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Science of accounts: Bookkeeping rooted in the ideal of science

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THE SCIENCE OF ACCOUNTS: BOOKKEEPING ROOTED IN THE IDEAL OF SCIENCE

Abstract: This paper presents the discourse of the "science of accounts" as it developed in 19th century U.S. accounting literature. The paper initially emphasizes the meaning which the term "science of accounts" had during this period. In addition, it presents the contemporary belief that this science helped reveal the essential economic ontology, which bookkeeping makes visible. Second, the paper analyzes how this rational institutional myth became institutionalized within the emerging profession's technical journals and its professional organization, the Institute of Accounts. Through reliance on this scientific foundation, the newly emerging profession could gain greater social legitimacy, leading to the first CPA law in 1896.

INTRODUCTION

Accountics is the mathematical science of values [*Office*, 1887, p. 103].

Inasmuch as other branches of scientific work manifest unexpected life from time to time, so may we assume that there lurks among the foundations of bookkeeping some as yet unapplied principles, which, once brought into play, will change, more or less, the routine of our office practice [Kittredge, 1896, pp. 320-321].

The term "science of accounts" became the most defining and formalizing concept for the body of knowledge encompass-

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ing bookkeeping and accountancy during the latter half of the 19th century in the U.S. As the CPA movement began to spread from New York to other states at the end of that century, the idea of the accountant as a scientist dominated the profession's self-image. As promulgated by elite accountants in the Institute of Accounts (IA) and affiliated professional journals, this image portrayed the accountant as investigating scientifically and rationally the political economy in order to explain that economy more efficiently and more truthfully. The affinity between an accountant and a scientist was so strong that writers continually stressed the similarities of actions of accountants and physical scientists, especially practical scientists such as architects and engineers. The "science of accounts" or "accountics," a body of thought that provided a rational investigative method equivalent to any other science's body of thought, permitted the "discovery" of new principles and practices through investigations. Kittredge [1896] demonstrated this presumed thought by relying on the science of accountics to provide new discoveries. This paper will discuss the contextual environment within which the science of accounts was developed and institutionalized in professional organizations and journals. It will be shown that the science of accounts became one of the formalized, rational institutional myths[1] that legitimized the U.S. accounting profession within its cultural environment.

The late 19th century emergence of a U.S. accounting profession has been well documented [Wilkinson, 1904, 1928; Brown, 1905; Anyon, 1925; Littleton, 1933; Reckitt, 1953; Webster, 1954; Edwards, 1954, 1960; Carey, 1969; Miranti, 1990; Previts and Merino, 1998]. Most accounts date the origins of the profession in 1886, with the founding of the American Association of Public Accountants (AAPA). This organization, inspired by the professional developments of British accountants, is seen as the most significant influence towards the passage of the first CPA law in 1896. Miranti [1990] has described the period prior to the passage of the first professional law as pitting two organizations, the AAPA and the IA, against one another. Miranti claimed that the IA's affiliation with the concepts of the science of accounts was a significant area of contention between the two. This paper attempts to place in con-

[1]For further general discussion on the concept of rational institutional myths, see Scott [1992], Meyer and Rowan [1977], and, specifically regarding accounting, Meyer [1986].

text the concepts of the science of accounts so as to aid in the understanding of the social and technical emergence of the U.S. accounting profession.

The development of the rational institutional myth, the "science of accounts," may be glimpsed through a review of the manner in which bookkeeping was defined in 19th century bookkeeping treatises. Generally, these early treatises defined bookkeeping as a series of systematic acts of an art based on scientific principles, which could present the truth of a business [Morrison, 1808; Jackson, 1813; Hutton, 1815; Goodacre, 1818; Morrison, 1822; Bennett, 1829; Foster, 1837, 1838; Harris, 1842; Fulton and Eastman, 1851]. Jones [1855, p. viii], the most prominent author of this period, defined bookkeeping in this manner:

> Book-keeping is the art of keeping Accounts in such a systematic mode, that we may be enabled to know the real state of each branch of our mercantile transaction with ease and promptitude.

By mid-century, bookkeeping began to be defined as the "science of accounts." One of the earliest examples comes from Crittenden [1857, p. 14]:

> Book-keeping *is the science of accounts*, and teaches how to preserve a correct record of all business transactions.

Crittenden did not explain what he meant by the term "science of accounts." His overall approach differed little from the typical method of presenting bookkeeping. Many other treatises never developed the idea of "science of accounts" beyond a definition for bookkeeping [Palmer, 1867; Pierce, 1890; Lyte, 1891]. The meaning of "science of accounts" was perceived to be self-evident, so much so that bookkeeping could be defined as simply, the *science of accounts*. However, numerous bookkeeping treatises were to incorporate a more "scientific" presentation into their science of accounts [Bryant et al., 1863; Packard and Bryant, 1878; Soulé, 1903].

The "science of accounts" will be shown to be rooted fundamentally in the rational process of account classification. Therefore, a review of the methods used to classify accounts will reveal the influence of this science on accounting thought. In addition, the development of the science of accounts grew dramatically once it became rooted in the professionalization of the occupation. This science promoted its ideals by becoming

the theoretical foundation for the professional journals and the first significant professional organization of bookkeepers and accountants, the IA. Consequently, this paper will review the process of classifying accounts and the science's institutionalization in professional journals and organization. The professional journals of *Book-keeper* (later renamed the *American Counting-room*), *Office* (later renamed *Business*), and *Accountics* constitute the major sources for this investigation.

CLASSIFICATION OF ACCOUNTS

An early 18th century British classification divided accounts into personal, real, and fictitious (or nominal) [Macghie, 1718]. This tradition continued in Jackson's treatise [1813, a reprint of his 18th century work]. He divided accounts into the following classification: personal, real, and imaginary. The imaginary category replaced fictitious. Personal accounts referred to records of what was owed to or due from other merchants, therefore personal. Real accounts were possessions of the merchant, such as cash, merchandise, property, and equipment. Imaginary accounts were "fictitious" accounts "invented" to represent the owner's capital, including the profit and loss account. This basic division was common among early treatises [Morrison, 1808, 1825; Bennett, 1829; Fulton and Eastman, 1851]. Occasionally, the third division was called fictitious rather than imaginary, as Macghie [1718] had done over a century earlier.

The isolation of personal accounts (debtors and creditors) into one separate category indicates that this classification may have emerged within a mercantile environment. These particular accounts would be the ones of greatest concern to merchants. The personal accounts encompassed the primary accounts of a merchant's single-entry system, and would have been used frequently during this period. Therefore, from the perspective of a merchant familiar with single entry, the personal accounts within a double-entry system would stand out as a unit.

To discriminate between the remaining accounts, real and fictitious, one presumably had to rely on the very material aspect of the accounts or on the material content to which the accounts referred. Real accounts had a tangible referent in the merchant's business — cash, property, merchandise. However, the fictitious accounts, which would not have existed in the single-entry system at all, would appear a creation of the book-

keeper. They would have had no obvious physical referents or, at least, not as "real" as either the personal or real accounts. This classification appears to have been an abstraction based on an experience of the single-entry system or, at least, a merchant's double-entry system.

This basic classification appears to make no ontological claim to explain the reality of the bookkeeping system or to demonstrate the aesthetic symmetry of the system. It served primarily as a pedagogical tool to aid the novice in grasping the bookkeeping art. Instead of rhymes, authors formulated rules within each of these classifications by which the bookkeeper could analyze transactions and record them in the books of original entry.

Some U.S. writers began to criticize this basic division:

> The division of Accounts into *Personal, Real,* and *Fictitious,* is one of the most ludicrous that ever enlivened the gravity of the scientific page. Are Personal Accounts unreal? Or rather, are they something neither real nor fictitious? Is the Stock Account a mere fiction? Are the accounts of Profit and Loss of some romantic nature? In the case of *Loss,* it would be consolation to consider them in this aerial and poetical light; but when a balance of *profit* occurs, the pleasure of transfer would not be much heightened by this view of the subject. The merchant may reasonably expect to find something *substantial* in his Stock Account; but the professors of Book-keeping, faithful to the Berkleian theory, gravely assure him that it is all fictitious and imaginary [Foster, 1837, p. 28]!

Attacking this rule-setting method, Foster[2] demonstrated the scientific irrationality of the classification by focusing on the economic reality revealed in the bookkeeping system. Foster emphasized a pedagogical focus that correlated with the logic of economic activity rather than one that made economic activity appear absurd.

Foster's Classification of Accounts: Foster [1837] presented one of the earliest classifications that appears to make an ontological claim. His division was not for pedagogical purposes. Rather, he believed his classification had been derived from the

[2]For more information on the thought of Foster and Jones and their relationship, see Hatfield [1909], Homburger and Previts [1977], and Hughes [1982].

immutable essence of bookkeeping, through the application of scientific thought. He classified all accounts into four categories — stock, money, merchandise, and personal:

> It is a primary axiom of the exact sciences, that the whole is equal to the sum of its parts; and on this foundation rests the superstructure of Double Entry Book-keeping. It considers property as a whole, composed of various parts; — the Stock Account records the entire capital; the Money, Merchandise, and Personal Accounts record the component parts. Hence, there must necessarily and inevitably be constant EQUALITY between the Stock Account, and all the other Accounts [Foster, 1837, p. 25].

Foster explicitly based his classification on the scientific principles of equality. However, the scientific equality was not the simple equality of debits and credits in each transaction, but the equality of accounts classified in a certain way. Though he never expressed it algebraically, he expressed in words the balance sheet equation, from the proprietor's prospective — the proprietor's capital was equal to the value of one's property and the combined value of one's receivables and payables.

Foster placed his classification within wider scientific thought. Immutable principles of bookkeeping determined the classification and arrangement of the accounts in the ledger. For Foster, the reality revealed by these principles should be the focus of education rather than arbitrary rules:

> In every art or science there are certain fundamental principles which must be first clearly impressed upon the mind before any sensible progress can be made in its attainment. This remark is particularly applicable to our present subject. There is one prominent defect in the ordinary methods of *teaching* book-keeping, which is, that rules are substituted for reasons, and particular forms are confounded with general principles.
>
> The principles of double entry are unfolded in the *ledger* only — the journal being merely a preparatory book — it must be obvious, therefore, on a moment's reflection, that the nature, object and arrangements of the accounts in the ledger should be the *first*, and not, as is usual, the last thing to which students' attention is directed [Foster, 1838, pp. 152-153].

The emphasis on the ledger will be seen to be very characteristic of many authors of the science of accounts.

The reason that Foster considered his method superior was not just that it was more efficient and sound pedagogically, but, even more importantly, that it disclosed the primary principles, which, when used correctly, could reveal the true debits and credits. By stripping the practice of double entry down to its basic principles, the whole system and the interaction between each kind of account could be revealed. Once this was acquired, the particular forms in any business could have been easily perceived. Foster's pedagogical method was radically different from the majority of his contemporaries. The method emphasized the science of bookkeeping. Foster developed this science more rigorously, by focusing on the basic principles and seeing all the other particulars in their light.

Similar to his contemporary Jones [1855], Foster stated that the terms debit and credit revealed no fundamental truth in accounting. He attacked any manipulation of reality and language which tried to distill bookkeeping into these two terms, debit and credit. The contortions of defining everything in the contexts of debtor and creditor resulted in the same old reliance on rules and arbitrary use of the definitions of words:

> But even if we could point out some hidden relation of owing in each debit entry, we should only be luring the learner from the investigation of principles, by employing his ingenuity on a series of conundrums, no one of which can throw light on the next, the whole being dependent upon an arbitrary use of words [Foster, 1857, pp. xiv-xv].

Foster viewed the science of bookkeeping as more than a pedagogical tool. Bookkeeping's presentation in a scientific manner, through the primary reliance on its immutable principles, was useful in the classroom precisely because the science was revealing the objective truth in economic activity which hitherto had been obscured.

Foster expressed the science of bookkeeping's relationship to the art of bookkeeping by appealing to the relationship of other arts, which also ultimately depended on the science of mathematics. Bookkeeping was not merely a science for pedagogical purposes. Because bookkeeping was classified within the truth of the science of mathematics, which itself was classified within the truth of metaphysics, bookkeeping was a science. Any rule that had to be used in the art of bookkeeping had to be explained and justified within the principles of the science of bookkeeping. Only through a thorough investigation of the

science of bookkeeping could one gain access to the truths of bookkeeping:

> Now this process of comparison on reasoning, constitutes what we term Science; and from this process of classification and arrangement arises what are called the Sciences .... But certainty and success of these arts [navigation, surveying, and engineering] depend upon the truth of the rules whereby the several operations are performed; and the truth of the rules depends upon the previous reasoning, these truths constitute what are called the *principles* of the science [Foster, 1857, p. xvii].

Bookkeeping was similar to the other practical sciences — navigation, surveying, and engineering. The science of bookkeeping, for Foster, entailed the rational process of discerning the classes of accounts within the double-entry system. To be scientific, one had to classify. To classify meant one gained access to the immutable truths of the system. The fact that bookkeeping was a science did not come from an analogical relationship to a science, such as mathematics. Rather, bookkeeping was a science because it was an applied science of mathematics, itself a subscience of metaphysics, which explained the entirety of the universe. Foster did not just appeal to science for a pedagogical method of instruction. Rather, because bookkeeping was a science rooted in the ultimate explanation of the universe, one needed to teach the science of bookkeeping and its principles rather than to rely on abstract, arbitrary rules. Through the science of accounts, one gained access to the immutable reality of bookkeeping.

SCIENCE OF ACCOUNTS INSTITUTIONALIZED IN THE *BOOK-KEEPER*

In New York City during the early part of the 1880s, the science of accounts became institutionalized in two forms — in the professional media via the *Book-keeper* and the *American Counting-room* and in a professional context via the founding of the Institute of Accountants and Bookkeepers of the City of New York (IABCNY). The *Book-keeper*, the first bookkeeping journal in the U.S., gave significant space to the discussion of the science of accounts illustrated by the indexed heading "Scientific and Instructive" in its annual index [*Book-keeper*, Vols. 4 and 5]. The IABCNY, which after a few years became the IA, made the exposition and development of the science of accounts one of its chief goals. Previously, the idea of science of

accounts had been propagated by expert bookkeepers (such as Jones and Foster) through their practice, advertisements and treatises on bookkeeping, or by certain commercial school entrepreneurs (such as S.S. Packard) through their teaching and books. The introduction of these two components, professional journalism and professional organizing, institutionalized the idea of the science of accounts to the point that it could influence more people and develop beyond a pedagogical tool for the unlearned. Through these two institutional forums, the ideas of the science could be cultivated and discussed within a protective, competent group.

In the very first issue of the *Book-keeper*, Charles E. Sprague [1880] wrote the first of a series of articles called "The Algebra of Accounts." Sprague viewed the science of accounts as being exclusively a "mathematical science." Through understanding the algebraic equations upon which bookkeeping was fundamentally based, one could deduce the economic reality captured within the ledger accounts:

> Treating the science of accounts as a branch of mathematics (which it is), I reduce it to an algebraic notation: I constantly interpret the algebraic results into common language, and also into the technical, conventional, but often convenient, notation used by book-keepers. I show this last to be as truly algebraic as the first; and I teach that no matter what particular form is employed in the presentation of facts, if the equation is preserved, implicitly or explicitly, it is true book-keeping [Sprague, 1880, p. 2].

Sprague developed the science of accounts from the stage illustrated by Foster's [1857] use of science. Foster may have presented the algebraic equation of bookkeeping in words, but in 1880 Sprague presented it in a fully developed algebraic model. He began with a basic bookkeeping equation [Sprague, 1880, p. 2]:

> THESIS. — All the operations of double-entry book-keeping are transformations of the following equation:
>
> What I HAVE + what I TRUST = What I OWE + what I am WORTH or symbolically written H + T = O + X.

Thus, for the first time in the U.S., the conceptual abstractions of the science of accounts found symbolic representation. Bookkeeping and the science of accounts gained a more scien-

tific appearance through this new symbolism. As the physical world came to be seen as modeled through mathematical science, so now the pecuniary activities of businesses came to be modeled using mathematical science. Sprague did not use this model purely for pedagogical simplicity, but rather as a method to reveal the real relationships captured by the accounts.

For Sprague, the primary equation was the balance sheet. He manipulated this basic equation so as to illustrate the simplicity of the ledger, which otherwise appeared complex. By adding in the details of cash, merchandise, land, specific debtors and creditors, and a partnership situation, the basic equation of the balance sheet became more complicated.

Using these basic categories, Sprague presented all the possible transactions that would impact balance sheet accounts, all within two simple tables:

(a) Elements of the Equation of Value at Rest

Debits	*Credits*
Have.	Owe.
Trust.	Worth.

(b) Elements of the Equation of Value in Motion

Debits	*Credits*
1. Have more.	2. Have less.
3. Trust more.	4. Trust less.
5. Owe less.	6. Owe more.
7. Worth less.	8. Worth more.

These tables are:

(a) A complete rule for balance-sheet or statements of financial condition.

(b) A complete rule for 'journalizing;' that is for an ascertaining the debit and credit in any transaction or shifting values; in other words, direction for placing the values on the left and right side of the equation respectively. As list *b* contains all the possible changes in the elements of the equation, it must suffice to represent any transaction or business occurrence [Sprague, 1880, pp. 21-22].

Thus, by deduction from the basic algebraic equation, Sprague was able to illustrate in these two tables what required other authors to deploy numerous rules and to distort the connotations of words. Importantly, Sprague separated the balance sheet equation or the equation of value into two different states, at rest and in motion. This appears to correlate with the manner in which physical objects would be analyzed, at rest and in motion. Matthern [1876] had also used the at rest and in mo-

tion analogy to defend his own classification scheme.

In all the other examples of classification, one had to infer the reasoning process that generated the classification. However, Sprague's classification came directly from his analysis of the equation of value, by classifying the balance sheet accounts as assets, liabilities, and capital:

> What I *have* is in my possession *now*; what I *trust* is to *be* in my possession. But many things (such as bank notes, mortgages, promissory notes) which are really only promises, are spoken of as if they had intrinsic value; we call them, not due receivable, but property. Hence the categories H and T shade into each other. This makes no difference, as both equally tend to increase the amount of X. The names 'Resources,' or 'Assets' are applied to H + T. Let H + T or the 'Resources' [assets] be represented by A; then substituting this value in equation (4).
>
> (10) A = O + X
>
> My assets = what I owe + what I am worth.
>
> The word 'Liabilities' is sometimes applied to O alone, sometimes to O + X together. But generally there is a sharp distinction between O, the outside liabilities and X, the difference of A - O, the net proprietorship. X participates in the profits and losses; X can only be paid off after O is fully satisfied. It is the losing sight of this distinction between O and X which causes much misunderstanding respecting the processes of double entry book-keeping [Sprague, 1880, pp. 20-21].

One gathers that this classification was not purely for pedagogical efficiency, but rather attempted to reveal the economic reality any bookkeeping system should capture. His disagreement regarding whether liabilities should be considered as both outside and inside obligations implied that classifications were very important for they portrayed true economic reality. The equation of value revealed the primary truths of economic activity. Obscuring the "distinction" between outside liabilities and capital would have caused a misinterpretation of reality.

Sprague [1880, p. 35] considered the P&L account as a subsidiary of the capital account. The main classifications were assets, liabilities, and capital:

> Gains and losses are not usually credited and debited to 'Capital' account, which department represents the present worth, but to 'profit and loss.' This is done, in order not to disturb the 'Worth,' except periodically in

> a gross amount, which amount shows the extent of our business success. 'Profit and Loss' is a sort of reservoir into which all gains and losses are poured merely to be held until a convenient season, which the net result is transferred in one sum to the 'Worth' account.

The gain or loss in the P&L account merely represented a convenient reservoir so that the capital account would not be cluttered by hundreds of entries. For Sprague, these accounts were sub-accounts of capital. The only classification remained within the static equation of value — assets, liabilities, and capital.

In this brief series by Sprague [1880], the most sophisticated example of the science of accounts was presented. The initial attempts of Foster and Jones had led to this abstract, deductive proof and demonstration of the double-entry system. The emphasis of the science on the classification of accounts now found its most symbolic and scientific representation: A=O + X. The equation of value was seen to contain all the intricacies of the double-entry system and truth in political economy.

The *Book-keeper* continued to promote the science of accounts. Packard [1881] presented the "philosophy of bookkeeping," emphasizing that the intelligent accountant needed to understand the principles of the science and how those principles were implemented in practice. Packard appeared to be trying to walk a middle ground, emphasizing that bookkeeping must be analyzed by its basic principles, while at the same time underscoring a pragmatism for the practitioner. He was suspicious of a radical objectification of bookkeeping:

> Whatever real philosophy there is in book-keeping, be it understood, is the philosophy of common sense; and whoever attempts to carry it beyond these limits or away from its reasonable application to practical things and practical thoughts, not only makes a mistake but throws himself outside the sympathy of those most apt to be interested in the matter. For instance, it may be a pretty conceit that the 'classification of accounts,' which is one of the forms in which 'philosophy' disports itself, may be made to show not only the financial condition of business, but to illustrate as well the relations of good to evil, and the whole groundwork of morals and metaphysics [Packard, 1881, p. 131].

Packard construed the science of accounts, or the philosophy of bookkeeping, as a component of political economy. Packard's focus on bookkeeping and "political economy" was evident ear-

lier in the revised edition of the Bryant and Stratton treatise, for which he was the main author [Packard and Bryant, 1878]. Bookkeeping provided one way of revealing the activities of political economy. To understand bookkeeping, one needed to focus on the wider social structures in which it was used.

This component of the science was different from others in that it reflected not on the closed system of bookkeeping, but on how bookkeeping illustrated and revealed a wider social reality. Packard made a pragmatic use of the science, where the science would provide tools by which an educated accountant would be able to aid business. The expert bookkeeper, using the principles of the science, revealed what was otherwise hidden. The application and emphasis on the science stopped there. For Packard, the science could not be used for more profound demonstrations beyond those rooted in political economy, and, more specifically, those focused on the determination of wealth, its increase and decrease.

A few years later in a lecture to the IABCNY, Packard [1884] demonstrated a classification of accounts through the use of two chalkboards. He classified accounts as "business" and "finance" accounts:

> What I attempted to illustrate on my two blackboards to that intelligent coterie of book-keepers was the intricate and complementary relation existing between the two classes of accounts; to show that what one class *asserted*, the other class recognized and *proved*; that when *business* declared a gain or a loss, *finance* immediately responded in exhibiting a corresponding increase or decrease in wealth. And beyond this, that while mere liquidating transactions, such as paying a debt or collecting what is due, could be recorded without touching the *business* accounts (thus requiring the use of but one board) *all* transactions looking to a profit or loss, or marking the progress of the *business*, inevitably required the use of both boards, and a compensatory record in each of the two classes [Packard, 1884, p. 79].

This classification was more than a pedagogical tool. It represented an attempt to illustrate the real economic dynamics of economic activity within a firm, here between the business and finance sectors of the enterprise. Packard's classification proceeded from an environment where the ledger accounts were being used to analyze the activities of a firm in a more complicated managerial way than the classification of personal, real,

and imaginary. His classification claimed to characterize entries by their assertions and proofs, which could be used to understand, either on a business or a financial basis, the activities of an enterprise.

An example of how pervasive the science of accounts was presumed to exist among the readers of the *Book-keeper* may be seen through reading the poem "Progression" [Robinsonian, 1883, p. 23]. The "light of the brighter day," was the light shown from "That Science." Progress in the field of accounting could only take place under the direction of its science. To neglect the science resulted in the use of old and inefficient methods, inherited over from the "Old World."

Through the *Book-keeper*, the development of the science of accounts stimulated discussions not merely between authors of treatises for the uninitiated, but between the elite of the profession. The institutionalization of the science through professional journalism widened the forum of the discourse, creating the intellectual space from which the ever-developing abstractions could mature. The *Book-keeper* also created the opportunity for the development of a professional institution. This institution would additionally create the institutional foundation in which the science of accounts would flourish.

SCIENCE OF ACCOUNTS INSTITUTIONALIZED IN THE INSTITUTE OF ACCOUNTS

Through the concerted effort of the editors of the *Book-keeper*, Selden Hopkins and Charles Sprague, the IABCNY was established in 1882. Just as the *Book-keeper* aided the development of the idea of the science of accounts, the IABCNY created an institutional forum through which the refinement of the science could progress. Its first series of lectures indicate the scientific and "modern" concern of the organization — "Origin of Calculation as Deduced from Evidence in Language" by Joseph Hardcastle [1882] (chairman of the Examining Committee); "Documents as Related to Accounts" by Charles E. Sprague [1882]; "Is Capital Account a Liability?" [*Book-keeper*, 1882] (a discussion by nine members of the IABCNY); "The Theory of Life Insurance" by Joseph Hardcastle [1883]; and "The Scope of the Accountant's Art" by E. T. Cockey [1883] (secretary of the IABCNY's first Examination Committee).[3]

[3]Many thanks to an anonymous reviewer who identified correctly that E. T. Cockey was not E. C. Cockey, the first president of the IABCNY, a confusion in earlier drafts of the paper.

The discussion of the classification of the capital account [*Book-keeper*, 1882] provides an insight into the contemporary thinking of the way classifications were made and the practical and theoretical importance of such classifications. Those who claimed that the capital account was a liability relied primarily on current practice among bookkeepers. A liability was a claim against the firm, whatever its source, inside or outside the firm.

Those who believed that a clear distinction must be made between outside and inside claims argued in two directions. First, they insisted that one must use the general meaning of words and not create a fiction so as to contort the language to fit present practice:

> On the other side, it was claimed that the theory must be made to agree with the facts, not the facts conformed to the theory, as was done by astronomers previous to Newton in the matter of gravitation. . . . A question in law or in language depends on usage; a question in mathematics or book-keeping depends upon principle and demonstration. Terms must not be assumed to have a distorted or fictitious meaning made to cover the case in point; they must be taken in their fair meaning. The capital account, so far from being a liability, it is in its very nature the opposite; it is the expression of *un*-liability; of so much of the resources as is *not* liable, *not* tied up [*Book-keeper*, 1882, p. 397].

The strict use of liability made the consideration of the capital account as a liability absurd, for it was the direct opposite, as seen by those advancing this argument. They required the book-keeping system to be influenced by a wider society, even in the simple use of words. For bookkeeping words to mean the direct opposite of their definitions outside the system was not justified for these experts, even if traditional among bookkeepers.

In retort, the supporters of the use of liability to include capital argued that the "science" itself defined the classification this way. One had to respect the science rather than arbitrary custom in wider society:

> The terms 'resources' and 'liabilities,' as used in the science of book-keeping, are, it was said, both, in a large sense, arbitrary, fictitious and conventional. Custom has given them a general acceptation and defined their meaning. They are terms used to represent opposite conditions, or the positive and negative elements of a business or enterprise. This, it was held, is the fabric,

> the fundamental basis upon which the principles of double-entry book-keeping are founded and practiced. 'We cannot,' said one speaker, 'confine either term to a strict definition laid down by lexicographers. Usage and practice have given these words the definition to which, in discussion of the Paper before us, we must give recognition' [*Book-keeper*, 1882, p. 397].

The science of accounts was being used by each side to defend its position. The science must depend on the political economy or it must be respectful of contemporary bookkeeping practice.

The second argument of the group seeking a very clear distinction between capital and liabilities concerned the actual economic reality of the accounts. Where tradition dictated that liabilities and capital were the same because they were on the same side of the balance sheet, reflection on the economic conditions of these two kinds of accounts led them to see that these two accounts were radically different. One had to distinguish clearly one from the other:

> Capital account represents a margin, a net result between resources and liabilities, the excess of resources over liabilities; it is not an indebtedness, but proprietorship.
>
> The affirmative rejoined that the resources were *bound* to the proprietor as well as to the other creditors; that the amount due the latter was a fixed one for the reason that they had no control over the employment of capital; that terms used in book-keeping must be taken in their technical, not their popular, sense; the credit 'By Balance' is a *quasi* payment offset by a *quasi* receipt afterward.
>
> The negative objected to the last view as being another introduction of fiction into the domain of fact and the cases rested [*Book-keeper*, 1882, p. 398].

The idea that capital was the margin implied use of Sprague's [1880] equation of value — capital was the net of assets and liabilities.

This late 19th century debate over classifications of various accounts, which may at first appear obscure and unsophisticated to the eye of a contemporary observer, demonstrated a sophistication regarding something of profound importance. The ideal of the "science of accounts" concerned the correct classification from which the reality of the economic activity could be made visible. Therefore, no debate over classifications was obscure or unimportant. In their context, these discussants

were grappling with the profound scientific issues of their day. Their decision either way would have greatly influenced how they interpreted what they were doing when they did accounts.

The idea of the science of accounts, as demonstrated by this self-selected group of expert accountants, became the only theoretical umbrella under which any discussion regarding the principles and foundations of the bookkeeping system could be based. No presentation of the principles of accounts was made without an appeal to the science of accounts. Therefore, only within this environment of the science of accounts could vigorous discussions take place. Arguments would be disregarded as unscientific if they were outside this perceived, rigorous, theoretical environment. One side could honorably disagree with the other as long as they both proceeded "scientifically." The presumed necessity of this science reveals very strongly the existence of the rational institutional myth of the science of accounts. Debate could take place within this presumed ideal. However, the idea that bookkeeping was a practical science was not discussed at all. All took that for granted. The IABCNY perceived its special status as a premier bookkeeping organization because it facilitated the development of the profession's science.

This over-arching belief in the scientific ideal within the IABCNY's self-selecting group of expert accountants was most explicitly demonstrated by Cockey [1883]. He attempted to expand the thought of the expert accountants to the higher levels of the science of accounts. In all seriousness, he stressed the need for accountants to get involved in natural science research, so that each of these sciences (musical sound, light and heat, chemistry, astronomy, botany, conservation of energy) could advance to a higher level. All these natural sciences had a mathematical description of the systems in which they purported to explain their particular natural phenomenon. The accountant, as the best practical expert on the manipulations of mathematical systems, was required to work with these natural scientists before these sciences could advance further:

> We are accustomed to look upon Number as the handmaid of commerce, and ourselves as slaves chained to the ledger, and only, by special good fortune, having the time or opportunity to reach anything nobler or higher. But to-night I hope to convince you of a fact which should lift our ideas higher, and give our energies a scope wider than the bounds of the counting-room. My thesis is: *Every natural law has*

> *number as an essential part, and every art and every science needs the labor and experience of the practiced accountant for its full development* [Cockey, 1883, p. 67].

A late 20th century reader of this lecture may perceive it as absurd. However, as demonstrated earlier, accounting principles had been explained through the use of analogies to physics [Matthern, 1876; Sprague, 1880]. Mirowski [1989] has illustrated the mutual interchange of ideas between economic and physical scientists during this period. The physicists' concept of the conservation of energy was influenced by bookkeeping, as other physical concepts were influenced by economic concepts [Mirowski, 1989]. The importance of the lecture may also be inferred from its being published in the *Book-keeper*, the unofficial forum for the IABCNY.

This lecture indicates the great importance these New York accountants placed on the view that the practice of bookkeeping rested on a profound foundation in the science of accounts. Cockey's opinions represented an extrapolation of the thoughts of Foster [1857] 30 years earlier, when Foster confidently placed the science of bookkeeping within the sphere of mathematics and, through mathematics, metaphysics. Cockey understood the relationship of bookkeeping to the sciences of the physical world as being so intertwined that good physical science could only be done with the assistance of a good, "expert accountant." This reinforces the perspective that by the late 19th century, the established elite of expert accountants considered the science of accounts to be fundamental, and that the status of this science was much more than practical methods to make efficient journal entries. Though most proponents of the science of accounts did not go as far as Cockey, he was the clearest exponent of the view that this science had real ramifications for perceiving the world. The science provided a view into the invisible world. Most authors simply limited bookkeeping to making the economic sphere visible through the determination of economic value, as Packard [1881] had made clear. However, others, like Cockey, did not limit themselves to the purely economic world.

ACCOUNTICS

In 1887, Sprague, the most prominent and respected practitioner and theorist of the science of accounts, presented a monumental lecture series at the School of Library Economy at

Columbia University. This course on accountics would be cited many times in the next decade. The new word "accountics" would become the technical term for the "science of accounts." The new school in library economy was founded by Melvil Dewey, the most prominent 19th century U.S. figure in library science. Dewey had invited Sprague to give a series of lectures describing the scientific methods of bookkeeping. The librarians considered the science of accounts a complementary science from which much could be learned. Dewey followed Sprague's series of lectures with his own presentation of a specialized set of accounts for a library he had developed. Sprague portrayed bookkeeping as explicitly scientific. Considering that many proponents of the science of accounts conceived of science as a rational classification of facts through which understandings and insights may be gleaned, the association of the science of accounts with library science does not appear accidental. Both advanced their scientific status through developing more sophisticated classificatory systems.

Sprague's actual lectures were not published. However, the editor of the *Office*, A. O. Kittredge, published his own summary [*Office*, 1887]. There appears to have been little new when this summary is compared to Sprague's earlier work, "Algebra of Accounts" [1880]. In fact, *Office* would republish this earlier work in 1889 [Sprague, 1889]. One can infer that, if any significant change or advancement in the science had been made by Sprague, the actual lecture would have been published with any changes or advances incorporated into the new article.

If the actual content of the lectures was not the cause of note, then the new way in which it was presented was. In this series, Sprague used the term "accountics" for the first time [*Accountics*, 1897]. In the next decade, this word would be used repeatedly by men claiming to be modern accountants fully trained in the science of accounts. Universally, these men would attribute this word to Sprague. He was open to the new and the modern in many areas of his life; he was U.S. president of an organization of academics promoting the universal language, Volapük. He had a series of articles in *Office* and *Business* giving basic lessons in Volapük, which he also taught at Packard's school. He had promoted a new system of numerals to replace Arabic numerals [Sprague, 1881]. Therefore, it was not uncharacteristic for Sprague to develop a new word to describe his new activities and those of his contemporaries at the IA.

He described accountics as the "mathematical science of values" [*Office*, 1887, p. 103]. The activity of analyzing a set of accounts through rational and scientific classifications was doing accountics. This activity was scientific for it was rational and proceeded to make deductions and classifications based on primary principles. The process used mathematical procedures, namely algebra, in formulating and expressing the fundamental principles of the science. Accountics, therefore, was placed alongside other mathematical sciences. These sciences were developing throughout the 19th century and, like statistics, were beginning to gain prominence They were defining a rational world in place of what had previously been seen as irrational and chaotic. Sprague, through the term "accountics," made the claim that the science of accounts was included in this family of sciences. What distinguished this science from the other mathematical sciences was that accountics concerned economic values. Thus, through Sprague's definition of accountics, the science of accounts was associated with the mathematical sciences and with political economy or economics. For Sprague, this science could not progress unless it relied on mathematical expression. In addition, it could not progress unless it associated itself with economic analysis.

These claims were not a pragmatic strategy to legitimize the development of sophisticated bookkeeping theories. Rather, this development of a science was seen as revealing long-hidden realities within the economic environment and the double-entry bookkeeping system itself. The science of accounts, through systematic mathematical analysis, could discover hidden truths of the reality of economic value. The term, "accountics," captured the imagination of the members of the IA, connoting the advances in bookkeeping that all these men were experiencing.

Hardcastle [1888] immediately took up this linguistic development in his article, "Prices and Profits, or a Chapter in Accountics." He went on to describe the construction of accounts and the determination of profits through mathematical (scientific) language, rather than in the traditional mechanical manner. He described the process to determine an account's balance mathematically and scientifically, not mechanically. The traditional process took on a more elevated, higher state because its description used accountics. The "T-account" became a physical repository of historical data in which even the physical horizontal line took on the status of encompassing time. In a rational, mathematical, and scientific manner, the

horizontal line of the "T-account" brought the past into the present. This summary of history, the mathematical resultant, Hardcastle [1888, p. 15] reluctantly called the balance, bowing to bookkeeping tradition:

> The resultant weight has been called the balance. This shows that the word balance is merely metaphorical, and used to express some points of resemblance between an account and the weighing by a pair of scales. It would be better to call it the mathematical resultant, because it is obtained by subtraction, from the other elements of the account. We will, however, call it the book balance, as representing that resultant which can be obtained by subtraction, from the two sets of elements entering into the account.

The science of accounts demanded a new language describing the activity of bookkeepers in a more rigorous and rational way. In this chapter on "accountics," Hardcastle made visible the economic reality captured within the mundane "T-account," which had hitherto been imperceptible, at least in his opinion. He was far from the tradition of the writers 80 years earlier who had struggled to move the presentation of bookkeeping from personified metaphors to clear and concise rules.

Hardcastle confronted the rational problem of profits. Nineteenth century economic thought repeatedly struggled with the problem of conserving economic value, yet recognizing the reality of economic profit [Mirowski, 1989]. Hardcastle stated that accountics was best suited to confront this problem, aiding the theory of political economy:

> The outgoings of our merchandise as measured by a money value may be greater than our incomings measured by the same value, or we may have the paradox that we can pour out more than was poured in. Here we have the veritable widow's cruse of oil, the oil increased in the act of using. There is nothing else like this in mathematics, and questions of this nature require special treatment, and consequently form a distinct science with its own laws, which has been named by our [IA] worthy president [Sprague] accountics, or the science of shifting values, and comprehends not only book-keeping but a great part of the science of political economy [Hardcastle, 1888, p. 16].

By demonstrating this direct link between accounting and political economy, the science of accounts could become the

method of investigation by which society could gain insight into economic reality.

The belief in the science of accounts by IA members was clearly more sophisticated than some of the other people who used the phrase. Some exclusively used it as a pedagogical tool to instruct youth better and more quickly. For Hardcastle, Sprague, Cockey, and others at the IA, the science of accounts provided the best means to comprehend the economic reality bookkeeping attempted to capture. The development of the science was essential for the understanding of bookkeeping, bookkeepers, accountants, and the historical determination of economic value. These men clearly placed the science at the center of the effort to understand the ontological essence of economic reality. The use of evolution, astronomy, and mathematical analogies all attempt to situate accountics specifically at the center of the modern scientific revolution. Cockey's [1883] radical statement of the accountant's place at the side of physical scientists does not appear as extreme when late 19th century social and philosophical considerations are placed in context. The expert bookkeeper was required to become a scientist investigating economic activity.

In 1889, Sprague made two significant contributions to the development of accountics. First, his series of articles from the *Book-keeper* was reprinted in the *Office* with only very minor alterations [Sprague, 1880, 1889a]. (The content of this series also formed the foundation for Sprague's 1908 work, *The Philosophy of Accounts*.) However, the actual environment in which the series could now be received was radically different. There now existed a substantial group of expert accountants and bookkeepers in New York and in other regions who could appreciate and understand this mathematical representation of bookkeeping. This series of articles was referred to by numerous contributors to *Office* and *Business* in the years to come. The use of the algebraic equation to describe the bookkeeping function was repeated by Hardcastle and others.

Throughout the 1880s, the science of accounts had been refined and nurtured through its institutionalization within bookkeeping's technical journals and the IA. The impact of the "Algebra of Accounts" in 1889, as compared to its original publication in 1880, provides the most explicit evidence of the changed intellectual and institutional environment. Through the *Book-keeper*, *American Counting-room*, *Treasury*, and *Office*, readers had been repeatedly exposed to the science of accounts

for nine years. In addition, for seven years the IA had been sponsoring monthly meetings devoted almost exclusively to discussing the science of accounts [Romeo and Kyj, 1998]. These two significant institutions had presented this science to many practitioners. Therefore, the science of accounts had been given an environment in which it could grow, both in its theoretical presentation and in the number of people adhering to it. In return, the technical media and professional organization had gained credibility through their emphasis on the development of the science of accounts. In 1889, as compared to 1880, the "Algebra of Accounts" had an enlarged and more sophisticated audience, cognizant of the ideals embodied in the science of accounts.

One area of concern which accountics confronted was the idea of economic profit. Hardcastle [1888] had attempted to demonstrate the need of accountics to reveal the peculiar aspects of economic profit. In 1889, Sprague [1889b] applied the principles of the science of accounts to describe the profit and loss account. This account, which was barely mentioned in bookkeeping treatises in the early part of the century, had apparently become more problematic and a concern for the bookkeeping community. The explanation Sprague gave may appear to a contemporary reader as very clear but mundane. He merely made the obvious points any introductory course in accounting would make; namely, that the profit and loss account is a summary account which only indicates profit or loss after all the entries have been added together. However, Sprague felt that his point was not an accounting principle that many could readily accept. The article was written to illustrate to readers the true economic reality captured by bookkeeping. In this case, Sprague [1889b, p. 207] attempted to illustrate how accountics, the mathematical science of values, could make explicit what otherwise could be easily confused or lost:

> This is the essence of business as distinguished from private or professional life. Outlay for the sake of income is business; income for the purpose of meeting expenditure is not. Therefore I contend that the profit and loss account is a unit. It is composed of outlay and income, not of losses and gains. When the results of outlay and income have by its agency been compared and the excess ascertained then and not till then do the books show a profit or a loss. Profit and loss is therefore named in the correct order, since the result is, normally, profit.

Sprague used economic arguments to interpret actual bookkeeping procedures. He stepped back from the mechanics of bookkeeping to reflect on the economic actions which the bookkeeper records. The expenses of the manufacturer were not considered losses. Instead, they were economic necessities to achieve income. The profit and loss account captured the outlays and incomes of a business. By this means, Sprague demonstrated explicitly the intimate relationship between accountics and economics.

F. W. Child [1891, p. 251] addressed engineers in 1891 to express the importance of scientific accounting. He clearly and explicitly relied on Sprague's theoretical work. The science of accountics allowed various "confusions" of bookkeeping to be cleared up. The confusion over the classification to which capital belonged [*Book-keeper*, 1882c] was clarified through the algebraic presentation of Sprague.

Hardcastle [1891] also used Sprague's algebraic presentation to expound on accountics. However, he used the same tools to arrive at different conclusions. He classified all accounts into three classes — the first two for accounts at rest and the third for accounts in motion. As with Sprague, the presentation of accounts based on the terms "at rest" and "in motion" necessarily alluded to physicists' theories of motion. The balance sheet described accounts "at rest" and the profit and loss statement presented accounts "in motion." The two classes of accounts at rest were "specialty accounts" (assets and liabilities) and the "capital account" (the mathematical aggregate of the specialty asset and liability accounts).

In a later article, Hardcastle [1892] subdivided specialty assets and liabilities into personal and property, being very reminiscent of the earlier classifications of real, personal, and fictitious. The personal accounts were additionally subdivided into two, depending upon whether the personal account had documentary evidence or not. This is one of the rare classifications that relied on a legal definition rather than a bookkeeping or economic one. Hardcastle, following Sprague, represented the balance sheet through an algebraic equation. Capital was the mathematical residual after the liabilities had been meet by the assets.

To present the accounts "in motion," Hardcastle [1891] introduced a third class of accounts which were characterized by having historical rather than true mathematical value. What true value they did have was only after there had been an adjustment to their balance, such as with the merchandise inven-

tory account. The curious feature of this third class was that it was comprised of both specialty and capital accounts. The adjustment based on estimation was to determine how much of the balance should be allocated to each of the two primary classes. Hardcastle's classification, especially of the interaction of the third class with the first two, appears confusing. His presentation, using the perceived methodology of Sprague, did not result in the same conclusions as Sprague. Hardcastle's presentation had similarities with the earlier classification of personal, real, and fictitious. Though Hardcastle presented the framework of accountics, a thorough and rigorous science of bookkeeping, he appears to have leaned heavily on this "unscientific" 18th century classification. Importantly for this discussion, Hardcastle felt it necessary and indispensable to present the theory of accounts using the now well-developed system of accountics. To make a presentation on the principles of bookkeeping in the U.S. during the 1890s, one was required to use the rational institutional myth of the science of accounts.

SCIENCE OF ACCOUNTS: STATUS AT THE PASSAGE OF FIRST CPA LAW

In the period up to the introduction of the first CPA law in New York State, the rational institutional myth of the "science of accounts" or "accountics" had become very well-established among U.S. practitioners of bookkeeping and accounting. An article by A. O. Kittredge [1896], shortly after the passage of the law, provides an insightful illustration of the institutionalized status of the science of accounts. His concern was whether bookkeeping was "progressive." The science of accounts had reached its full acceptance within the IA, a group encompassing the most "advanced" accountants in New York. Kittredge relied on this shared cultural belief of the science of accounts to suggest that bookkeeping was as progressive as any other science. The science of accounts was believed to be a genuine "science."

The evidence that Kittredge considered the science of bookkeeping a real science becomes clear when he very naturally compared the development of the science of accounts directly to "other sciences" and to "electrical science" in particular:

> When it comes to bookkeeping as a science, with principles established and defined, the answer to the question of progress and development is not so readily made. We are obliged, therefore, to be guided, in part at least, by analogy. Inasmuch as other sciences ad-

> vance from time to time, even though their fundamental principles have long been known, we may expect bookkeeping to advance in like manner. Inasmuch as other branches of scientific work manifest unexpected life from time to time, so may we assume that there lurks among the foundations of bookkeeping some as yet unapplied principles, which, once brought into play, will change, more or less, the routine of our office practice.
>
> . . . Is bookkeeping progressive, what is to be its future? What will be its ultimate development? Such questions are useless. No one can answer them. The best we can do is to institute comparisons. In the field of electrical science, for example, the dynamo and electric light were known in the laboratory experiments long before their general utility and practical availability for use were discovered....It is possible that there may be some germ-principle in bookkeeping which, in the near or distant future, at the magic touch of an office genius yet to appear, will revolutionize the art. No one can tell at present what it is nor guess when it will be found; but analogy says it may be there [Kittredge, 1896, pp. 320-321].

To state so unequivocally the parallel of other sciences implied a profound belief in the science of accounts as a means to reveal reality that would otherwise remain hidden and lost in the chaos of the business world. Bookkeeping was a science because its principles were discoverable. The principles were discoverable because they referred to some objective reality. Inventions in technique were seen to have been made, and were expected to be seen in the future, as long as they derived justification from discovered principles. Because the principles described reality, new techniques derived from them would be true, useful, and revealing.

According to Kittredge, this science, which was intimately bound to the business world and political economy, had shown itself to be instrumental in aiding the business world and the political economy to adapt to new situations created in the process of industrialization. Many changes had affected the individual of the late 19th century. Business reality had changed dramatically. In addition, technical progress had altered the way people lived and worked. Kittredge placed the science of accounts squarely within this popular belief that rational thought could eventually encompass and control the physical world. Belief in the science of accounts, in part, derived its

strength from this widespread optimistic faith in the future through progressive sciences:

> If all these changes, and hundreds of others not necessary to mention, have taken place during the nineteenth century, why should not similar changes in other fields occur for the good of the world in the twentieth century? And why should not bookkeeping be one of the sciences to show special progress? Or to put the question otherwise: If business conditions continue to advance, can bookkeeping stand still?
>
> New business conditions demand new methods and facilities. The truth of the old proverb, that necessity is the mother of invention, was never more strikingly illustrated than by what has been done by accountants in adapting their methods to meet the requirements of business men as new enterprises and new lines of industry have been established [Kittredge, 1896, p. 231].

The success of business relied on the success of accountants to investigate the hidden truths of economic activity embedded in bookkeeping through the use of the science of accounts.

Kittredge proceeded to demonstrate how bookkeeping had itself radically changed in the 19th century, filled with new discoveries and new applications. The dynamism of the times was manifested in bookkeeping through recent advances:

> We find that classification of accounts, in the sense in which the term is generally used by advanced accountants, was absolutely unknown so recently as the date of some of the first editions of the textbooks now largely current. This classification of accounts differently applied in different lines of business by different accountants, while always holding to the double entry idea for balance proof, still makes use of certain new features, so novel and so unlike what was originally set forth in the double-entry system as to warrant the term 'new principles.' Systems of cost accounts, statements of resources and liabilities, with exhibits of profits or losses while the business is running, or our modern balance sheets, also make use of features not referred to in the least by the early writers [Kittredge, 1896, p. 231].

Higher accounting can be assumed to include the science of accounts with its emphasis on the classification of accounts.

Kittredge and others believed profoundly in the reality of the rigorous and scientific principles of accountics. This was demonstrated in the direct use of the concept of "discovering"

principles. The manner in which these scientists of accounts were open to new discoveries can be demonstrated by their reaction to a new accounting system "logismography," which had been developed by Giuseppe Cerbini, Accountant-General of Italy:

> The rumor reaches us from far-away Italy, the birthplace of double-entry bookkeeping, that new discoveries have recently been made there which will place the 'new bookkeeping' as far in advance of double-entry as double-entry is in advance of what preceded it [Kittredge, 1896, p. 231].

Kittredge ended his article on the progressiveness of accounting by hinting that new discoveries were being made even as he wrote.

Both Hardcastle [1897] and Sprague [1898a, 1898b] wrote a series of articles describing this new Italian method. The development of the ideal of the science of accounts had become a sufficiently profound reality to these men that they looked for new methods which could reveal new principles that had previously remained hidden. For Kittredge, the science had progressed as the new classifications, the new financial statements, and cost accounts had demonstrated. In this belief system, as true scientists, they had to be open to new discoveries and willing to test them within the principles and methods of rigorous science.

CONCLUSION

U.S. concepts and institutions of bookkeeping had changed dramatically during the 19th century. At the beginning of the century, bookkeeping treatises were crude, simple, unscientific works, at least as they would have been perceived by IA expert accountants in 1896. The trade of bookkeeper had developed into a three-fold occupation — bookkeeper, expert bookkeeper, and expert accountant. The latter two, and especially the accountant, focused on the modern presentation of bookkeeping to develop skills and status. The shared belief in the science of accounts became a vital link in this professional development. At the point when the accounting profession was to make its most significant institutional change, the first CPA law, the science of accounts had established itself as a vital component underpinning the profession, propagated by the very people who would help create this new qualification.

The development and refinement of the rational institu-

tional myth of the science of accounts, through the second half of the 19th century, provided the intellectual and theoretical basis through which the U.S. accounting profession could develop. This emphasis on science, and the role of the accountant as a scientist, contrasted dramatically with the gentlemanly, professional idea which the Chartered Accountants from Great Britain brought to the U.S. during this same period. A better understanding of the theoretical framework in which the native accountants derived their sense of the profession provides a more nuanced understanding of the profession as it emerged in New York City. In addition, an appreciation of the science of accounts may provide a greater understanding of the development of accounting programs in U.S. universities in the 1900s and the early developments of U.S. accounting theory in the first two decades of the 20th century. In 1900, Sprague, Hardcastle, and Kittredge, the main proponents of the science of accounts, were founding faculty members of the New York University business school. This school quickly became the model for many schools throughout the country (AAPA, 1907). The legacy of the science of accounts influenced both accounting's professional and academic development in the U.S.

The strong scientific basis for the development of the U.S. accounting profession provided an institutional bias towards a technical understanding of the skills necessary for the promotion of the profession, especially focusing on the principles upon which accounting was believed to be based. Contemporary discussions concerning the manner in which accounting is a science [e.g., Mouck, 1990; Arrington and Francis, 1993; Manicas, 1993; Merino, 1993; Mattessich, 1995] illustrate how the social context of accounting thought and practice remains focused on the ways in which scientific abstractions may be gained, if at all. The debate concerning the artistic skills and scientific rigor of accounting was vigorously debated in the late 19th century, with profound influences to this day. An understanding of this development may help inform the contemporary debate.

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