor	dir/ cr	n/a	dir/ cr	receipts/ disbursements	dir/ cr	dir/ cr	debtor/ creditor
Operating flows analyzed by type	yes	yes	yes	yes[4]	no	yes	yes	yes	no	yes	no	no	yes
<i>Asset recognition and accruals within accounting system</i>													
Properties	yes	yes	no	no	no	no	no	no	no	no	yes	no	yes
Personal belongings	no	no	no	no	no	no	yes	no	no	no	yes	no	no
Ships	yes	yes	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	no	n/a
Stock of animals/crops	no	yes	yes	no	no	no	yes	no	no	n/a	yes	n/a	yes
Stock of minerals and timber	no	n/a	n/a	no	n/a	n/a	n/a	n/a	n/a	yes	n/a	no	n/a
Rent	no	no	yes	no[5]	no	no	yes	no	no	yes	yes	yes	no
Gain or loss reported	yes	yes	no[6]	yes	no	no	yes	no	no	no	yes	no	yes

[1] Described as a waste book, it is in typical journal format.

[2] Final page of book separately demonstrates "a Shorter way for a Gentleman" to keep his rent receipts in tabular form.

[3] Contains individual lists of receipts and disbursements analyzed by type.

[4] Analysis appears in build-up of journal entry detailing the credit to capital account.

[5] Accruals remain the responsibility of the steward.

[6] A separate calculation is made based on the information contained within the accounting system.

as receipts and payments. For this purpose, texts on CDA also advocate the use of tabular formats to present the kind of information that would appear in an accruals-based ledger account for rents receivable [Monteage, 1683, p. 23; Clerke, c.1712, p. 48] or to enable comparisons to be made between different activities [Morris, 1759, pp. 12-17, p. 25] and accounting periods [Snell, 1711, p. 3; Clerke, c.1712, pp. 46-47].

The application of accruals accounting results in asset valuations being reported in financial statements, and Table 2 reveals that such valuations feature more prominently within systems of DEB. But they are by no means entirely absent from CDA. Monteage [1683], for example, values livestock for inclusion in an accruals-based CDA, while Clerke [c.1712] makes an inventory of the lord's estate by valuing properties at 20 times the annual rental. Admittedly, the latter figures are not incorporated within Clerke's cash-book-based system, but its purpose is the same as inventories that are the first step in the implementation of a system of DEB, namely to supply the owner with a figure for "The total Value of my Estate" (p. 14).

Evidence of a capitalist mentality is further evidenced by the fact that employment of CDA did not entirely rule out an interest in profit calculation. Monteage [1683, p. 32] contains a calculation of the profit or loss on direct farming based on the information contained within the system of CDA, although not integrated within it. Particularly noteworthy is Morris [1759] whose "entry book" and "abstract" of charge/discharge contain a plethora of data relevant for performance assessment, including quantities and values of inventories, separate values for goods produced and sold, gains arising from increases in the value of opening stock sold during the year, and net profit from each of the "Branches of the Estate."

Composite and Combined Accounting Systems: It is known that the classification of an accounting system as CDA or DEB is often not a straightforward matter. There is no shortage of examples revealing the presence of individual features of DEB within systems of CDA. They include cash accounts presented in bilateral format, use of the terms debit and credit to head up columns of entries, and the terms "to" and "by" employed to annotate entries in the accounts [H. Jones, 1985, pp. 41-42, 52-63; Napier, 1991, 1998; Coombs and Edwards, 1994, p. 165]. The existence of such practices has misled historians less expert in the arcane features of accounting technologies. For example, Hoskin and Macve [1994] discovered that Chandler [1977, p.

74] wrongly categorized the early 19th century records of the Springfield Armory as “a sophisticated system based on ‘double-entry.’” Instead, it was “a charge/discharge system, albeit one utilizing a debit/credit terminology” [Hoskin and Macve, 1994, p. 18].²⁸

H. Jones’ [1985, p. 41] exhaustive study of the accounting records of estates and industrial entities in Wales between 1700-1830 produced the following conclusion: “It is around the mid-eighteenth century that we are seeing the transition from the charge and discharge basis to double entry accounts integrated the one with the other.” He adds: it was “a time of great change” when “knowledge and understanding of double-entry book-keeping was spreading and it was being adopted, in a fashion, on a broadening basis.” This paper reveals that similar comments might be applied to the content of contemporary treatises.

The non-DEB structures studied made heavy use of terminology and methods of presentation characteristic of DEB. For example, cash books are typically headed debtor/dr and creditor/cr (Table 2), and this practice extended to other elements of the accounting system [esp. Lazonby, 1757]. The bilateral format is used in illustrative cash-book layouts and by Laurence, Lazonby, and Morris for the purpose of presenting the statement of charge/discharge. Indeed, Laurence [1727, pp. 154-155; see also Lazonby, 1757, p. 85] labels the CDA statement an “Accompt current,” which was the term typically used for a statement of personal indebtedness extracted from a system of DEB. We have also seen that some authors were keen to forge links between the two systems that went beyond layout and terminology. North [1714, pp. 106-109; see also Richards, 1707; Clerke, 1712, p. 22] saw scope for charge/discharge statements providing inputs to a scheme of DEB. Stevenson [1762] shows how two systems of DEB, one focusing on the estate as a separate entity and the other recording the personal accountability of the steward, might run in parallel.

The transfer of terminology also saw CDA borrowing from DEB. When discussing “The Fundamental Notion on which the whole Practice [of DEB] depends.” North [1714, p. 12] starts with the following assertion: “The Art of Regular Accompting depends wholly upon this Supposition, *viz.* that every thing negociated comes out of Something and goes into Something.” As-

²⁸Napier [1998, p. 692] gives a number of other examples of economic historians wrongly interpreting CDA as DEB.

suming a gentleman's natural familiarity with contemporary scientific progress,²⁹ he continues: "having (as they say of Motion) its *terminus a quo & ad quem*" (p. 8). Thus, "however spaciouly the Books are branched out, there is conserved a perpetual Par, or Ballance of the Whole" (p. 12). The following description of the operation of DEB clearly signals a conceptual connection with CDA:

for that Person or Thing which takes, is made *Dr.* that is, stands *charged*; and that Person or Thing which delivers, or parts from, is the *Cr.* or *discharged*...and since every Person or Thing may at Times be both *Dr.* and *Cr.* they are made all Titles of Accompts in the Books, and under them are wrote the Debts or Charges, on the left Hand Page; and the Credits or Discharges, on the right Hand Page of the Book (pp. 12-13).

Further:

In fine, it is to be always observed, that the same Charge which is writ on the Debt-side of one Accompt, is also wrote on the Credit-side of some other Accompt, which is twice writing the same thing; whereby every Accompt by both Sides of it, Charge and Discharge, hangs to certain other Accompts, by every Line of it (p. 16).³⁰

It is therefore possible to discern the kind of deep-seated connection between CDA and DEB that has caused accounting historians to speculate that the latter emerged out of the former [Littleton, 1933, pp. 38-39; Lee, 1975, pp. 7-8].

Finally: It has been suggested that CDA was superseded by DEB because the latter had the potential for routinely providing decision-useful information in the form of the income statement and balance sheet and because it was better suited to recording large volumes of transactions. Although these factors are part of the story, this study raises the question of whether the demise of CDA was the inevitable outcome. This paper has shown that, despite the absence of a P&L account, *per se*, from CDA, this by no means ruled out the possibility of providing (both outside and within the system of CDA) information relevant to performance assessment based on calculations of capital, asset values,

²⁹Sir Isaac Newton's *Philosophiæ Naturalis Principia Mathematica* [1687] describes universal gravitation and the three laws of motion.

³⁰Corresponding comments can be found in the literature directed at merchants [e.g., Malcolm, 1718, p. 120].

sources of revenue, and, indeed, profit. Turning to an accounting system's record-keeping potential, the prior literature reveals examples of CDA which contain the self-balancing features designed to ensure the kind of accuracy achieved by an interlocking system of DEB. Accuracy was also a prominent concern of the authors studied here with Clerke [c.1712, p. 48; see also Monteage, 1683, p. 24] demonstrating a "Proof" of the figures. Whether CDA could achieve the degree of sophistication and reliability of DEB in this respect is uncertain, but we do know that the charge/discharge statement was, like the income statement and the balance sheet, based on subsidiary records, the extent and sophistication of which have been little explored in accounting historiography.

With a few exceptions, the course of history has seen the replacement of CDA by DEB. Whether this has been an inevitable outcome of historical processes remains unproven. Perhaps CDA should not have survived as long as it did and merely did so because of institutional resistance within the landowning class to a system associated principally with traders [see Monteage, 1675, preface; Lemarchand, 1994]. It may be the case that the transfer from CDA to DEB awaited a fuller transition on the part of landowners from rentier to capitalistic farmer and industrialist [Napier, 1998, pp. 695-696]. On the other hand, it could be that the sheer momentum which built up in favor of DEB proved unstoppable irrespective of the genuine merits of CDA. Where did such momentum come from? Candidates include: an increasingly DEB-dominated accounting literature; the role which DEB was believed, or at least claimed, to possess in achieving cheaper and more efficient ways of doing things; and the perceived contribution to the professional process, mounted by public accountants, of a more "mysterious" method of accounting. Reflecting on the provisional nature of accounting change, Stone [1993, p. 18] commented: "The early practice, later discontinued, of beginning the annual statement with an inventory of such assets [as belonged to an entity] could have been developed to make the charge and discharge system an accounting for all assets for which the steward was responsible." The writings reviewed in this paper show that this, and more, was within the potential of CDA.

REFERENCES

- Baigent, E. (2004), "Donn, Benjamin (1729–1798)," *Oxford Dictionary of National Biography* (Oxford: Oxford University Press). Accessed February 3, 2009 at

Edwards, *Accounting during the English Agricultural Revolution*

41

<http://www.oxforddnb.com/view/article/7815>.

- Baxter, W.T. (1980), "The Account Charge and Discharge," *Accounting Historians Journal*, Vol. 7, No. 1: 69-71.
- Baxter, W.T. (1983), "Accounting Roots and their Lingering Influence," in Gaertner, J.F. (ed.), *Selected Papers from the Charles Waldo Haskins Accounting History Seminars* (San Antonio, TX: Academy of Accounting Historians): 135-152.
- Baxter, W.T. (1989), "Early Accounting: The Tally and Checker-Board," *Accounting Historians Journal*, Vol. 16, No. 2: 43-83.
- Beckett, J.V. (1986), *The Aristocracy in England 1660-1914* (Oxford: Basil Blackwell).
- Betty, J.H. (1993), *Estates and the English Countryside* (London: Batsford).
- Boyns, T. and Edwards, J.R. (2007), "The Development of Cost and Management Accounting in Britain," in Chapman, C.S., Hopwood, A.G. and Shields, M.D. (eds.), *Handbook of Management Accounting Research, Volume 2* (London: Elsevier): 969-1,034.
- Bryer, R.A. (1994), "Accounting for the Social Relations of Feudalism," *Accounting and Business Research*, Vol. 24, No. 95: 209-228.
- Bryer, R.A. (2000a), "The History of Accounting and the Transition to Capitalism in England. Part One: Theory," *Accounting, Organizations and Society*, Vol. 25, No. 2: 131-162.
- Bryer, R.A. (2000b), "The History of Accounting and the Transition to Capitalism in England. Part Two: Evidence," *Accounting, Organizations and Society*, Vol. 25, No. 4/5: 327-381.
- Bryer, R.A. (2006), "The Genesis of the Capitalist Farmer: Towards a Marxist Accounting History of the Origins of the English Agricultural Revolution," *Critical Perspectives on Accounting*, Vol. 17, No. 4: 367-397.
- Bywater, M.F. and Yamey, B.S. (1982), *Historic Accounting Literature: A Companion Guide* (London: Scholar Press).
- Carmona, S., Ezzamel, M., and Gutiérrez, F. (2004), "Accounting History Research: Traditional and New Accounting History Perspectives," *De Computis*, Vol. 1: 24-53.
- Chandler, A. (1977), *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, MA: Harvard University Press).
- Chatfield, M. (1977), *A History of Accounting Thought* (New York: Robert E. Krieger).
- Clare, M. (c.1740), *A Short and Familiar Sketch of Book-Keeping per Double Entry, in the Italian Manner* (London).
- Clerke, G. (c.1712), *The Landed-Man's Assistant: or. The Steward's Vade Mecum. Containing the Newest, Most Plain and Perspicuous Method of Keeping the Accounts of Estates* (London).
- Colquhoun, P. (2009), "The State," in Edwards, J.R. and Walker, S.P. (eds.), *The Routledge Companion to Accounting History* (London: Routledge): 543-560.
- Coombs, H.M. and Edwards, J.R. (1994), "Record Keeping in Municipal Corporations: A Triumph for Double Entry Bookkeeping," *Accounting, Business & Financial History*, Vol. 4, No. 1: 163-180.
- Coombs, H.M. and Edwards, J.R. (1996), *Accounting Innovation: Municipal Corporations, 1835-1935* (New York and London: Garland Publishing).
- Dobie, A. (2008), "The Development of Financial Management and Control in Monastic Houses and Estates in England c.1200-1540," *Accounting, Business & Financial History*, Vol. 18, No. 2: 141-159.
- Dobie, A. (2011), "A Review of the Granators' Accounts of Durham Cathedral

- Priority 1294-1433: An Early Example of Process Accounting?" *Accounting History Review*, Vol. 21, No. 1: 7-35.
- Dodson, J. (1750), *The Accountant, or, the Method of Book-keeping, Deduced from Clear Principles* (London).
- Donn, B. (1765), *The Accountant and Geometrician [containing] An Essay on Book-Keeping by Double Entry* (London).
- Donn, B. (1773), *The Young Shopkeeper's, Steward's, and Factor's, Companion*, 2nd. edn. (London).
- Edwards, J.R. (2011), "Accounting Education in Britain during the Early Modern Period," *Accounting History Review*, Vol. 21, No. 1: 37-67.
- Edwards, J.R. and Boyns, T. (1992), "Industrial Organization and Accounting Innovation: Charcoal Ironmaking in England 1690-1783," *Management Accounting Research*, Vol. 3, No. 2: 51-69.
- Edwards, J.R. and Greener, H.T. (2003), "Introducing 'Mercantile' Bookkeeping into British Central Government, 1828-1844," *Accounting and Business Research*, Vol. 33, No. 1: 51-64.
- Erskine, J. (1769), *The Principles of the Law of Scotland: In the Order of Sir George Mackenzie's Institutions of that Law* (Edinburgh).
- Fleischman, R. and Tyson, T. (2004), "Accounting in Service to Racism: Monetizing Slave Property in the Antebellum South," *Critical Perspectives on Accounting*, Vol. 15, No. 3: 376-399.
- Forrester, D.A.R. (1978), "Whether Malcolm's is Best or Old Charge and Discharge," *Accounting Historians Journal*, Vol. 5, No. 2: 51-61.
- Grant Thornton (1996), *Charge and Discharge Statement and Accountants' Compilation Report, William P. Lear Family Trust January 1, 1995 to December 31, 1995*. Accessed July 1, 2011 at <http://www.learfamilytrust.com/Trust/1995%20CD.pdf>.
- Grassby, R. (2004), "North, Sir Dudley (1641-1691)," *Oxford Dictionary of National Biography* (Oxford: Oxford University Press). Accessed June 22, 2011 at <http://www.oxforddnb.com/view/article/20297>.
- Habakkuk, J. (1953), "Economic Functions of English Landowners in the Seventeenth and Eighteenth Centuries," *Explorations in Entrepreneurial History*, Vol. 6, No. 2: 92-102.
- Hamilton, R. (1788), *An Introduction to Merchandise [containing] Book-Keeping in Various Forms*, 2nd. edn. (London).
- Harvey, P.D.A. (1994), "Manorial Accounts," in Parker, R.H. and Yamey, B.S. (eds.), *Accounting History: Some British Contributions* (Oxford: Clarendon Press): 91-115.
- Hay, L.E. (1956), "The Myth of the Charge and Discharge Statement," *Accounting Review*, Vol. 31, No. 4: 632-635.
- Hayes, R. (1739), *Modern Book-Keeping: or, the Italian Method Improved*, 2nd. edn. (London).
- Hoskin, K.W. and Macve, R.H. (1994), "Reappraising the Genesis of Managerialism: A Re-Examination of the Role of Accounting at the Springfield Armory, 1815-1845," *Accounting, Auditing & Accountability Journal*, Vol. 7, No. 2: 4-29.
- Jack, S.M. (1966), "An Historical Defence of Single Entry Book-Keeping, *Abacus*, Vol. 2, No. 2: 137-158.
- Jones, H. (1985), *Accounting, Costing and Cost Estimation, Welsh Industry: 1700-1830* (Cardiff: University of Wales Press).
- Jones, M.J. (1991), "The Accounting System of Magdalen College, Oxford, in 1812," *Accounting, Business & Financial History*, Vol. 1, No. 2: 141-161.

Edwards, *Accounting during the English Agricultural Revolution*

43

- Jones, M.J. (2008), "The Role of Change Agents and Imitation in the Diffusion of an Idea: Charge and Discharge Accounting," *Accounting and Business Research*, Vol. 38. No. 5: 355-371.
- Jones, R.H. (1985), "Accounting in English Local Government from the Middle Ages to c. 1835," *Accounting and Business Research*, Vol. 15, No. 59: 197-209.
- Jones, R.H. (1992), *The History of the Financial Control Function of Local Government Accounting in the United Kingdom* (New York and London: Garland Publishing).
- Keenan, M.G. (1998), "A Defence of 'Traditional' Accounting History Research Methodology," *Critical Perspectives on Accounting*, Vol. 9, No. 6: 641-666.
- King, P. (2010), "Management, Finance, and Cost Control in the Midlands Charcoal Iron Industry," *Accounting, Business & Financial History*, Vol. 20, No. 3: 385-412.
- Kirk, R.E.G. (ed.) (1892), *Accounts of the Obedientiars of Abingdon Abbey*, Camden, New Series, Vol. 51.
- Laurence, E. (1727), *The Duty of a Steward to his Lord, Represented under Several Plain and Distinct Articles* (London).
- Lawson, G.A. (ed.) (1992), *Studies in Cash Flow Accounting and Analysis* (New York: Garland Publishing).
- Lazonby, T. (1757), *Merchants Accounts: or, the Italian Method of Book-keeping* (York).
- Lee, G.A. (1975), *Modern Financial Accounting*, 2nd. edn. (Sunbury-on-Thames: Nelson).
- Lee, G.A. (1981), "The Francis Willughby Executorship Accounts, 1672-1682: An Early Double-Entry System in England," *Accounting Review*, Vol. 56, No. 3: 539-553.
- Lee, G.A. (1991), "Colliery Accounting in Sixteenth-Century England: The Willoughbys of Wollaton, Nottinghamshire," in Graves, O.F. (ed.) *The Costing Heritage: Studies in Honor of S. Paul Garner* (Harrisonburg, VA: The Academy of Accounting Historians): 50-73.
- Lee, T.A. (1984), *Cash Flow Accounting* (Wokingham: Van Nostrand Reinhold).
- Lee, T.A. (1993), *Cash Flow Reporting: A Recent History of an Accounting Practice*. (New York and London: Garland Publishing).
- Lemarchand, Y. (1994), "Double Entry versus Charge and Discharge Accounting in Eighteenth-Century France," *Accounting, Business & Financial History*, Vol. 4, No. 1: 119-145.
- Liset, A. (1660), *Amphithalami, or, the Accomptants Closet being an Abridgment of Merchants-Accounts Kept by Debtors and Creditors* (London).
- Littleton, A.C. (1933), *Accounting Evolution to 1900* (New York: American Institute Publishing Company).
- Lovett, T. (c.1770), *Treatise on Estate Management*, National Library of Wales, Aberystwyth, Chirk Castle Manuscripts, Group A, No. 35.
- Mair, J. (1773), *Book-keeping Modernised: or, Merchants-Accounts by Double Entry* (Edinburgh).
- Malcolm, A. (1718), *A New Treatise of Arithmetick and Book-keeping. Containing... the Admirable Method of Accompts by Debtor and Creditor* (Edinburgh).
- Melton, F. (2004), "Monteage, Stephen (bap. 1623, d. 1687)," *Oxford Dictionary of National Biography* (Oxford: Oxford University Press). Accessed October 12, 2009 at <http://www.oxforddnb.com/view/article/19040>.
- Monteage, S. (1675), *Debtor and Creditor Made Easie* (London).
- Monteage, S. (1683), *Instructions for Rent-Gatherers Accompts* (London).
- Morris, C. (1759), *A Plan for Arranging and Balancing the Accounts of Landed Es-*

- tates (London).
- Murdoch, A. (2004), "Morris, Corbyn (1710–1779)," *Oxford Dictionary of National Biography* (Oxford: Oxford University Press). Accessed December 6, 2009 at <http://www.oxforddnb.com/view/article/19302>.
- Napier, C.J. (1991), "Aristocratic Accounting: The Bute Estate in Glamorgan 1814–1880," *Accounting and Business Research*, Vol. 21, No. 82: 163-174.
- Napier, C.J. (1998), "Giving an Account of Accounting History: A Reply to Keenan," *Critical Perspectives on Accounting*, Vol. 9, No. 6: 685-700.
- Newton, Sir Isaac (1687), *Philosophiæ Naturalis Principia Mathematica* (London).
- Noke, C. (1981), "Accounting for Bailiffship in Thirteenth Century England," *Accounting and Business Research*, Vol. 11, No. 42: 137-151.
- Noke, C. (1991), "Agency and the Excessus Balance in Manorial Accounts," *Accounting and Business Research*, Vol. 21, No. 84: 339-348.
- North, R. (1714), *The Gentleman Accomptant: or, an Essay to Unfold the Mystery of Accompts. By Way of Debtor and Creditor, Commonly Called Merchants Accompts* (London).
- Notes for the Guidance of Curators (2000). Accessed July 1, 2011 at http://www.scotcourts.gov.uk/library/curator/docs/curators_guidance.pdf.
- Oldroyd, D. (2007), *Estates, Enterprise and Investment at the Dawn of the Industrial Revolution: Estate Management and Accounting in the North-East of England c.1700-1780* (Aldershot: Ashgate).
- Oldroyd, D. and Dobie, A. (2009), "Bookkeeping," in Edwards, J.R. and Walker, S.P. (eds.), *The Routledge Companion to Accounting History* (London: Routledge): 95-119.
- Overton, M. (1996), *Agricultural Revolution in England: The Transformation of the Agrarian Economy 1500-1850* (Cambridge: Cambridge University Press).
- Oxford English Dictionary*, online. Accessed July 2, 2011 at: www.oed.com.
- Parker, R.A.C. (1975), *Coke of Norfolk: A Financial and Agricultural Study, 1707-1842* (Oxford: Clarendon Press).
- Parker, R.H. (1997), "Roger North: Gentleman, Accountant and Lexicographer," *Accounting History*, Vol. 2, No. 2: 31-51.
- Peele, J. (1569), *The Pathe Waye to Perfectnes, in Th'accomptes of Debitour, and Creditour* (London).
- PPC's Accounting and Reporting for Estates and Trusts (Thomson Reuters). Accessed July 1, 2011 at <http://ria.thomsonreuters.com/estore/detail.aspx?ID=AETQ&productInfo=Table%20of%20Contents&SITE=prof>.
- Ratcliffe, T.A. (1999), "Estate Accounting and Financial Reporting," *National Public Accountant*, November 1. Accessed July 1, 2011 at http://findarticles.com/p/articles/mi_m4325/is_9_44/ai_n25026806/pg_8/.
- Richards, T. (1707), *The Gentlemans Auditor: or a New and Easie Method for Keeping Accompts of Gentlemens Estates* (London).
- Russell, C., Cotton, W. and Dew, R. (2005), *Ranking Spicer and Pegler: Executorship Law, Trusts and Accounts*, 25th edn. (London: LexisNexis Butterworths).
- Scorgie, M.E. (1996), "Evolution of the Application of Present Value to Valuation of Non-Monetary Resources," *Accounting and Business Research*, Vol. 26, No. 3: 237-248.
- Snell, C. (c.1711), *Accompts for Landed-Men: or; a Plain and Easy Form which they may Observe, in Keeping Accompts of their Estates* (London).
- Stevenson, W. (1762), *Book-Keeping by Double Entry* (Edinburgh).
- Stone, E. (1962), "Profit-and-Loss Accountancy at Norwich Cathedral Priory,"

Edwards, *Accounting during the English Agricultural Revolution*

45

Transactions of the Royal Historical Society, 5th series, Vol. 12 (December): 25-48.

Stone, L. (1965), *The Crisis of the Aristocracy 1558-1641* (Oxford: Clarendon Press).

Stone, W.E. (1993), "The Development of Charge and Discharge Accounting, 1183 to 1660," *Accounting History*, Vol. 5, No. 2: 4-20.

Tawney, R.H. (1941), "The Rise of the Gentry, 1558-1640," *Economic History Review*, Vol. 11, No. 1: 1-38.

Tawney, R.H. (1967), *The Agrarian Problem in the Sixteenth Century* (New York: Harper & Row).

Todd, K.R. (1966), "Reporting Equities in Estate Accounting," *Journal of Accounting Research*, Vol. 4, No. 2: 253-259.

Vanes, J. (ed.) (1974), *The Ledger of John Smythe 1538 - 1550* (London: HMSO).

Webster, W. (1719), *An Essay on Book-Keeping, According to the True Italian Method of Debtor and Creditor, by Double Entry* (London).

Zeff, S.A. (2009), *Principles before Standards*. Accessed July 1, 2011 at <http://www.icaew.com>.



CALL FOR PAPERS

13th World Congress of Accounting Historians Newcastle upon Tyne 17-19 July 2012

www.ncl.ac.uk/nubs/about/events/worldcongress

Newcastle University Business School is delighted to be hosting the 2012 World Congress of Accounting Historians which will take place in St James' Park, home of the Newcastle United football team. Newcastle is conveniently located 3 hours from London by train and connected to all international routes via its international airport. The region is rich in historical interest including Hadrian's Wall.

The purpose of the Congress is to act as a forum, bringing together scholars from around the world to debate thought provoking research. It is intended to be a celebration of accounting history research in all its diversity. Therefore, all topics are welcomed. The role of accounting in industrial expansion and decline has been designated as a special theme of the Congress in view of its relevance to the region in which it is being held.

Submission details:

In order to make the event more inclusive, authors are invited to submit papers either in English or their native language if preferred. In all cases a 600 word abstract written in English is required. The presentations should also be delivered in English and must be based on completed papers.

The abstract should be emailed to WCAH@ncl.ac.uk by **15 January 2012**. Authors will be notified if their paper has been accepted by **15 March 2012**. Offers of acceptance will be made subject to receipt of a completed paper. These should be emailed to WCAH@ncl.ac.uk by **30 April 2012**.

The abstracts will form the basis of acceptance decisions although we reserve the right request further information where there is uncertainty. The abstracts should cover the key areas of aims, method, findings, originality and research limitations. Accepted papers and their accompanying abstracts will be published on the Congress website.

A special section dedicated to a selection of papers presented at the Congress will be published by the British Accounting Review (BAR). Delegates wishing to be considered for this will need to submit their papers in English following BAR guidelines. Such papers will undergo the BAR's normal reviewing procedures.

Accounting Historians Journal
Volume 38, Number 2
December 2011
pp. 47-74

Jill Hooks
MASSEY UNIVERSITY
and
Ross E. Stewart
SEATTLE PACIFIC UNIVERSITY

FARMERS, POLITICS, AND ACCOUNTING: THE HISTORY OF STANDARD VALUES – AN ACCOUNTING CONVENIENCE OR POLITICAL ARITHMETIC?

Abstract: This paper examines accounting in the social, political, and economic context within which it operates. Specifically, the farming sector in New Zealand provides the context for studying the history of standard-value accounting. This accounting practice emerged with the support of accountants, farmers, and the state as the tax regime in New Zealand slowly moved to an income tax for farmers from 1915. The paper examines how accounting became a practice of political arithmetic, mediating the economic power of the farmers with the rest of the tax base of New Zealand. Standard-value accounting for livestock became a device that represented the power of farmers to receive favorable tax treatment compared with other New Zealanders, while still demonstrating they carried their fair share of the country's tax burden.

INTRODUCTION

Farming is the backbone of the New Zealand economy, and as a result, influences all aspects of New Zealand life. Sir Keith Holyoake, New Zealand's prime minister from 1960 to 1972, was often quoted as saying, "if farmers are happy the country will be happy" [Gustafson, 2007, p. 314]. Agriculture was, and still is,

Acknowledgments: The authors gratefully acknowledge funding from the New Zealand Institute of Chartered Accountants and Massey University. We also acknowledge helpful comments from colleagues – two anonymous reviewers, participants at the 2009 AAA Annual Meeting and the 2010 Accounting History International Conference, and, particularly, Kim Sawers.

essential to New Zealand's economy.¹ Consequently, the government was directly involved in agriculture decisions related to production and marketing, as well as indirectly through agriculture producer boards for the apple and pear, meat, dairy, and wool industries. Members of New Zealand's Parliament were often farmers, thus farming interests were well-represented at this level. Holyoake was the archetypical farmer-politician as was William Massey ("Farmer Bill"), New Zealand's prime minister from 1912 to 1925. Massey was heavily involved in the period when standard values for farm accounting emerged, and Holyoake was similarly involved when standard-value accounting (SVA) was being called into question as an accounting practice. This paper uses archival material to explore the interrelation between farmers, accounting, and the state in the introduction and use of SVA. In doing so, we examine the events that came together and influenced the emergence and subsequent decline of SVA in New Zealand.

Accounting is viewed as a social and institutional practice [Miller, 1994], and the literature reflects a concern for understanding the influences on accounting practice in specific settings [Potter, 2005]. We investigate the incentives, actions, and consequences associated with the choice of a particular accounting practice by tracing the history of SVA² in the social, political, and economic context of the agricultural industry in New Zealand. Our aim is to increase understanding of the forces that influence accounting change. SVA emerged with the support of the state, accountants, and farmers as the tax regime slowly moved to an income tax for farmers from 1915. The paper examines how SVA was not simply an accounting convenience but became a practice of political arithmetic, mediating the economic power of the farmers with the rest of the tax base of New Zealand. Farming interests influenced political processes and economic considerations, and thus, SVA for livestock became

¹Livestock farming and related downstream products contribute to approximately 60% of New Zealand's export income. New Zealand is the world's eighth largest milk producer. The national sheep flock peaked at 70 million head in the 1980s and is now about 38.5 million. The national beef cattle herd is about 4.4 million head, and there are about 5.6 million dairy cattle. The average herd size is 351 cows. There are about 63,000 farms in New Zealand with an average size of 232 hectares: 46% sheep and beef, 18% dairy, 17% horticulture, and the rest comprise other farm types. Farms are predominantly owner-operated [Federated Farmers, 2011].

²SVA refers to a system for the valuation of livestock which allowed farmers to adopt a fixed value for each type of livestock and to retain that year-after-year for income-tax purposes regardless of market value fluctuations and whether the animals were capital or trading stock.

a device that represented the power of farmers to receive favorable tax treatment compared to other New Zealanders, while demonstrating they carried their fair share of the country's tax burden. "Political arithmetic" is used to highlight how SVA became a technique of socio-political management for the exercise of power under the cloak of objectivity and neutrality.

Taxation is intertwined with accounting, but there is a dearth of tax history in the accounting history literature as noted by Lamb [2003], Noguchi [2005], and Oats and Sadler [2008]. This study of SVA provides a good example of how taxation is intertwined with accounting, and how an accounting technique emerges and changes over time because it intersects with organizational, industry, and fiscal policy rationales. Standard values were used to value livestock on hand in farm accounts. The Inland Revenue Department allowed the farmer to make his own assessment (with some limitations) of the average value of each class of livestock and to use this figure from year-to-year in calculating taxable profits [Payne, 1965]. Standard values provided an element of consistency in livestock valuation, but because actual market values often differed, the tax liability could be deferred (almost indefinitely) through the use of this technique. Standard values were often 10% or less of the market value of the livestock, and it was only when stock were disposed of, that the difference between book value and market value became assessable income for tax purposes [McCrea *et al.*, 1990].

The accounting profession was effectively co-opted by the farmers to support their privileged position in the economy. This was achieved through calls for accounting to support fiscal expediency and to increase efficiency in the farming sector. Particular fringe accounting practices, such as SVA techniques, emerged alongside mainstream accounting practices, such as depreciation, to enable fiscal and political objectives to be established. The accounting profession was identified, by defining taxable income, as a rationalizing organization for the exercise of government fiscal objectives. The accounting profession not only provided the technique of SVA but also provided the vocabulary by which the political agenda of the farmers could be achieved. The accounting profession provided experts who aligned themselves with the politicians in support of farmers [Miller and O'Leary, 1994]. Farm accounting intersected with discussions of agricultural efficiency, capital/income debates, rural-bank financing, income-tax avoidance, death duties, farm subsidies, and the valuation of livestock.

The study has benefited from archives of narrative material³ comprising letters and memoranda as well as accounting information. The paper is organized as follows. The theoretical background informs the basis of the discussion and is followed by a discussion of political influences on change. Then, the interplay of the farming environment, accounting techniques, taxation, and politics is examined. The paper ends with a conclusion.

THEORETICAL BACKGROUND

Calls have been made for accounting to be studied in the context within which it operates [Burchell *et al.*, 1985; Hopwood, 1987], and Miller [1990, p. 316] noted the importance of examining the interrelations of accounting and the state to increase our understanding of accounting change. This research seeks to document the process of accounting change and the imperative or rationale for change. In particular, it examines “accounting’s embeddedness in political processes.” Accounting is seen in this paper as a calculative technology which intervenes, reflects, and changes the context within which it operates [Miller, 1994]. Thus, accounting becomes “an instrument of power and control rather than a value-free body of ideas and practices” [Gomes *et al.*, 2008, p. 1,149]. Usually accounting is studied in the context of trading, retail, or manufacturing organizations; however, this paper examines accounting within the agricultural sector. We examine how SVA was instituted and supported by political processes and self-interested parties, and how farmers gained political support and thus exerted influence on economic policy and accounting practice. We observe “political manoeuvring” [Skaerbaek and Melander, 2004] to rationalize what was perceived as legitimate practice, effectively giving power to accounting to differentiate between different economic groups [Burns, 2000]. The political manoeuvring encompassed the dimensions of power categorized by Hardy [1996] as farmers, politicians, and associated special interest groups determined that SVA was desirable, rational, and legitimate.

There is a tendency to see accounting as being purely functional within an agricultural environment, untouched by broader debates of fiscal expediency and efficiency which infiltrated the industrial sector. This study concentrates on situating an accounting technique (standard values) within broader con-

³Material was sourced from the New Zealand Institute of Chartered Accountants Library, Archives New Zealand, the National Library Archives at the Turnbull Library, and the Hocken Library Collections, Archives and Manuscripts.

cerns of agriculture, fiscal, and political policy. Miller [1990, p. 316] pointed out that the construction of government policy and programs involves “processes that often call upon the calculative practices of accounting to make their objectives operable.” Thus, there is a reciprocal relationship between accounting and the state, and it is through calculative technologies of government, like SVA, that the “programmable realm of political rationalities is made operable” [Miller, 1990, p. 318]. Farmers and their institutions, such as the Farmers’ Union (later Federated Farmers) and producer boards became the domain of economic life for political rationalities. The power of various political parties ebbed and waned depending on how well they mediated the rationale for rural financing, farm subsidies, or land tax as opposed to income tax, and therefore the income measurement issues involved with livestock valuation.

The accounting calculation of “profit” for farmers took on a particular significance as economic policy and political power emerged. Farmers’ accounting practices become intertwined with fiscal policy. Miller [1994, p. 14] pointed out that accounting practices of profit measurement transformed farming: “profit was held to result from good management of the farming process, rather than from the diligence of individuals who tended the resources provided by God.” Accounting calculation made it possible to regard farming as a production unit that had costs, revenues, and profits, and therefore could contribute to the tax revenue of the national economy. This enabled farming to be compared to any other sector of the economy and created a regime of economic calculation so that interventions and judgments could be made and government policies devised.

Miller and Rose [1990] and Higgins [2001], in outlining the way the government uses technologies such as accounting practices, drew on Foucault’s [1980, pp. 131, 133] ideas of disciplinary power. “Governmentality” refers to the way technologies like accounting produce “truth-effects.” Knowledge is produced and is coupled with power to produce a “regime of truth.” As stated by Foucault, to produce knowledge and sustain it, you need “multiple forms of constraint.” Constraint is diffused through the political apparatus of the state and the use of technologies like accounting practices. This power/knowledge framework has been used to examine accounting practices in various organizational and institutional contexts [e.g., Stewart, 1992; Carmona *et al.*, 1997; McKinlay and Pezet, 2010]. The contribution of this paper is to show how these technologies of power become intertwined with political interests. Governmentality denotes

the way the state orients the economic behavior of the electorate through subtle disciplinary mechanisms like accounting technologies. Yet, if regimes of truth are produced and sustained through constraint, then accounting knowledge provides a means to seek and exercise power. Accounting practices become weapons in exercising democratic freedoms [Volf, 1996].

The political economy of accounting emphasizes the relationship between the political and economic forces of society. The concept of political arithmetic couples the idea of governmentality with the idea that accounting is an interested activity that can be used to further the interests of particular groups in society [Cooper and Sherer, 1984]. The overt interests of farmers embedded accounting practices in a legislative agenda that was governed by political interests.

POLITICAL INFLUENCES ON CHANGE

From the mid-1800s, farmers tended to be over-represented (on a population basis) in Parliament. Of the 37 parliamentary members in 1853, 11 were farmers (30%) and by 1856, 14 were farmers (38%). According to Martin [2004], the Legislative Council was characterized as a run-holding oligarchy in 1856. The main concern of the farmer members was to ensure that the tenure of their runs was not changed. By the 1870s, the composition of the House of Parliament included professionals such as lawyers, but a strong representation of farmers continued, and in 1892, the Liberal Party announced itself as the farmers' party of the future and invited smaller run-holder farmers to join the party as "friendly farmers' advocates" [Gardner, 1970, p.11]. At the same time, the Farmers' Union claimed to be the political voice of farmers, and three candidates became members of the House of Parliament in 1902. They claimed to represent "the new, irresistible force in rural politics" [Gardner, 1970, p. 12] and were regarded as holding a strategic position in the economic system with regular access to ministers of Parliament. Grossman and Helpman [2001] and Barney and Flesher [2008] noted that effective lobby groups depend on good organization. The farmers' pressure group, Federated Farmers (Farmers' Union), obtained official recognition on boards and committees, and members often paid large sums into national party funds [Gardner, 1970].

After the national election of 1911, farmer representation increased further. Then in 1912, William Massey became prime minister. Massey placed farming first [Gardner, 1970], and there was extensive expansion of primary production during the pe-

riod of his governance from 1912 to 1925. Massey believed in having “sturdy freeholders, farming their own lands, and sending representatives of their own class to the Parliament of the country” [Martin, 2004, pp.148-149]. In this respect, Massey appointed his old allies to cabinet so that farming was the main occupational background of cabinet members. In addition, a large contingent of party members represented small farmers – “the Back Blocks cowspankers whom Mr Massey has drawn into his net by promising them the new Jerusalem.” The mood of the time may be summed up in the *New Zealand Truth* [March 15, 1924] cartoon which shows the cartoonist’s view on Massey’s priorities for tax relief.⁴ Three very fat farmers are depicted, one with a wool check in his pocket, one with a meat check, and one with a butter check. The taxman, who holds a top hat bearing the label “reduced taxation,” is giving a “not for you” signal to a very small man representing the general public.

From Massey (1912-1925), there was an unbroken line of farmer leaders to 1940, and farmer members accounted for about half of the ministers in Parliament [Gardner, 1970, p. 16]. As a result, the politics of that period reflected the economic pre-eminence of farmers, and farming was considered “...as a way of life which set some New Zealanders apart from their fellows, and required special representation.” There was obviously a dominance of farming interests in Parliament over this period. Martin [2004, p. 197] quoted Burdon [1935, p. 168] who expressed the opinion that the towns and cities of New Zealand viewed New Zealand as a “country governed by the farmer for the farmer.” Reeves [1902, p. 253] cited in Goldsmith [2008, p. 104] stated that: “In New Zealand farmers are almost all-powerful.” Le Heron [1989, p. 21] noted that farmers were “...a numerically large and politically powerful group” and identified a strong government-farmer alliance. Powerful representation in Parliament was the means by which self-serving intentions were achieved and the desires of powerful individuals exerted on others [Buchanan and Badham, 1999]. The dominance and influence of farmers was a distinctive characteristic of the New Zealand Parliament and arguably led to farmers receiving special privileges, not only tax-related, but also in terms of rural mortgages, guaranteed prices, and various subsidies.

Commodity prices declined during the Great Depression, but after the mid-1930s, they started to climb again. The first (1935) Labour government of Michael Savage had wooed farm-

⁴Goldsmith [2008 p. 150]

ers with the promise of guaranteed prices. Accountants provided a political arithmetic, a technology of state intervention, and a rationale for the farmers to pay income tax although they were allowed to shelter some of their income from taxation. There was reciprocity between the technology of SVA and the political rationalities of government programmatic initiatives [Miller, 1990].

In the 1950s, the government was increasingly concerned about efficient farm management and not simply fiscal expediency to retain the farming vote. Even the political arithmetic of standard values was raised as an issue. Standard values came under the scrutiny of government. A 1950 Memorandum to Members of Cabinet from the minister in charge of the Land and Income Tax Department [Archives NZ, 1950, MS 172/2/2] outlined the farmers' issue with using standard values as:

the adoption has always carried with it the contingent liability for taxation on the excess of the sale price over standard value. Ever since farmers have been liable for taxation on income, this liability has continuously been brought under their notice, and the desirability of adjusting standard values to keep them in reasonable relation to average market values has been constantly stressed by the Department. In many cases, the standard values adopted in the past have not been revised in the light of increasing market values and the difference now disclosed on realisation gives rise to a substantial increase in income in the year of sale, with a corresponding increase in taxation.

The minister noted that there were relief provisions and adjustments allowed by section 17 of the *Land and Income Tax Amendment Act 1945* which gave the commissioner of taxes wide discretionary powers to effect adjustments to standard values without tax liability. The Crown Law Office had confirmed the legality of the commissioner's adjustments to further legitimize the preferential treatment given to the farmers. The minister also noted that the *Land and Income Tax Amendment Act 1949* allowed the farmer with any tax liability left after all the adjustments to spread the tax assessment over three years [Archives NZ, 1950, MS 172/2/2]. The memorandum ended with a brief consideration of the capital-stock system used in Australia and the United Kingdom, where increases in the value of the capital stock did not attract taxation, although increases in numbers of stock, which were regarded as the produce of the capital stock, were income.

The minister dismissed the capital-stock system as it would not give the farmer any tax advantage over the standard-value system, and “a capital stock system without very complete accounting records under constant supervision would lend itself to evasion and the Department’s experience is that the average New Zealand farmer is averse to keeping detailed records” [Archives NZ, 1950, MS 172/2/2]. The lobbying body, Federated Farmers, pushed government to look into the capital-stock system in 1954, and the Cabinet Committee, which included Prime Minister Holyoake, decided to refer back to the conclusions of the 1950 Memorandum and, in 1956, finally decided to keep the standard-value system.

The government was increasingly concerned with farm-management issues. The pressure for efficient farm management came from the technological advances referred to and the increasingly international and competitive environment. There was also an increasing worry about the dependence on the U.K. as New Zealand’s main market for its farming output. These pressures provided a shifting rationale from bookkeeping procedures, to accounting calculations like standard values, to efficient farm management. The government co-opted the New Zealand Society of Accountants (NZSA) as allies to provide legitimating expertise.

FARM ACCOUNTING, TAXATION, AND STANDARD VALUES

Farm accounting and the recommended use of standard values was first mentioned in *The Accountants’ Journal* in 1925, and SVA was formally included in the *Land and Income Tax Amendment Act 1929*. At that time, farming was established as a significant part of the economy in New Zealand and was recognized as a global business in which “effective account keeping was indispensable” [New Zealand Society of Accountants, 1930, p. 123]. Individual farmers were called upon to manage their farms in terms of the “true costs and real return on capital invested” [New Zealand Society of Accountants, 1933, p. 358]. Calls for rational and efficient farm management transformed a family way of life as government intervention increased [Belshaw *et al.*, 1936]. Although these early calls for using accounting for farm-management purposes were made, they were largely hijacked by the tax minimization and avoidance imperative. Smith [1977, p. 21] addressed management-accounting issues for farmers and rued the fact that tax accounting was overemphasized. He noted that tax-based stock valuations resulted in an “unsatisfactory measure of farm profit.”

It was not until the 1960s and 1970s that farm efficiency rationales became a regular part of the discourse from the government and the NZSA. This enhanced the profile of accountants and increased their professional boundaries as the stock and station agent's influence with the farmer subsided [Abbott, 1988]. This also coincided with the disappearance of standard values. We examine the emergence and subsequent fall of SVA through three events: (1) pre-standard-value farm accounting, (2) a period of change followed by stabilization, and (3) the fall of SVA (summarized in Table 1).

TABLE 1
Key Developments in Livestock Valuation

<i>Pre-Standard Value</i>	<i>Period of Change</i>	<i>Period of Stabilization</i>	<i>Fall of SV Accounting</i>
No Income Tax on farming income	1915-23 Income tax on farming income	Standard Values legislated in Land and Income Tax Amendment Act 1929	1987 SV accounting replaced with herd scheme and trading stock scheme
Livestock at purchase price	1923 Income tax on farming income abolished	1939 all farming income liable to income tax	
Minimal farming records	1929-1939 Income tax progressively replaced land tax	Inflation makes SVs unrealistic	
	1921 Standard Values introduced unofficially		
	Farming records for tax purposes		

Pre-Standard Value Farm Accounting: The income-tax-free economic environment in which farmers operated in the early 1900s resulted in farmers keeping minimal accounting records. Details of livestock purchased were often entered as diary notes, and only a few farmers kept more formal livestock registers. Malloch [1933, p. 25] reported that there were 86,000 holdings in New Zealand and about 40,000 of those did not keep proper accounts, based on the concept that "a good farmer knows how he has done without needing books to tell him." Those farmers who did keep accounts used simple methods. In respect of dairy farming, cows were recorded by name and at purchase price as shown in the following example:

TABLE 2
Livestock Register
Class of Stock – Calves

<i>Date</i>	<i>No.</i>	<i>Particulars</i>	<i>Purchase</i>	<i>Date</i>	<i>No.</i>	<i>Disposed</i>	<i>Amount</i>	<i>Remarks</i>
			£ s d				£ s d	
April 1	16	Stock	60.0.0	April 4	2	Bull calves	7.2.0	Dolly's
	1	Bull calf "Dolly"				Bull calves	7.1.6	Queen's
	1	Bull calf "Daisy"						
	1	Heifer calf "June"						
	1	Heifer calf "Queenie"						

Source: Spicer and Pegler [1925, p. 34]

Farmers (and their children) must have enjoyed selecting names for their cows. An archival record shows names such as: Darkie, Red, Yvonne, Doris Dainty, Annie Lucky, Tulip, Bones, Alma, Violet, Blackbird, Bella, Ruby, Bud, Peggy, Matilda, Topsy, Katey, Dorcas, Squirt, Myrtle, Jolly, Buster, Jewel, Una, Fanny, Nan, Hilda, Ethel, and Beauty [Paynter Family Farm, National Library Archives, MSX-4467]. Eventually, such specific identities were not recorded, and the focus was on standard value rather than purchase price. Queenie, Daisy, and Blackbird gave way to "livestock" at a standard value. This became paradigmatic of the way the government used accounting as a transformative technology to intervene on the family farm.

Although more detailed records may have been useful for management purposes, they were not officially required because while farmers paid land tax, they were not subject to the payment of income tax on farming income until 1915-1923 (commencing during World War I). The land tax was based on government valuations [Rodwell, 1936]. Malloch [1933] commented that some farmers had the idea that they could beat the Inland Revenue Department by not keeping any records so that very little, if any, tax would be payable. Massey [quoted in Goldsmith, 2008, p. 151], prime minister and farmer, stated that:

farmers are not accountants, and few of them do much in the way of bookkeeping. The farmer looks to his bank pass-book and to his cheque-book, and he also has his accounts with the stock and station agents with

whom he does business. From these sources he generally manages to form a fairly accurate idea of what his financial position is. The matter, however, is very different when it becomes necessary for him to send his return to the Land and Income Tax Department: he is then in trouble at once, because the furnishing of the return requires aknowledge of the Act, which is somewhat technical.

Massey's quote points to farmers' ambivalence to record keeping and accountants. Farmers are essentially in a commodity business, and as long as they can finance land and capital expenditures, their revenue streams and cost structures are fairly well defined.

The aversion to paying income taxes came from the inquisitorial nature of income taxes. Many farmers wondered why their private affairs should be picked over by a government bureaucrat [Goldsmith, 2008, p. 66]. Preston [1989] raised the same issue in his paper on the interrelationship between accounting and the taxing authorities by including in the title "the taxman cometh." The use of calculative practices such as tax accounting created a regime of truth that brought the affairs of farmers into the light and colonized their way of life [Foucault, 1977]. Eventually such political interference disrupted and disturbed their social and economic reality.

Period of Change: When the first land tax was introduced in 1878, there was a feeling that farmers were supporting the urban investor or what one MP called the "moneyed class" [Goldsmith, 2008, p. 63]. The *Land and Income Assessment Act, 1891* introduced a progressive land tax on the unimproved value of land. The graduation levels were later changed [*Land and Income Assessment Act, 1907*] to a flat rate of a penny in the pound of unimproved value plus an additional graduated tax. The 1891 act also introduced an income tax from which farmers were exempted. The land tax was "hated and feared by the great landowners" [Rodwell, 1936, p. 215] even though it was less severe than urban taxation which combined progressive land tax with progressive income tax. The battle about whether farmers should be relieved or held liable for income tax raged between 1915 and 1935, and an urban/rural split in politics emerged.

With the outbreak of war, there were increased demands for farmers to share the tax burden, and the idea of a "conscription of wealth" was talked about by some MPs in order to show solidarity with the soldiers' sacrifice. Farmers had to be part of

the sacrifice. From 1915-1923, farmers paid income tax in addition to the graduated land tax to help finance World War I. There was now an incentive for farmers to keep better records and to collude with accountants to invent and employ accounting devices to reduce taxable income. Parliament commissioned and received a report in 1916 of the amount of income tax paid by farmers under the *Finance Act, 1915*. £249,048 was collected from the new income tax imposed on farmers [Appendices to the Journals of the House of Representatives, 1916, p. 3]. This amount was for two years of income tax (the new law was retroactive) and represented less than 3% of the total tax collection for the period. Exemptions granted to farmers were so generous as to make taxation for most farmers a negligible matter [Rodwell, 1936]. James Ward, the minister of finance, pointed out that the majority of farmers were paying less tax than businessmen paid on similar incomes in town [Goldsmith, 2008].

World War I altered the incidence of taxation permanently in New Zealand. The income tax became a significant component of the country's tax revenue. Twenty per cent of tax revenues came from income taxes compared to around 8% before the war, and income taxes were to become a higher proportion over the next 15 years [Goldsmith, 2008]. The 1920s were a time of debate about how the tax burden should be shared in society. There was the financial legacy of the war and infrastructure investments in roads, rail, telegraph, power stations, schools, and hospitals to be made. Company income tax remained at the high levels of the war. However, at the end of 1923, income tax in respect of income from farming activities was abolished. Massey argued that the tax on farmers was a war tax which was never intended to be permanent. This privileged position remained until 1929. Massey set up a commission to examine taxes in 1924. The Royal Commission recommended that the land tax be abandoned for a graduated income tax, and that company taxation should be reduced [Appendices to the Journals of the House of Representatives, 1924, p. 3]. The accounting profession became involved, and the NZSA provided W.D. Hunt as one of the commissioners. Hearings were held throughout the country. The majority of the submissions were from farmers and accountants. Massey did not act on the commission's recommendations and wanted further study of their ramifications. The farmers were supportive of the status quo of paying no income tax and the resulting lack of government involvement in farming business. However, the higher taxes on companies' income discouraged the development of industry and left the country's living

standards hostage to the fortunes of commodity prices. Massey's party was well-supported by farmers in the 1925 elections [Martin, 2004].

This was the pinnacle of power for the farmer politician. The argument for the farmer to be relieved of paying income tax was weak when compared to other sectors of the economy. The argument that farmers needed more money in their pockets to make improvements and employ workers could be applied to companies as well [Goldsmith, 2008]. Yet, companies, as mentioned, continued to pay income tax after the war. Income tax for farmers was reintroduced in 1929 as a substitute for land tax and was initially imposed on large farms (unimproved value of land over £14,000, 1928-1929) and progressively for other farmers (unimproved value of land £7,500 or over, 1929-1931, and unimproved value of land £3,000 or over, 1931-1939). Eventually, all farming operations were liable for income tax (from April 1, 1939). The exemptions granted to farmers were generous, and Rodwell [1936] commented that the amount of direct taxation paid by farmers in the period as a whole from 1924-1929 was about half what it would have been if they had paid tax at the same rate as the rest of the New Zealand workers.

The imposition of income tax led to the need for more sophisticated record keeping and resulted in farmers seeking ways to minimize their tax liability. In particular, the introduction of income tax raised the question of valuation of livestock on hand as this affected the calculated profit of farming entities and therefore the taxation payments for the year. Russell [2004, p. 10] listed a number of complicating factors:

- Market values fluctuate significantly from year-to-year;
- cost is difficult to calculate;
- livestock is a self-replacing asset;
- livestock is both a self-sustaining capital asset and a tradable produce;
- livestock may be held on capital account (like a machine) for the production of tradable commodities such as wool or for the production of progeny for meat; and
- some farming systems involve buying in young stock (semi-manufactured goods) and growing them through to maturity (further processing) before they are sold as finished goods.

Traditionally, the rule of "the lower of cost or net market

value” was applied, but some farmers considered this inappropriate for valuing livestock which have multiple purposes; e.g., in the case of sheep, wool is produced, lambs are produced, some of the stock is killed, some fattened and sold, and some die. Market values for both sheep and cattle reflect seasonal and overseas conditions and have the effect of increasing reported profits (the higher the value of stock on hand, the higher the calculated profit). Conversely, when market values are low, already low profits will be further decreased. The perceived problem of increased profits due to high market values could be overcome by the use of cost as the basis for stock valuation. However, Russell [2004] noted that this would reflect only the initial cost and does not take into account the increase in value of the wool or the meat. Fippard [1948, p. 38] provides the following example:

In 1930 a farmer purchased land and stocked it with 5-year breeding ewes costing on average 18s 6d per head. The effect of the slump of 1931 was accentuated in his district by a severe earthquake which disrupted killing facilities, and by a very serious drought. The survivors of some lines were sold on the market for only 6s per head. Had this extremely low market value been placed on the remainder of the stock, the loss for the year ended June 30, 1931 would have been greatly increased. Market values showed a partial recovery in 1932, and a steady improvement over the next four years until in 1937 market values were higher than in 1930. Under the market-value system, this market recovery would have been reflected in the profit results of the years 1932 to 1937 and the last year’s results, a boom year for farming, would have been further improved.

These sorts of fluctuations in stock value are not unique to the farming industry, but the farming community generally was unhappy with the situation, and sought to effect a change in the methodology for calculating the value of livestock on hand. Farmers, from a position of political power, effected the introduction of SVA which had both social and economic repercussions.

Period of Stabilization: In *The Accountants’ Journal* [1925, p. 1], it was noted that “standard values came to be fairly generally adopted during the time that profits from farming transactions were subject to income tax.” The standard-value system “allowed farmers to adopt a fixed value for each type and class of livestock and to retain that fixed value year-after-year regardless

of market value fluctuations, whether the animals were capital or trading stock, whether the stock was held short term for fattening or long term for the production of wool or milk, or for the production of progeny to be used for herd or flock replacement" [Russell, 2004, p. 11] Once adopted, standard values were used for as long as the farmer continued to farm and could in fact be passed on to the next generation.

Standard values emerged as a tax-avoidance device soon after 1915. Tax returns of 1915 for the Preston family farm in Waikouaiti showed sheep without specifying whether a standard value per head existed. In 1921, tax form 3, part D was more directional and stated "adopt a standard value per head for each class of livestock and adhere to that value per head in subsequent returns." In 1923, the instructions to the farmer were more explicit, prefacing the explanation with "It is advisable in the case of a continuing business to adopt...." The Preston farm did just that: £1 for sheep, £3 for cattle, £10 for horses. Significantly, the same standard values were used in the 1948 income tax return [Preston Family Papers, MS-1271-031, MS-1272-035, MS-1272-036, Hocken Collections, Archives and Manuscripts]. It was appropriate that farmers were paying income taxes to help with the war effort, but accountants were allowed to invent standard values to dampen income and avoid paying too much tax. This was done with the institutional approval of the tax authorities who officially sanctioned the accounting device through the published tax forms.

As the primacy of farm politics was drawing to a close [Gardner, 1970, p. 13], and as more and more farmers became liable for income tax, the farmers ensured that the tax avoidance possible through the use of standard values for livestock was legislatively solidified in the *Land and Income Tax Amendment Act, 1929*. As proposed by Joseph Ward, prime minister representing the United Party, standard values were written into Section 13 of the 1929 Act. Ward came into power in 1928 by criticizing what his urban supporters called "farmer-socialism," and he decided that farmers had not borne their fair share of taxation in recent years. Goldsmith [2008, p. 160] stated: "politics in the 1920s was essentially a game of pass the parcel between commercial and rural elites. Massey in 1923 had relieved big farmers, leaving more for urban commercial elites to carry; Ward had got them [farmers] again in 1929, taking pressure off his urban supporters." The 1929 Act was debated at length although there was little change through its three readings in Parliament. Standard values for livestock, as an accounting

method for reducing income, were officially sanctioned by the Act. It was a case of the farmers giving into an income tax, on one hand, yet taking away with the other by putting some parameters on how income was measured.

Although standard values adopted in the 1930s supposedly represented, more or less, the market conditions at that time, they became progressively more unrealistic as inflation altered true market values. Spicer and Pegler [1925, p. 105] provided an example:

Assuming that it costs £30 to rear a cow until the date it is brought into the milking herd this figure becomes the standard figure and is increased over the next three years by £5 per annum and over the next four years decreased by £5 per annum leaving the value at £25 when it is drafted out of the herd. This system does not show the true value in the Balance Sheet at a particular date but provides a fixed standard. There is an implied intention of understating livestock values (and profits).

Due to inflation, the initial standard value represented less and less of the true value, resulting in a large discrepancy between the true profit and the profit that was returned for taxation purposes [Watson, 1968]. Minimum standard values were set by the Inland Revenue Department and were increased infrequently and on an ad hoc basis. King [1995, p. 135] provided the following example of how standard values increasingly failed to reflect market value:

TABLE 3
Standard Values versus Market Values

	<i>Standard Value</i> <i>1985-86</i>	<i>Market Value</i> <i>1985-86</i>
	\$	\$
Sheep (Ewes)	2-6	8-20
Rising one year beef cattle (Steers)	40	250
Rising two year beef cattle (Steers)	70	600
Rising one year red deer (Hinds)	150	1,000
Rising two year red Deer (Hinds)	200	1,400

Source: King [1995, p. 135]

Due to the difference between standard value and market value, farmers were “literally too scared to die or retire from

farming” [Russell, 2004, p. 12]. Two hundred dairy cows held at standard values of \$70 per head meant a total tax book value of \$14,000. If sold for \$400 per head (\$80,000), the \$66,000 difference was taxable income. The tax cost of quitting was very large [Russell, 2004]. When farms were sold, the livestock was considered inventory and subject to tax. There was no tax exemption for capital gains.

The Accountants' Journal in 1930 outlined the tax department's view of avoiding tax through artificial stock values for businesses: “the department has always set its face against a process of juggling of stock values for the purpose of equalizing dividends and establishing secret reserves and – most important of all – evasion of income tax. Profits must be assessed as made and no portion carried forward into the subsequent year per medium of the convenient channels of stock in trade” [New Zealand Society of Accountants, 1930, p. 225]. It is remarkable that, given this view of the tax department, the SVA technique was legislatively sanctioned by the state.

Non-farming entities did not have the tax advantages that the use of standard values gave to farmers. The difference between the purchase cost and the standard value of livestock was a tax-deductible expense. With a 66% tax rate, the write down effectively meant that little more than one-third of the purchase cost needed to be met by the farmer. The remainder (66%) was met by tax savings, at the expense of other taxpayers in the country [Russell, 2004]. In addition to the tax benefits on an annual basis, Section 14 of the *Land and Income Tax Amendment Act, 1940* gave the commissioner of taxes discretionary power to grant relief when the farmer sold all, or substantially all, of his livestock at values in excess of standard values. The relief was limited to the writing up of the value of the livestock owned at April 1, 1928, April 1, 1929, and April 1, 1931 to the true value at that time or 19s per head for sheep and £5 for cattle, whichever was the lesser [Fippard, 1948]. An increase in the value of stock would more correctly be taxed in equal increments over the years rather than in a lump sum when the farm was sold [Watson, 1968].

The following examples from an actual case [Toomath, 1973, p. 11] highlight the tax advantages that farmers had.

TABLE 4
True Income versus Taxable Income

<i>Year</i>	<i>True Income</i>	<i>Change from Previous Year</i>	<i>Taxable Income</i>	<i>Change from Previous Year</i>	<i>Change Difference True Income vs. Taxable Income</i>
	\$	\$	\$	\$	\$
19X7	-1,452		3,638		
19X8	3,905	+5,357	6,416	+2,778	-2,579
19X9	8,296	+4,391	4,386	-2,030	-6,421
19X0	11,231	+2,935	6,152	+1,766	+1,169
19X1	13,153	+1,922	6,431	+279	+1,643

Source: Toomath [1973, p.11]

The true income figure is calculated using livestock values that could be expected to be realized at a normal sale at the end of the season, which would usually coincide with balance date (i.e., market value). The table shows that the use of standard values (taxable income) reduced the magnitude of the movement in income each year and, in one case, reversed the direction (e.g., in 19X7-19X8, true income increased by \$5,357 when stock on hand was valued at market value, but when stock on hand was valued using standard values (tax-based), taxable income increased by only \$2,778. The difference between the two figures is \$2,579. In 19X8-X9, the difference between the movement in true income and taxable income was \$6,421. Toomath [1973, pp. 6-7] argued that: "No good case can be made in favour of using a livestock valuation which purports to be an 'average' or stable price for livestock. Rather than seek some means of smoothing out the effects of fluctuations in livestock values on income, it is much more informative if the accounts reflect current trends." Therefore,

"...The use of nil or standard values for livestock on hand produces totally meaningless gross profits in management terms." As a result, "only in exceptional cases are the financial records of our farming friends based on sound commercial lines" [New Zealand Society of Accountants, 1937, p. 358].

Despite some early comments on the inadequacy of accounting for farm management, accountants were focused on providing advice on tax avoidance for the farmer and the fiscal expediency of SVA. Standard values and sheltering income ruled the day as all farmers' income, down to the smallest of farms, came under income taxation. In fact, farmers wanted all the

benefits of standard values but none of the downside. When livestock values in the early 1930s dipped below previously selected standard values, the lower market value was used for stock on hand. Consequently, the commissioner of taxes complained that “dairy farm income has been greatly reduced by lowering the value of the herd at the end of the season without any note of this fact in the returns.” The commissioner noted that his approval was needed to write down a previously selected standard value [New Zealand Society of Accountants, 1932, p. 210]. As livestock values increased in the 1940s, 1950s, and 1960s, farmers lobbied the government for relief from the sudden imposition of high taxation when they were faced with the significantly higher market livestock prices on selling their farms and/or herds.

Accountants even started to provide theoretical justification for SVA as an income-sheltering device by suggesting that it was a way to recognize and reconcile the dual nature of livestock. Haisman [1955, pp. 3, 14, 16], vice chairman of the Accounting Practice and Procedure Committee of the NZSA, identified livestock as having a dual identity as a capital asset and as trading stock. Haisman stated that “all existing accounting systems, with the exception of the Standard Value System operating in New Zealand, are based on the concept that the breeding stock is capital stock and the remainder trading stock, or else on the concept that the whole of the stock is trading stock.” He identified the theoretical ingenuity of standard values:

the Standard Value system is itself a departure from accepted accounting procedure and it has been but dimly perceived by some farm accountants that it has characteristics as much akin to a capital stock as to a trading stock system. It has not been recognised, however, that fundamentally it produced results in a dual way. It is therefore proper to say that the Dual (capital and trading stock) Account System is an expansion of the Standard Value System into the full stature of its inherent duality.

In making this theoretical justification for SVA, it is interesting to note Haisman’s [1955, p. 4] view of accounting and the professional accountant. It is a view that is amenable to developing accounting expertise and technologies to be co-opted by the state:

The question is: Is the professional accountant to merely be a recording angel, and accountancy a dead

and fixed system to assist business within the stone walls which it calls principles, or is he to be a scientist engaged in the development of a living and ever developing system designed to cope with the ever changing situations which the development of modern business and taxation systems present to the businessman?"

He defined accounting as "...an instrument of public policy and private management. It is adaptable to any purpose and any condition." Accountants provided accounting technologies to enable an interpenetration of public policy and private management [Miller and Rose, 1990]. This occurred despite the contested nature of the conceptualization of accounting for tax in general and standard-value livestock accounting in particular [Nurnberg, 2009].

Farmers sought support for change through their strong representation in Parliament and through influential bodies such as the NZSA. Thus, a particular accounting was embedded in the political process.

Fall of SVA: The 1940s and 1950s brought further technological efficiencies to farmers. Exotic grasses replaced native grasses, fertilizers enabled intensive land use, and aerial top dressing improved farming in the hill country. These built on the technological developments of refrigeration, electricity, milking-shed technologies, and herd quality and maintenance methods. SVA was abandoned in 1987 and replaced with the herd scheme and the trading-stock scheme. Under the herd scheme, livestock were revalued annually to national-average market values. The herd scheme applied to animals held primarily for the production of progeny, wool, milk, velvet, or fiber. Stock was treated as capital (rather than inventory) and was revalued annually to national-average market values. Under the trading-stock scheme, livestock were valued at 70% of a three-year moving average based on national-average market values. Changes in stock numbers and changes in market value between beginning and end of an income year affected taxable income [McCrea *et al.*, 1990]. The trading-stock scheme was abandoned in 1993 for a national standard-cost system. Farmers can now use market values or replacement costs, national standard costs, or the herd scheme.

Accountants were called upon to provide a rationale for efficient farm management. The technology of market-value accounting (MVA) became the new political arithmetic of government. Just as SVA did from 1920 to 1987, MVA now played a "central role in the elaboration and operationalization of spe-

cific state projects enabling these to be translated into attempts to intervene" [Miller, 1990, p. 333] and to manage and control agriculture in New Zealand in the name of efficiency.

POLITICS, ACCOUNTING, AND ACCOUNTANTS

The NZSA had a research interest in farming and farm-accounting techniques. Its first commissioned research project was on the dairy-farming industry [Duncan, 1933]. However, most of the early writing on farm accounting was dominated by a concern for memorializing transactions through bookkeeping procedures and recommendations for producing summary reports [Spicer and Pegler, 1925; Malloch, 1933; Malloch and Weston, 1935; Fippard, 1948]. The NZSA also became involved in documenting SVA procedures and relating standard values to accounting theory, such as the capital-trading stock debate [Malloch and Weston, 1935; Fippard, 1948; Haisman, 1955]. However, by the 1960s, accountants had to provide a rationale for accounting for efficient farm management.

In 1966, the Farm Research Committee of the NZSA produced *Farm Accounting in New Zealand*, which highlighted the need for the accountant to provide management advice to the farmer and to see accounting as much more than tax reports. In fact, Minister of Agriculture B. Talboys wrote the foreword to the report and praised the accountants, Federated Farmers, producer boards, government departments, universities, stock and station agents, and banks for cooperating in the production of the report. He stated that all these groups had "worked with the common aim of encouraging increased economic farm production" [Farm Research Committee, 1966, p. vi].

In 1968, the NZSA published a paper boldly entitled "Accounting as an Aid to Efficient Agriculture." Livestock valuations became the lightning rod for the inadequacy of accounting as an aid to efficient farm management. Toomath [1973] and Glasgow [1975, p. 11] presented the case for current values in farm accounting, and consequently, considered that "it is essential that reports be freed from the straightjacket of tax standard values." Glasgow also pointed to the move to investor/owners from farmer/owners and the need for information on the stewardship and efficiency of management. This shifting rationale towards farm efficiency brought about the eventual disappearance of SVA. Fiscal expediency gave way to efficient farm management.

The official history of the NZSA portrays accountants as having a benign, neutral, cooperative attitude with government:

“Successive Ministers have paid tribute to the co-operation received from accountants, and the Society has established a record of public service combined with political impartiality which has been in every way worthy of the responsibilities entrusted to it by successive governments” [Graham, 1960, p. 73]. It is almost as if accountants unwittingly provided tax-avoidance techniques of SVA without seeing the sanctioning rationale their status provided. Higgins [2001, p. 315] noted that accounting techniques like SVA, although mundane accounting practices, are the way in “which authorities seek to embody and give effect to governmental ambitions...These represent effective strategies for stabilizing the objectives of authorities and their downstream power effects by embodying them into durable materials.” SVA became political arithmetic, transforming the rationalities of government into a technical means of intervening in the life of farmers, making them knowable to authorities; yet, at the same time, providing them with preferential treatment [Higgins and Lockie, 2002].

The political economy of accounting examines accounting practices like SVA and the role such accounting practices have on the interaction between politics and economics, and particularly, the way these practices are implicated in social conflicts and wealth-distribution transfers in society. This study illustrates the relationship between an accounting practice and the macro-political and economic environment in which it operates [Arnold, 2009].

CONCLUSION

It was considered that the “lower of cost or market value” method for stock valuation was not appropriate for valuation of livestock. In 1929, New Zealand farmers (with the support of Federated Farmers, NZSA, and parliamentary representation) successfully lobbied for a fixed or standard value-per-head to be adopted from year-to-year to avoid taxation impacts of changing prices. SVA was not merely a routine, convenient accounting technique but rather an example of political arithmetic. Epstein and O’Halloran [1996] noted that special interest groups are more successful if they are aligned with the needs of a political party. In this study, we have identified the relative power of organized interests who sought to achieve a self-interested outcome. We used the term political arithmetic to highlight the reciprocity between the political rationalities of government intervention in the agriculture sector and the technology of an accounting method called SVA. Within the frame of political economy theo-

ry, we examined the appearance of SVA and the social, political, institutional, and economic context within which this tax-based methodology for valuing livestock was developed. In particular, we have highlighted the political-historical background which led to preferential income-tax treatment for the farming community and the interrelation between farmers, accounting, and the state in achieving this outcome.

SVA became a vehicle for examining state politics and economics [Miller and Rose, 1990]. SVA practices legitimized existing and shifting power relations and distributional transfers of wealth by cloaking them in the guise of a seemingly neutral accounting technique [Arnold, 2009].

Some studies [e.g., Hansen, 1990; Epstein and O'Halloran, 1996; Barney and Flesher, 2008] have examined the political economy of tariffs in the U.S. These studies, which described the influence and power of special interest groups, provided examples of preferential tax treatment for farmers and, similar to our study, identified the influence of politicians with agricultural backgrounds in achieving tax benefits for one sector of the economy. We observed that the position of power of farmers enabled the construction of a particular form of accounting. Farmer-politicians promoted themselves as more authentic representatives of New Zealand than were city candidates and accounted for up to 50% of members of Parliament during the period of the study. This influence of political power indicated the economic pre-eminence of farmers and brought about a change in accounting practice which favored the agriculture sector of the New Zealand economy. Thus, accounting practice reflected political manoeuvring in which power and influence was used to achieve a desired outcome [Skaerbaek and Melander, 2004].

As the operating environment of farmers changed, so did the nature of farming records. Simple accounting records of livestock purchases became necessarily more complicated with the introduction of income tax on farming profits, and accountants responded to the farmers' need for advice and instruction. By default, their status lent credibility to tax minimization schemes for farmers and financial records that had little relationship with commercial reality.

The disappearance of standard values occurred as accounting was called upon to create a new political arithmetic (MVA) around the rationality of efficient farm management. Farming's transformation can be traced through the nomenclature of livestock accounting – in dairy farming accounts, cows went from “Queenie,” “Mollie,” and “Hazel” to “livestock at standard

value,” to “biological assets” as of 2004 [NZIAS 41]. This changing nomenclature reflects the changing government rationales and interventions in the agricultural sector through the various narratives around the accounting technique of standard values for livestock.

Potter [2005] called for more studies that depict accounting as a social and institutional practice in order to enhance understanding of the determinants of change. There are opportunities for further research into how accounting techniques are initially constituted, supported, and become embedded, and the consequences of applying particular accounting practices over time. The impact of special interest groups on other areas of tax reform is another area for further study. Studies of this nature increase our understanding of the processes through which accounting can change.

REFERENCES

Primary Sources:

Appendices to the Journals of the House of Representatives (1916, 1924) (Wellington, NZ: Government Printer).

Paynter Family Farm, National Library Archives, MSX-4467, Wellington, NZ.

Preston Family Papers, Hocken Collections, Archives and Manuscripts, MS-1271-031, MS-1272-035, MS-1272-036, Dunedin, NZ.

Archives New Zealand (1950), Memorandum to Members of Cabinet from Minister in charge of the Land and Income Tax Department: MS-172/2/2, Wellington, NZ.

Secondary Sources:

Abbott, A. (1988), *The Systems of the Professions: An Essay on the Division of Expert Labor* (Chicago: University of Chicago Press).

Arnold, P. (2009), “Global Financial Crisis: The Challenge to Accounting Research,” *Accounting, Organizations and Society*, Vol. 34, No. 6/7: 803-809.

Barney, D. and Flesher, T. (2008), “A Study of the Impact of Special Interest Groups on Major Tax Reform: Agriculture and the 1913 Income Tax Law,” *Accounting Historians Journal*, Vol. 35, No. 2: 71-100.

Belshaw, H., Williams, D., Stephens, F., Fawcett, E., and Rodwell, H. (1936), *Agricultural Organisation in New Zealand* (Melbourne: Melbourne University Press).

Buchanan, D. and Badham, R. (1999), *Power, Politics and Organizational Change: Winning the Turf Game* (London: Sage Publishing).

Burchell, S., Clubb, C., and Hopwood, A. (1985), “Accounting in its Social Context: Towards a History of Value Added in the United Kingdom.” *Accounting, Organizations and Society*, Vol. 10, No. 4: 381-413.

Burdon, R. (1935), *New Dominion* (Wellington, NZ: A.H. and A.W. Reed).

Burns, J. (2000), “The Dynamics of Accounting Change. Inter-Play between New Practices, Routines, Institutions, Power and Politics,” *Accounting, Auditing & Accountability Journal*, Vol. 13, No. 5: 566-596.

- Carmona, S., Ezzamel, M., and Gutiérrez, F. (1997), "Control and Cost Accounting Practices in the Spanish Royal Tobacco Factory," *Accounting, Organizations and Society*, Vol. 22, No. 5: 441-476.
- Cooper, D. and Sherer, M. (1984), "The Value of Corporate Accounting Reports: Arguments for a Political Economy of Accounting," *Accounting, Organizations and Society*, Vol. 9, No. 3/4: 207-232.
- Duncan, G. (1933), *The New Zealand Dairy Industry* (Palmerston North, NZ: H.L. Young).
- Epstein, D. and O'Halloran, S. (1996), "The Partisan Paradox and the U.S. Tariff, 1877-1934," *International Organization*, Vol. 50, No. 2: 301-324.
- Farm Research Committee (1966), *Farm Accounting in New Zealand* (Wellington, NZ: New Zealand Society of Accountants).
- Federated Farmers (2011), "Farm Facts." Accessed October 20, 2011 at www.fedfarm.org.nz.
- Fippard, N. (1948), *Farm Accounts in New Zealand* (Wellington, NZ: Butterworths).
- Foucault, M. (1977), *Discipline and Punish: The Birth of the Prison* (Harmondsworth: Penguin).
- Foucault, M. (1980), *Power/Knowledge: Selected Interviews and Other Writings 1972-1977*, Gordon, C., Marshall, L., Mepham, J., and Soper, K. (trans.) (New York: Pantheon Books).
- Gardner, W. (1970), *The Farmer Politician in New Zealand History* (Palmerston North, NZ: Massey University Occasional Publication, No. 3).
- Glasgow, R. (1975), *The Case for Current Values in Farming Accounts* (Wellington, NZ: New Zealand Society of Accountants).
- Goldsmith, P. (2008), *We Won, You Lost. Eat That!* (Auckland, NZ: David Ling Publishing Limited).
- Gomes, D., Carnegie, G., and Rodrigues, L. (2008), "Accounting Change in Central Government: The Adoption of Double Entry Bookkeeping at the Portuguese Royal Treasury (1761)," *Accounting, Auditing & Accountability Journal*, Vol. 21, No. 8: 1,144-1,184.
- Graham A. (1960), *The First Fifty Years 1909-1959* (Wellington, NZ: New Zealand Society of Accountants).
- Grossman, G. and Helpman, E. (2001), *Special Interest Politics* (Cambridge, MA: MIT Press).
- Gustafson, B. (2007), *Kiwi Keith: A Biography of Keith Holyoake* (Auckland, NZ: Auckland University Press).
- Haisman, J. (1955), *Live Stock Accounting* (Wellington, NZ: New Zealand Society of Accountants).
- Hansen, J. (1990), "Taxation and the Political Economy of the Tariff," *International Organization*, Vol. 44, No. 4: 527-551.
- Hardy, C. (1996), "Understanding Power: Bringing about Strategic Change," *British Journal of Management*, Vol. 7: 3-16.
- Higgins, V. (2001), "Assembling Restructuring: Governmentality, Economic Regulation and the Historical Emergence of the 'Enterprising Farmer' in Australian Agricultural Policy," *Review of International Political Economy*, Vol. 8, No. 2: 311-328.
- Higgins, V. and Lockie, S. (2002), "Rediscovering the Social: Neo-Liberalism and Hybrid Practices of Governing in Rural Natural Resource Management," *Journal of Rural Studies*, Vol. 18: 419-428.
- Hopwood, A. (1987), "The Archaeology of Accounting Systems," *Accounting, Organizations and Society*, Vol. 12, No. 3: 207-234.

- King, J. (1995), "Rural Income Tax Reform: The New Zealand Experience 1985-1994," *Review of Marketing and Agricultural Economics*, Vol. 63, No. 1: 134-144.
- Lamb, M. (2003), "Questions of Taxation Research Framed as Accounting Research: A Suggested Approach," *Accounting Historians Journal*, Vol. 30, No. 2: 175-196.
- Le Heron, R. (1989), "A Political Economy Perspective on the Expansion of New Zealand Livestock Farming 1960-1984 – Part 1 Agricultural Policy," *Journal of Rural Studies*, Vol. 5, No. 1: 17-32.
- McCrea, P., Grundy, T., and Hay, D. (1990), *Tax Shields: Their Implications for Farm Project Investment, Risk and Return*, Research Report No. 206 (Agriculture and Economics Research Unit, Lincoln University: Canterbury, New Zealand).
- McKinlay, A. and Pezet, E. (2010), "Accounting for Foucault," *Critical Perspectives on Accounting*, Vol. 21, No. 6: 486-495.
- Malloch, D. (1933), *Taxation Concerning the Farmer* (Wellington: NZ: Whitcombe and Tombs).
- Malloch, D. and Weston, I. (1935), *Practical Farm Bookkeeping* (Auckland, NZ: Whitcombe and Tombs).
- Martin, J. (2004), *The House: New Zealand's House of Representatives, 1854-2004* (Palmerston North, NZ: Dunmore Press Ltd).
- Miller, P. (1990), "On Interrelations between Accounting and the State," *Accounting, Organizations and Society*, Vol. 15, No. 4: 315-338.
- Miller, P. (1994), "Accounting as Social and Institutional Practice: An Introduction," in Hopwood, A. and Miller, P. (eds.), *Accounting as Social and Institutional Practice* (Cambridge: Cambridge University Press): 1-39.
- Miller, P. and O'Leary, T. (1994), "Governing the Calculable Person," in Hopwood, A. and Miller, P. (eds.), *Accounting as Social and Institutional Practice* (Cambridge: Cambridge University Press): 98-115.
- Miller, P. and Rose, N. (1990), "Governing Economic Life," *Economy and Society*, Vol. 19, No. 1: 1-31.
- New Zealand Equivalent to International Standards (NZ IAS-41) – A "Agriculture," NZ Institute of Chartered Accountants (Auckland, NZ: Publishing Press Ltd.).
- New Zealand Society of Accountants (1925), *The Accountants' Journal*, October 20, (Wellington, NZ).
- New Zealand Society of Accountants (1930), *The Accountants' Journal*, January 20 and October 20 (Wellington, NZ).
- New Zealand Society of Accountants (1932), *The Accountants' Journal*, June 20 (Wellington, NZ).
- New Zealand Society of Accountants (1933), *The Accountants' Journal*, January 20 (Wellington, NZ).
- New Zealand Society of Accountants (1937), *The Accountants' Journal*, June 20 (Wellington, NZ).
- New Zealand Truth* (1924), Cartoon, No. 955, March, 15 (Wellington, NZ: John Norton Publishers): 1.
- Noguchi, M. (2005), "Interaction between Tax and Accounting Practice: Accounting for Stock in Trade," *Accounting, Business & Financial History*, Vol. 15, No. 1: 1-34.
- Nurnberg, H. (2009), "Conceptual Nature of the Corporate Income Tax," *Accounting Historians Journal*, Vol. 36, No. 2: 31-74.
- Oats, L. and Sadler, P. (2008), "Accounting for the Stamp Act Crisis," *Accounting*

- Historians Journal*, Vol. 35, No. 2: 101-143.
- Payne, W. (1965), "The Standard Value System of Livestock Costing in New Zealand," discussion paper 43, Department of Agricultural Economics and Farm Management, Massey University.
- Potter, B. (2005), "Accounting as a Social and Institutional Practice: Perspectives to Enrich our Understanding of Accounting Change," *ABACUS*, Vol. 41, No. 3: 265-289.
- Preston, A. (1989), "The Taxman Cometh: Some Observations on the Interrelationship between Accounting and Inland Revenue Practice," *Accounting, Organizations and Society*, Vol. 14, No. 5/6: 389-413.
- Reeves, W. (1902), *State Experiments in Australia and New Zealand* (New York: Dutton).
- Rodwell, H. (1936), "Taxation, Grants, and Subsidies in Relation to Farming," in Belshaw, H., Williams, D., Stephens, F., Fawcett, E. and Rodwell, H. (eds.), *Agricultural Organisation in New Zealand* (Melbourne: Melbourne University Press): 211-231.
- Russell, D. (2004), *Livestock Valuation for Taxation Purposes* (New Plymouth, NZ: David H. Russell).
- Skaerbaek, P. and Melander, P. (2004), "The Politics of the Changing Forms of Accounting. A Field of Study of Strategy Translation in a Danish Government-Owned Company under Privatisation," *Accounting, Auditing & Accountability Journal*, Vol. 17, No. 1: 17-40.
- Smith, D. (1977), *Management Accounting for the New Zealand Farmer* (Farm Accounting Sub-Committee of New Zealand Society of Accountants: Wellington, NZ: New Zealand Society of Accountants).
- Spicer, E. and Pegler, E. (1925), *Farming Records and Accounts* (London: HFL Publishers Ltd.).
- Stewart, R. (1992), "Pluralizing Our Past: Foucault in Accounting History," *Accounting, Auditing & Accountability Journal*, Vol. 5, No. 2: 57-73.
- Toomath, C. (1973), *Current Value Techniques in Farm Accounting* (Wellington, NZ: New Zealand Society of Accountants).
- Volf, M. (1996), *Exclusion and Embrace* (Nashville: Abingdon Press).
- Watson, R. (1968), *New Zealand Farm Accounting* (Wellington, NZ: Butterworths).

New Zealand Government Acts:

- Finance Act 1915 (6 GEO V, 1915, No. 39)
- Land and Income Tax Assessment Act 1891
- Land and Income Tax Amendment Act 1907 (7 EDW VII, 1907, No. 18)
- Land and Income Tax Amendment Act 1929 (20 GEO V, 1929, No. 12)
- Land and Income Tax Amendment Act 1940 (4 GEO VI, 1940, No. 3)
- Land and Income Tax Amendment Act 1945 (9 GEO VI, 1945, No. 37)
- Land and Income Tax Amendment Act 1949 (13 GEO VI, 1949, No. 29)

Accounting Historians Journal
Volume 38, Number 2
December 2011
pp. 75-103

Frank A. Badua
LAMAR UNIVERSITY
and
Ann L. Watkins
LAMAR UNIVERSITY

TOO YOUNG TO HAVE A HISTORY? USING DATA ANALYSIS TECHNIQUES TO REVEAL TRENDS AND SHIFTS IN THE BRIEF HISTORY OF ACCOUNTING INFORMATION SYSTEMS

Abstract: Using several data-analysis techniques, this paper seeks to construct a brief history of Accounting Information Systems (AIS). In an effort to achieve some degree of comprehensiveness, this paper examines both AIS research and pedagogy. It begins by documenting and classifying topical foci of research papers in the *Journal of Information Systems*. It then compares the pedagogical emphases of AIS courses as identified in past research. By deploying multiple methods of analysis to identify patterns of hegemony or change in the topics of AIS scholarship and teaching, this paper highlights the use of two data-analysis techniques found to be useful in the historical research of accounting. Findings reveal signs of the assimilation of AIS scholarship into the wider world of accounting research and strong influences upon AIS pedagogy by oversight bodies and technological innovation.

INTRODUCTION

This paper explores the history of Accounting Information Systems (AIS) research and pedagogy through the use of two data-analysis techniques – content analysis and exploratory data analysis. The objectives of this paper are three fold: 1) to provide some insight into the development of AIS research by documenting the extent to which it has become differentiated from other areas of accounting research over time; 2) to provide a better understanding of the chronological development of AIS

Acknowledgments: The authors thank Dr. Richard Fleischman, the AHJ anonymous reviewers, and participants at the 2010 American Accounting Association conference in San Francisco for their aid in the development of this paper.

by examining the topics that have been emphasized in this area of accounting pedagogy; and 3) to demonstrate the potential for both content analysis and exploratory data analysis as methods of inquiry in accounting history research. Thus, this study examines changes in both AIS research and pedagogy with the additional aim of determining the degree to which AIS research and education are interconnected. This bi-focal objective is partly motivated by the Association to Advance Collegiate Schools of Business' (AACSB) assertion that through intellectual contributions such as research, faculty members can remain current in their areas of teaching specialization (AACSB, 2011).

DEFINING AIS

The origin of the history of AIS in large part depends on how AIS is defined. The Greek root of the word "systems" is *συστημα* which means "components standing together to form a whole." As can be gathered from this classical etymology, AIS has been defined as the union of various functional components interacting to produce information useful to financial statement users and firm managers [Kieso *et al.*, 2007]. This broad definition encompasses traditional manual accounting systems that start with transaction analysis and end with financial statements and would trace AIS back to 8,000 B.C. (See Kee, [1993] for an example of a longitudinal secular review of the interaction between data-processing technology and accounting, ranging from the era of clay tokens and pot-shards to the 20th century digital revolution.)

However, if AIS is defined more narrowly as the joint deployment of traditional accounting processes and computer and telecommunications technology for financial and managerial accounting purposes [Mock, 1999], then its beginning is much more recent. It was in the late 1920s, for example, when the term "systems" in reference to accounting began to crop up in the popular media. Wootton and Kemmerer [2007, p. 93] focus more specifically on technological changes in the late 19th and early 20th centuries. These changes transformed accounting into a profession "while deskilled, repetitive, task-based bookkeeping became a trade," and "[accountants] became responsible for...analyzing data and the way information was used" (p. 93). Their paper delineates a point in history where technology played a significant role in the evolution of the accountant's role from bookkeeper to professional. A similar idea is put forth by Abbott [1988, p. 154], which characterizes a profession as "a coherent occupational group with some control of an abstract

expertise.” For example, the rise of cost accountants is linked to the invention of calculating machines, such as the Hollerith device. According to Abbott, “the machines created, virtually overnight, the field of cost accounting (p. 228).” However, it was not until the creation and establishment of theoretical assumptions and conventions against which a firm’s actual cost data could be analyzed in order to make various decisions as to reengineering production, evaluating performance, and budgeting capital, that cost accountants were given professional status. Abbot (p. 232) states: “These conventions created the crucial judgments that made cost accountants real professionals. As long as cost accounting merely recorded costs it was just data processing... the invention of standard costs and the use of those costs for management decision making established the new jurisdiction.” Similar phenomena in the late 20th century, such as advances in computing, data modeling, and telecommunications, had significant implications for accounting broadly and for AIS research and pedagogy specifically. These phenomena also constitute the point at which this paper locates the origins of AIS.

Identifying the inception of AIS at the turn of the 20th century arguably limits its history and, thus, perhaps renders it too young to have much of a history. However, brevity and/or recency of events do not preclude its historical poignancy.

The remainder of this paper will examine whether over this relatively brief period, there have been significant trends and shifts in the scholarship and teaching of AIS as defined herein. The paper begins with an exploration of AIS research using content analysis.

AIS SCHOLARSHIP

Content Analysis: The first step is an analysis of AIS research utilizing a taxonomic review of research published in the *Journal of Information Systems (JIS)*. The research method used is explicit (manifest) content analysis. This technique is used because of the nature of the data collected from research papers. It is a research method in which text is broken into its component parts (e.g., sentences, phrases, and words). Then, quantitative analysis is deployed on these components to make inferences regarding the intention, meaning, and significance of the text, as well as the characteristics of the author and of the milieu in which the text was created [Berelson, 1971].

Content analysis has been used in accounting research in several ways [Jones and Shoemaker, 1994]. Specific uses include tracing the development of government accounting [Previts and

Brown, 1993], investigating the information in CEO's letters to shareholders [Abrahamson and Amir, 1996], and analyzing discretionary narrative disclosures [Smith and Taffler, 2000].

In spite of content analysis' versatility and its adaptability for use in studying different types of written communication, it has its disadvantages and limitations. When done by hand, the analysis consumes much effort and time [Yen *et al.*, 2007], and where the object of study is latent meaning rather than explicit textual communication, reliability may be questionable [Krippendorff, 2004].

Due to advances in information technology, such as the advent of optical character recognition (OCR) and databases, the tedium and difficulty of content analysis has been largely obviated. Reliability, however, remains an issue to the extent that the text requires interpretation to uncover hidden meanings. To compensate, multiple analysts may be employed when working with latent content, or explicit or manifest content analysis may be employed. In the case of the Rutgers University Accounting Research Directory (ARD), which provides data for this paper, both compensating measures were used – the analysts were continuously supervised by one of the academicians who developed the classification scheme. Only manifest content was analyzed. Thus, the validity and consistency of the content analysis throughout the periods of study were assured and maintained.

Literature on AIS Scholarship: Papers, such as Haseman [1978], Vasarhelyi *et al.* [1988], and Fleming *et al.* [1990, 1991, 2000] provide additional insight into how accounting scholarship evolves. Haseman [1978] compared research in managerial accounting in the 1920s and the 1970s. The comparison revealed that the rate at which research was produced had increased, and that “the literature...covered a considerably wider range of topics (p.78).” Vasarhelyi *et al.* [1988], using the Rutgers University ARD taxonomy to characterize accounting research, found increased use of economics, finance, and psychology as theoretical bases for papers, as well as increases in behavioral topics and quantitative methodologies. Finally, the trilogy of papers by Fleming *et al.* [1990, 1991, 2000] analyzed the research in *The Accounting Review* and found that the literature had evolved from a practice orientation to a more empirical one. As will be seen later, several of these developments, particularly the increased proliferation of research, the migration towards behavioral studies, and increased focus on economics and finance, are true of AIS research as well.

A number of retrospectives on AIS research were written towards the close of the 20th century and the first decade of the 21st. These include David *et al.* [1999], Murthy and Wiggins [1999], Stone [2002], and Steinbart [2009]. Murthy and Wiggins [1999] provide a definition of AIS research similar to the one provided in this paper, characterizing it as the intersection between accounting, which focuses on providing information for economic decision making, and management information systems, which is concerned with the design, implementation, and maintenance of those technological artifacts that make information provision possible. The paper also calls for increased attention to behavioral research as being appropriate for AIS, citing auditor behavior, decision making, and group behavior as specific foci of inquiry. As will be seen later, there is evidence that AIS scholars have responded to this call. David *et al.* [1999] propose a framework for AIS research, defining several archetypal AIS research questions, as well as suggested research methodologies appropriate to them. Like Murthy and Wiggins [1999], the paper recommends a behavioral emphasis for AIS, suggesting such behavior-oriented research methods as laboratory experiments, field studies, and surveys. Also, reminiscent of Kee [1993], David *et al.* [1999] frame AIS, and consequently AIS scholarship and pedagogy, as primarily concerned with facilitating and tracking the flow of data through transactions and business processes. This stance also has implications for AIS education.

Data for AIS Research: Content analysis may be deployed in order to find both explicit and latent content. However, in order to simplify data gathering and maximize analytical validity, only explicit data was considered in this study. The data used to characterize AIS research consisted of papers published in *JIS*, the American Accounting Association's (AAA) information systems section journal. Its editorial policy defines its primary criterion for publishing a paper as contribution to AIS [*JIS*, 2011]. A similar approach for identifying distinctive research areas was used in Brown *et al.* [1987]. Therefore, this research outlet may arguably be considered an appropriate representation of AIS scholarship within the academic accounting research network.

In order to characterize the topical emphases in AIS research, only papers consisting of at least five pages published between 1986 and 2003 in *JIS* were inspected. The start of this time period, 1986, corresponds to the year in which *JIS* published its first volume of research. It also represents a period of time when PCs were becoming more common and accessible

and portable computers were being introduced to the market [Computer Hope, 2011]. Many universities were beginning to establish computer labs and students were able to work on PCs rather than mainframes. The end of the period, 2003, corresponds to the end of the coverage of *JIS* research by the Rutgers University ARD. The time period analyzed in this study may also be considered pre-Sarbanes-Oxley as little time had passed since its passage in the summer of 2002 for the impact to show up in research or the classroom. While it would have been better to have had access to more recent data, the limitations of the ARD coverage precludes analysis beyond 2003. However, much accounting history research has focused on discrete periods leading up to or following certain events. For example, Fleischman and Radcliffe [2005] focuses on accounting history research leading up to the 21st century, while Fleming *et al.* [1991, 2000] trace the development of research in *TAR* through the first three decades after World War II. These discrete periods provide an opportunity to compare accounting practice and research before and after certain important historical inflection points. As discussed in the conclusion, this time period implies future avenues of research on the development of AIS scholarship.

The ARD taxonomy contains several classification categories for research topics and methods. Among these are five topical taxons: school of thought, information, treatment, accounting area, and foundation discipline. Each of these five taxons may be used to describe some topical emphasis of research artifacts. School of thought describes what broad accounting-related issue is investigated by the research, such as behavioral research, accounting theory, accounting history, or accounting institutions, among others. The information taxon is more specific, defining which particular account, transaction, or procedure serves as the research piece's dependent or response variable. It may be thought of as the action or result that the research is trying to predict. The treatment taxon is similarly specific in that it is the account, transaction, or procedure that is employed as the independent or predictor variable. Hence, it may be defined as the causal or influential factor being investigated by the research. Accounting area describes the accounting function to which the research contributes, such as financial accounting, tax, auditing, managerial accounting, or information systems. Finally, foundation discipline establishes the underlying subject or body of knowledge upon which the research depends. These may include such obvious disciplines as accounting, finance and economics, or management, or others

less germane, such as the humanities, mathematics, or telecommunications and information systems.

Counts of papers falling under the several different categories of every one of these taxons were tallied for each of the 17 years under consideration. Then, a ratio was computed by comparing the counts in each category to the total number of research papers in each year of the study. Finally, statistical analysis was carried out in order to see if there were significant differences in the topical emphases between *JIS* papers in the first half of the period (1986 to 1994) and those in the second half (1995 to 2003), thus dividing the time period into equal halves of nine years, respectively. The *JIS* research data were subjected to the Mann-Whitney nonparametric test, a form of quantitative statistical analysis used to detect significant differences between data distributions.

Significant Differences in JIS Research over Time: Among 45 topical taxonomic classifications, seven classifications exhibited significant differences between the frequencies in which they had been studied by *JIS* researchers from 1986 to 1994 (period 1) and 1995 to 2003 (period 2). These were: (1) school of thought-human information processing, (2) information-mixed topics, (3) treatment-other financial accounting, (4) treatment-other topics, (5) treatment-mixed topics, (6) accounting area-mixed, and (7) foundation discipline-telecommunications.

The human information processing school of thought is concerned with studying how people absorb data and use them to arrive at conclusions or decisions. *JIS* researchers have significantly increased (sig. = .014) the proportion of research devoted to this topic from 8% to 23%.

The information taxon classifies what the dependent variable (y-variable) is in a particular research paper. Significant differences (sig. = .001) are revealed between the proportion of papers having multiple dependent variables in period 1 (37%) and period 2 (5%).

The treatment taxon indicates what the independent or predictor variable (x-variable) is. Significant differences are revealed in the usage of three treatment classifications between research in the two periods. Predictor variables related to financial accounting were absent in period 1 research, but make up 7% of later research, a difference significant at the .029 level.

TABLE 1
Proportions of JIS Research that Various Taxonomic
Classifications Comprised, and Mann-Whitney Significance
of Differences between 1986-1994 and 1995-2003

Taxons and Sub-Classifications	Average Annual Percentage each Classification Comprised of JIS Output		Significance of Differences
<i>Schools of Thought</i>	<i>1986-1994</i>	<i>1995-2003</i>	
human information processing	(4 of 52) 7.69%	(15 of 65) 23.08%	0.01
other behavioral	(4/52) 7.69%	(2/65) 3.08%	0.46
efficient markets hypothesis	(0/52) 0.00%	(1/65) 1.54%	0.32
accounting theory	(1/52) 1.92%	(1/65) 1.54%	0.94
accounting history	(0/52) 0.00%	(1/65) 1.54%	0.32
institutional	(2/52) 3.85%	(3/65) 4.62%	0.63
other	(37/52) 71.15%	(39/65) 60.00%	0.17
expert / information systems	(0/52) 0.00%	(1/65) 1.54%	0.32
agency theory	(4/52) 7.69%	(2/65) 3.08%	0.5
	100.00%	100.00%	
<i>Information</i>			
financial accounting	(0/ 52) 0.00%	(3/65) 5.26%	0.07
internal information	(3/52) 6.12%	(0/65) 0.00%	0.15
performance measures	(1/52) 2.04%	(2/65) 3.51%	0.54
personality measures	(2/ 52) 4.08%	(1/ 65) 1.75%	0.73
auditor behavior	(10/ 52) 18.37%	(6/65) 8.77%	0.94
manager behavior	(6/52) 12.24%	(1/65) 1.75%	0.6
decision making	(3/52) 6.12%	(9/65) 14.04%	0.11
costs	(4/52) 8.16%	(0/65) 0.00%	0.58
group behavior	(1/52) 2.04%	(0/65) 0.00%	0.07
other	(2/52) 4.08%	(39/65) 59.65%	0.32
mixed	(19/52) 36.73%	(3/65) 5.26%	0
	100.00%	100.00%	
<i>Area</i>			
financial	(2/ 52) 3.85%	(5/65) 7.69%	0.2
managerial	(4/52) 7.69%	(1/65) 1.54%	0.2
audit	(7/52) 13.46%	(13/65) 20.00%	0.1
information systems	(31/52) 59.62%	(46/65) 70.77%	0.38
mixed	(8/52) 15.38%	(0/65) 0.00%	0.03
	100.00%	100.00%	

TABLE 1 (CONTINUED)
Proportions of JIS Research that Various Taxonomic Classifications Comprised, and Mann-Whitney Significance of Differences between 1986-1994 and 1995-2003

Taxons and Sub-Classifications	Average Annual Percentage each Classification Comprised of JIS Output		Significance of differences
<i>Treatment</i>			
inventory	(1/52) 2.17%	(0/65) 0.00%	0.32
other financial accounting	(0/52) 0.00%	(4/65) 6.67%	0.03
risk	(1/52) 2.17%	(0/65) 0.00%	0.32
analytical review	(1/52) 2.17%	(0/65) 0.00%	0.32
internal control	(3/52) 6.52%	(0/65) 0.00%	0.15
EDP audit	(5/52) 8.70%	(1/65) 1.67%	0.3
transfer pricing	(1/52) 2.17%	(0/65) 0.00%	0.32
cost allocations	(2/52) 4.35%	(0/65) 0.00%	0.15
other	(6/52) 10.87%	(42/65) 65.00%	0
auditor behavior	(1/52) 2.17%	(2/65) 3.33%	0.59
decision aids	(3/52) 6.52%	(10/65) 15.00%	0.29
organization and environment	(2/52) 4.35%	(1/65) 1.67%	0.54
mixed	(25/52) 47.83%	(4/65) 6.67%	0.04
	100.00%	100.00%	
<i>Foundation Discipline</i>			
psychology	(6/52) 11.76%	(12/65) 18.46%	0.24
sociology, political science, philosophy, history	(0/52) 0.00%	(5/65) 7.69%	0.07
economics and finance	(1/52) 1.96%	(5/65) 7.69%	0.2
engineering, communication, computer science	(40/52) 78.43%	(34/65) 52.31%	0.05
math, decision science, game theory	(1/52) 1.96%	(5/65) 7.69%	0.25
other mixed	(1/52) 1.96%	(1/65) 1.54%	0.94
accounting	(0/52) 0.00%	(2/65) 3.08%	0.15
management	(2/52) 3.92%	(1/65) 1.54%	1
	100.00%	100.00%	

The proportion of research using multiple predictors decreased from 48% to 7%, a decrease significant at the .004 level. Finally, "other" predictor variables, which are so exogenous to accounting research that they do not readily fit into the existing treatment classifications, were shown to have significantly increased (sig. = .042) from 11% to 65% of research.

Although 15% of early *JIS* research was comprised of mixed accounting areas, this study did not reveal similar papers in later research. This constitutes a decrease significant at the .029 level.

The final taxon, foundation discipline, reveals a significant decrease (sig. = .049) in the proportion of papers using telecommunications and computer science as a theoretical basis from 78% in period 1 to 52% in period 2.

The findings show that AIS research is significantly different between its earlier years and later years. There has been a significant increase in the study of human information processing (HIPS) topics and in the research related to financial topics and a significant decrease in dependence upon telecommunications as a foundation discipline. These results suggest an increasing integration of AIS research into the broader realm of accounting scholarship.

The finding that AIS scholarship has developed a behavioral niche as evidenced by the significant increase in HIPS topics since the early 1990s appears consistent with a wider behavioral movement in accounting research observed by Vasarhelyi *et al.* [1988] and Flesher and Flesher [2006]. It also provides evidence that AIS scholars heeded calls for behavioral research encouraged by David *et al.* [1999] and Murthy and Wiggins [1999].

Further signs of assimilation include a significant increase in financial accounting variables being included as treatment factors in AIS research. This implies an increased appreciation for the possible ways by which traditional accounting constructs predict or influence AIS-related phenomena and is consistent with the increased attention to economics and finance issues recorded in Vasarhelyi *et al.* [1988]. Nevertheless, the significant increase in "other" treatment variables indicates that AIS research is still distinctive in that it uses predictors that are so different from those normally used in accounting research that they cannot be classified using the ARD taxonomy. This is true even as the actual topics studied begin to resemble those in mainstream accounting scholarship.

Finally, results of this study evince that AIS is broadening its theoretical bases rather than drawing narrowly from

telecommunications. It is reaching out to other foundation disciplines used in accounting research. Once again, this may be considered a symptom of assimilation.

AIS PEDAGOGY

Exploratory Data Analysis: Exploratory data analysis (EDA) is comprised of several, mainly graphical techniques designed to summarize data quickly and identify trends and patterns therein. While EDA often provides quantitative metrics to characterize the data, the results are commonly reported graphically in order to give a quicker, more intuitive characterization of the data. EDA may be said to operate on the principle, “a picture paints a thousand words.”

In the U.S., the development and widespread use of EDA can be traced to Tukey [1962] and his landmark paper, “The Future of Data Analysis.” In it, Tukey issued a call for the recognition of data analysis as a legitimate branch of statistics distinct from mathematical statistics. Shortly thereafter, he began the invention of a wide variety of new, simple, and effective graphic displays under the rubric of “Exploratory Data Analysis.” Tukey’s stature as a statistician served to legitimate this informal, graphical approach to data analysis. Adding to the momentum for the use of EDA, Bertin [1967] published in France the monumental *Semiologie Graphique*. Computer processing of data had begun and offered the possibility to construct old and new graphic forms via computer programs. True high-resolution graphics were developed but would take some time to achieve common use.

By the end of this period, significant intersections and collaborations would begin. Computer science research (software tools, C language, UNIX, etc.) at Bell Laboratories [Becker, 1994] and elsewhere would combine forces with developments in data analysis (EDA, psychometrics, etc.) and display and input technology (pen plotters, graphic terminals, digitizer tablets, the mouse, etc.). These developments would provide new paradigms, languages, and software packages for expressing and implementing statistical and data graphics. In turn, they would lead to an explosive growth in new visualization methods and techniques [Colorado State University, 2011].

AIS Pedagogical Literature: The AIS pedagogical literature includes Wu [1983], Davis and Leitch [1988], Heagy and Rakow [1991], Smith and Bain [1993], Murthy and Groomer [1996], Bain *et al.* [2002], Fordham [2005], and Badua [2008]. Several

of these papers, such as Wu [1983], Davis and Leitch [1988], and Bain *et al.* [2002], were undertaken in order to elicit from faculty and industry a set of topics or issues to form the basis for a classic AIS curriculum. Others, such as Groomer and Murthy [1996] and Badua [2008], were concerned with documenting the AIS curriculum as it existed at certain points in time. Taken together, these works represent what topics various stakeholders in AIS pedagogy considered important to include in the curriculum. These works will also constitute a portion of the data used in the analysis of AIS pedagogy. As discussed in greater detail later, they reveal an evolving focus on modeling transaction cycles of firms in support of systems analysis and design.

Methodology and Data: Analysis of AIS pedagogy was implemented by a review of both faculty's and overseeing institutions' initiatives at AIS curriculum formation. In order to be able to trace the longitudinal development of AIS teaching topics as embodied in faculty efforts, past literature on AIS pedagogy was reviewed. The literature was comprised of the eight papers discussed in the literature review. These papers were chosen because they offer data from the last 25 years and because their data were gathered in different ways, including faculty surveys (Wu, 1983; Davis and Leitch, 1988; Heagy and Rakow, 1991; Smith and Bain, 1993; Groomer and Murthy, 1996); case studies (Fordham, 2005); and content analysis of syllabi (Bain *et al.*, 2002; Badua, 2008). Therefore, the temporal dispersion of these studies and the triangulation provided by their different populations and research methods provide the basis for an analysis that is longitudinally comprehensive and enjoys high external validity. The lists of topics mentioned in these works were analyzed using EDA in order to determine which topics faculty emphasized the most and how these emphases may have changed over time.

In order to describe the evolution of AIS teaching topics as envisioned by overseeing organizations, topic recommendations of the 1987 Mock Committee, the 1999 American Institute of Certified Public Accountants (AICPA) Core Competencies Committee, and the 2009 AICPA Emerging Technologies Committee were compared. These lists of recommended topics were chosen because they were prepared towards the end of the 1980s, 1990s, and 2000s, respectively. Once again, these lists were compared to see how overseeing institutions may have emphasized different topics over time.

The data from past AIS pedagogical literature were sum-

marized using box-plots, a form of EDA that identifies outliers in data distributions; in this case, topics most frequently taught or most highly ranked by AIS faculty. Box-plots take the form of a box, one of whose horizontal edges is the third quartile of a distribution, whose other horizontal edge is the first quartile, and which has a line drawn across the box at the median of the distribution. Thus, extreme outliers, such as very high or very low numbers in the distribution, would be above or below the edges of the box, respectively.

The topics whose frequencies lie above the third quartile may be considered to have received greater curricular coverage than others. Similarly, topics whose ordinal rank lies below the first quartile may be deemed to be more greatly esteemed by those doing the ranking. These emphasized topics were then compared across studies to determine patterns and trends. Finally, content analysis of the list of topics drawn up by oversight institutions was done to detect differences among them.

Results of EDA of Faculty Initiated Pedagogical Topics over Time:

The data in the various past pedagogical papers measured different things, such as the number of faculty surveyed saying they teach a particular topic [Wu, 1983], the percentage of class time devoted to a topic (Davis and Leitch, 1988; Groomer and Murthy, 1996), faculty rankings of various topics (Heagy and Rakow, 1991; Smith and Bain, 1993), and the proportion of syllabi that include a particular topic (Badua, 2008). Thus, direct comparisons of their data distributions would not be valid.

However, using box-plots allows the identification of outliers embodied by topics that are most important to faculty regardless of how that importance was measured. It is the set of outliers that emerges in each paper's data set that can be compared to those in other papers in order to find how pedagogy has evolved over time.

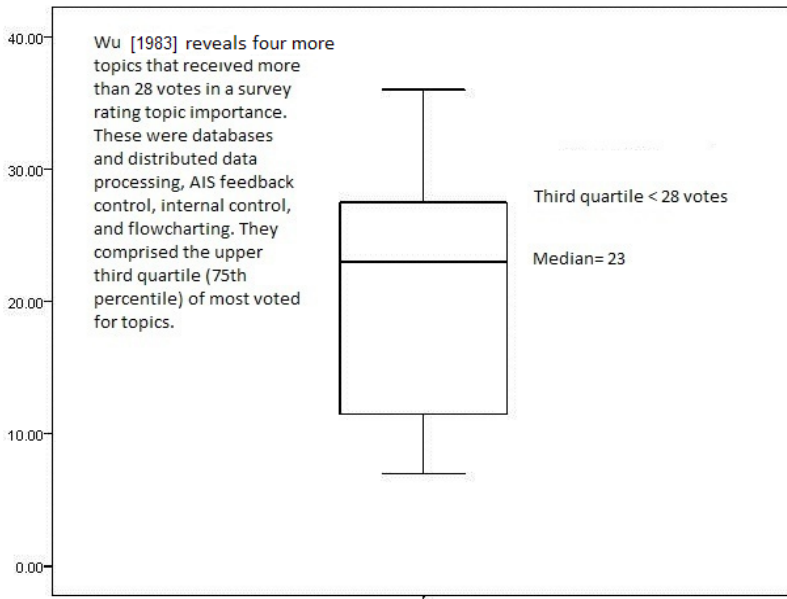
The following table reveals the topics comprising the third quartile (75th percentile) of the data distributions in the sample papers. Hence, these topics are those that each of the papers reveals to be most emphasized by faculty.

TABLE 2
AIS Teaching Topics Identified by Faculty

<i>Wu [1983]</i>	<i>Davis&Leitch 1988]</i>	<i>Heagy&Rakow [991]</i>	<i>Smith&Bain [1993]</i>
databases and distributed data processing	management of information systems	internal control	internal control
AIS feedback control	systems analysis and design	transaction cycles	systems analysis and design
internal control	database design and management	file organization and access	revenue cycle
Flowcharting	quantitative methods	introduction to systems	purchase cycle
	computer software applications		
<i>Groomer- Murthy (1996)</i>	<i>Bain et al. (2002)</i>	<i>Fordham (2005)</i>	<i>Badua (2008)</i>
Spreadsheets	introduction to systems	spreadsheets	Controls
internal control	internal control	spreadsheet design	transaction cycles
computer controls	systems documentation	design of accounting applications	resource-entity-agent
systems documentation	purchase cycle	databases	flowcharts
revenue cycle	revenue cycle	database design	databases
purchase cycle	systems analysis and design	transaction cycles	data flow diagrams
introduction to AIS	databases	flowcharting	e-commerce
	transaction cycles	internal control	systems analysis and design
	telecommunications	AIS vs MIS	fraud
	reporting cycle		AIS auditing
	computer fraud		enterprise resource planning
	production cycle		databases
			spreadsheets
			risks

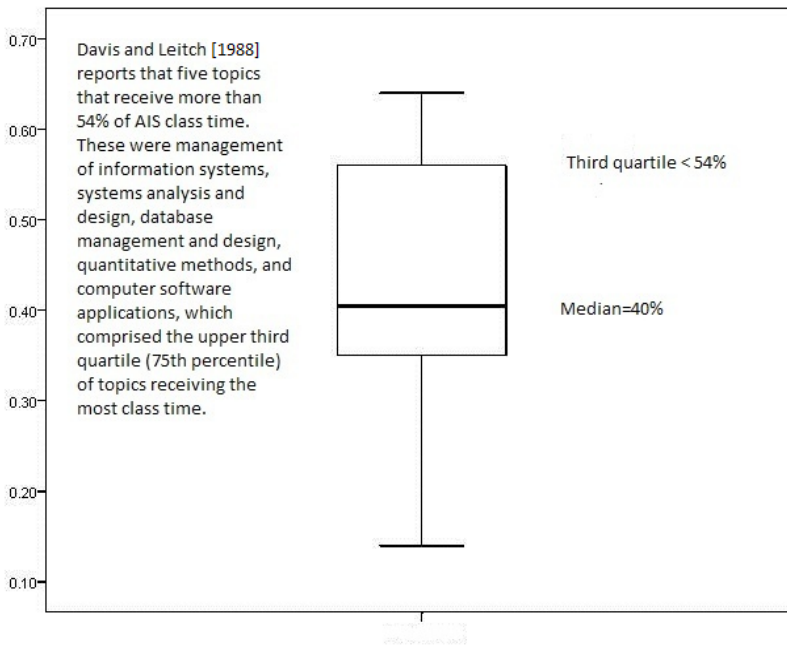
Wu [1983] surveyed AIS faculty to elicit from them what topics they considered essential for the AIS course. Box-plots reveal that four topics (databases and distributed data processing, AIS feedback control, internal control, and flowcharting) elicited faculty votes in excess of the third quartile threshold (27.5 votes).

FIGURE 1
Box-Plot of the Distribution of Faculty for AIS Topics in Wu [1983]



Davis and Leitch [1988] measured the importance faculty ascribe to a topic by the proportion of class time devoted to it. Box-plot analysis reveals that five topics (management of information systems, systems analysis and design, database management and design, quantitative methods, and computer software applications) took class time beyond the third quartile threshold of 54%.

FIGURE 2
Box-Plot of the Distribution of Percentages of Class Time Allocated to AIS Topics in Davis & Leitch [1988]



Heagy and Rakow [1991] and Smith and Bain [1993] asked faculty to rank topics in order of importance. Here, the closer the number is to 1, the higher the rank and the more important the topic. Therefore, box-plot thresholds for topics below the first quartile (as opposed to above the third quartile) were used to screen topics for importance. Heagy and Rakow [1991] revealed that faculty ranked four topics (internal control, transaction cycles, file organization and access, and introduction to systems) as the most important. Similarly, Smith and Bain [1993] generated a list of four highly ranked topics, consisting of internal control, systems analysis and design, revenue cycle, and purchase cycle.

FIGURE 3
Box-Plot of the Distribution of Faculty Rankings of AIS Topics in Heagy & Rakow [1991]

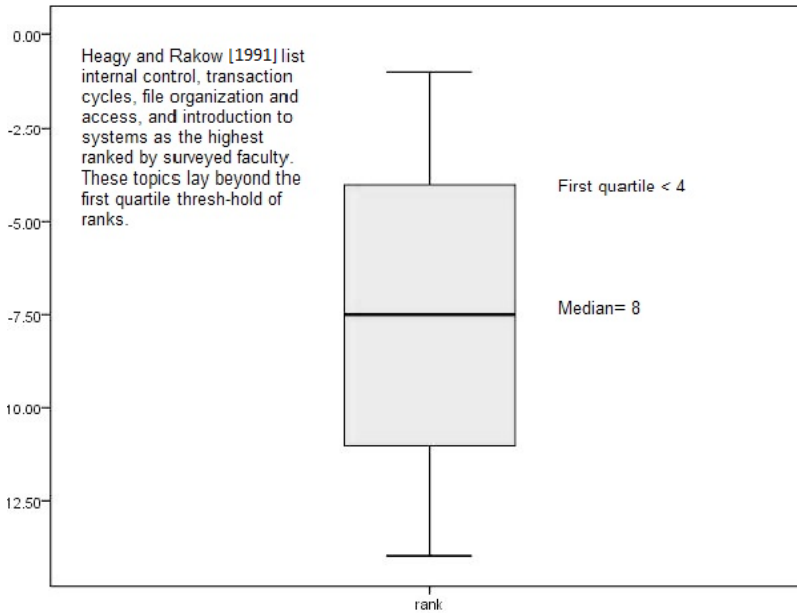
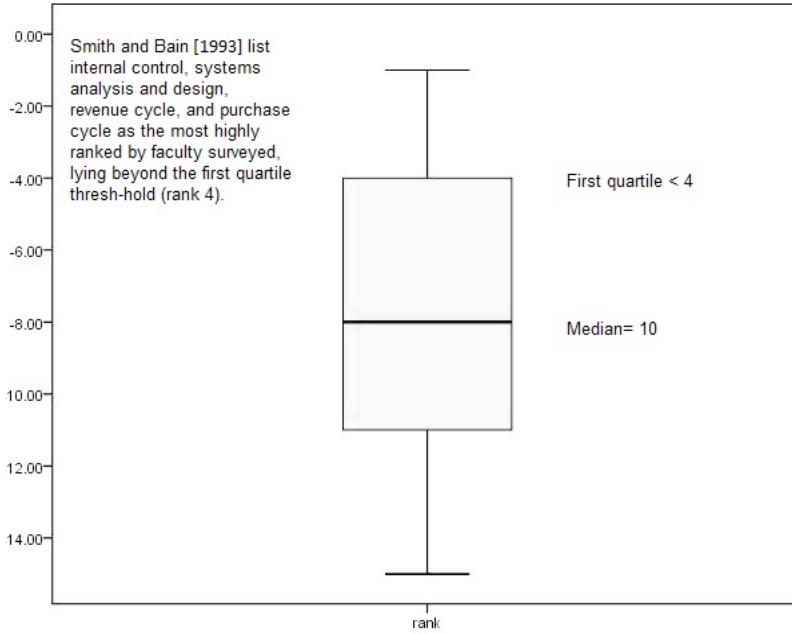
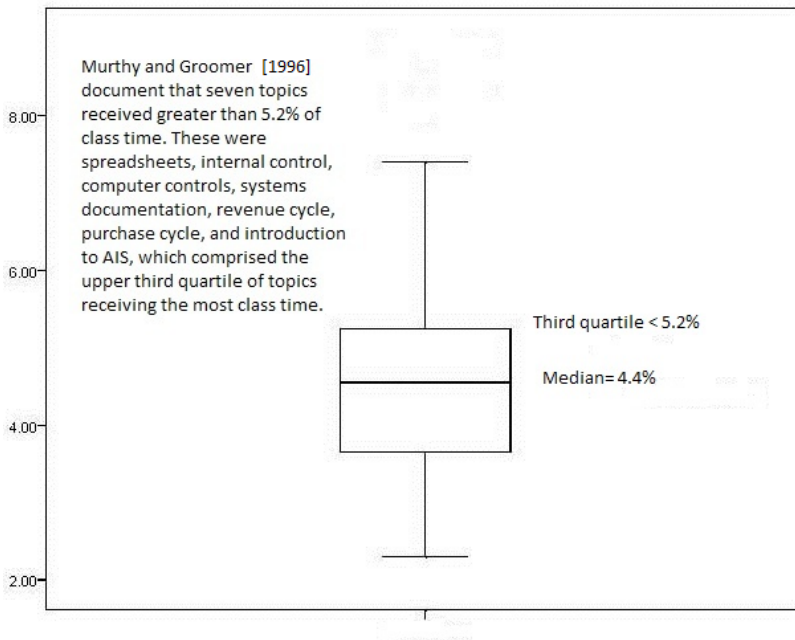


FIGURE 4
Box-Plot of the Distribution of Faculty Rankings of
AIS Topics in Smith & Bain [1993]



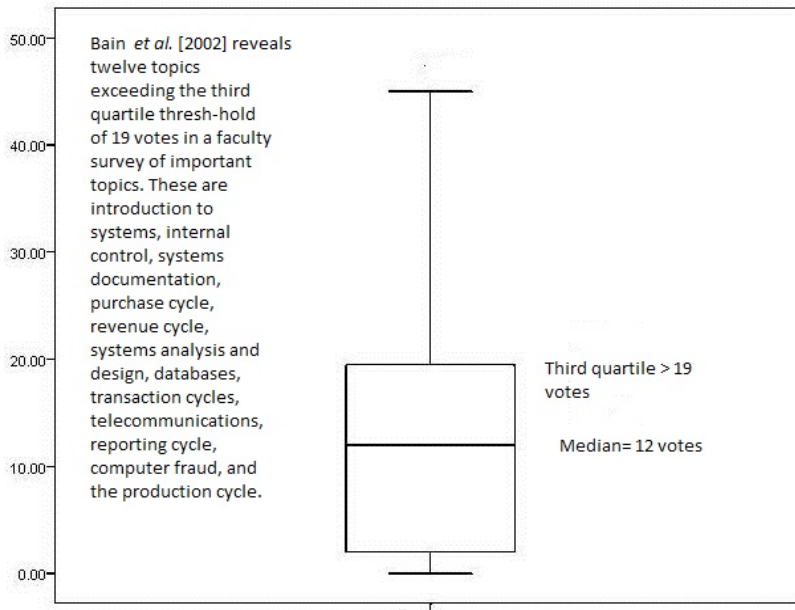
Murthy and Groomer [1996], like Davis and Leitch [1988], operationalized percent of class time as a measure of importance. Seven topics (spreadsheets, internal control, computer controls, systems documentation, revenue cycle, purchase cycle, and introduction to AIS) were shown to be above the third quartile class time threshold of 5.2%.

FIGURE 5
Box-Plot of the Distribution of Percentages of Class Time
Allocated to AIS Topics in Murthy & Groomer [1996]



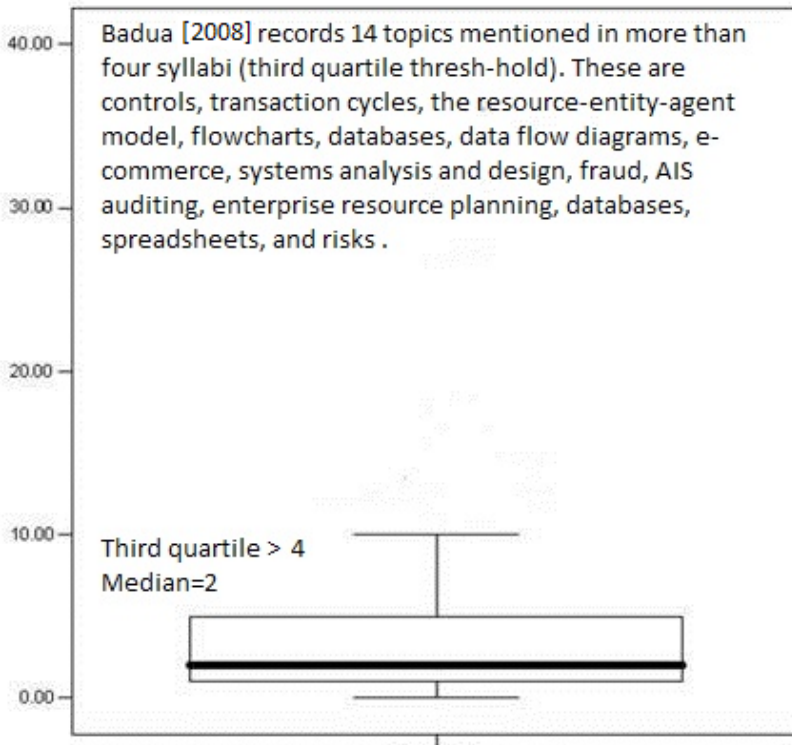
Bain *et al.* [2002] surveyed faculty to see how many favored a certain topic. Twelve important topics (introduction to systems, internal control, systems documentation, purchase cycle, revenue cycle, systems analysis and design, databases, transaction cycles, telecommunications, reporting cycle, computer fraud, and the production cycle) were identified as being favored by a greater number of faculty than the third-quartile threshold (19.25 faculty votes).

FIGURE 6
Box-Plot of the Distribution of the Number of Faculty for an AIS Topic in Bain *et al.* [2002]



Finally, Badua [2008] counted the number of times faculty syllabi mentioned teaching a particular topic. The distributions of topic frequencies generated a third-quartile threshold of four syllabi mentions, exceeded by 14 topics (controls, transaction cycles, the resource-entity-agent model, flowcharts, databases, data-flow diagrams, e-commerce, systems analysis and design, fraud, AIS auditing, enterprise resource planning, databases, spreadsheets, and risks).

FIGURE 7
Box-Plot of the Distribution of Syllabus Mentions of AIS Topics in Badua [2008]



The first four papers have an average of about four outlier topics, while the last three papers have an average of 11 topics. This may imply that pedagogy has changed in that there has been a growth in the number of topics considered by faculty to be essential to the course [Doost *et al.*, 2003]. Another noticeable change is the emergence in the 1990s of transaction cycles, either taught as a group or individually (revenue cycle, purchase

cycle, etc.). This observation is buttressed by those in Kee [1993] and David *et al.* [1999] which document the increased importance of transaction cycles in accounting practice and advocate increased research of the topic in AIS scholarship.

However, database-related topics and controls remain important throughout the studies. This is because computerized AIS applications are essentially databases with accounting specific interfaces to allow for input of transaction data and output of financial records [McCarthy, 1982]. Similarly, controls remain an important feature of AIS education because the integrity of transactions and custody of assets are an issue whether or not a firm's accounting system is electronic.

Results of Content Analysis of Oversight Committee Topic Recommendations over Time: While faculty initiatives are probably the best indication of the current state of pedagogy at any given moment, recommendations by overseeing organizations should also be considered. This is because the role of these bodies is to provide guidance for faculty and educational institutions and, hence, to take into consideration various interests and perspectives. Thus, their pronouncements are an indication of a wider range of AIS education stakeholders, such as industry, government, students, and a wider cross section of faculty than would be represented in any individual pedagogical study. Also, to the extent that faculty heeds these overseers' recommendations, the pronouncements of such boards are a leading indicator of the future of AIS pedagogy.

The table below summarizes the recommended topic emphases from three different oversight committees over the last three decades. These include the AAA Mock Committee Report of 1987, the 1999 AICPA Core Competencies Committee, and the 2005 AICPA Top Technologies Committee.

TABLE 3
AIS Teaching Topics Recommended by Oversight Bodies

<i>Mock Committee [1987]</i>	<i>AICPA Core Competencies [1999]</i>	<i>AICPA Top Technologies [2005]</i>
auditing of AIS	systems analysis	information security management
management use of information systems	systems design	privacy management
managing information systems	output design	secure data storage
use of systems technology	systems implementation	transmission and exchange of data
AIS applications	project management	business process improvement
systems analysis and design	systems strategy and decision making	work flow and process exception alerts
technology of information systems	technology implications of security, risk, and controls	mobile and remote computing
database concepts	data modeling	technology training and competency
internal control		identity and access management
		improved application and data integration
		knowledge management and electronic data retention strategy

The “leading” nature of these oversight boards becomes apparent when comparing them to Table 1. The earliest oversight body, the 1987 Mock Committee, includes internal control as one of its recommended topic emphases. The six subsequent pedagogical studies consistently mention it as one of its most important topics, and in five of them, controls are ranked first or second in importance. However, internal control is absent in the last two committee recommendations lists. It is possible, but highly unlikely, that this omission is due to these committees coming to believe that controls are no longer important, especially in the light of recent events surrounding the late 20th century accounting scandals. A more plausible explanation is that earlier oversight boards were highlighting a lack of controls coverage, but that the last two boards, noticing the increased curricular attention in more recent years, omitted controls from their “wish list” as faculty had already complied.

The same could be argued for systems analysis and design

which was recommended by the oversight bodies in 1987 and 1999, but not in 2005. Analysis of the AIS pedagogical literature that makes up one-third of the data in this paper shows consistent reference to “transaction cycles” and “systems analysis and design.” These two terms are interconnected. All systems design flows from the types of transactions a firm routinely has. Conversely, systems “analysis” entails the “breaking up” of a firm’s information systems applications into the component functional groups of transactions that comprise them. This emerging emphasis on systems analysis and design may be considered as a response to the changed role of the accountant, no longer merely a recorder of data and information, but an analyst and designer of data and information flows [Wootton and Kemmerer, 2007].

With this in mind, the latest round of recommendations, which include emerging issues such as privacy, security, mobile computing, and identity management, may be expected to engender a proliferation of curricular coverage. These initiatives could be considered a response to current or recent technological innovation and is perhaps appropriate for a subject as technology driven as AIS.

AIS pedagogy is characterized as maintaining a consistent emphasis on database-related topics and controls from its earliest days. However, recent pedagogy has exhibited an increase in the number of topics covered and a growing emphasis on transaction cycles. Both findings are consistent with previous research [Doost *et al.*, 2003; Badua, 2008]. AIS faculty have also been shown as responsive to oversight institutions’ recommendations. These oversight bodies, in turn, have been shown to be responsive to technological change.

As with the assimilation of AIS research, the increase in pedagogical topics is also a double-edged sword. While students benefit from a broader spectrum of information, their ability to absorb and retain these data may be strained. The optimum number of topics taught per AIS course, the number and sequence of AIS courses, and topics which ought to be culled or retained are all issues that warrant further investigation.

Indeed, the endeavor of determining topic inclusion and excision is one that entails a consideration of many factors. These include obsolescence of topics in a highly mutable, technologically driven field, behavioral and cognitive characteristics of faculty and students, and the provenance of concepts and topics to AIS as opposed to other accounting fields such as cost accounting, financial accounting, or auditing. Ultimately, such

a determination also entails a consideration of the essential nature of AIS, a question this paper helps address.

CONCLUSIONS

This paper examines what is a brief 17-year period of AIS research and education. Despite the relative youth of AIS as defined in this paper, AIS has experienced major changes in its research agenda and a dynamic interaction between faculty and oversight bodies.

This study considered evidence from scholarly literature, previous studies documenting faculty pedagogical initiatives, and recommendations from overseeing bodies in an effort to identify patterns and detect changes in the topical emphases studied and taught by AIS academics. Results indicate two developments in AIS research. First, there appears to be an emerging behavioral emphasis, contemporaneous with a similar behavioral trend in accounting research beginning in the 1990s [Flesher and Flesher, 2006]. Second, there seems to be a process of assimilation of AIS scholarship into the academic accounting research network.

These findings may reflect both desirable and undesirable consequences. While increasing assimilation of AIS research contributes to an increasingly integrated academic accounting research network, with concomitant benefits of more facile scholarly dialogue, this may also imply that a "special" nature of AIS scholarship with its purported focus on the accounting applications of information systems modeling [McCarthy, 1982] and hardware and software technology [Stone, 2002] being lost.

Another finding of this study is the similarity between the professional legitimization of cost accounting outlined in Abbott [1988] and that of AIS. The advent of digital technology in the mid-20th century and the internet revolution of the late 20th and early 21st centuries would be analogous to the role played by the Hollerith machines, fostering the technical capability to process and communicate large amounts of data much more quickly than before. However, merely possessing the capacity for rapid data processing would not be sufficient to distinguish AIS as a distinct branch of the accounting family of professions. It would require the creation of the concept of transaction cycles based on routine accounting functions (revenue cycle, purchasing and production cycle, payroll cycle, etc.) and the adoption of information systems data-flow modeling conventions to portray these cycles to justify that distinction. Thus, AIS came about as a hybrid of traditional accounting and information technology

in order to facilitate the design, assessment, and implementation of internal controls to guide the development and deployment of new business technology and to assist in the making of business decisions that depended on any of these transaction cycles. As with the Abbott framework, merely possessing the hardware (and software in the case of AIS) would not be enough. It took the creation of rigorously developed, formalized, theoretical conventions and their application to practical business problems to establish the jurisdictions of cost accounting and AIS.

The trend in AIS research identified in this study is interesting given the focus of AIS teaching. The AACSB suggests that faculty make “efforts to learn about their specialty and how it is applied in practice [and] engage in constant learning activity to maintain currency with their fields’ developing research and theory” [AACSB, 2011, p. 48]. However, this study shows that while there has been an increased emphasis on systems design and implementation in the classroom, the focus of AIS research has shifted away from these towards financial and behavioral topics. Future research should investigate these trends and determine the causes of this divergence.

A major limitation of this study was due to data availability. Future research in this area should study the effect of the Sarbanes-Oxley (SOX) legislation on AIS research. This law was promulgated in 2002 and took effect in 2003, which corresponds to the end of the time period of AIS research considered in this paper. Many of the SOX provisions may have AIS implications, such as internal controls provisions in SOX Section 404. Recent research [Bradford and Bazel, 2007] has found significant changes in such AIS-related fields as systems documentation since SOX.

Additionally, although this paper reveals certain trends in AIS teaching and research, future research could study the influences behind those changes. A number of influences most likely have contributed to the shaping of AIS research and pedagogy, including advances in technology, more accounting faculty and professionals being trained in this area of accounting, as well as possible broader social and economic phenomena. This paper, by documenting shifts in research and curriculum, provides a critical basis upon which to explore the causes of such changes.

While there may be some doubts as to whether an area of accounting as young as AIS could possibly have accumulated a compelling history, the findings reported and analyzed herein seem to suggest that AIS has enjoyed enough of the vicissitudes

of time to deserve a mention in accounting history. The questions raised by these results imply that this story is far from complete.

REFERENCES

- Abbott, A. (1988), *The System of Professions* (Chicago: University of Chicago Press).
- Abrahamson, E. and Amir, E. (1996), "The Information Content of the President's Letter to Shareholders," *Journal of Business, Finance, and Accounting*, Vol. 23, No. 8: 1,157-1,182.
- American Accounting Association (1987), "Committee on Contemporary Approaches to Teaching Accounting Information Systems (Mock Committee)," *Journal of Information Systems*, Vol. 2, No. 1: 42-49.
- American Institute of Certified Public Accountants, Accounting Education Executive Committee (1999), *Core Competency Framework for Entry into the Accounting Profession* (New York: AICPA).
- American Institute of Certified Public Accountants (2005), "2005 Top 10 Technologies." Accessed June 10, 2009 from <http://infotech.aicpa.org/Resources/Top+Technology+Initiatives/2009+Top+Technology+Initiatives+and+Honorable+Mentions.htm>.
- Association for the Advancement of Collegiate Schools of Business (2011), *Eligibility and Accreditation Standards* (Tampa, FL: AACSB).
- Badua, F. (2008), "Pedagogy and the PC," *Journal of Education for Business*, Vol. 83, No. 5: 259-264.
- Bain, C., Blankley, A., and Smith, M. (2002), "An Examination of Topical Coverage for the First Accounting Information Systems Course," *Journal of Information Systems*, Vol. 16, No. 2: 143-164.
- Becker, R. (1994), "A Brief History of Statistics," in Dirschedl, P. and Ostermann, R. (eds.), *Computational Statistics* (Heidelberg: Physica-Verlag): 81-110.
- Berelson, B. (1971), *Content Analysis in Communication Research* (New York: Hafner Publishing Company).
- Bertin, J. (1967), *Sémiologie Graphique: Les diagrammes, les réseaux, les cartes* (Paris: Gauthier-Villars).
- Bradford, M. and Brazel, J. (2007), "Flirting with SOX 404: Are Private Companies Interested in a Relationship?" *Strategic Finance*, Vol. 89, No. 3: 48-53.
- Brown L., Garner, J., and Vasarhelyi, M. (1987), "An Analysis of the Research Contributions of *Accounting, Organizations and Society*, 1976-1984," *Accounting, Organizations and Society*, Vol. 12, No. 2: 193-204.
- Colorado State University (2011), "Writing Guide: Content Analysis." Accessed October 10, 2011 from <http://writing.colostate.edu/guides/research/content>.
- Computer Hope (2011), "When was the First Computer Invented?" Accessed October 10, 2011 from www.computerhope.com/issues/ch000984.htm.
- David, J., Dunn, C., McCarthy, W., and Poston, R. (1999), "The Research Pyramid: A Framework for Accounting Information Systems Research," *Journal of Information Systems*, Vol. 13, No. 1: 7-30.
- Davis, J. and Leitch, R. (1988), "Accounting Information Systems Courses and Curricula: New Perspectives," *Journal of Information Systems*, Vol. 3, No. 1: 153-167.

- Doost, R., McCombs, G., and Sharifi, M. (2003), "The State of Teaching Accounting Information Systems: Is There a Gap?" *Review of Business Information Systems*, Volume 7, No. 3: 61-67.
- Fleischman, R. and Radcliffe, V. (2005), "The Roaring Nineties: Accounting History Comes of Age," *Accounting Historians Journal*, Vol. 32, No. 1: 203-210.
- Fleming, R., Graci, S., and Thompson, J. (1990), "Characteristics of the Work of Leading Authors of *The Accounting Review*, 1926-1945," *Accounting Historians Journal*, Vol. 17, No. 1: 5-25.
- Fleming, R., Graci, S., and Thompson, J. (1991), "Tracing the Evolution of Research in *The Accounting Review* through Its Leading Authors: 1946-1965," *Accounting Historians Journal*, Vol. 18, No. 2: 27-54.
- Fleming, R., Graci, S., and Thompson, J. (2000), "The Dawning of the Age of Quantitative Empirical Methods in Accounting Research: Evidence from the Leading Authors of *The Accounting Review*, 1966-1985," *Accounting Historians Journal*, Vol. 27, No. 1: 43-72.
- Flesher, D. and Flesher, T. (2006), "A History of the ABO Section of the AAA," working paper.
- Fordham, D. (2005), "New Roles for AIS Courses," *Journal of Information Systems*, Vol. 16, No. 1: 113-129.
- Haseman, W. (1978), "Management Accounting Literature: 1925 and 1975," *Accounting Historians Journal*, Vol. 5, No. 2: 71-78.
- Heagy, C. and Rakow, E. (1991), "Course Content of AIS," *Accounting Educators' Journal*, Vol. 3, No. 2: 140-158.
- Jones, M. and Shoemaker, P. (1994), "Accounting Narratives: A Review of Empirical Studies of Content and Readability," *Journal of Accounting Literature*, Vol. 13, No. 1: 142-184.
- Journal of Information Systems* (2011), "Editorial Policy." Accessed October 10, 2011 from www.jisonline.com
- Kee, R. (1993), "Data Processing Technology and Accounting: A Historical Perspective," *Accounting Historians Journal*, Vol. 20, No. 2: 187-216.
- Kieso, D., Weygandt, J., and Warfield, T. (2007), *Intermediate Accounting*, 12th edn. (Hoboken: Wiley).
- Krippendorff, K. (2004), *Content Analysis: An Introduction to Its Methodology*, 2nd edn. (Thousand Oaks, CA: Sage).
- McCarthy, W. (1982), "REA Accounting Model," *Accounting Review*, Vol. 58, No. 3: 554-578.
- Mock, T. (1999), "Accounting Information Systems in the Encyclopedia of Business." Accessed June 10, 2009 from http://findarticles.com/p/articles/mi_gx5209/is_1999/ai_n19125599/.
- Murthy, U. and Groomer, S. (1996), "An Empirical Analysis of the Accounting Information Systems Course," *Journal of Information Systems*. Vol. 10, No. 2: 103-127.
- Murthy, U. and Wiggins, C. (1999), "A Perspective on Accounting Information Systems Research," *Journal of Information Systems*, Vol. 13, No. 1: 3-6.
- Previts, G. and Brown, R. (1993), "Development of Government Accounting: A Content Analysis of Journal of Accountancy," *Accounting Historians Journal*, Vol. 20, No. 20: 119-139.
- Smith, L. and Bain, C. (1993), "Scope of AIS Based on Textbook Coverage," *Accounting Educators' Journal*, Vol. 5, No. 2: 1-11.
- Smith, M. and Taffler, R. (2000), "The Chairman's Statement: A Content Analysis of Discretionary Narrative Disclosures," *Accounting, Auditing, & Accountability Journal*, Vol. 13, No. 5: 624-646.

Badua and Watkins, *History of Accounting Information Systems*

103

- Steinbart, P. (2009), "Thoughts about the Future of the *Journal of Information Systems*," *Journal of Information Systems*, Vol. 23, No. 1: 1-4.
- Stone, D. (2002), "Researching the Revolution: Prospects and Possibilities for the *Journal of Information Systems*," *Journal of Information Systems*, Vol. 16, No. 1: 1-6.
- Tukey, J. (1962), "The Future of Data Analysis," *Annals of Mathematical Statistics*, Vol. 33, No. 1: 1-67.
- Vasarhelyi, M., Bao, D., Berk, J. (1988), "Trends in the Evolution of Scholarly Accounting Thought: A Quantitative Examination," *Accounting Historians Journal*, Vol. 15, No. 1: 45- 64.
- Wootton, C. and Kemmerer, B. (2007), "The Emergence of Mechanical Accounting in the US, 1880-1930," *Accounting Historians Journal*, Vol. 34, No. 1: 91-124.
- Wu, F. (1983), "Teaching Accounting Information Systems: A Synthesis," *Issues in Accounting Education*, Vol. 1, No. 1: 132-146.
- Yen, A., Hirst, D., and Hopkins, P. (2007), "Content Analysis of Comprehensive Income Exposure Draft Content Letters," *Research in Accounting Regulation*, Vol. 19, No. 1: 55-82.

Accounting History

ANNOUNCEMENT

The third Accounting History International Emerging Scholars' Colloquium

Paris, France

11-13 JULY 2012

Organized in cooperation with SKEMA Business School
Université Paris-Sud 11

This international forum is designed for emerging scholars of all ages and career stages, including doctoral degree students, new faculty and other emerging accounting researchers who have an interest in accounting history research and publication, and who seek to obtain feedback from senior faculty members on their historical accounting research projects in an intellectually stimulating environment.

The third forum will be organized in cooperation with SKEMA Business School and the University Paris-Sud 11. The colloquium will be held at SKEMA Business School, Parisian campus at La Défense. La Défense is the major business district in Paris, situated on the Historical Axis of the French capital, near major sites like The Louvre, Champs Elysées, and The Arc de Triomphe. Please note that the event will take place on the eve of the French National holiday, celebrating the historic Bastille Day and featuring memorable festivities.

The forum will be led by Garry Carnegie of RMIT University and Brian West of the University of Ballarat, Australia who are the editors of *Accounting History*, the journal of the Accounting History Special Interest Group of the Accounting and Finance Association of Australia and New Zealand. Other senior faculty members participating are as follows: Lisa Evans, University of Stirling, UK; Elena Giovannoni, University of Siena, Italy; Delfina Gomes, University of Minho, Portugal; Marc Nikitin, University of Orleans, France and Henri Zimmovitch of the University Paris-Sud 11, France.

Expressions of interest in the third *Accounting History* International Emerging Scholars' Colloquium (3AHIESC) should be addressed to the editors, *Accounting History* and forwarded to Leona Campitelli: leona.campitelli@rmit.edu.au

Further information about the Colloquium will soon be available at the 3AHIESC website, hosted by the Lille School of Management Research Center: <http://www.lsmrc.com/>

Inquiries may be directed to the Colloquium Convenor, Mrs. Raluca Sandu, SKEMA Business School: raluca.sandu@skema.edu

Information about SKEMA Business School is found at:
<http://www.skema.edu/en>

Information about University Paris-Sud 11 is found at:
<http://www.u-psud.fr/en/index.html>

Information about visiting Paris is obtainable at: www.paris.fr

Accounting Historians Journal
Volume 38, Number 2
December 2011
pp. 105-124

Alan Sangster
MIDDLESEX UNIVERSITY BUSINESS SCHOOL
Greg N. Stoner
UNIVERSITY OF GLASGOW
and
Patricia McCarthy
OPEN UNIVERSITY BUSINESS SCHOOL

IN DEFENSE OF PACIOLI

Abstract: This paper responds to Basil Yamey's paper in the December 2010 issue of this journal. In that paper, Professor Yamey contradicts some of the points made in our 2008 paper, also in this journal, in which we conclude that Pacioli's *Summa de Arithmetica, Geometria, Proportioni et Proportionalita* (1494) was written primarily for merchants and their sons. He does so by attempting to explain why Pacioli's exposition of double-entry bookkeeping, *De Computis et Scripturis*, was neither an effective reference text for merchants nor a satisfactory school text for their sons. We are unconvinced by Professor Yamey's argument and counter it in this paper by demonstrating that, if anything, Pacioli's bookkeeping treatise was even more fit-for-purpose than we previously indicated.

INTRODUCTION

We welcome the commentary by Professor Basil Yamey [2010] on our paper [Sangster *et al.*, 2008], in which we concluded that the *Summa de Arithmetica, Geometria, Proportioni et Proportionalita* (*Summa*) of Luca Pacioli [1494] was written primarily for merchants and their sons. We are grateful for this opportunity to revisit our work with a new purpose, adding evidence to our previous arguments and, not least, to correct at least one error in our paper that has troubled us since it appeared in print.

Some of Professor Yamey's comments focus on our paper and some on *De Computis et Scripturis* (*De Scripturis*), Pacioli's treatise on double-entry bookkeeping (DEB). We shall endeavor to address both sets of comments. First, however, we must consider Yamey's overall conclusion and the method by which he attempts to justify reaching it.

Yamey states that he is not persuaded by our conclusion that *Summa* was written for merchants and their sons. To support this position, he focuses *solely* upon consideration of *De Scripturis* [Yamey, 2010, p. 146, footnote 1] to demonstrate that *De*

Scripturis was “seriously inadequate and defective” (pp. 145-146).

We do not accept that Yamey succeeds in demonstrating the inadequacy of *De Scripturis* and, consequently, we do not believe that he is correct in questioning the validity of our conclusion concerning the intended market for *Summa*. We also do not believe that focusing solely upon *De Scripturis* rather than on *Summa* in its entirety is appropriate, particularly in this case as our paper considered the market for the entire book, not solely *De Scripturis*. Nor do we believe it is possible to reach such a conclusion while ignoring relevant characteristics of the time and place in which it was printed. We first revisit the main theme of our 2008 paper.

THE MERCHANT MARKET

At the beginning of his commentary, Yamey [2010, p. 145] reiterates what he said in his article on *De Computis* in 2004: “... it is unlikely that merchants, even Italian merchants, were major purchasers of the *Summa*.” In this earlier article, Yamey [2004, p. 144] concluded that, “The fact that so many copies have survived to the present day is best explained in terms of purchases by mathematicians and other learned individuals rather than by merchants.” We addressed these issues in our 2008 paper and concluded that a print run of 1,000 or more copies¹ made it inconceivable that purchases of *Summa* were mainly by mathematicians and other learned individuals. Along with a number of other factors, this left the merchant class as the likely purchasers of *Summa*, a market that is consistent with the number of extant copies of the book.

Yamey appears to have overlooked the fact that our conclusion (that the motivation for the publication of *Summa* was to provide an instructional and reference text for merchants and their sons) was based upon the content of *Summa* as a whole. His commentary appears to imply that he believes that we identified that market on the assumption that *Summa* would have sold into it because 27 of its 615 pages (4% of the book) consisted of a treatise on DEB that was “fit-for-purpose,” and that he believes that merchants would not have bought *Summa* if the treatise were not “fit-for-purpose.” If so, he is incorrect on both

¹Any such statement ought to be based upon a comparison of the number of copies printed with the number that have survived. When Yamey wrote his 2004 paper, it was believed that only 300 copies of *Summa* had been printed [Antonori, 1980]. Antonori revised this estimate to 1,200 in 1994 (in conversation with Hernández-Esteve, 2009), but never said so in print. Sangster [2007] estimated that 1,000 to 2,000 copies may have been printed.

counts.

SUMMA AS A WHOLE

The need to consider *Summa* as a whole when analyzing the market for the book is supported by the mathematician Smith [2008, p. 143; see also Rankin, 1992], whose Ph.D. in 1992 was on Pacioli and his mathematics: “[*Summa*] was [written] with the aim of completeness: to furnish the merchant, and anyone interested in mathematics generally, with the tools necessary for the efficient running of a commercial business.” We made a similar point in our paper [Sangster *et al.*, 2008, p. 130]:

The bookkeeping treatise was not only intended to be read and used by merchants and their sons, it was designed specifically for them. Further analysis of the content and sequencing of [*Summa*] indicates that the entire book was written primarily as a reference text for merchants and as a school text for their sons.

While some merchants may, as Yamey [2010, p. 146] suggests, have purchased *Summa* “primarily for its pages on bookkeeping and accounts,” anyone reading even the first two pages of Smith’s [2008] article would appreciate that the relevance of the rest of *Summa* to any merchant makes that extremely unlikely.

Pacioli clearly saw *De Scripturis* as an integral part of *Summa*. As Pacioli [Geijsbeek (trans.), 1914, p. 33] writes in his introduction to the treatise:

The second thing necessary in business is to be a good bookkeeper and ready mathematician. To become such we have given above [in the foregoing sections of the book] the rules and canons necessary to each transaction, so that any diligent reader can understand it all by himself. If one has not understood this first part well, it will be useless for him to read the following.

The undeniable and important link between bookkeeping and mathematics is also found in the comments of the mathematical historian Heeffer [2009, pp. 2, 13] on the development of both subjects in the 14th and 15th centuries:

These two developments of the fourteenth and fifteenth century were both instrumental in the objectivation of value and they supported the reciprocal relations of exchange on which mercantilism depended... [Pacioli’s] *Summa* literally brings together all important aspects of knowledge in such a mercantile society, including algebra and double-entry bookkeeping.

This link between bookkeeping and mathematics is longstanding and is not confined to the 14th and 15th centuries. The bookkeeping treatise by John Mellis [1588] is followed by a treatise on arithmetic which includes a chapter on barter calculations and a chapter on calculating currency exchange. It is also evident in Edwards' [2009] discussion of the way that DEB was taught as applied algebra in late 18th and early 19th century England, and by the frequent inclusion of bookkeeping in U.K. school mathematics texts, such as Hutton's text from 1802. Even today, many U.K. universities require accounting students to obtain passes in high-school mathematics examinations as a prerequisite for admission to study accounting.

We are perplexed that Yamey appears so unwilling to accept our conclusion concerning the market for *Summa*. However, as he chooses to focus on *De Scripturis* in his commentary, we shall endeavor to demonstrate that he is incorrect in dismissing its relevance and usefulness to merchants and their sons, particularly in Venice where the book was printed. In order to do so, we must place some of the issues raised by Yamey in context, in particular printing and education.

PACIOLI'S *SUMMA* IN PLACE AND TIME

Printing: Summa was published only 40 years after the first book was printed in Mainz on the newly invented Gutenberg press. In those early years of printing, typesetting was crude and inconsistent, and proofreading was prone to inaccuracy, if it took place at all [Sangster, 2007, p. 134]. Developments in printing in the Renaissance occurred over a lengthy period. For example, the Venetian-based printer Erhard Ratdolt was the first to discover how to print graphics in the margins of pages and then used the technique (which was crucial in the printing of *Summa*) in his printing of Euclid's *Elementa Geometriae* in 1482 [Baldasso, 2010, p. 91], the book Pacioli is using in his famous portrait currently in Naples [Mackinnon, 1993].

De Scripturis suffers in places from poor typesetting. Yet, if a student of bookkeeping in 2010, using Geijsbeek's [1914] similarly presented translation of *De Scripturis*, feels that *De Scripturis* merits being described as "amazing" and another states, "I feel that the double entry process is very easy when using this book as it makes clear sense" [Sangster *et al.*, 2010], what would the students or merchants of the late 15th century for whom it was written have thought about it? We do not know, but we can surmise which generation of students would be more likely to relate to the content and style of the text, and it is not those

studying the subject in 2010.

In terms of representing bookkeeping in print, compared with Pacioli's *De Scripturis* of 1494, we see improvements in Tagliente's two somewhat unsophisticated texts on double entry in the journal (for gentlemen and merchants) [1525a] and single entry in a ledger (for merchants and artisans) [1525b],² and many more in Manzoni's [1540] textbook, *Quaderno doppio...*, published some 40 years after *Summa*. Yamey elects to compare the 1540 edition of Manzoni's book to *De Scripturis*, but he makes no allowance for the increased sophistication of printing or professionalism of printers and typesetters that appear to have occurred during the 46 years that passed between their publications. He also fails to take into account that readers of printed textbooks in 1494 were not accustomed to the virtually perfect typesetting of the 21st century. As was previously mentioned, typesetting was erratic; and it was no less prone to error than text in scribal manuscripts. A present-day reader would possibly find some of the typesetting in *De Scripturis* confusing and irritating, but would a merchant have done so in 1494 and would it have left him "perplexed," as Yamey [2010, p. 146] suggests? Surely, not to the same extent as it might today and not to the extent that anyone reading the actual text would be confused for long [Sangster, 2010].

Education: Leonardo Pisano's [1202] *Liber Abai*, a manuscript book of applied mathematics, was the first of its type. It spawned not only many abridged versions, but a completely new branch of education: the abbaco schools of Northern Italy,³ schools for sons of merchants and other craftsmen [Grendler, 1989]. *Summa* was a school textbook. Yamey [2010, p. 150] cites Raymond de Roover [1944] to that effect and, as we explained [Sangster et al., 2008, pp. 124, 128], the schools for which it was prepared were the abbaco schools. Ulivi [2002, p. 11] offers an alternative view, suggesting that texts such as *Summa* were principally intended as *aide memoires* for those who had already studied in an abbaco school, if anything, reinforcing what we wrote concerning the market for the book. As the book was printed in Venice, it would have been sold mainly in that region, an assumption we implicitly made in our consideration of the market and in our discussion of teachers and students in the abbaco school system.

2 See Gordon [1914, pp. 156-157].

3 The abbaco school system operated in the north of the country in cities like Florence, Lucca, Parma, Perugia, Pisa, Siena, and Venice.

De Roover [1944, p. 398] discusses the omission of topics from *De Scripturis* but accepts that this is justified. Yamey [2010, pp. 145-146] is of a different opinion and uses the absence of some topics from *De Scripturis* as partial justification for stating that *De Scripturis* was deficient and not fit-for-purpose, either for merchants or, disagreeing with de Roover, for their sons. How can anyone possibly *know* if this was the case? We contend that there is good reason to believe that *De Scripturis* actually covers all the basic principles of DEB clearly enough to be used by merchants and used effectively in a classroom, even 500 years ago. We also believe that Yamey is wrong in how he interprets the relevance of the content and presentation of material in *De Scripturis*.

A 15th CENTURY LENS

Summa and *De Scripturis* must be judged through a 15th century lens, not a modern one, and judged as a whole. We believe that in limiting his assessment of our conclusion concerning the market for *Summa* to a critique of *De Scripturis*, Professor Yamey has used a lens that is neither of that period nor modern, and is overwhelmingly myopic. In many places, he also takes no or insufficient note of the importance of analyzing and/or critiquing the contents of *De Scripturis* from a perspective that is sympathetic to the technological, cultural, educational, and mercantile context of the time and place of *Summa's* genesis. We also believe that he is too willing to dismiss opinion which challenges the views he holds.

To illustrate this last point, Lane [1945, p. 44] compared research conducted by de Roover [1941] on the ledger accounts of Florentine cloth manufacturers with his own on the ledger accounts of Venetian merchants in the 15th and 16th centuries. He found that the accounts maintained, the timing and frequency of account closure, the accounting techniques applied, and the key focus of accounting activity were not the same. Bookkeeping in the 15th century was performed according to the needs of the enterprise and to meet the decision-making needs of the managers, and these were clearly different in these two centers of business activity.

Yamey [2010, p. 151] asserts that the differences between the practice of bookkeeping and accounting in various parts of Italy were not significant, a reasonable statement if we are considering solely the *principles* of DEB. However, it seems that Yamey (p. 158) has the wider discipline of accounting in mind for he completely ignores the significantly different accounting

priorities and techniques in use in Florence compared to Venice and uses the word “Italy” when he should have used “Florence.” The substitution is misleading, to say the least, and it results in his continuing a line of argument that we believe to be fundamentally flawed. This argument, as we discuss later in this paper, goes to the core of his view that *De Scripturis* was not fit-for-purpose.

DE SCRIPTURIS

Yamey raises a number of issues criticizing *De Scripturis*, including its lack of appropriate example entries and the omission of crucially important bookkeeping and accounting techniques that were in use at that time. Before addressing the issues he raises in more detail, we shall first briefly clarify the criticism he makes concerning example entries and then offer some initial background concerning the omission of topics in the context of the time when *Summa* was published. We will return to both these topics later.

Examples: De Scripturis does not include a surfeit of examples of bookkeeping entries, but it does have more than many realize. It contains 25 examples of journal entries, not just the seven in Chapter 12, virtually one per page of text. Similarly, the text contains several examples of ledger entries, sufficient for Yamey [2010, p. 153] to state that there was no need for more. What Yamey (p. 147) is concerned about is the lack of a model set of entries in account books (i.e., journal and ledger), such as that contained in Manzoni’s textbook of 1540, not worked examples such as would typically appear in a modern textbook. In this case, as we shall explain later, we believe he is focusing on the wrong learning resource and overestimating the instructional benefits of examples without detailed explanations.

Important Omissions: Whatever the merits of Yamey’s (p. 150) position concerning topics not covered in *De Scripturis*, incomplete coverage was typical of such books at that time. As Grafton [2008, p. 29] observes:

Again and again, publisher, authors and readers of textbooks in technical fields noted, often with rancor, that the textbook [of the 15th and 16th centuries] could not provide all of the information or instruct in all of the techniques that one needed to practice in a given field....In general, textbooks [of that period] on technical subjects were always liable to be incomplete.

Even if Professor Yamey were correct, does being guilty of the same “crime” as all these other textbooks render *De Scripturis* (and consequently, in Yamey’s eyes, *Summa*) unfit as an instructional manual or reference text for merchants and their sons and, in particular, merchants of Venice?

A MISCELLANY OF ARGUMENT: CLAIMS AND RESPONSES

1. **Yamey [2010, p. 144] contends that our statement that the “bookkeeping treatise would have been invaluable to many merchants in various ways” [Sangster *et al.*, 2008, pp. 128-129] rests on the assumption by us that *De Scripturis* was an effective exposition of the double-entry method and guide to its practice in Venice.**

It is inaccurate of Yamey to imply that we made such an *assumption*. Indeed, we acknowledged (p. 113) deficiencies in the treatise, deficiencies that are the basis of many of the points he raises, adding that, “Anyone using the bookkeeping treatise to learn how to do bookkeeping would need to have either been in business himself or, as suggested by Yamey [1978, p. 580], to have known someone he could ask for help in following it.” However, our position has changed since 2008. While we still subscribe to the view that such access or help would have been useful, we are no longer so convinced that it would have been necessary, as we explain in the following sections.

2. **Yamey [2010, p. 150] is doubtful that “an exposition directed at experienced merchants would also serve as an introductory basic text for inexperienced young beginners.”**

This statement ignores the emphasis upon merchants, not their sons, in Pacioli’s statement in the Introduction to *De Scripturis* [Geijsbeek, 1914, p. 33], that he has prepared his treatise: “In order that [merchants]...may have all the rules that a good merchant needs, I decided to compile... a special treatise which is much needed... to enable them to keep all their accounts and books in an orderly way.” Pacioli clearly believed that sufficient merchants in late-15th century Venice were *not* experienced in the *use* of DEB, and thus justified including the treatise in *Summa*. Has Yamey any reason for implying that Venetian merchants generally *did* have this experience, or that they were more experienced in the use of DEB than their sons? He gives none, and Pacioli ought to have had an informed view on that, having worked for a Venetian merchant for six years 30 years

earlier [Taylor, 1942].

3. The treatise is not sufficiently *detailed* to have been of practical use to merchants.

As alluded to previously, Yamey [2010, p. 150] lists a number of facets and techniques of 15th century accounting practice omitted by Pacioli, including compound journal entries, closing and reversed opening balance accounts, doubtful debts, balancing of merchandise accounts, *nostro* and *vostro* accounts, and fixed-asset accounts. He suggests that the items he lists would have been welcomed, even by “experienced merchants” (presumably “experienced” in DEB) using his treatise to guide them. We accept that the items listed by Yamey were used in practice at that time, but “in Florence” not, as stated by Yamey, “in Italy,” and not typically “in Venice.”

For example, not only was the concept of periodic closing of the ledger as practiced in Florence only infrequently observed by Venetian merchants (so making the inclusion of illustrations of balance accounts in *De Scripturis* much less important than in Florence), venture accounting, as Lane [1945, p. 164] notes, rather than manufacturing accounting, was of primary importance in Venice. “The Venetians, being mainly exporters and importers, were concerned chiefly with keeping track of wares shipped, wares received, and amounts owed by or to agents.” It is, therefore, unsurprising that Lane [1945, p. 173] ascribed the popularity of the “Venetian method” to the quality of Venetian accounting tutors, the printed textbook, and to the fact that, “The venture system of accounting used at Venice was the most practical form for merchants much of whose wealth was coming and going on the seas.” *De Scripturis* deals with how to record such transactions and is clearly focused upon meeting the needs of merchants of Venice, not those in Florence, or elsewhere.

In addition, merchants had access to transactions, and they already knew how to maintain single entry, mainly cash records. Pacioli gave them the tools to convert to a three-book, double-entry system – *memoriale*, *giornale*, and *quaderno* – that was simple and straightforward to apply and that also gave them a means of systematically managing records of their ventures, their debtors, and their creditors. These were surely useful benefits for merchants adopting his Venetian method.

As for the “omitted items,” once the underlying principles of the method are known and understood, any of these could be added if the merchant wished. All he had to do was ask someone to demonstrate how to do so or employ a bookkeeper

who already knew. How long, for example, would it take such a merchant to learn how to prepare a compound journal entry, the first item in Yamey's list, but not something Tagliente [1525a, b] or Manzoni [1540] included in the examples in their Venetian textbooks? It seems strange that Yamey saw the absence of any such entries in *De Scripturis* as being something that would have frustrated a Venetian merchant.

Among topics *not* mentioned by Yamey, two surely ought to have been part of any treatise on DEB and accounting at that time – multiple currencies and barter. Pacioli deals appropriately with the former in *De Scripturis* but, for barter, he chooses to split his coverage, placing most of it in a separate part of *Summa* (the 15-page *Distinctio* 9, *Tractatus* 4 [Pacioli, 1494, ff. 161r-168r]), with some other examples elsewhere [Smith, 2008]. How to record such transactions is covered in Chapter 20 of *De Scripturis*, along with a reference back to the earlier *tractatus* [Pacioli, 1494, f. 204v]. Merchants would surely have been delighted to see the extent of Pacioli's coverage of this topic.

Any assessment of the fitness for purpose of *De Scripturis* ought to include mention of the coverage of these two extremely important topics for 15th century merchants. Pacioli's coverage of barter also demonstrates the questionability of Yamey's decision not to take the rest of *Summa* into account when considering subject coverage and relevance to merchants, a strange decision given that the subheading he used for this section of his Commentary is, "Important Omissions From The *Summa*." If we are going to criticize something, we ought to also give credit where credit is due, otherwise our critique risks being overly selective and biased.

4. Yamey [2010, pp. 151-152] questions our suggestion that *De Scripturis* could have standardized the practice of DEB because the typesetting of the example journal entries in Chapter 12 would have caused too much confusion.

Sangster *et al.* [2008, p. 129] were referring to standardization within a *single* merchant's business: "The merchant could also use the bookkeeping treatise as a guide to ensure that his bookkeeper was actually recording inventory and transactions in the appropriate manner...[*Summa*] effectively gave merchants the capability to audit their bookkeepers through standardizing the DEB method in use." Yamey's conclusion is excessively negative when read in that context, but it is also excessively negative if his interpretation of our wording (as if we referred to

widespread standardization) is used. Any reader of *De Scripturis* can see that the example journal entries in that chapter are incorrectly presented and deduce how they ought to appear from Pacioli's description of the layout to adopt.⁴

5. The treatise is not sufficiently *clear* to have been of practical use to merchants.

Yamey suggests that Manzoni's book of 1540 demonstrates how this topic could have been presented in a manner that is clearer than Pacioli's, principally because it contains 300 example entries into model account books compared with the much smaller number of examples that appear in the text of *De Scripturis* rather than in model account books.

We believe that Pacioli's treatise is considerably clearer than Manzoni's for anyone who wished to *learn* and *understand* the method and then to apply what they had learned in their own businesses because he explains the *principles* of the method better. Manzoni's narrative text is less detailed than Pacioli's and contains many fewer examples within the dialogue. Those that are included are merged into the text with no attempt made to show how they should be entered in the account books. This is perhaps why readers of Manzoni needed the presentation of example entries in the form of a complete journal and ledger while, as we suggest, readers of *De Scripturis* did not.

6. Yamey [2010, p. 152] disagrees with our view that it would have been too costly and complex to include a set of model account books in *De Scripturis*.

In this case, Yamey has misunderstood us. Sangster *et al.* [2008, p. 114, emphasis added] were not referring to adding a set of model account books, but to adding some worked examples:

Including *worked examples* would have significantly increased the length of the bookkeeping treatise, perhaps by as much as 30% if modern texts are a guide. It would also have considerably increased the complexity, and therefore the cost, of the typesetting and required many costly wood blocks to be carved or metal plates to be cast. *It is unlikely to have been an accident that the journal entries shown on the last page appear after all the text.*

In the final sentence, we were suggesting that those extra entries may have appeared on the final page because it was easier to

⁴See, Sangster [2010] for a detailed discussion of this issue.

print them without any surrounding text. What we had in mind was not a set of model account books but, in keeping with Pacioli's pedagogy, worked examples of each of the main types of entries placed in the text, as they would be in a modern text, or presented in the margin, as was done extensively in Volume 2 of *Summa*.

However, is it realistic to think that Pacioli's typesetter would have been capable of doing so with or without the use of wooden or metal blocks? Ability of the typesetter aside, the cost of adding this level of complexity may have been prohibitive in the context of this book, irrespective of whether or not Pacioli truly did not perceive a need to add any more to the treatise. Perhaps Yamey is correct that the examples we had in mind would not require very complex typesetting, but looking at Manzoni's journal entries and comparing them with Pacioli's in Chapter 12 suggests to us that even that level of complexity was beyond the ability of Pacioli's typesetter (who could not even manage to include '/' in the text [Yamey, 2010, p. 151]), and it is that level of complexity that we had in mind.

7. Yamey [2010, p. 149] states that we misinterpret the passage in *De Scripturis* in which Pacioli wrote: "For if we wanted to give you an example of all the ways in which merchants do business...this would make our treatise very long..." and that we use it erroneously as an explanation for why Pacioli did not include a set of examples in the manner of Manzoni.

Yamey correctly identified what Pacioli was referring to calculating amounts to be entered in the journal. However, he has misunderstood both what we had in mind (worked examples not model account books) and our reason for using this quotation, which was simply evidence that supported our contention [Sangster *et al.*, 2008, p. 114] that, "For pragmatic economic reasons, if material was not considered essential in a printed book in the late 15th century, it was omitted."

8. Yamey [2010, p. 149] believes that the lack of a model set of account books, combined with the seriously confusing and internally inconsistent Chapter 34, rendered *De Scripturis* unfit for the purposes we claimed for it.

Yamey made this statement after describing Manzoni's inclusion of a model journal and ledger containing entries for 300 transactions, which Yamey [2010, p. 147] believes is the best

element of Manzoni's textbook from which to learn this subject: "We can be sure that merchants, bookkeepers and schoolboys were much better served by the model set of account books included as an integrated part of Manzoni's treatise than by Manzoni's rule and, indeed, by much of his written text."

As Yamey mentions, Manzoni was not the only person to include an exemplar of this type. Neither, in fact, was he the first. Tagliente's two brief texts [1525a, b] are virtually devoid of textual discussion of principles. In the first, he starts with a brief statement that each entry in the journal is posted to the ledger, once to the debit side of an account and once to the credit side. He then relies almost exclusively upon teaching from example entries in a journal. He does the same in the second book, which shows how to record each of a series of entries in a book for debtors and creditors maintained under single entry. In contrast, Pietra's [1586] textbook is replete with discursive text and also includes over 800 examples in a model set of books covering an entire year. Yamey mentions Ympyn [1543a, b, 1547] and North [1714] as two others whose textbooks contain both text and a set of model account books. Presumably, it was expected that learners seeking confirmation that they have learned everything correctly would look no further than the model set of books.

This is not the same as learning leading to understanding. It is, however, the equivalent of having a deaf and mute tutor at your side as you set about making entries in your account books. Yamey is certainly correct in asserting that including a model set of account books, such as those in Manzoni's text, would have improved Pacioli's treatise. But was the inclusion of such an exemplar a *necessary* addition if *De Scripturis* was to have been fit-for-purpose?

Pacioli was intent upon merchants *learning, understanding,* and then *applying* the principles of DEB from a few simple generalizable statements and examples rather than initially learning and then testing learning using a set of model entries in account books. As Geijsbeek [1914, p. 33] translates Pacioli's Chapter 1 of *De Scripturis* [1494, f. 198v]:

I have written this treatise, in which, step by step, the method is given of making all sorts of entries. Although one cannot write out every essential detail for all cases, nevertheless a careful mind will be able, from what is given, to make the application to any particular case.

Pacioli was not alone. Roger North [1714, p. 13] and Malachy Postlethwayt [1751, p. 317] expressed similar views concerning

the importance of learning principles, understanding them, and then applying them, and that this is achievable with the support of an appropriate (and small) number of examples.

We suggest that Yamey places too much emphasis on the learning that may be obtained from the inclusion of a model set of account books. Such exemplars are useful for drill and practice exercises, and their presence in Manzoni's text may even have encouraged a standardization of the presentation of entries in account books in Venice when it was printed. But they do not teach the method; they do not engage learning even if each of them is explained in the text, which they are not in Manzoni's exemplar ledger; and they are not a necessary condition/provision for the learning of principles. The principles of DEB are simply too straightforward to require such lengthy and detailed exposure to examples. Students learn far better by preparing the entries for themselves, applying the principles of double entry they have been taught. This is what Pacioli did and promoted, and this is what, 500 years later, we do today. *De Scripturis* as it stands is, we believe, sufficient for that phase of learning. As for Chapter 34, which is about closing ledgers and preparing a *Summa Summarum*, we address this comment in point 10.

9. Yamey [2010, pp. 146-147] complains that *De Scripturis* does not include any general rule or rules purporting to guide the reader as to which account to debit and which to credit in a particular case, having previously quoted Manzoni [1540]: “the whole difficulty of the art of double entry bookkeeping is to know how to discern in each transaction which account is to be debited and which to be credited.”

Many students and most accountants we have ever met, including ourselves, would agree that *the* difficulty in double entry lies in *identifying* whether to debit or credit a *particular* account. Yamey [2010, p. 147] initially offers a single rule given by Manzoni as a possible solution to the problem: “[The] rule is to debit the receiver or the thing received, and to credit the giver or the thing given.”⁵

While Yamey is absolutely correct in saying that this rule is evident in many texts, and we have colleagues who were taught it, a single rule capable of use in all circumstances is something of a “holy grail” for writers and teachers of double entry. Recognizing a problem, Yamey [2010, p. 147] indicates limitations

⁵As discussed by Geijsbeek [1914, pp. 84-85], this is by no means the only rule contained in Manzoni's text.

in Manzoni's rule with a very apposite example and switches his focus to Manzoni's use of exemplar account books. Yamey seems to believe that "rules" for this purpose can only be of the style offered by Manzoni, but rules can be presented in the form of generalizable guidance, which is what Pacioli does. His approach is very simple. Within the space of six pages, Pacioli [1494, ff.201r-204r] indicates when to credit the capital account (when it increases), when to credit the cash account (when its value decreases), when to credit a personal account (when its value to the business decreases), when to debit a merchandise account (when its value increases) and when to debit the cash account (when its value increases). He thus focuses upon capital, cash, and credit in explaining how to decide whether to make a credit or debit entry to a particular account. It is then simply a matter of identifying how these principles apply to each transaction and treating the entries accordingly. The correct entries for Yamey's example of giving discount to a debtor who pays his debt early, which cannot be correctly posted using Manzoni's rule, are obvious – a personal account has decreased in value to the business, so you credit the account of the debtor; the debit entry must be to the other account involved in the transaction – discount.

Modern textbooks do not mirror Manzoni's approach of rules plus exemplar account books; they more commonly mirror Pacioli's with, in some cases, the inclusion of explicit rules. For example, Wood and Sangster [2008], the largest selling introductory financial accounting textbook outside North America, has seven pages dedicated to double entry, containing simple rules for debiting and crediting accounts for assets, liabilities, and capital, which is many fewer than the number of rules offered by Manzoni – his general rule in four parts and then eight more rules in one chapter [Geijsbeek, 1914, p. 85]. As in Pacioli's treatise, the side of an account on which entries are made depends solely upon whether the account amount increases or decreases. These simple rules are then followed by a *worked example* involving four transactions relating to a simple business start-up. A second *worked example* follows, looking at recording a month's trading involving nine transactions. There is not a single compound journal entry among them. At that point, the authors state that the student should now be able to record transactions in T-accounts. The basic principles of double entry are contained in those seven pages, virtually as many pages as that used by Pacioli in covering those same points.

This comparison suggested that Pacioli's approach might

work with modern-day students, with worked examples being added by the instructor, just as they were likely to have been added by teachers of bookkeeping 500 years ago. Accordingly, in order to assess whether Pacioli's approach to teaching double entry was effective, *De Scripturis* was used as the sole text in a series of classes on DEB to over 200 first-year U.K. undergraduate students [Sangster *et al.*, 2010]. The students outperformed the previous year's cohort (which had used a modern text) on all aspects of their assessment.

We therefore find no grounds for accepting Yamey's assertion that Pacioli's treatise was unfit as a teaching text, either for the lack of a "general rule" or, as discussed earlier, for the lack of exemplar account books. However, we willingly accept that had Pacioli been more explicit in the rules to follow on this topic, learning may have been facilitated in some cases. As to the addition of worked examples or a model set of account books, while the former would almost certainly have improved the ability of readers to learn from and understand the text and the latter may have helped some learners confirm their learning, neither was an essential component for *De Scripturis* to have been fit-for-purpose.

10. Yamey [2010, p. 147] repeats his previously expressed view [Yamey, 1994, p. 163] that Pacioli's *Summa Summarum* could not serve a useful purpose and that Pacioli's Chapter 34, in which it is described, is "confused and confusing."

Rather than going into these points in detail, we refer to Peragallo's extensive work on early books on accounting. Peragallo [1956] accepts a lack of clarity in Pacioli's text concerning the distinction between the trial balance and the *Summa Summarum*. However, they are covered in different chapters of *De Scripturis*, and he believed that Pacioli knew very well how to prepare a trial balance, how to prepare a *Summa Summarum*, and of the differences between them. He also believed that Pacioli knew very well how to close a ledger and open a new one, the *Summa Summarum* being the last stage of doing so. Peragallo believed that Pacioli was describing a Venetian practice (the *Summa Summarum*) in Chapter 34, and that he included both the trial balance (Chapter 36) and the *Summa Summarum* in *De Scripturis* because doing so was consistent with Venetian best practice at the time.

Peragallo believed that use of the *Summa Summarum* was short-lived and that it was being replaced in Venice by a "bal-

ance account" (which is not included in *De Scripturis* although Peragallo [1956, p. 394] believed that Pacioli was aware of it). He noted that 40 years later, Manzoni included an example of a *Summa Summarum* after his model ledger in his text, but, unfortunately, he was under the impression that it was a trial balance.⁶

As to whether or not the *Summa Summarum* was useful,⁷ its inclusion in *De Scripturis* was appropriate at that time, and the description of it in Chapter 34 of *De Scripturis* is consistent with its presentation in Manzoni [1540], even if Manzoni thought he was presenting an example of a trial balance. Perhaps that is an example of the dangers of learning mainly from exemplar account books rather than from learning, understanding, and then applying principles.

11. Yamey [2010, pp. 152-153] comments on our description of the example entries at the end of the treatise as "journal entries" and states that they are, in fact, "four ledger accounts in which entries are shown for five inter-related transactions."

We unreservedly acknowledge that we were incorrect in describing these entries as "journal entries." We also do not believe that they are entries in the Ledger, but this is not the place for that discussion.⁸

CONCLUSION

We welcome Professor Yamey's comments on our paper [Sangster *et al.*, 2008]. While we recognize that there is considerable room for debate on the issues raised and discussed by Yamey, we present here what we consider to be a more appropriate analysis than that offered by him. In doing so, we place *De Scripturis* firmly within its context as a part of *Summa* and consider the whole of *Summa* within the technological, cultural, educational, and mercantile context of the time and place in which it was created by Pacioli and his printer. We have demonstrated the intrinsic pedagogical merits of *De Scripturis* itself, considering it in the context of education at the time of its publication

⁶Peragallo [1956, pp. 392-393] describes how Manzoni discussed the trial balance (copying Pacioli verbatim) and directed readers to his model *Summa Summarum* as an example of it.

⁷Peragallo [1971] discusses Viganó [1968], the source referred to by Yamey when making this point. Peragallo does not appear to change any of his own opinions concerning the *Summa Summarum* from those he held in 1956.

⁸See Sangster *et al.* [2012].

and drawing attention to Pacioli's focus upon the importance of teaching students to understand (rather than simply memorize rules and practices through rote learning from cases).

Yamey's apparent treatment of 15th century Venetian accounting practice as if it were the same as Tuscan practice, as we argued at the outset of this paper, resulted in his pursuing a line of argument that is fundamentally flawed and consequently undermines his case for stating that *De Scripturis* was not fit-for-purpose. Pacioli's text focused appropriately upon the book-keeping and accounting needs of late 15th century Venetian merchants. It was more than sufficient for someone to learn and understand the principles of DEB as was appropriate in Venice at that time. Yamey's criticisms of the treatise have been shown to be overstated or invalid, and he has demonstrably failed in his attempt to dismiss *De Scripturis* as not fit-for-purpose.

With respect to our 2008 paper, we have presented a plausible interpretation of events and text that justifies and explains Pacioli's motivation for the inclusion of *De Scripturis* in *Summa* and reinforces what we said in that paper about the intended market for *Summa* – the merchants of Venice and their sons.

REFERENCES

- Antinori, C. (1980), *An Anomalous Edition of the "Summa," 1494 by Luca Pacioli* (Parma: Palatina Editrice).
- Baldasso, R. (2010), "Portrait of Luca Pacioli and Disciple: A New, Mathematical Look," *Art Bulletin*, Vol. 92, No. 1/2: 83-102.
- de Roover, R. (1941), "A Florentine Firm of Cloth Manufacturers," *Speculum*, Vol. 16, No. 1: 3-33.
- de Roover, R. (1944), "Early Accounting Problems of Foreign Exchange," *Accounting Review*, Vol. 19, No. 4: 381-407.
- Edwards, J. (2009), "Different from what has hitherto appeared on this Subject: John Clark, Writing Master and Accomptant, 1738," paper presented at the 32nd Annual Congress of the European Accounting Association, Tampere, Finland.
- Geijsbeek, J. (1914), *Ancient Double-Entry Bookkeeping* (Denver: J.B. Geijsbeek). Available at www.archive.org/details/ancientdoubleent00geijuoft.
- Gordon, C. (1914), "Books on Accountancy, 1494-1600," *Transactions of the Bibliographical Society*, Vol. 13, No. 1: 145-170.
- Grafton, A. (2008), "Textbooks and the Disciplines," in Campi, E., De Angelis, S., Anja-Silvia Goeing, A., and Grafton, A. (eds.) *Scholarly Knowledge: Textbooks in Early Modern Europe* (Genève: Librairie Droz): 11-36.
- Grendler, P. (1989), *Schooling in Renaissance Italy: Literacy and Learning, 1300-1600* (Baltimore: Johns Hopkins University Press).
- Heffer, A. (2009), "On the Curious Historical Coincidence of Algebra and Double-Entry Bookkeeping." Available at <http://logica.ugent.be/albrecht/thesis/FOTFS2008-Heffer.pdf>.
- Hernández-Esteve, E. (2009), conversation with the authors.

- Hutton, C. (1802), *A Complete Treatise of Practical Mathematics and Book-Keeping, both by Single and Double Entry, Adapted to the Use of School* (Edinburgh: G.&J. Ross).
- Lane, F. (1944), *Andrea Barbarigo, Merchant of Venice. 1418-1449* (Baltimore: Johns Hopkins University Press).
- Lane, F. (1945), "Venture Accounting in Medieval Business Management," *Bulletin of the Business Historical Society*, Vol. 19, No. 5: 164-173.
- Mackinnon, N. (1993), "The Portrait of Fra Luca Pacioli," *Mathematical Gazette*, Vol. 77, No. 479: 130-219.
- Manzoni, D. (1540), *Quaderno doppio col suo giornale, nouamente Composto, & diligentissimamente ordinato, secondo il costume di Venetia...*(Venetia: Comin de Tridino de Manfredato).
- Mellis, J. (1588), *A Briefe Instruction and Mane how to Keepe Bookes of Accompts after the Order of Debitor and Creditor, & as well for Proper Accompts Partible, etc.* (London: John Windet).
- North, R. (1714), *The Gentleman Accomptant, or, an Essay to Unfold the Mystery of Accompts...* (London: E. Curll).
- Pacioli, L. (1494), *Summa de Arithmetica, Geometria, Proportioni et Proportionalita* (Venezia: Paganino de Paganini).
- Peragallo, E. (1956), "Origin of the Trial Balance," *Accounting Review*, Vol. 31, No. 3: 389-394.
- Peragallo, E. (1971), "A Commentary on Viganó's Historical Development of Ledger Balancing Procedures, Adjustments and Financial Statements during the Fifteenth, Sixteenth, and Seventeenth Centuries," *Accounting Review*, Vol. 46, No. 3: 529-534.
- Pietra, A. (1586), *Indirizzo de gli Economi* (Mantova: F. Osanna).
- Postlethwayt, M. (1751), *The Universal Dictionary of Trade and Commerce...* (London: J.&P. Knapton).
- Rankin, F. (1992), *The Arithmetic and Algebra of Luca Pacioli (c. 1445-1517)*, Ph.D. thesis (London: Warburg Institute, University of London).
- Sangster, A. (2007), "The Printing of Luca Pacioli's *Summa Arithmetica* in 1494," *Accounting Historians Journal*, Vol. 34, No. 1: 125-146.
- Sangster, A. (2010), "Using Accounting History and Luca Pacioli to put Relevance back into the Teaching of Double Entry," *Accounting, Business & Financial History*, Vol. 20, No. 1: 23-39.
- Sangster, A., Franklin, E., Abdul-Rahim, J., and Alwis, D. (2010), "Using Pacioli's Medieval Text in Today's Introductory Accounting Course," paper presented at the British Accounting Association Special Interest Group in Accounting Education Annual Conference, Dublin, Ireland.
- Sangster, A., Stoner, G., and McCarthy, P. (2008), "The Market for Luca Pacioli's *Summa Arithmetica*," *Accounting Historians Journal*, Vol. 35, No. 1: 111-134.
- Sangster, A., Stoner, G., and Scataglini-Belghitar, G. (2012), "Pacioli's Example Entries – A Conundrum Resolved?" *Abacus*, forthcoming.
- Smith, F. (2008), "The Influence of Amatino Manucci and Luca Pacioli," *BSHM Bulletin: Journal of the British Society for the History of Mathematics*, Vol. 23, No. 3: 143-156.
- Tagliente, G. (1525a), *Considerando... el laudabile modo de tenere conto de libro dopio cioe, el zornale, el Libro con l'alphabetto secondo el consueto de questa incli ta Citta di Venetia...* (Venice: no publisher).
- Tagliente, G. (1525b), *Considerando... la presente opereta per quelli che hano bisogno accio che sapi no tener ordinata mente el detto conto del suo libro ugnolo...* (Venice: no publisher).

- Taylor, R. (1942), *No Royal Road* (Chapel Hill: University of North Carolina Press).
- Ulivi, E. (2002), "Benedetto da Firenze (1429-1479) un maestro d'abaco del XV secolo: Con documenti inediti e con un'Appendice su abacisti e scuole d'abaco a Firenze nei secoli XIII-XVI, *Bollettino di Storia delle Scienze Matematiche*, Vol. 22 (Roma: Istituti Editoriali e Poligrafici Internazionali).
- Viganó, E. (1968), *La Tecnica del Bilancio di Verificazione nell'Opera dei primi Trattatista* (Napoli: Giannini & Figli).
- Wood, F. and Sangster, A. (2008), *Business Accounting 1* (Harlow: Pearson Education.)
- Yamey, B. (1978), "Pacioli's Pioneering Exposition of Double-Entry Bookkeeping: A Belated Review," in De Rosa, L. (ed.), *Studi in Memoria di Federigo Melis* (Napoli: Giannini Editore), Volume 3: 569-580.
- Yamey, B. (1994), "Luca Pacioli, the 'Summa' and 'De Scripturis,'" in Gebattel, A. and Yamey, B. (eds.), *Luca Pacioli: Exposition of Double Entry Book-Keeping* (Venice: Albrizzi Editore): 11-33.
- Yamey, B. (2004), "Pacioli's *De Scripturis* in the Context of the Spread of Double-Entry Bookkeeping," *De Computis: Revista Española de Historia de la Contabilidad*, No. 1: 142-154.
- Yamey, B. (2010), "The Market for Luca Pacioli's *Summa Di Arithmetica*: Some Comments," *Accounting Historians Journal*, Vol. 36, No. 2: 145-154.
- Ympyn, J. (1543a), *Nieuwe instructie ende bewijs...*(Antwerp: Copyns van Diest).
- Ympyn, J. (1543b), *Nouvelle instruction et remonstration...*(Antwerp: Copyns van Diest).
- Ympyn, J. (1547), *A Notable and very Excellente Woorke...*(London: R. Grafton).

Accounting Historians Journal
Volume 38, Number 2
December 2011
pp. 125-143

Basil S. Yamey
THE LONDON SCHOOL OF ECONOMICS

TWO-CURRENCY, *NOSTRO* AND *VOSTRO* ACCOUNTS: HISTORICAL NOTES, 1400-1800

Abstract: Suppose a merchant in country A has dealings with an agent in country B. The indebtedness between the merchant (principal) and his foreign correspondent (agent) has to be settled in terms of B's currency. Fluctuations in the exchange rate give rise to gains or losses, borne by the merchant. This paper discusses one accounting treatment (in the principal's ledger) of the dealings between domestic principal and foreign agent. It also considers the treatment where the merchant serves as agent for a foreign principal. The discussion is illustrated by references to two 15th century Italian ledgers and to passages in several treatises on bookkeeping and accounts published in the period 1400 to 1800.

INTRODUCTION

According to Luca Pacioli, it was not important in which currencies (moneys) an entry would be recorded in the memorial by the person involved in the particular transaction, whether this was, for example, the merchant himself, his wife, child, or employee. The memorial was the book of original entry. The entries in it were then in due course entered in proper form – in an “accountantly” manner – in the journal, and from there in the relevant accounts in the ledger. The entries in the ledger, however, had to be made in the same currency in the money columns although in the narrative part of the entries “you can name the currencies that occur, whether ducats or florins or gold scudi or, whatever currency it may be” [Pacioli, 1494, chs. 6, 36]. In practice, the prefatory information given at the beginning of the ledger sometimes indicated the particular currency in which entries would be made (in the money columns). For example, the ledger (1453-1454) of the Florentine partnership of Della Casa and Guadagni, active in Geneva, states that the ledger will be kept in *scudi* “di 64 per marchio d'oro” [Cassandro, 1976, p. 199]. The opening statement in Sir Thomas Gresham's journal (1546), now in the custody of the Mercers' Company, London) declares, *inter alia*, that it “shalbe holden by poundes shillings and pence of money of Englonde.”

Yet, well before Pacioli's *Summa* was published in Venice in 1494, the ledgers of many Italian merchants and bankers had personal accounts in which there were entries in two different currencies (in separate money columns). There are many such two-currency accounts in the Della Casa/Guadagni partnership ledger (mentioned above); for instance, there are personal accounts in which entries are made in *scudi* (in the outer money column) and also in *fiorini* or *lire* (in an inner money column). The ledger (1456-1459) of Giovanni Piccamiglio [Heers, 1959], a merchant in Genoa, includes accounts in which entries are made in *lire* (in the outer money column) and in sterling or *doubles* of Seville (in an inner money column). Angelo Pietra [1586] explained that such ledger accounts were *conti a moneta doppia*¹; and Lodovico Flori [1636, p. 41] called them *conti di moneta doppia*. (Here, I use the term two-currency accounts or *nostro* accounts.)

However, the presence of two-currency accounts in early double-entry ledgers in no way contradicted Pacioli's prescription that the ledger accounts should be kept in only one currency. In the examples referred to above, the entries in the inner columns did not form part of the double-entry set of ledger accounts. Nevertheless, the entries in the inner columns contained important information, just as did inner columns in merchandise accounts for quantities of goods (e.g., barrels, pieces, weights, and so on) contained useful information, although they obviously did not constitute part of a double-entry system of inter-locking ledger accounts.²

Two-currency accounts, indeed much more than this subject, are discussed in the article "Early Accounting Problems of Foreign Exchange" by the late Professor Raymond de Roover [1944]. The title of that article, however, is misleadingly limited; the article is in fact largely concerned with the ways in which merchants and bankers used bills of exchange in 15th and 16th century Europe.

De Roover's article of 1944 has deservedly been praised by

¹"*Moneta doppia; è quando fuori si ne mettono due, cioè scuti, e lire*" Pietra [1586, fo. 29].

²Several authors seem to have been struck by the similarity, as regards their function as memoranda, of the inner (foreign-currency) columns of two-currency accounts and the inner quantity columns of merchandise accounts. For example, the discussion of two-currency accounts appears in close proximity to the discussion of quantity columns in merchandise accounts in the treatises of Flori [1636, p. 41] and Ricard [1709, p. XXVII]. The heading of Flori's chapter 12 is: "*Come si referischino i conti di moneta doppia, e quelli, che hanno annesso Peso, ò Misura.*"

economic historians. Federigo Melis [1950, p. 523] observed that de Roover “had written brilliantly” (*ha scritto brillantemente*) on *nostro* accounts, and Henri Lapeyre [1955, p. 356, n. 88] referred to the article as “*très important*.” However, de Roover’s discussion of two-currency accounts and related bookkeeping matters did not deal with all aspects of early practice. Further, in wartime U.S., de Roover evidently had limited access to early publications on bookkeeping and accounts (henceforth referred to here as “the early treatises”), and, in any case, his article referred to only a few books published after 1700. Moreover, new information about early treatises is of some relevance. The present article seeks to fill a few gaps, to supplement de Roover, and, in the process, to pay posthumous tribute to this versatile historian who contributed notably to several branches of study, including economic history, history of economic doctrine, and accounting history.

THE FUNCTIONS OF TWO-CURRENCY ACCOUNTS

The need for two-currency accounts arises in a particular business setting. It arises when merchant A in one commercial center uses the services of a business correspondent (or “friend”) B located in a different commercial center (with a different currency) to transact some business transactions on his behalf. Also, B, the agent, has to be reimbursed by A (or make payments to A) in B’s currency, the exchange value of which fluctuates in relation to A’s currency. The risk of changes in the rate of exchange between A’s “domestic” currency and the “foreign” currency (i.e., B’s “domestic” currency) is borne by A. The entries in the inner columns (the foreign-currency columns) show the indebtedness between A and B in respect of transactions made within the merchant-agent arrangement, while the entries in the outer columns (the domestic-currency columns) show, when the account is closed and balanced, the profit or loss made by A as a consequence of changes in the rate of exchange. Thus, a two-currency account serves two purposes: it shows the amount (and direction) of the indebtedness between the two parties, and it shows the principal’s profit or loss on exchange.

It follows from the above that in one respect the entries in the foreign-currency columns are more significant than the entries in the domestic-currency columns, although as already noted, the former do not form part of the double-entry network of ledger accounts. The importance of the foreign-currency columns is emphasized by Oudshoff, described as a bookkeeper in Rotterdam, in his first-rate treatise of 1833. Oudshoff [1833,

pp. 85-86] observes that in two-currency accounts, the foreign currency is the main or chief subject (“...in deze rekeningen de vreemde munt hoofdzaak is”). Thus, when the ledger is being balanced and closed, one must first ascertain the balance on the foreign-currency entries, then translate that balance into the corresponding domestic currency, and finally enter the amount in the domestic-currency column. (It is interesting that de Roover [1944, p. 402] writes that the “foreign currency is the ruling currency” in two-currency accounts). Oudshoff also notes that any profit or loss stemming from exchange-rate movements is no concern of the foreign agent (“...waarmede onze buitenlandsche vriend niets te maaken heef ...”).³ This profit or loss is disclosed as an equilibrating entry on the appropriate debit or credit side of the account, the counterpart entry being made in the profit-and-loss account (henceforth “P&L account”).⁴

The earliest known written discussion of two-currency accounts is in a manuscript, dated 1458, by Benedetto Cotrugli of Ragusa, who, among other activities, was a merchant. The discussion [Tucci, 1990, p. 174] consists only of a few lines and would have been difficult for an uninformed merchant or book-keeper to follow. But it clearly distinguishes between entries in the foreign currency (“*muneta fuori*”) and those in the domestic currency, i.e., the currency in which the merchant’s (principal’s) books are kept (“*ad moneta che costume a tenere il tuo libre sicondo lo costume della tua patria*”). It also identifies the two purposes of a two-currency account. From the entries in the domestic-currency columns, the merchant can always see the profit or the loss on the account with the correspondent (“...*sempre apare l’utile et lo danno di quel conto*”). As regards the entries in the foreign-currency columns, Cotrugli conveys the idea that they always enabled the merchant to check or verify his position *vis-à-vis* his correspondent (“...*per potere sempre riscontrare con chui hai da ffare*”).⁵

³ The same point is made in some other treatises, e.g. Irson [1678].

⁴ Where appropriate, the profit or loss on exchange could be transferred to a particular merchandise account or similar type of trading account instead of being transferred to the P&L account. An example is in the model ledger in Coutereels [1603; ledger fo. 14]. The profit shown on one *nostro* account is transferred to the Voyage to Antwerp account (*Schepinghe op Antwerpen*), the balance on which is posted in due course to the P&L account. The profit in question arose out of the foreign agent’s dealings in connection with a partnership venture, the transactions of which are recorded in the Voyage account. The option of transferring the profit (loss) on a *nostro* account to a merchandise account (or similar trading account) instead of to the P&L account is mentioned, in general terms, in the treatise by Flügel [1781, p. 27].

⁵ Cotrugli’s manuscript has been published, with an illuminating introduction, by Professor Ugo Tucci [1990]. There have been earlier printed versions of the manuscript, all seriously

NOSTRO AND VOSTRO ACCOUNTS

A merchant could use a particular foreign correspondent to carry out activities on his behalf. That same foreign correspondent could, in turn, use the merchant as his agent to carry out activities for him. Any debt arising out of those activities would then be settled in terms of the merchant's domestic currency, not the correspondent's. The merchant, acting as agent, would have an account in his ledger to record the outlays made and revenues received on behalf of his foreign correspondent.

Accordingly, the same foreign correspondent could be both an agent and a principal *vis à vis* a particular merchant. In such a case, the merchant's ledger would have two separate accounts for the same correspondent.⁶ But whereas it would be a two-currency account as regards activities made on behalf of the merchant, the account recording the merchant's outlays and revenues on behalf of his correspondent would be an ordinary personal ledger account with only one set of money columns, with entries in them expressed in the domestic currency. The Della Casa/Guadagni ledger includes several examples of correspondents with two accounts – one as agent, the other as principal.

In Italy, the term *nostro* (or variant) was used for the foreign correspondent's account as agent, and the term *vostro* (or variant) for his account as principal. The term *nostro* (= our) tended to be used when the merchant was a partnership (*compagnia*),⁷ and *mio* (= my) when it was an individual. For no obvious reason, the word *vostro* (= your) was commonly used for the correspondent when acting as principal, although the more appropriate *loro* (= their) was also used if the correspondent was a partnership, or *suo* (= his) if it was an individual.⁸

The connection between a *nostro* account and a *vostro* ac-

flawed, as Tucci has demonstrated in detail. Cotrugli's short account of two-currency accounts was omitted from all those versions.

⁶ The same correspondent could also have had other personal accounts in the merchant's ledger as well. Flügel [1781, pp. 24-25] includes the following types: *conto corrente*, *conto di tempo*, *conto di deposito* and *conto di compagnia*. Note the use of Italian terms in a treatise written in German.

⁷ The words *de noi* were sometimes used instead of *nostro*.

⁸ The Italian words were translated into other languages, e.g., *mon compte/son compte* and *mijn rekening/zijn rekening*. It seems that in Germany, the use of the Italian words was often preferred to their German equivalents. The use of Italian terminology (as illustrated in footnote 6 above) was sometimes deplored. Christian Hingstedt, a bookkeeper in Hamburg, noted, with satisfaction, that the tendency to favor foreign terminology was declining. Hingstedt [1804, p. 9] writes, *inter alia*, that "Man schreibe also künftig nicht mehr...mio Conto, suo Conto, loro Conto und nostro Conto... sondern... meine Rechnung, seine Rechnung, ihre Rechnung und unsere Rechnung...." The terms *vostro* and *nostro* are still used today by British banks.

count may be noted. Continuing with the earlier example of A and B, the entries in the foreign-currency columns in the *nostro* account (in B's name) in A's ledger should mirror exactly the entries in the *vostro* account (in A's name) in B's ledger, except that debits and credits would be reversed.

NOSTRO/VOSTRO: A DIGRESSION

As de Roover [1944, p. 402] noted, the difference between a *nostro* account and a *vostro* account was clearly set out in a treatise in English by John Carpenter [1632, pp. 57-58]:

Note. *But you must remember to make a difference betwixt his Account and your Account.* – As for example...

All which another doth for you, you shall write it, *Such are on my Account.*

And, contrarily, that which you doe for him, you shall write it, *Such are on his Account...*

Several other authors also clarified the difference between *vostro* and *nostro* accounts; nevertheless, it seems that the distinction was not always understood.

Oudshoff [1833, p. 10] included a long explanation of the need for *nostro* and *vostro* accounts because his own experience showed him that many pupils had difficulty understanding the matter. He noted that a person familiar in practice with business readily understood the difference between *nostro* and *vostro* even if he had no knowledge of bookkeeping itself.

Hendrik Waninghen (or Waningen), author of a successful treatise, seems to have been confused about the distinction. Waninghen's treatise in Dutch was published in the 17th century in several editions, with some differences in the title, and also in a French version with two editions [Ten Have, 1933, pp. 29-30]. Without acknowledgment, a large part of the Waninghen book was rendered into English in Carpenter's treatise of 1632.

According to de Roover [1944, p. 401] Waninghen explains carefully "that a *Vostro* account is opened for a foreign principal and a *Nostro* account for a foreign agent." Although the illustrative accounts in Waninghen do include examples of the two types of account, at least in one passage in the text the two types are confused. The passage appears, in faithful translation, in Carpenter [1632, p. 44]. Without going into detail, it is enough to state that Carpenter, like Waninghen, wrote *inter alia* as follows: "...to the end that you may understand, that which you sell for the Account of some one, or that which hee buyes for you,

ought to be put Creditor for his Account, since that he is the demander, both of the one and the other....”⁹ The passage clearly is at odds with another passage in Carpenter [Carpenter, 1632, pp. 57-58], which is quoted in the de Roover article and in the text above. The contradiction seems to have escaped de Roover’s customary vigilance.¹⁰

There is, indeed, good reason to believe that Carpenter was not responsible for the correct passage on pages 57-58 of his book. It is far more likely that it was written by Ralph Handson, self-styled “accomptant.” A tangled story involves Waninghen, Handson, and Carpenter.¹¹

In a note to the reader in Richard Dafforne’s [1635] *Merchants Mirrour*, Handson wrote that he had “collected” Notes “out of *Henry Waninghen* in French, for mine own use.” Handson presumably translated into English the passages he selected from Waninghen. He did not publish his Notes.¹² Carpenter, however, had “surreptitiously” acquired them, and a large part of his treatise of 1632 consists of passages corresponding to parts of Waninghen’s text. Carpenter, incidentally, also used material he took without acknowledgment, from published English treatises. There is little that is original in his book.

The correct passage in Carpenter [1632, pp. 57-58] begins with the word “Note,” and the first sentence is printed in italics.

⁹ The passage corresponds to the *disciple*’s answer to the *master*’s 27th question in Section III of Waninghen’s book:

(a) Version in Dutch [Waninghen, 1613]:

“Overmits men sal verstaen, watmen voor yemandts reeckeninghe vercoopt of wat hy voor ons reeckeninghe incoopt, dat daer voor zijn reeckeninghe moet Credit staen, te wijl hijt beyde is eysschende”

(b) Version in French [Waninghen, 1615]:

“A fin qu’on entende, que ce qu’on vend par la compte de quelqu’un, ou ce qu’il achete pour le nostre, que cela se doit mettre Credit pour son compte, puis qu’il est demandeur, & de l’un, & de l’autre ...”

¹⁰ De Roover’s small lapse is understandable. The Waninghen text is often long-winded, boring, and *repetitive*. As Irson [1678, ch. 1] put it, “*le mauvais style & les frequentes repetitions qui se pourroient abreger*” renders “*la lecture ennuyeuse*.”

¹¹ For further details, see Yamey [1957] and Yamey *et al.* [1963, pp. 167-168].

¹² There is only one known published work by Handson [1669]; his broadside (single sheet) *Analysis ...*, of which the third edition is dated 1633. There must have been earlier editions. In the fourth “corrected and enlarged edition” of 1669, there appears the following somewhat perplexing statement, inserted, it seems, as an afterthought:

NOTA. That...Also, All Accompts of Exchange and of parties residing in Forrain Countries, are to be kept with a double Margin, viz. The inward Margin for the Money of the place beyond the Seas, and the outward for the place where you reside.

De Roover [1944, p. 401] suggested that the use of italics was intended “to attract the attention of the reader.” The use of the word “Note,” I suggest, was also used to attract attention, not that of the reader, but that of Handson himself, the compiler of the Notes. This inference stems from the fact that the incorrect passage in Carpenter (p. 44) also begins with the word “Note,” printed in italics. I suggest that when Handson was working on his Notes, he realized that a passage in Waninghen he had already translated was erroneous. He therefore wrote a correct statement, beginning it with the word “Note” as a reminder to himself. At the same time, he added the word “Note” to the incorrect passage to draw his own attention to the fact that it was wrong. In due course, Carpenter saw the correct statement and inserted it at the end of a short section on a subject on which it had no bearing. Carpenter was an inept plagiarist.¹³

EXPLAINING TWO-CURRENCY ACCOUNTS

Only a few of the many treatises published between 1494 and 1800 include a detailed explanation and discussion of two-currency accounts in their texts, as distinct from illustrative examples in their model sets of account books. Many did not include any discussion or illustration at all, beginning with Pacioli [1494]. Presumably their authors considered the subject too advanced or complicated for their intended readers, if these were mainly students of the subject or their teachers. Other treatises included examples of two-currency accounts in their model account books, without any reference or with only a very brief and perfunctory reference to them in their expository text. It is as though the subject was considered too complex to be explained concisely in words, or that it could only be made clear, even to more experienced readers, in the form of a worked-out example or two.

The first treatment of two-currency accounts in the published literature is in John Weddington’s *Brefve instruction*

¹³Richard Dafforne [1670, pp. 51-53], an Englishman who spent some time in The Netherlands and was knowledgeable about Dutch treatises, noted that there were contradictions in Carpenter concerning the *nostro/vostro* question. He indicated other passages in Carpenter which, like that on pp. 57-58, were correct statements. One example is a short un-titled section which begins with the word “Note” [Carpenter, 1632, pp. 12-13]. There is no corresponding section in Waninghen. (Incidentally, in two sections immediately following the section in question, the initials “R.H.” appear in an account title.) Although the discussion in Dafforne is not always easy to follow, it is evident that the respondent in the question-and-answer dialogue ended up being frustrated by the contradictions: “these HIS MY seems to me an *Androgyne*, or *Hermaphrodite*, from which (as I conjecture) a good *Facit* can never issue.”

[1567]. Weddington, an Englishman, had practical experience of mercantile affairs in Antwerp, where for some years he was the agent of Sir Thomas Gresham and also taught accounting. The text of his book does not mention two-currency accounts, but they do make an appearance in the model ledger. The ledger is that of Thomas Lane, “merchant of London and now resident in Andwarpe.” One account of Francis Durant has inner columns for entries in “sterlinge” to the left of the main columns for entries in the (domestic) currency of the ledger [Weddington, 1567, ledger A, fo. 34]. The heading of the account, on the credit side, is “Francis Durant marchant of London, for this *my* account...” (italics added). It is a *nostro* account. The last entry on the debit side has an entry, only in the outer column, for the profit (“... welche I finde to be cleare gaynid”), which is credited to the “ac-compt of gayns and losses.” In addition to the *nostro* account, there is an account in Durant’s name “for this *his* accompt ...” (italics added), without columns for entries in sterling [Weddington, 1567, ledger A, fo. 30]. It is a *vostro* account.

James Peele, who had practical experience of business and accounting, wrote two books on bookkeeping and accounts. The first [Peele, 1553] has nothing on *nostro* and *vostro* accounts. His later treatise [Peele, 1569, ledger A, ff. 26, 31], no doubt influenced by Weddington, has examples of two-currency accounts in the model ledger, including one for the merchant’s “factour [agent] in Spaine,” and another for his “factour in France.” The profit on the latter, disclosed in an entry in the account “to make the eng. Monie even,” is transferred to the P&L account. The profit in the former is, however, “borne to the accompte of voyages into Spaine” (a trading account, the profit on which is in due course transferred to the general P&L account). (The comments in Peele’s text on the above two *nostro* accounts are not illuminating, and one of them is not even correct.)

There were, however, a few treatises which treated two-currency accounts at greater length, although even then their readers were likely to have had recourse to the illustrative examples in the model ledgers. Two of the more extensive discussions are presented here. They are sustained attempts to explain a subject which, as Lapeyre [1955, p. 356] has put it: “le problème le plus ardu de toute la science des comptes,...c’est celui du change extérieur.”

Claude Irson was a “*Juré Teneur de Livres, nommé par Sa Majesté [of France] pour l’ordre & l’examen, verification, & liquidation de toutes sortes de Comptes.*” His interesting book, “*composée de l’ordre de Monseigneur Colbert,*” was published in Paris

in 1678. His discussion of two-currency accounts begins with the fifth rule in chapter 5:

CINQUIEME REGLE

Que les Comptes des affaires que l'on a dans les Pays étrangers, où la Monnoye ordinaire du Livre n'a pas cours, doivent estre tenus en Monnoye double, c'est à dire en la Monnoye étrangere, & en la Monnoye ordinaire du Livre.

Lors que l'administration pour laquelle le Livre est tenu, suppose des Affaires propres, qui se font dans des Pays estrangers où la monnoye ordinaire du Livre n'a pas cours, c'est une necessité indispensable detenir les Comptes en deux sortes de Monnoyes, sçavoir en la Monnoyeestrangere & en celle qui est commune à tout le Livre: parce qu'on ne peut obliger le correspondant à rendre compte qu'en la Monnoye deson administration, & qu'il seroit impossible d'en faire la verification & l'appurement, si l'on ne l'avoit pas tenu en sa Monnoye: il est aussi necessaire de la tenir en la Monnoye commune du Livre, tant par la relation que chaque partie d'un Compte a avec celle d'une autre Compte, que pour pouvoir tirer le Bilan, & voir si le Livre est juste. Pour la pratique de cette Regle on a accoûtumé de faire, au Debit & au Credit des Comptes de nos Correspondans ou Commissionnaires des Païs étrangers, qui font des affaires pour nostre Compte propre, une colomne en dedans où l'on met la Monnoye étrangere, de laquelle il n'est pas fait mention dans les rencontres, n'y ayant que la Monnoye commune du Livre qui doit toujours indispensablement estre en deux endroits.

Irson then refers the reader to examples of two-currency accounts in his model ledger “pour avoir une plus grande intelligence de cette pratique.” The first of several such accounts is the “Compte du Sieur Humphray Willette de Londres,” who also has a *vostro* account. Irson’s text then continues:

SIXIEME REGLE

Que les Comptes en Monnoye doubles doivent estre soldez en la Monnoye étrangere, & que l'inegalité qui se trouve dans la Monnoye commune du Livre, doit avoir sa rencontre au Compte des Profits & des Pertes.

Comme les correspondans étrangers ne sont obligez de compter des affaires de leur administration qu'en leur propre Monnoye, il s'ensuit que le Compte en doit estre necessairement soldé en leur Monnoye, celle du lieu, où

se tient le Livre, leur estant indifferente: Et que la difference qui se trouve par l'evaluation de la Monnoye étrangere à la commune du lieu, doit estre portée au Compte des Profits & des Pertes. Ensorte que si c'est le Debit qui excède, c'est une Perte de laquelle le Correspondant, n'est pas tenu, ayant soldé son Compte en sa monnoye: & si c'est le Credit qui excède, c'est un profit qui ne luy appartient pas, puis qu'ayant esté pleinement satisfait en sa Monnoye, il ne peut pretendre autre chose.

The second example of extensive treatment of the subject matter is in Robert Hamilton, *An Introduction to Merchandise* [second edition, 1788]. After some experience in the family business, Hamilton became professor of natural philosophy at Aberdeen University and later professor of mathematics. He achieved some prominence as an economist with his *Inquiry Concerning the Rise and Progress of the National Debt* (1813). Hamilton [1788, p. 327] discusses two-currency accounts as follows:

INNER COLUMNS FOR FOREIGN MONEYS

If an accompt with a foreigner is to be settled in British money, we have no occasion to compute the value of the articles in foreign money, and the entries are the same as in domestic trade: But, if the accompt is to be settled in foreign money, we must enter the value of each article [entry], reduced to that money, in an inner column. In these accompts, if we are able to receive the money which is due us, at a more advantageous rate of exchange than we expected when the debt was contracted, or pay the money which we owe, at a cheaper rate, there is a gain obtained; on the contrary, a loss is sustained, if the rates of exchange undergo the opposite alterations....

If the sums of the inner columns be equal, there is nothing due by the one party to the other; and then, if the sums of the outer columns be unequal, the difference is gain or loss. But, if the inner columns be unequal, the balance due from one party to the other must be valued at the current rate of exchange; and, after the value is added to the proper side, the difference of the outer columns is the gain or loss.

If we have different transactions with a foreigner, some of which are to be settled in British, and some in foreign money, the articles should be entered in separate accompts. The title for the former is, *A.B. his accompt*, because it generally contains business transacted by us

at his desire. The title of the latter is, *A.B. my accompt*, because it generally contains business transacted by him at our desire. The balance of one accompt may be transferred to the other when we settle....

Reasonably detailed discussion of *nostro* and *vostro* accounts are also to be found in some other treatises, including Flügel [1781, pp. 26-28] and Oudshoff [1833, pp. 9-10, 85-86], both already referred to above.¹⁴

MISCELLANEOUS TOPICS

Placing of the Columns: It has been assumed implicitly so far that in two-currency accounts the foreign-currency columns are the inner columns. This seems to have been the usual arrangement in practice and is to be found in all the early treatises I have seen.

There were, however, exceptions in practice. Ceccherelli [1913, pp. 26-29] reproduced a two-currency account in an early Italian ledger in which the foreign-currency entries are in the outer columns. It may have been an advantage of this placing that the space for the posting reference – giving the page number of the original entry in the journal or of the particular account in the ledger to be debited or credited – was next to the domestic-currency entry, thereby reducing the likelihood of mistakenly posting the foreign-currency amount. Many of the authors of treatises achieved the same end by placing the posting-reference space between the inner and the outer currency in the more common arrangement.

Converting Foreign-Currency Entries into the Domestic Currency: Two-currency accounts were used in early accounting to deal with fluctuations in rates of exchange. Yet, few of the early treatises deal explicitly with the question of which exchange rates the merchant should use when extending entries in the inner columns of *nostro* accounts into the outer (domestic currency) columns. Perhaps authors considered the choice of rate to be self-evident; for example, that the rate ruling at the date the entry is made in the outer column. In my view, a different explanation is more plausible. Most merchants and their book-

¹⁴Matthieu de la Porte included a long section on “*Comptes des Correspondans*” in his *Science des negocians* of 1704, a successful treatise of which there were many editions. The section includes discussion of two-currency accounts. However, it is confused and contains a few errors. De la Porte, incidentally, refers to the domestic-currency columns as *les colonnes ordinaire* and the foreign-currency ones as *les colonnes extraordinaires* [De La Porte, 1704, pp. 170-174].

keepers were not preoccupied with the question of the precise determination of periodic profits or with the value to be placed on an asset when the ledger was being balanced and closed. Authors of treatises by and large reflected this attitude. The choice of rate did not, of course, affect the amount which the merchant owed his foreign agent or which the latter owed the merchant. That indebtedness was the relevant figure of direct interest to the merchant and was to be found in the inner columns.

References in certain treatises to the choice of exchange rate are noted here. John Mair [1736, p. 81], author of the most frequently issued textbooks in English on bookkeeping and accounts in the 18th century, observed that, when the ledger is balanced and closed, via a *balance* account, any balance shown in the inner columns should be converted by “valuing the Foreign Money at the current Rate of Exchange.” Matthieu de La Porte [1704, p. 174] made the same point, as did Hamilton, quoted above, and Oudshoff [1833, p. 85].

As regards the entries to be made for the foreign agent’s receipts and payments on behalf of the merchant, Flügel [1781, p. 27] observed that there were differences of opinion as to the rate of exchange to be used. However, the best view was that the conversion should be made at the rate of exchange ruling when the transaction was being entered in the merchant’s books.

Abraham de Graaf [1693, p. 34], a writer on bookkeeping with an original approach, has an interesting discussion of choice of exchange rate. He considers the case of a purchase of merchandise by the foreign agent on behalf of the merchant. He explains that it is better to enter a sum in the domestic-currency column of the *nostro* account at a higher rather than a lower amount than that indicated by the prevailing exchange rate. The reason behind this advice is that, if the corresponding debit entry in the merchandise account were lower, the merchant might think the merchandise cost less and so sell it too cheaply since the apparent profit on the re-sale would appear to be high enough to satisfy him. This possibility cannot be completely ruled out.¹⁵ De Graaf goes on to make the point (which assumes that the re-sale price is not affected) that, though the higher purchase price causes the profit shown on the merchandise account to be lower than it would otherwise be, the profit shown on the *nostro* account, when it is balanced, would be correspondingly

¹⁵ The point de Graaf made had been made earlier by Pacioli [1494, ch.12], who advised that values of items in the opening inventory should be put higher rather than lower, so that you can more easily succeed to make a profit. See Yamey [1994, pp. 118-119].

higher. He concludes that, as regards the net effect on the merchant's P&L account is concerned, it does not matter whether the purchase price had been set too high or too low; the balance on the P&L account would be exactly the same.

Entries only in the Inner Columns: It was the general practice for the foreign agent's expenditure on acquiring merchandise for the merchant to be entered in the *nostro* account in the inner column as well as in the outer column (converted at the appropriate rate). But what about other outlays the agent made on the merchant's behalf and would be entitled to recover, or the commission that was the agent's reward? Practice was not uniform. It seems that some merchants entered these expenses and commission in both columns, while others did not do so.

Giovanni Piccamiglio adopted the former course. A foreign agent's incidental expenses were entered in his *nostro* account in Piccamiglio's ledger in both the foreign and the domestic-currency columns. The counterbalancing debit entries were made in the P&L account. When a *nostro* account was balanced, the excess of credit over debit entries (or vice versa) in the outer columns, was credited (or debited) to the same P&L account.¹⁶

The Della Casa/Guadagni ledger [Cassandro, 1976] includes a large number of *nostro* accounts. The entries for the foreign agent's incidental expenses (such as brokerage and carriage) and the commission payable to him are made only in the foreign-currency columns and not in the domestic-currency columns. It follows that this treatment gives rise to the recording of smaller profits (or larger losses) on the *nostro* accounts when these are balanced than if the treatment used by Piccamiglio had been used. But the P&L account would not be debited directly for the expenses and commission. The two treatments thus would have the same net effect on the balance of the P&L account. Of course, the amount of the indebtedness between agent and principal shown as the balance on the inner columns would not be affected at all by the particular treatment used, but the balance on the outer columns would differ according to the treatment used.

It is not possible to establish which of the two treatments was used more widely in practice, or whether there were re-

¹⁶The language used in the Piccamiglio ledger was "*latin médiéval génois riche en incorrections, fantaisies et néologismes*" [Heers, 1959, p. 10]. The types of expenses entered in *nostro* accounts included *censaria*, *corretagius cambiorum*, *missorum*, and *improxia literarum*, i.e., brokerage and letters. The P&L account is *avarie diverse* or *ratione avariarum*. A debit entry in a *nostro* account to transfer a profit to the P&L account is as follows: ... *pro cressimento istius rationis de ratione avariarum*....[Heers, 1959, p. 320].

gional or national differences. In the great majority of early treatises, the latter method seems to have been illustrated, with incidental expenses and commission being entered only in the inner columns.¹⁷

Only one attempt at explaining why that treatment is to be preferred has been encountered. According to Hamilton [1788, p. 328], discussing the recording of commission due to the foreign agent:

This method of entry [i.e., amount not being extended to the outer column] is better than charging *Profit and Loss*, or *Commission-accompt Dr. to our Correspondent A.B.*, for if that method were used, an imaginary gain would appear on balancing our correspondent's accompt, which would be counterbalanced by a latent loss in a different accompt.

It is not clear what Hamilton meant by "imaginary" and "latent" in the passage just quoted. The meaning is elusive, although Hamilton, a careful expositor, may have had some subtlety in mind.

Entries only in the Outer Columns: Entries made only in the domestic-currency columns of a *nostro* account obviously neither increase nor reduce the amount of the indebtedness between agent and merchant as shown in the foreign-currency columns. Those entries do, however, affect the profit or loss shown in the domestic-currency columns when the account is balanced.

Entries of this kind are to be seen in several *nostro* accounts in the Della Casa/Guadagni Ledger [Cassandro, 1976, e.g., p. 415]. In several cases, it is clear that the debit or credit related to matters arising out of the agent's dealings, although not affecting his debt to or from his principal. For example, there is a credit entry for a profit made by the partnership in connection with a foreign-exchange transaction recorded in that account.¹⁸ I believe that this explanation also applies to other entries where the underlying circumstances cannot now be ascertained in the absence of other account books.

It is not at all clear why entries of this kind were made in *nostro* accounts. It seems somewhat anomalous that transactions or events that did not affect the foreign agent were recorded in what, in a major respect, was a personal account

¹⁷ Scali [1755, fo. 19] is one exception.

¹⁸ Cassandro [1976, p. 415] wrote: "...avanzati chon Arigho di Spangna del sopra ditto chanbio"

in the name of that agent. It would have been possible to have made the entries directly in the P&L account (or an intermediate account). It may well be that most merchants did just that. In any event, however, the choice of treatment did not affect the eventual balance shown in the firm's P&L account.

ALTERNATIVE TREATMENTS

According to Benedetto Cotrugli, writing in mid-15th century Italy, a merchant who was involved in foreign-exchange transactions should use two-currency accounts in his ledger. If he did not do so, he was not worthy of being called "merchant" (*Se pure non lo farai, non se' degno d'essere nominato mercante* [Tucci, 1990, p. 174]). Some 120 years later, Irson [1678] declared that it was an indispensable necessity (*necessité indispensable*) to have two-currency accounts for foreign correspondents acting on the merchant's behalf.¹⁹

Yet, there were other ways of keeping or recording the information a merchant needed in order to determine how he stood *vis-à-vis* his foreign agent. The merchant could have a personal account for the agent, with entries being made, in domestic currency, in the only money columns in the account. He would also keep a record outside the ledger, in foreign-currency terms, of his dealings with the agent. Whenever he thought fit, he could adjust the agent's personal account for the profit or loss on exchange with an appropriate entry in the P&L account. Clearly, this was a less "accountantly" solution than the *nostro* account favored by Cotrugli.

There was, however, a more "accountantly" alternative to the *nostro* account. That alternative was an accounting treatment associated with Venice although it was not used by all Venetian merchants of the 15th and 16th centuries. Here is the description of de Roover [1944, p. 398] of this Venetian method and his adverse assessment of it:

Casanova (1558) was the first Venetian writer to touch upon the problem of foreign exchange. If his description of commercial practices is accurate and trustworthy, it seems that *Nostro* accounts were little used in Venice but were replaced by an impersonal account called 'Exchange with Antwerp,' (London, Lyons, or whatever the place might be). The exchange differences

¹⁹ See Irson extract quoted above. The same words are used by Samuel Ricard [1709, p. XXVII], a French-born merchant who traded in Amsterdam. Ricard's discussion is derived from Irson's.

were eliminated from the current accounts with correspondents abroad by using a fixed exchange rate. As a result of this procedure, exchange differences appear in the Exchange accounts just mentioned.

This method has the serious defects of being cumbersome, of involving extra work, and of necessitating the arbitrary choice of a fixed exchange rate. I do not know why this method was preferred in Venice. It is certain that Venetian business practices frequently differed in important respects from those of other Italian cities.

There is evidence which suggests that this Venetian method was sometimes used outside Venice. Simon Ruiz (1526-1597) was one of the most important merchants of 16th century Spain. His career as merchant is the main subject of Henri Lapeyre's [1955] *Une famille marchands: les Ruiz*. The surviving ledgers pertaining to the early years of Ruiz's running of the family enterprise suggest that, as regards dealings with foreign correspondents, Ruiz used a treatment very similar to that described by the Venetian Alvise Casanova in 1588 [Lapeyre, 1955, p. 358].²⁰ In due course, Ruiz modified his accounting treatment in various ways.

Jan (= Giovanni) della Faille, the Elder (1515-1582) is the principal subject of Wilfrid Brulez's [1959] monograph *De firma Della Faille....* Jan was the factor in Antwerp of the de Hane business located in Venice, established by a Flemish merchant who settled there. Jan also traded on his own account and was prominent in the commercial community in Antwerp, itself the center of the international trading system. It seems clear, from a short paragraph in Brulez's [1959, pp. 42-43] book, that della Faille followed the Venetian method of treating accounts with his foreign agents.

Both Simon Ruiz and Jan della Faille were leading merchants who operated on a large scale. For them, the two-currency *nostro* account was not indispensable. Yet, although not

²⁰De Roover [1944, p. 406, note 65] draws attention to the fact that Casanova, in some of his examples, uses the names of real-life merchants, including Anton Fugger and the Bonvisi. Casanova also has an account for "Giovan della Faglia" (= Jan della Faille), the merchant mentioned in the penultimate paragraph of this paper. Casanova was not the only author to use the names of real merchants. For example, Weddington has a *nostro* account for "Johan de la Fallio, merchant of Andwarpe," in his model ledger [Weddington, 1567, ledger A, fo. 20]. Michel van Damme, the son of a patrician merchant, and himself a merchant in Rouen, has a ledger account in his model ledger, "*Martin de la Faille d'Anvers mon compte ...*" [Van Damme, 1606, ledger fo. 2]. Maarten (= Martin) de la Faille (1545-1620) was the son of Jan de la Faille and in business with him.

indispensable, the treatment involving entries in two currencies was an eminently “accountantly” solution to the problem created by fluctuating exchange rates and the use of agents located in foreign trading centers. It is a solution which has had a long history.

REFERENCES

- Brulez, W. (1959), *De firma Della Faille en de internationale handel van Vlaamse firma's in de 16e eeuw* (Brussels: Paleis der Academiën).
- Carpenter, J. (1632), *A Most Excellent Instruction...* (London: J. Boler).
- Casanova, A. (1558), *Specchio lucidissimo...* (Venice: Comin di Tridino).
- Cassandro, M. (1976), *Il libro giallo di Ginevra della compagnia fiorentina di Antonio Della Casa e Simone Guadagni 1453-1454* (Prato: Istituto Internazionale di Storia Economica 'F. Datini').
- Ceccherelli, A. (1913), *I libri di mercatura della Banca Medici, e l'applicazione della partita doppia a Firenze nel secolo decimoquarto* (Florence: Bemporad).
- Coutereels, J. (1603), *Den stijl van boeck-houden...* (Middelburg: S. Moulert).
- Dafforne, R. (1635), *The Merchants Mirrour...* (London: N. Bourne).
- Dafforne, R. (1670), *The Apprentices Time-Entertainer Accomptantly...*, 3rd. ed. (London: R. Horne).
- De Graaf, A. (1693), *Instructie van het Italiaans boekhanden...* (Hardewyk: H. Rampen).
- De La Porte, M. (1704), *La science des negocians et teneurs de livres...* (Paris: G. Cavalier & C. Osmont).
- De Roover, R. (1944), “Early Accounting Problems of Foreign Exchange,” *Accounting Review*, Vol. 19, No. 4: 381-407.
- Flori, L. (1636), *Trattato del modo di tenere il libro doppio...* (Palermo: D. Cirillo).
- Flügel, G. (1781), *Theoretische Abhandlung vom doppelten Buchhalten...* (Frankfurt).
- Hamilton, R. (1788), *An Introduction to Merchandise...*, 2nd. ed. (Edinburgh: C. Elliot).
- Handson, R. (1669), *Analysis or Resolution of Merchants Accompts*, 4th. ed. (London: R. Horne).
- Heers, J. (1959), *Le livre de comptes de Giovanni Piccamiglio, homme d'affaires Genoïse 1456-1459* (Paris: SEVPEN).
- Hingstedt, C. (1804), *Die neuern praktischen Fortschritte...* (Hamburg: Kratisch & Wettach).
- Iron, C. (1678), *Methode pour bien dresser toutes sortes de comptes...* (Paris: J. Jombert).
- Lapeyre, H. (1955), *Une famille de marchands: les Ruiz* (Paris: Armand Colin).
- Mair, J. (1736), *Book-keeping Methodiz'd ...* (Edinburgh: T. & W. Ruddimans).
- Melis, F. (1950), *Storia della ragioneria* (Bologna: Cesare Zuffi).
- Oudshoff, W. (1833), *Volledig theoretisch en praktisch handboek...* (Rotterdam: Mensing & Van Westreenen).
- Pacioli, L. (1494), *Summa de arithmetica...* (Venice: Paganino de Paganini).
- Peele, J. (1553), *The maner and fourme how to kepe a perfecte reconyng ...* (London: R. Grafton).
- Peele, J. (1569), *The Pathe way to perfectnes...* (London: T. Purfoote).
- Pietra, A. (1586), *Indirizzo degli economi...* (Mantua: F. Osanna).
- Ricard, S. (1709), *L'Art de bien tenir les livres de comptes...* (Amsterdam: P. Marret).
- Scali, P. (1755), *Trattato del modo di tenere la scrittura...* (Leghorn: G.P. Fantechi).
- Ten Have, O. (1933), *De leer van het boekhouden in de Nederlanden tijdens de zeven-*

Yamey, *Two-Currency Accounts*

143

tiende en achttiende eeuw (Delft: J. Waltman Jr.).

Tucci, U. (1990), *Benedetto Cotrugli Raguseo: Il libro dell'arte di mercatura* (Venice: Arsenale).

Van Damme, M. (1606), *Manière la plus industrieuse...* (Rouen: N. Dugort).

Waninghen, H. (1613), *Tresoor van 't Italiaens boeck-houden...* (Amsterdam: W.J. Stam).

Waningen, H. (1615), *Le thresor de tenir livre de comptes a l'Italienne...* (Amsterdam: P. de Wachter & G. Stam).

Weddington, J. (1567), *A breffe Instruction and Manner ...* (Antwerp: P. van Keerbergen).

Yamey, B. (1957), "Handson's Analysis of Merchants Accompts – an Unrecorded Broadside, 1669," *Accounting Research*, Vol. 8, No. 4: 299-304.

Yamey, B. (1994), "Commentary on Pacioli's 'De Computis et Scripturis,'" in Geb-sattel, A. and Yamey, B. (eds.), *Luca Pacioli: Exposition of Double Entry Bookkeeping* (Venice: Albrizzi): 95-169.

Yamey, B., Edey, H., and Thomson, H. (1963), *Accounting in England and Scotland: 1543-1800* (London: Sweet & Maxwell).



Accounting Historians Journal
Volume 38, Number 2
December 2011
pp. 145-170

Jeffrey J. Archambault
MARSHALL UNIVERSITY
and
Marie E. Archambault
MARSHALL UNIVERSITY

EARNINGS MANAGEMENT AMONG FIRMS DURING THE PRE-SEC ERA: A BENFORD'S LAW ANALYSIS

Abstract: This paper examines the existence of financial statement manipulation in the U.S. during a time period when many of the current motivations did not exist. The study looks for types of manipulations that would be motivated by the pre-SEC operating environment. To examine this issue, a sample of U.S. firms from the 1915 *Moody's Analyses of Investments* is divided into industrial firms, railroads, and utilities. The railroad and utility companies faced rate regulation during this time period, providing incentives to manipulate the financial reports so as to maximize the rate received. Industrial firms were not regulated. These companies wanted to attract investors, motivating manipulations to increase income and net assets. To determine if manipulations are occurring, a Benford's Law analysis is used. This analysis examines the frequency of numbers in certain positions within an amount to determine if the distribution of the numbers is similar to the pattern documented by Benford's Law. Some manipulations consistent with expectations are found.

Companies face incentives to choose accounting policies and estimates to achieve certain goals. Managers may want to smooth earnings, maximize earnings, or meet analysts' earnings forecasts. They may want to generate enough earnings to be able to issue dividends or to maintain their current or debt ratios to satisfy lending agreements. Earnings management is the process of choosing accounting alternatives to achieve desired accounting results. McKee [2005] stresses that earnings management uses legal methods as opposed to fraud. Managers may also engage in economic earnings management by making operating decisions designed to achieve desired accounting results.

Several authors have examined accounting policy choice to study earnings management. Many studies have focused on the choice of inventory cost-flow assumption [Morse and Richardson, 1983; Hunt, 1985; Johnson and Dhaliwal, 1988; Lindahl, 1989]. In general, these studies have found that companies choose the LIFO inventory cost-flow assumption if they face

high inflation in the cost of inputs, and also if they have certain accounting characteristics such as a high current ratio, low debt ratio, and/or large amounts of unrestricted retained earnings. These characteristics allow firms to continue with contracts that rely on accounting measures while using LIFO to reduce taxable income.

Other studies have modeled the accrual process and used the results to estimate abnormal accruals. These studies have then used abnormal accruals to examine a number of issues related to earnings management [Rees *et al.*, 1996; Cheng and Warfield, 2005; Peasnell *et al.*, 2005; Morsfield and Tan, 2006; Pincus *et al.*, 2007]

Another approach to examine earnings management is Benford's Law. Digits are not uniformly distributed in naturally occurring, unrestricted data. Instead, the first digit is much more likely to be small and much less likely to be large. For example, approximately 30% of the first digits will be one. This is thought to be due to the geometric growth of natural processes [Nigrini, 1999]. Manipulated data do not tend to follow Benford's Law. This occurs because people may overuse a favorite number, for example, or may tend to overuse large digits or the digit one in an attempt to overstate results. Benford's Law can then be used to detect fraud (Nigrini and Mittermaier, 1997; Carr, 2005; Cleary and Thibodeau, 2005; Johnson, 2005] or earnings management [Skousen *et al.*, 2004; Guan *et al.*, 2006, 2008; Jordan and Clark, 2011].

This study will examine the earnings management of U.S. company-reported data from the 1915 *Moody's Analyses of Investments (Moody's)* using a Benford's Law analysis. This time period is being chosen because it is before the Securities and Exchange Commission (SEC) was created so that U.S. government regulation of securities did not exist. This time period is also before the existence of promulgated U.S. generally accepted accounting principles (GAAP) and modern auditing techniques. The study will examine what types of manipulation occurred in this environment and whether the manipulations are consistent with basic incentives to maximize the value of the firm. The analysis used is empirical which will extend the existing historical literature that is primarily based on conjecture and conventional wisdom. The sample of firms will be broken into industrial companies, which faced no U.S. federal governmental regulation, and railroads and utilities, which did have government-imposed rate regulations. By looking at these two groups of firms, the role of non-securities regulation can be examined

as a deterrent to financial statement manipulation.

Examining these issues will help the profession better understand the important role that securities' regulation does play in providing higher quality financial statements. It will also provide insight regarding the role of other forms of oversight of accounting practice and disclosures in improving reporting. Rate regulators in the railroad and utility industries are shown to provide some effective controls over certain types of financial statement manipulation, while the regulatory process seems to encourage other types of manipulations. Specifically, unregulated industrial companies primarily managed gross revenue, total net income, and payables. Regulated companies also managed payables. In addition, the regulated companies managed other income in the income statement and property, plant, and equipment, equity, and bonds payable in the balance sheet. These differential results between the groups studied indicate that pre-SEC regulatory actions did influence accounting choices.

The general conclusion that rate regulation did deter manipulation of operating revenues and operating income also has current ramifications. There are movements within the profession to increase oversight of reporting. The results presented here indicate that increased scrutiny of financial statements will lead to less manipulation in those areas under scrutiny, but can also encourage manipulation in areas not under scrutiny. Overall, this study contributes to our understanding of the importance of both securities-based and non-securities-based regulation on financial reporting and management incentives to manipulate those reports to achieve reporting goals or personal gain.

The next sections provide a discussion of the background for the study, a review of the literature, and development of hypotheses. These sections are followed by a discussion of the methodology. The results of the Benford's Law tests are then presented. The last section presents a discussion and conclusion.

BACKGROUND

Prior to the establishment of the SEC, financial reporting was not federally regulated in the U.S. While U.S. stock exchanges typically required financial statements for listed companies, GAAP were not well developed, and unlisted firms could trade on the exchanges as long as they provided a balance sheet [Sivakumar and Waymire, 1993]. The first published attempt at U.S. accounting standardization was "Uniform Accounts." issued April 1, 1917, in the *Federal Reserve Bulletin* [Tucker, 1987].

Full financial statement audits were not required for New York Stock Exchange (NYSE) listed companies until 1933 [Skinner, 1987]. Listing requirements, however, only applied to newly listed companies. As a result, 85% of listed companies had a full audit in 1933 [Gross, 2002]. The NYSE did have a listing requirement of a balance-sheet audit starting in 1910 [Sivakumar and Waymire, 1993]. Prior to 1917, the lack of promulgated accounting standards and minimal audit requirements created a situation that allowed firms to choose accounting policies to achieve desired results with fewer limitations than firms face today.

This study will use this time period, then, to examine whether managers took advantage of the lack of regulation and standardization to manipulate the reported financial information. To complete this investigation, the types of manipulations to look for need to be considered. This consideration needs to take into account the time period under study as the current types of manipulations seen in recent studies may not have been common in 1915 because, for instance, managers may not have had incentive contracts. Therefore, literature will be examined that is of both an historical nature and more current to consider what types of accounts may have been manipulated and the rationale for that manipulation.

The literature that is of an historical nature is used to give perspective on the way financial information was prepared and used. This provides insights on what types of accounts would most likely be manipulated. In reviewing the literature, the majority of papers with much depth regarding the preparation and use of financial information in the early 1900s are focused on the U.K. The literature on U.S. firms from this time period is both less substantial and less detailed. Therefore, the literature discussed in the next section will be for both U.S. and U.K.-based studies. While companies in these two countries did operate in different economic and regulatory environments, there were many similarities as well. Consideration of both reporting environments can provide indicators of the types of accounts that managers of the day may have manipulated.

LITERATURE

Accounting and Reporting in the U.K.: Laws in the U.K. established reporting and auditing requirements prior to the time period of this study. The Joint Stock Companies Act of 1844 required audited balance sheets [Morris, 1993]. This was the

earliest legislation requiring financial disclosure. Edwards [1992] notes that balance-sheet audits were mandatory by 1900. Legislation also standardized the reporting formats for railroads in 1868, gas utilities in 1871, and electric utilities in 1882. Therefore, there was considerably more observation and standardization of U.K. company reporting than U.S. reports at the same time. This increased audit oversight and reporting requirements may have led to less manipulation. Arnold [1998] does indicate that legislation prior to 1948 was inadequate for providing satisfactory disclosures and a reporting environment useful for those making capital-investment decisions. Thus, the reporting environment in the early 1900s, while more regulated than the U.S. at the same time, still lent itself to potential manipulation and reporting norms that would be more closely scrutinized under today's standards. The issues of interest in this literature are examples of how accounting and reporting were used to manage earnings and to provide insights into the types of accounts or statements where manipulation would most likely be found. These studies are non-empirical in nature, but they do provide useful insights regarding the belief of informed historians regarding where and why manipulations of financial reporting occurred.

Secret reserves were common in the U.K. These reserves were used to overstate financial position and to smooth earnings [Edwards, 1976; Arnold, 1991]. Companies often created reserves by overstating liabilities or depreciation during years of high income and then liquidating the reserves during lean years [Arnold, 1991].

Arnold [1998] examined internal information versus published statements for 30 U.K. companies between 1900 and 1924. His results indicate that prior to 1914, little manipulation of the statements occurred. From 1915-1924, his analysis documented manipulations of reported versus internal numbers. This manipulation was achieved through depreciation, taxation, and secret reserves, used by 25% of the companies after 1915.

As a result of the lack of audits and promulgated accounting standards, manipulation and omission were common in public financial statements in the U.K. Maltby [1998] noted that concerns over fraud and measurement uncertainty led to the Joint Stock Company legislation in Britain in the late 1800s. Lee [1975] indicated that the act of 1856 limited dividends paid to shareholders to reported earnings. This legislation also required annual balance sheets and statements of income. Bryer [1993] described the more widely owned corporations result-

ing from the merger wave at the turn of the 20th century in Britain as manager-controlled firms. In these entities, investors were seen as no more than loose constraints on management action. The accounting model that was developed at the time was easy for management to manipulate. Lee [1975] indicated that it was managers' opinion that shareholders only needed to know income so that they would be aware of the dividend to expect. Thus, income was manipulated through the use of secret reserves to allow for more conservative dividend payments to owners. Jones and Aiken [1994] also support the assertion that most of the income manipulation was used to stabilize dividend policy. The problem for investors in the early 20th century in the U.K. was not lack of disclosure as much as manipulation of and omissions in the statements provided. Without any reporting standards or regulations, what and how much to report was at the discretion of the Board of Directors.

Accounting and Reporting in the U.S.: Manipulation by American companies prior to the establishment of the SEC has been more infrequently studied than in the U.K. Merino and Neimark [1982] claimed, however, that financial statements were of poor quality and unreliable. Hawkins [1963] noted that during the 1920s, the Investment Bankers Association of America sought greater standardization of accounting information provided by industrial issuers. Statements were difficult to use for analysis because of a lack of standardization.

Johnson [1943] examined reporting of U.S. companies and found large charges and credits being made directly to surplus or reserves that should have been included in income, using a modern view of an all-inclusive income statement. Some charges were so large that they exceeded the reported income of the entity. Without standards to guide practice, what amounts went through reported income and what types of charges and credits went directly to surplus was at the discretion of management and the Board of Directors. For instance, Kern [2000] provided evidence that depreciation varied between good and poor years for companies between 1908 and 1930. This was an area of reporting that could easily be manipulated in an attempt to make the company look like a better investment prospect. Johnson [1943] noted that operating results generally did go through income, but nonoperating activity was inconsistently allocated between income and surplus.

Merino (1993) discussed the use of reserves to limit distributable income since it was common to pay all income as divi-

dends prior to 1920. These reserves were then used to regulate the amount of dividend payments and resulted in reported income manipulation to achieve the desired dividend distribution to shareholders. Thus, the condition of reporting in the U.S. was similar to that described by Bryer [1993] in Britain. Managers and the Board of Directors were free to adjust discretionary amounts such as depreciation, depletion, and reserves to report the income they wanted to report.

Rate Regulation in the U.S.: Public concern over rates in the late 1800s led to the regulation of railroads and utilities. The first laws were the Granger Laws established in the Midwestern states in the 1870s. These laws gave states the ability to regulate railroad rates [Ulen, 1980].

Rate regulation was typically based on cost plus a fair return on investment [Covaleski, *et al.*, 1995]. This provided regulated companies, such as railroads and utilities, an incentive to over-invest in assets in order to maximize the rate and, therefore, revenue. Boockholdt [1978] noted that the use of these return-on-invested-capital (ROIC) rate-setting regulations coincides in time with the increased use of the retirement method of depreciation and a trend toward capitalizing rather than expensing new assets. While he did not empirically test this relationship, the correlation between a regulatory change and a change in accounting policies seems to have clearly existed. These changes in accounting policies were such that it would tend to increase rates. These may not have been the only types of accounting changes made in response to rate regulation. This study seeks to determine if other efforts may also have been used by these regulated companies to manipulate the rate base.

Alternatively, the regulation process may have provided some scrutiny of the accounting process, reducing the ability of the managers to manipulate assets [Baskin, 1988; McKee, 2005]. The Interstate Commerce Commission (ICC) was established in 1887. The ICC devised an accounting system that served as a basis for examining revenues, expenses, and earnings of railroads and utilities so that fair rates could be established [Trebing, 1984]. These examinations may have acted to limit regulated companies' abilities to manipulate income. An example of such a limit would relate to property, plant, and equipment. If physical comparisons were made to accounting records, companies could no longer capitalize assets that were completely utilized in the current period since they would not be physically present to examine. Adequacy of depreciation would be an-

other possible item for regulators to examine through these laws that could have been highly manipulated without the regulatory oversight. As a result of these regulatory movements, accounting-rate-of-return-based laws existed in 29 states and the federal government by 1913 [Trebing, 1984]. The Hepburn Act (1906) empowered the ICC to establish a uniform chart of accounts for railroads [Ulen, 1980]. This uniformity in reporting would further reduce management's ability to manipulate earnings. Sivakumar and Waymire [2003] provide some empirical support for this lack of manipulation, reporting that railroads responded to accounting rules for fixed assets by adopting more conservative accounting policies to reduce earnings and, thereby, preventing lower rates rather than engaging in income-smoothing activities by adjusting maintenance expenses to counteract high or low revenue periods.

HYPOTHESES

The literature examined in the previous section seems to indicate that companies had the ability and incentive to manipulate income during the early 1900s. Incentives to manage earnings during that time period differ from incentives today. For example, fewer analysts followed firms in the early 20th century, so the need to meet analysts' earnings forecasts may have either not existed or been much less significant. However, since individual investors still had expectations, incentives existed to maximize or smooth earnings. The literature also indicates that incentives existed to manage earnings to satisfy dividend requirements or to remain attractive to lenders [Lee, 1975; Merino, 1993]. To help individual investors make decisions, *Moody's* issued stock and bond ratings. These ratings, in turn, were influenced by financial results. Thus, attracting investors would have been easier with higher net assets and income. The literature indicated that reserves were commonly used to accomplish this goal [Johnson, 1943; Edwards, 1976; Arnold, 1991; Merino, 1993]. This implies that the basic motive to improve the appearance of the company through "window dressing" existed in the pre-SEC environment as it does today.

Incentives to reduce income also existed. In 1909, the government passed an excise tax on corporate income of 1% of income in excess of \$5,000 [Previts and Bricker, 1994]. Thus, there were competing pressures on income manipulation to achieve different goals.

Audits were less frequent and less developed than today. Balance-sheet-only audits were a common practice, becoming

popular around 1910 [Gilman, 1939; Corcell, 1989]. Baskin [1988] noted that the lax standards of the day relegated accounting earnings to be a validation of dividend policy. The reporting environment was such that not all firms issued financial statements, and the statements issued varied greatly in the level of quality and quantity of detail provided [Brief, 1987]. A lack of standardized GAAP and less detailed audits created a situation where managers were able to make a greater number of accounting choices than today.

H1: Unregulated companies managed earnings and net assets to appear to be a more favorable investment.

However, as a result of rate regulation, railroads and utilities may have been less able to manipulate operating costs and earnings than unregulated companies. The regulated companies had an incentive not to appear too profitable in order to avoid rate reduction and/or increased regulation. Thus, the incentive in income manipulation may have been to reduce income through higher non-operating costs and deferring other income rather than increasing income as would be the case for most unregulated companies. Likewise, the increasing of reserves to hide excessive profit may also have been used. The regulated companies were receiving enough scrutiny; they did not want to attract more through the appearance of high profit margins.

Regulated companies had an incentive to manage assets to charge higher rates, but the regulatory environment left them unable to manipulate operating revenues. In this sense, regulators may have been providing an audit function with respect to some of the reported information of these regulated entities in the absence of actual financial statement audits.

H2: Rate-regulated companies managed net assets to increase the numbers to provide higher rates and only nonoperating components of earnings through income decreasing manipulations.

METHODOLOGY

This study examines earnings management among firms listed in the 1915 *Moody's Analyses of Investments*. This publication included data for 5,334 companies. A random sample of 810 companies was taken. Companies were eliminated if they were wholly owned subsidiaries (331), were incorporated outside the U.S. (10), were in receivership (1), or had no financial statements (141). This left a sample of 129 industrial companies (123 of which published an income statement and 128 of which

published a balance sheet), 89 railroads (82 of which published an income statement and 72 of which published a balance sheet), and 109 utilities (105 of which published an income statement and 92 of which published a balance sheet).

Earnings management may be operationalized in a variety of ways. Specific accounting policies are not disclosed in the 1915 *Moody's*. The average number of line items disclosed in the income statement was 4.33. With this lack of detail in the financial statements, estimating accruals would be too difficult. Therefore, earnings management is measured by whether the distribution of first digits in numbers conforms to Benford's Law.

Digits are not uniformly distributed in naturally occurring, unrestricted data. Instead, the first digit is much more likely to be small and correspondingly less likely to be large. This is thought to be due to the geometric growth of natural processes.

Benford postulated that first digits in naturally distributed data are distributed with probability equal to $\log(1+1/d)$, where d represents the digit and \log is the base 10 logarithm [Nigrini and Mittermaier, 1997]. The following chart provides the probability that the first digit of any number has the value given:

<u>Digit</u>	<u>Probability</u>
1	0.30103
2	0.17609
3	0.12494
4	0.09691
5	0.07918
6	0.06695
7	0.05799
8	0.05115
9	0.04576

Manipulated data do not tend to follow Benford's Law. This occurs because people may overuse a favorite number, for example, or may tend to overuse large digits or the digit one in an attempt to overstate results. Benford's Law can be used to detect fraud [Nigrini and Mittermaier, 1977; Cleary and Thibadeau, 2005; Carr, 2005; Johnson, 2005; Kelly, 2011] or earnings management.

Guan, *et al.* [2006] used Benford's Law to find that U.S. firms engage in cosmetic earnings management to achieve key reference points in each of the reported four quarters. The fourth quarter, which is audited, has less manipulation. Jordan and Clark [2011] reported that cosmetic earnings management decreased after passage of Sarbanes-Oxley. Skousen *et al.* [2004] and Guan *et al.* [2008] reported similar cosmetic rounding of reported earnings among Japanese and Taiwanese firms, respectively.

Lin *et al.* [2011] used Benford's Law to show that Taiwanese firms tend to report earnings in increments of 5 or 10. Zhou [2010] reported that using I/B/E/S, analyst forecasts that are in increments of 5 tend to be more optimistic and be accompanied by weaker stock-market responses.

Benford's Law analysis only utilizes information from one account unlike accounting policy choice or abnormal accrual estimation techniques which utilize information from other accounting choices or reported amounts. This focus on one account results in Benford's Law studies having less statistical power to detect earnings management. Only manipulations of one account significant enough and frequent enough to alter the distribution of digits can be detected. The other techniques can combine the changes in various accounts to detect manipulation rather than rely on adjustment to one account alone. However, Benford's Law can be tested on any set of data without the need to gather other information that may be difficult or impossible to identify, especially during the early 20th century when accounting was not as fully developed as it is today and when disclosure was less complete.

The actual distribution of first digits will be compared to the expected distribution with the goodness-of-fit test. The chi-square statistic was computed for the overall distribution. A second statistic was computed to measure firms' potential desire to manage size. Firms wanting to make an amount appear larger want to manage first digits up to the next 1 or 5. Firms wanting to make an amount to appear smaller would want to manage the first digit down to the previous 9 or 4 [Carslaw, 1988; Skousen *et al.*; Guan and Wetzel, 2004]. The second chi-square statistic compared the distribution of three sets of first digits: 1 or 5 (for line-item amount increases), 4 or 9 (for line item-amount decreases), and all other digits. In addition, the t-statistic was used to test the distribution of the digits 1, 4, 5, and 9 relative to Benford's Law.

Each line item in the reported financial statements was

gathered. Because of the lack of standards during this time period, there was considerable variation in the account titles given in *Moody's*. The authors combined only obviously similar items (such as cost of goods sold and cost of sales). If there was any doubt that a title represented something different than the titles already in use, the line item was added to the data base as a separately titled account. As a result, the data base used had 107 balance-sheet account titles and 48 income-statement account titles. The goodness-of-fit tests were conducted for each account title that had 20 or more observations in the sample. By examining items as reported, the Benford's Law test is being used appropriately by examining naturally occurring numbers. If line items were arbitrarily combined, the numbers being reported would no longer be naturally occurring numbers, and therefore, Benford's Law would not apply. The tests were separately conducted for unregulated industrial companies and rate-regulated companies.

RESULTS

Unregulated Companies: Table 1 presents the results of the goodness-of-fit test for the income statements of unregulated industrial companies. These companies were tested for gross revenue, gross earnings, operating expenses, depreciation, preferred dividends, dividends paid, fixed charges, total net income, balance, and final surplus. The overall goodness-of-fit test for total net income was significant with a probability 0.079. Gross revenue had a first digit of 1 or 5 more frequently than expected, though the frequency of the digit 5 did not achieve significance when considered individually. This result indicates that industrial companies had a tendency to report revenue in larger amounts than Benford's Law would expect. Interestingly, 17 of the 32 companies reporting net income had a first digit of 1, while none of the companies reported a first digit of 5. The chi-square test for the combined first digits is not significant. Still, the evidence suggests a tendency to report total net income that appears larger, moving into the next digit with a leading one.

TABLE 1
Goodness-of-Fit Tests
Unregulated Industrial Companies Income Statements

Statement Line Item	N	Distribu- tion of 1 st digit Chi-square Probability	t-statistic				Distribution of 1 & 5, 4 & 9, and others Chi-square Probability
			1	5	4	9	
Gross Revenue	46	0.271	1.82**	1.01	-0.48		0.035**
Gross Earnings	24	0.352	0.57	-0.30	0.12		0.833
Operating Expenses	32	0.404	0.72	-0.02	-0.96	-0.82	0.196
Depreciation	35	0.305	-0.72	-0.80	0.63	-0.89	0.968
Preferred Dividends	23	0.422	-0.19	-1.02			0.423
Dividends Paid	49	0.191	-0.08		-1.09	-1.19	0.085*
Fixed Charges	26	0.832		0.32		-0.65	0.872
Total Net Income	32	0.079*	2.65***	-1.33*	-0.36	0.88	0.151
Balance	50	0.616	0.14		-1.12	0.14	0.689
Final Surplus	82	0.634	-0.53		0.58	-0.13	0.756

* 10% Significance ** 5% Significance *** 1% Significance
T-statistics are adjusted for the finite correction factor. Raw statistics less than 0.50 are omitted from the table.

The only other line item disclosed in the income statement to have a significant deviation from Benford's Law was dividends paid. The digits 4 and 9 were less likely than expected even though neither digit achieved significance individually. Reporting these digits less frequently than expected indicates a tendency to pay larger dividends than would be expected from a normal distribution of first digits even though the frequency of the digits 1 and 5 do not statistically indicate the tendency for larger dividend payments. This finding of inflated dividend payments is consistent with Lee [1975] who noted that the dividend policy of companies during this time period was to maximize the dividend paid to shareholders.

Table 2 presents the results of the goodness-of-fit tests for the balance sheets of unregulated industrial companies. The balance-sheet items tested were property, plant, and equipment; investments; inventories; bills receivable; accounts receivable; cash; common stock; preferred stock; bonded debt; bills payable; accounts payable; reserve; surplus; and total assets.

TABLE 2
Goodness-of-Fit Tests
Unregulated Industrial Company Balance Sheets

Statement Line Item	N	Distribu- tion of 1 st digit	t-statistic				Distribu- tion of 1 & 5, 4 & 9, and others	
			Chi-square Probability	1	5	4		9
Property, Plant, and Equipment	79	0.904	-0.80			0.70	-0.60	0.644
Investments	28	0.736	-0.38				0.20	0.764
Inventories	38	0.717	0.35	-0.31	1.54*			0.190
Bills Receivable	30	0.567	0.58	0.08	-0.25	0.11		0.612
Accounts Receivable	64	0.423	-1.84**	0.25	0.54	-0.85		0.342
Cash	93	0.423	-0.79	1.20	1.57*	0.62		0.114
Common Stock	100	0.105	-2.31**	2.44***	0.61	-0.51		0.708
Preferred Stock	48	0.017**	-0.30		0.41	-1.17		0.826
Bonded Debt	39	0.426	-1.13		0.93			0.340
Bills Payable	30	0.634	-1.41*	0.76	-0.25	0.11		0.597
Accounts Payable	58	0.057*	-1.42*	-0.53	2.17**	1.79**		0.003***
Reserves	34	0.561	0.47	1.15	-1.04	-0.05		0.218
Surplus	90	0.406	-0.14	-1.03		-0.82		0.441
Total Assets	104	0.010**	-0.17	-0.99	-0.19	0.82		0.656

* 10% Significance

** 5% Significance

*** 1% Significance

T-statistics are adjusted for the finite correction factor. Raw statistics less than 0.50 are omitted from the table.

Unregulated industrial companies had a tendency to understate accounts payable. This is indicated by the significance of both the first digit distribution as a whole and the distribution of 1, 4 and 9, and other numbers relative to 1 and 5 and 4 and 9. The direction of the distribution is determined by the t-statistics of each number. These t-statistics show that the digits 4 and 9 were both significantly more common, and the number 1 was less common than expected by Benford's Law. One was also less common for bills payable. However, the other results from accounts payable were not replicated for bills payable.

Some evidence of earnings management behavior is demonstrated among current-asset accounts. Both the inventory and cash accounts show the number 4 being the first digit more often than expected. For accounts receivable, 1 is a first digit less often than

expected. Surprisingly, in each case, the company manipulated the reported balance to make the account appear smaller than a distribution of numbers consistent with Benford's Law would look.

The equity accounts also had deviations from the distribution of first digit numbers that would be expected under Benford's Law. In the common-stock account, 1 is less common and 5 is more common than expected. These results are opposite each other since the frequency of both 1 and 5 indicate an increasing manipulation effect [Carslaw, 1988; Skousen *et al.*, 2004]. Both the chi-square statistic for the first digit as a whole and for the groupings of 1 and 5, 4 and 9, and all other numbers are insignificant for common stock. Thus, the intent of the manipulation with common stock is unclear.

The overall distribution of first digits is significantly different from expected for the preferred-stock account. However, the other reported statistics do not show a significant deviation from the expected distribution. The only digits that showed significance were 2 (t-statistic of 3.42) and 6 (t-statistic of 1.57).

Total assets also show a similar result. The overall distribution of first digits significantly differs from Benford's Law as shown by the significance of the overall chi-square result. However, the only other significant differences from the expected distribution were for 2 (t-statistic of 2.01), 6 (t-statistic of 2.17), and 8 (t-statistic of 2.75). These numbers were all more common than expected and do not represent increasing or decreasing tendencies. A total would also be difficult to manipulate since it is the sum of previous numbers. Therefore, the significant result found here is probably not related to manipulation.

Regulated Companies: Table 3 presents the results of the goodness-of-fit tests for the income statement of regulated companies. The income statement line items tested for these companies were gross revenue, operating expenses, tax accrued, depreciation, other income, preferred dividends, dividends paid, fixed charges, total net income, balance, and final surplus. The lack of significance in the overall goodness-of-fit test for net income indicates that the distribution of first digits is consistent with Benford's Law. This suggests that the regulatory process provided enough scrutiny over reporting to discourage earnings management of net income. Significant deviations were found, however, in components of the income statement. The first digit of tax accrued was less likely to be 1 and more likely to be 9 than expected. This result indicates a tendency to understate this expense even though neither the chi-square statistic for the distribution of first digits as a whole nor the chi-square tests

considering 1 and 5, 4 and 9, and all other numbers were significant. This manipulation of taxes is consistent with the findings of Arnold [1998], who reported that taxation was one of three reported numbers that differed from internal data in his analysis of U.K. companies during a similar time period.

TABLE 3
Goodness-of-Fit Tests
Regulated Company Income Statements

Statement Line Item	N	Distribution of 1 st digit Chi-square Probability	t-statistic				Distribution of 1 & 5, 4 & 9, and others Chi-square Probability
			1	5	4	9	
Gross Revenues	158	0.671	-0.70	-0.59		-0.66	0.309
Operating Expenses	165	0.747	0.82	-0.16	0.92	-0.39	0.571
Tax Accrued	36	0.438	-1.58*	0.40		1.48*	0.394
Depreciation	29	0.747		0.83	-0.19	0.15	0.740
Other Income	53	0.059*	0.46	-1.88**	2.03**	1.36*	0.089*
Preferred Dividends	25	0.123		1.13	0.52		0.490
Dividends Paid	71	0.195		-0.93	-0.96	0.14	0.460
Fixed Charges	116	0.959		-0.24	-0.86		0.554
Total Net Income	44	0.234	-0.57	0.01		-1.09	0.413
Balance	59	0.291	-0.36	-0.56	0.78	-0.12	0.624
Final Surplus	137	0.114	-0.70	0.21	-1.96**	0.50	0.235

* 10% Significance

** 5% Significance

*** 1% Significance

T-statistics are adjusted for the finite correction factor. Raw statistics less than 0.50 are omitted from the table.

Other income tended to be understated as indicated by the digits 4 and 9 being more common and 5 less common than expected. Both the chi-square statistic for the first digit as a whole and the chi-square statistic for frequency of 1 and 5, 4 and 9, and other digits were significant. These chi-square results show that reported other income fails to follow the pattern of first digits expected from Benford's Law. Combined with the t-test result for the numbers 1 (being too few) and 9 (being too frequent), the conclusion can be drawn that regulated companies attempted to minimize the affect of other income on total net income. This is consistent with attempting to appear not any more profitable than necessary to avoid rate reduction.

The only other significant result in the income statement of regulated companies was that the digit 4 in final surplus was less com-

mon than expected. This indicates that regulated companies made some attempt to make retained income appear larger. However, the test for increased frequency of the number 5 was not significant.

Table 4 presents the results of goodness-of-fit tests for the balance sheets of regulated companies. The account balances tested for these companies were property, plant, and equipment; investments; bills receivable; accounts receivable; supplies and materials; cash; common stock; preferred stock; bonded debt; notes payable; accrued liabilities; bills payable; accounts payable; current liabilities; reserves; surplus; and total assets.

TABLE 4
Goodness-of-Fit Tests
Regulated Company Balance Sheets

Statement Line Item	N	Distribution of 1 st digit	t-statistic				Distribution of 1 & 5, 4 & 9, and others
		Chi-square Probability	1	5	4	9	Chi-square Probability
Property, Plant, and Equipment	82	0.348	-1.97**		1.33**	0.92	0.043**
Investments	30	0.281	-0.61	-0.59	0.37	0.11	0.385
Bills Receivable	33	0.207	-0.54		-0.41		0.733
Accounts Receivable	48	0.864	1.27		-0.29	-0.48	0.275
Supplies and Materials	64	0.330	0.88	0.66	-0.72		0.329
Cash	92	0.809	0.64	-0.30	0.56	-0.35	0.833
Common Stock	97	0.014**	0.51	2.56***	-1.00	-1.43*	0.041**
Preferred Stock	48	0.106	1.59*	-0.25	-2.03**	0.90	0.370
Bonded Debt	79	0.071*	-0.80	-0.31	1.08	1.55*	0.085*
Notes Payable	27	0.209	-0.26	-0.45	-0.08	-0.68	0.258
Accrued Liabilities	27	0.360	1.00	-1.17	-0.08		0.886
Bills Payable	28	0.507		0.20	1.78**	0.20	0.066*
Accounts Payable	32	0.783			0.84	0.03	0.358
Current Liabilities	30	0.120	0.021		-0.25	-0.76	0.311
Reserves	45	0.272	-1.96**		0.57	0.31	0.150
Surplus	76	0.300	1.16	-1.07	1.60*	-0.54	0.399
Total Assets	103	0.069*	-2.04**	0.13	1.84**	2.26**	0.004***

* 10% Significance

** 5% Significance

*** 1% Significance

T-statistics are adjusted for the finite correction factor. Raw statistics less than 0.50 are omitted from the table.

Similar to unregulated companies, the digit 4 was more common than expected in bills payable. This result was also found in the chi-square statistic for the digits 4 and 9. The digit 9 was also more common than expected in bonded debt. Both the chi-square for the entire first digit and the chi-square for the 1 and 5, 4 and 9, and all other digits were significant as well. Taken together, these results indicate that regulated companies had a tendency to report bills payable and bonded debt as smaller amounts than would be expected within Benford's Law.

For property, plant, and equipment, the digit 1 was less common and the digit 4 more common than would be expected given Benford's Law. The common occurrence of these digits indicates a tendency to reduce the size of the property, plant, and equipment account balance shown. This result is also confirmed in the chi-square statistic for the combined distribution of 1 and 5 and 4 and 9, which is also significant. This balance-reducing behavior may seem opposite the incentive provided by regulated rates which would seem to encourage overinvestment in assets. This result is also opposite the expected result of changes in accounting policy noted by Bookholdt [1978]. However, companies may have been manipulating downward to reduce scrutiny by the regulators and appear more efficient by using fewer assets to generate the revenue that they actually generated.

The equity accounts show clearer evidence of numeric manipulation than in the case of the unregulated companies. In common stock, 5 was more common and 9 less common than expected. Both the chi-square for the first digit as a whole and the chi-square for the combined distribution of 1 and 5, 4 and 9, and all other numbers were significant. These results all consistently point to a tendency to report larger common stock balances than would be expected. For preferred stock, 1 was more common and 4 less common than the expected Benford's Law distribution. However, for the preferred stock, neither the chi-square for the first digit distribution nor the distribution for 1 and 5, 4 and 9, and all other numbers was significant. The individual number results again point to balance-increasing manipulations. These results indicate that regulated companies were consistently inflating the capital-stock balances on their balance sheets. For any given amount of income, higher equity balances would result in lower return on equity. This result could have given regulated companies some leverage for obtaining higher rates to ensure a better return for their capital providers. By decreasing bonded debt, which was shown in this table as well, the portion of financing provided by equity

providers is also maximized. Thus, the managers could inform regulators that if adequate return is not given to their shareholders that the regulated entities will be unable to attract additional capital and grow. The companies may have chosen equity as the place to manipulate because it was scrutinized to a lesser extent than either income or fixed assets. The ICC examined revenues, expenses, and earnings [Trebing, 1984] and physical assets are clearly visible. However, the balances of capital stock were not considered in the legislation or policies for rate regulation and would be more difficult for regulators to monitor. Merino [1993] points out that watered stock was common in the early 20th century. The increasing account-balance manipulations detected in this study seem to give empirical weight to this contention.

Reserves showed a lower than expected number for the digit 1, but this was the only significant result for reserves. The digit 4 was more common than expected for the surplus balance. Both of these results again indicate a reducing effect on total equity.

Total assets have significantly fewer first digits as number 1 and significantly more first digits 4 and 9 than would be expected under Benford's Law. For total assets, both the chi-square for the distribution of first digits and the chi-square for the distribution of 1 and 5, 4 and 9, and all other digits were significant. Thus, total assets appear to be manipulated in a downward direction. This is inconsistent with the hypothesis that rate-regulated entities would increase their asset base to raise rates. However, regulatory scrutiny and pressure may have actually encouraged the companies to reduce these numbers.

DISCUSSION AND CONCLUSION

Table 5 summarizes the results described in the previous section along with indicating the hypothesized manipulation. A line item was considered for inclusion in this summary table when there were two significant results in a consistent direction in the previous tables. Section A of Table 5 considers the unregulated industrial companies. The results found were highly consistent with the hypothesis that these companies would manipulate income and net assets to appear to be a better investment prospect. The results indicate that companies tended to increase gross revenues leading to increased total net income. *Moody's* [1915] and other investment services did provide investment ratings for companies, and these ratings related to income. Therefore, manipulating income in an upward direction would result in a better investment rating and the ability to attract increased capital at a lower cost. The income-statement manipu-

lations found were then consistent with company incentives. Likewise on the balance sheet, a safer company is one with higher net assets. The results again supported this hypothesis with significant decreases in accounts payable observed.

TABLE 5
Summary of Results

Section A			
Unregulated Companies	Hypotheses	Significant Account	Direction of Manipulation
Income Statement			
Revenues	Increasing	Gross Revenue	Increasing
Expenses	Decreasing	NA	
Totals	Increasing	Total Net Income	Increasing
Balance Sheet			
Assets	Increasing	NA	
Liabilities	Decreasing	Accounts Payable	Decreasing
Equity	Increasing	NA	
Section B			
Regulated Companies			
Income Statement			
Operating Revenues	NA	NA	
Nonoperating Revenues	Decreasing	Other Income	Decreasing
Operating Expenses	NA	NA	
Nonoperating Expenses	Increasing	Accrued Taxes	Decreasing
Totals	Decreasing	NA	
Balance Sheet			
Assets	Increasing	Property, Plant, and Equipment	Decreasing
		Total Assets	Decreasing
Liabilities	Decreasing	Bills Payable	Decreasing
		Bonded Debt	Decreasing
Equity	Increasing	Common Stock	Increasing
		Preferred Stock	Increasing

Section B of Table 5 summarizes the results for the regulated companies. On the income statement, it was expected that only nonoperating items would be manipulated as the regulators scrutinized operating revenues and expenses. This expectation was confirmed by the results. Nonoperating revenues were manipulated downward to show lower profits. However, accrued taxes were actually manipulated in a downward direction which increases income. The manipulation of nonoperating revenues is logically related to rate setting in the regulated environment. However, the manipulation of taxes may have been more mo-

tivated by manipulations to attract investors. These regulated companies do not want to increase income much to reduce rates and increase regulation by being too profitable, but showing lower payments for taxes may be a way to indicate to investors that the company is trying to control costs.

Since rates were often influenced by accounting-rates-of-return, rate-regulated companies would have an incentive to increase net assets to convince regulators that higher rates are needed. The results were consistent with this expectation with respect to liability and equity manipulations. However, property, plant, and equipment showed a decrease rather than the expected increase. This result may not be completely inconsistent if regulators did examine the operating-asset base as part of their evaluations. The reduction of property, plant, and equipment would make the company look more efficient with its use of assets and place the company in higher regard with the regulators. While neither the depreciation or operating-expenses accounts showed signs of manipulation, if the companies were expensing assets rather than capitalizing them or recording higher levels of depreciation, deliberate decreases in operating assets would be associated with lower income which is consistent with the rate-increasing goal. The significant decrease in property, plant, and equipment, then, could have been accomplished with some manipulations to both depreciation and operating expenses so that the statistically significant effect in property, plant, and equipment was spread between two other accounts, making the manipulations to the expense accounts more difficult for Benford's Law to detect.

The manipulations observed with debt and equity accounts are highly consistent with achieving the rate-increasing goal. The asset base must be financed through either debt or equity. By showing lower debt balances, the company indicates to regulators a higher reliance on equity financing. This not only appears safer but also decreases the return-on-equity measure which would lead regulators to a conclusion that higher rates are needed for this well run, safe utility or railroad. Thus, these manipulations together are highly encouraged by the way regulators set rates.

The results taken as a whole for the rate-regulated companies indicate that these companies responded to the regulatory environment extremely well. No manipulations were found in the operating-income accounts which regulators scrutinized. The manipulations found, however, are highly consistent with actions that could maximize rates given the system used to set

rates. Thus, as with manipulations found in current reporting, rate-regulated companies were examining incentives set up by regulators and manipulated accounts to get the highest return for shareholders.

Because of less oversight, the original expectation was that more accounts would be manipulated by unregulated entities. This ended up not being the case. The regulated companies were documented to manipulate eight different line items on financial statements while unregulated companies were shown to manipulate only three line items. The increased manipulation by regulated companies actually may have been encouraged by the regulation. The regulated companies were aware of what the regulators looked at and how the regulators determined the need for rate increases. This knowledge provided companies with the information needed to work within the regulations to try to increase rates. The unregulated companies lacked regulatory scrutiny and were, therefore, able to manipulate any accounts they wanted to achieve goals of higher income and net assets. As a result, the unregulated companies may have manipulated different accounts to achieve the higher income/net assets appealing to shareholders. Benford's Law looks at a whole set of numbers to find manipulation rather than just the number for one company. Therefore, if a few unregulated companies were manipulating each account, the technique used in this paper to detect the manipulations would not find any distortions in the reported data. The accounts found to have significant manipulation were accounts that are high profile in conducting analysis; revenues and net income are highly referenced numbers in analysis. Thus, the significant manipulation was to accounts that investors would likely use to assess the company directly rather than to accounts that would accomplish the higher income goal less directly. The regulated companies could not manipulate these high-profile accounts because they were being scrutinized by regulators. Therefore, to accomplish the same goals, the regulated companies had to manipulate lower-profile accounts, which, because of lower dollar value, may have necessitated multiple manipulations. These issues taken together explain the relative frequency of accounts being manipulated between the regulated and unregulated samples.

The conclusion that regulated companies did not manipulate operating revenues and expenses is also important. These were the accounts scrutinized by regulators. By failing to find manipulation in these accounts for regulated companies but finding manipulation of gross revenues and net income by un-

regulated companies during the same time period, this study demonstrates that regulatory scrutiny did seem to influence behavior of company officials.

Another limitation of using Benford's Law to investigate the existence of financial-statement manipulations is that it provides no evidence of how the manipulations occur. The amount of the likely manipulation is not determined by a Benford's Law analysis. Analysis using other techniques would be needed to answer these questions.

The analysis in this study did show results that are consistent with the assertion that regulated and unregulated companies managed reported results and did so in different ways. The only common area of manipulation was current liabilities. While unregulated companies manipulated revenue and income, regulated companies were more likely to manipulate amounts in non-value maximizing ways and did so in accounts that were more difficult to verify. This suggests that the regulatory process provided some scrutiny of results and did influence the types of manipulations made. Examining the pre-SEC, pre-audit, pre-promulgated accounting standards era indicates that incentives did exist for manipulation and that financial-statement manipulation did exist consistent with those incentives. Therefore, the results indicate that to reduce financial-statement manipulation in the past as well as today, either incentives for manipulation need to be reduced and/or greater oversight with respect to what is reported is needed. This confirms the importance of examining the incentives implicit in both private contracts and public regulations.

REFERENCES

- Arnold, A. (1991), "Secret Reserves or Special Credits? A Reappraisal of the Reserve and Provision Accounting Policies of the Royal Mail Packet Company, 1915-1927," *Accounting and Business Research*, Vol. 12, No. 83 203-214.
- Arnold, A. (1998), "U.K. Accounting Disclosure Practices and Information Asymmetry during the First Quarter of the Twentieth Century: The Effects on Book Return and Dividend Cover," *Journal of Business Finance and Accounting*, Vol. 25, No. 7/8: 775-794.
- Baskin, J. (1988), "The Development of Corporate Financial Markets in Britain and the United States, 1600-1914: Overcoming Asymmetric Information," *Business History Review*, Vol. 62, No. 2: 199-237.
- Bookholdt, J. (1978), "Influence of Nineteenth and Early Twentieth Century Railroad Accounting on the Development of Modern Accounting Theory," *Accounting Historians Journal*, Vol. 5, No. 4: 9-28.
- Brief, R. (1987), "Corporate Financial Reporting at the Turn of the Century," *Journal of Accountancy*, Vol. 163, No. 5: 142-157.
- Bryer, R. (1993), "The Late Nineteenth Century Revolution in Financial Reporting: Accounting for the Rise of Investor and Managerial Capitalism," *Ac-*

- counting, *Organizations and Society*, Vol. 18, No. 7/8: 649-690.
- Carr, D. (2005), "Equity Incentives and Earnings Management," *Accounting Review*, Vol. 30, No. 2: 321-327.
- Carslaw, C. (1988), "Anomalies in Income Numbers: Evidence of Goal Oriented Behavior," *Accounting Review*, Vol. 63, No. 2: 321-327.
- Cheng, Q. and Warfield, T. (2005), "Equity Incentives and Earnings Management," *Accounting Review*, Vol. 80, No. 2: 441-476.
- Cleary, R. and Thibodeau, J. (2005), "Applying Digital Analysis Using Benford's Law to Detect Fraud: The Dangers of Type I Errors," *Auditing: A Journal of Practice & Theory*, Vol. 24, No. 1: 77-81.
- Corcell, F. (1989), "Financial Statement Reporting-75 Years Ago," *Practical Accountant*, Vol. 22, November: 116, 119.
- Covaleski, M., Dirsmith, M., and Samuel, S. (1995), "Use of Accounting Information in Governmental Regulation and Public Administration: The Impact of John R. Commons and Early Institutional Economics," *Accounting Historians Journal*, Vol. 22, No. 1: 1-33.
- Edwards, J. (1976), "The Accounting Profession and Disclosure in Published Reports, 1925-1935," *Accounting and Business Research*, Vol. 6, No. 24: 289-303.
- Edwards, J. (1985), "The Origins and Evolution of the Double Account System: An Example of Accounting Innovation," *Abacus*, Vol. 2, No. 2: 19-43.
- Edwards, J. (1992), "Companies, Corporations and Accounting Change, 1835-1933: A Comparative Study," *Accounting and Business Research*, Vol. 23, No. 89: 59-73.
- Edwards, J. (1996), "Financial Accounting Practice 1600-1970: Continuity and Change," in Lee, T., Bishop, A., and Parker, R. *Accounting History from the Renaissance to the Present: A Remembrance of Luca Pacioli* (New York: Garland Publishing, Inc.): 31-70.
- Gilman, S. (1939), *Accounting Concepts of Profit* (New York: The Ronald Press Company).
- Gross, D. (2002), "Tried and True," in *Your Market: (New York Stock Exchange):* 24-27.
- Guan, L., He, D., and Yang, D. (2006), "Auditing, Integral Approach to Quarterly Reporting, and Cosmetic Earnings Management," *Managerial Auditing Journal*, Vol. 21, No. 6: 569-581.
- Guan, L. Lin, F., and Fang, W. (2008), "Goal-Oriented Earnings Management: Evidence from Taiwanese Firms," *Emerging Markets Finance & Trade*, Vol. 44, No. 4: 19-32.
- Hawkins, D. (1963), "The Development of Modern Financial Reporting Practices among American Manufacturing Concerns," *Business History Review*, Vol. 37, No. 3: 135-168.
- Hunt, H. (1985), "Potential Determinants of Corporate Inventory Accounting Decisions," *Journal of Accounting Research*, Vol. 23, No. 2: 448-467.
- Johnson, A. (1943), "Form, Function, and Interpretation of the Profit and Loss Statement," *Accounting Review*, Vol. 18, No. 4: 340-347.
- Johnson, P. (2005), "Fraud Detection with Benford's Law," *Accountancy Ireland*, Vol. 37, No. 4: 16-17.
- Johnson, W. and Dhaliwal, D. (1988), "LIFO Abandonment," *Journal of Accounting Research*, Vol. 26, No. 2: 236-272.
- Jones, S. and Aiken, M. (1994), "The Significance of the Profit and Loss Account in Nineteenth-Century Britain: A Reassessment," *Abacus*, Vol. 30, No. 2: 196-230.

- Jordan, C. and Clark, S. (2011). "Detecting Cosmetic Earnings Management Using Benford's Law," *CPA Journal*, Vol. 81, No. 2: 32-37.
- Kelly, C. (2011), "Benford's Law to the Rescue," *Internal Auditor*, Vol. 68, No. 1: 25-27.
- Kern, B. 2000, "The Role of Depreciation and the Investment Tax Credit in Tax Policy and Their Influence on Financial Reporting During the 20th Century," *Accounting Historians Journal*, Vol. 27, No. 2: 145-164.
- Lee, G. (1975), "The Concept of Profit in British Accounting 1760-1900." *Business History Review*, Vol. 49, No. 1: 6-36.
- Lindahl, F.(1989), "Dynamic Analysis of Inventory Accounting Choice," *Journal of Accounting Research*, Vol. 27, No. 2: 201-226.
- Lin, F., Guan, L., and Fang, W. (2011), "Heaping in Reported Earnings: Evidence from Monthly Financial Reporting of Taiwanese Firms," *Emerging Markets Finance and Trade*, Vol. 47, No. 2: 62-73.
- Maltby, J. (1998), "U. K. Joint Stock Companies Legislation 1844-1900: Accounting Publicity and 'Mercantile Caution,'" *Accounting History*, Vol. 3, No. 1: 9-32.
- McKee, T. (2005), *Earnings Management: An Executive Perspective* (Mason, OH: Thomson).
- Merino, B. and Neimark, M. (1982), "Disclosure Regulation and Public Policy: A Sociohistorical Reappraisal," *Journal of Accounting and Public Policy*, Vol. 1, No. 1: 33-57.
- Merino, B. (1993), "An Analysis of the Development of Accounting Knowledge: A Pragmatic Approach," *Accounting Organizations and Society*, Vol. 18, No. 2/3: 163-185.
- Moody, J. (1915), *Moody's Analyses of Investments Part II Public Utilities and Industries* (New York: Moody's Investment Services).
- Morris, R. (1993), "Distributable Profit in Nineteenth-Century British Regulated Industries." *Accounting, Business, and Financial History*, Vol. 3, No. 2: 165-195.
- Morse, D. and Richardson, G. (1983), "The LIFO/FIFO Decision," *Journal of Accounting Research*, Vol. 21, No. 1: 106-127.
- Morsfield, S. and Tan, C. (2006), "Do Venture Capitalists Influence the Decision to Manage Earnings in Initial Public Offerings?" *Accounting Review*, Vol. 81, No.5: 1,119-1,150.
- Nigrini, M. (1999), "I've Got Your Number," *Journal of Accountancy*, Vol. 187, No. 5: 79-83.
- Nigrini, M. and Mittermaier, L. (1997), "The Use of Benford's Law as an Aid in Analytical Procedures," *Auditing: A Journal of Practice and Theory*, Vol. 16, No. 2: 52-67.
- Peasnell, K., Pope, P., and Young, S. (2005), "Board Monitoring and Earnings Management: Do Outside Directors Influence Abnormal Accruals?" *Journal of Business, Finance, & Accounting*, Vol. 32, No. 7/8: 1,311-1,346.
- Pincus, M., Rajgopal, S., and Venkatachal, M. (2007), "The Accrual Anomaly: International Evidence," *Accounting Review*, Vol. 82, No.1: 169-203.
- Previts, G. and Bricker, R. (1994), "Fact and Theory in Accounting History: Presentmindedness and Capital Market Research," *Contemporary Accounting Research*, Vol. 10, No.2: 625-641.
- Rees, L., Gill, S., and Gore, R. (1996), "An Investigation of Asset Write-Downs and Concurrent Abnormal Accruals," *Journal of Accounting Research*, Vol. 34, No. 3: 157-169.
- Sivakumar, K. and Waymire, G. (1993), "The Information Content of Earnings in

- a Discretionary Reporting Environment: Evidence from NYSE Industrials, 1905-10," *Journal of Accounting Research*," Vol. 31, No. 1: 62-91.
- Sivakumar, K. and Waymire, G. (2003), "Enforceable Accounting Rules and Income Measurement by Early 20th Century Railroads," *Journal of Accounting Research*, Vol. 41, No. 2): 397-432.
- Skinner, R. (1987), *Accounting Standards in Evolution* (Toronto: Holt Rinehart and Winston of Canada, Limited).
- Skousen, C., Guan, L., and Wetzel, T. (2004), "Anomalies and Unusual Patterns in Reported Earnings: Japanese Managers Round Earnings," *Journal of International Financial Management & Accounting*, Vol. 15, No. 3: 212-234.
- Trebing, H. (1984), "Public Utility Regulation: A Case Study in the Debate over Effectiveness of Economic Regulation," *Journal of Economic Issues*, Vol. 18, No. 1: 223-250.
- Tucker, J. (1987), "Government Oversight in 1917: The Shape of Things to Come," *Journal of Accountancy*, Vol. 163, No. 5: 73-77.
- Ulen, T. (1980), "The Market for Regulation: The ICC from 1887 to 1920," *American Economic Review*, Vol. 70, No. 2: 306-310.
- Zhou, L. (2010), "Nickels Not Pennies: Granularity in Analysts' Earnings per Share Forecasts and Forecast Revisions," *Journal of Accounting, Auditing, and Finance*, Vol. 25, No. 2: 201-233.

THE ACADEMY OF ACCOUNTING HISTORIANS

APPLICATION FOR 2012 MEMBERSHIP

Individual Membership: \$50.00

Student Membership: \$10.00

Name: (please print) _____

Mailing Address: _____

City: _____ State: _____

Zip Code: _____ Country: _____

Accounting History Area of Interest: _____

Phone: _____ Fax: _____

E-mail: _____

Method of Payment: check enclosed

Mastercard

VISA

Card Number: _____

Expiration Date: _____

Signature: _____

Mail to: Ms. Tiffany Welch
Case Western Reserve University
Weatherhead School of Management
10900 Euclid Avenue
Cleveland, OH 44106
USA