



Accounting and accountability in ancient civilizations: Mesopotamia and ancient Egypt

Accounting and
accountability

177

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Received 7 February 2006
Revised 24 May 2006
Accepted 1 June 2006

Abstract

Purpose – The purpose of this paper is to analyze and critique the growing literature on record-keeping practices in Mesopotamia and ancient Egypt with a particular focus on processes of ancient accountability, and provide a research agenda for future work.

Design/methodology/approach – Analyzes the contributions of accounting historians in this area as well as the research conducted by Assyriologists and Egyptologists. Our analysis emphasizes the embeddedness of ancient processes of accounting and accountability in their wider contexts.

Findings – A framework is proposed comprising levels and spheres of accountability. The levels of accountability consist of: hierarchical; horizontal; and self, all entailing both accounting and non-accounting elements. Furthermore, accountability is analyzed at three spheres: the individual-state, the state-individual, and the individual-individual.

Originality/value – Further research in this area might examine issues such as the temporal dimension of accountability and whether more precise time measures than those reported in the extant literature were enforced in ancient economies; how the ancients dealt with differences between actual and expected measures; examination on the extent to which accountability exerted an impact on, and the role of accounting in, ordering the lives of individuals and communities; and examination of the trajectories of accounting and accountability across different historical episodes.

Keywords Accounting history, Ancient history, Accounting, Egypt, Exchange

Paper type Research paper

Introduction

The last three decades have witnessed a growing number of publications that have challenged, and moved well beyond, the view that examination of accounting practices in archaic and ancient economies constitute an antiquated exercise located at the margin of scholarly enquiry, at times being a futile endeavour of no relevance to the present (e.g. Stevelinck, 1973, 1985). These studies investigating accounting practices in ancient civilizations have shed light on a number of key issues, including the behavioural (Mattessich, 2000; Mouck, 2004) and the social (Ezzamel, 1997), both

Research reported in this paper was partially funded by the CICYT (Spain) research grant (SEJ-2004-08176-C02-01). We are grateful to Dick Fleischman, Lee Parker, Rosario Rivero-Menéndez, Tony Tinker and the participants at the 2005 Annual Congress of the European Accounting Association (Göteborg, Sweden) and the 2nd Accounting, Business and Financial History Workshop (Seville, Spain, 2006) for their many helpful suggestions on earlier drafts of this paper.



Accounting, Auditing &
Accountability Journal
Vol. 20 No. 2, 2007
pp. 177-209

© Emerald Group Publishing Limited
0951-3574
DOI 10.1108/09513570710740993

dimensions showing great potential for enriching contemporary efforts to theorise the roles of accounting in organizations and society. Contributions to this ancient accounting history span diverse topics: work on state projects, manufactories and workshops; taxation; temples; private estates; the household; semi-barter exchange; and the cult of the dead. They also cover varying socio-political and economic contexts, ranging from the predominantly state-controlled economy of ancient Egypt to the largely private trade economy of Mesopotamia.

To-date, the literature on ancient accounting has progressed on a careful, but piecemeal basis, with little attempt to integrate, or even draw together, its key findings. We believe now that a thorough overview of that literature is timely, identifying the achievements, limitations, and potential for future research in this field. A review of all the diverse literature on ancient accounting is beyond the scope of one paper; hence we limit our review to the literature dealing with Mesopotamia and ancient Egypt[1], focusing only on those parts that relate to the role of accounting practices in the processes of ancient accountability. This clearly excludes the important literature on other ancient civilizations (e.g., Greece: de Ste. Croix, 1956; Costouros, 1978; China: Fu, 1971; India: Scorgie, 1990; Rome: Oldroyd, 1995; Persia: Vollmers, 1996), as well as other roles of accounting in Mesopotamia (Mattessich, 1987) and ancient Egypt (Hain, 1966; Rathbone, 1994). Our argument is that focusing on Mesopotamia and ancient Egypt has the advantage of contrasting accounting and accountability in two civilizations that co-existed at similar historical eras, yet exhibited significantly different socio-political and economic contexts. For example, keeping records about land production in ancient Egypt was performed on behalf of the state or temples because such institutions, and ultimately the Pharaoh, owned most the land. In contrast, keeping such records in the contemporary civilization of Mesopotamia was in the main concerned with private ownership. Such historical proximity and contextual variety offers significant potential for exploring similarities and differences in the emergence and functioning of accountability systems in these two civilizations. Our decision to focus on accountability is not motivated by a view that it is more significant than other areas where accounting intervenes, but is underpinned by our understanding that processes of accountability are endemic to all social organizations across human history.

Our aim, therefore, is to identify the key attributes, scope, and implications of ancient accountability in Mesopotamia and ancient Egypt. We argue that such an undertaking is timely for two reasons. First, a considerable literature examining accounting and accountability in ancient civilizations has focused on the technical aspects of such practices (Keister, 1963). Studies of this persuasion have adopted a strict historical standpoint and, hence, have enhanced understanding of the technicalities of accounting and record-keeping in ancient societies (Mattessich, 2000). In contrast, other studies on ancient societies offer rich insights with significant potential to advance knowledge of the roles of accounting and accountability in organizations and society, and in contributing to contemporary efforts to theorize accounting (Littleton, 1968, p. 48). In particular, we suggest that an emphasis on the context-embeddedness of ancient accounting and accountability would facilitate connecting with contemporary debates on the role of accounting in the development and functioning of different forms of accountability (Ezzamel *et al.*, 1990; Munro and Mouritsen, 1996). In this sense, we seek to examine the underpinnings of the processes

of accountability that may unfold those general or specific patterns they exhibit. Second, in addition to the diversity of topics addressed by accounting academics, many of the contributions to this area have been offered by specialists in ancient history, in particular Assyriologists (e.g., Schmandt-Besserat, 1977, 1992; Nissen *et al.*, 1993) and Egyptologists (Spalinger, 1986; Kemp, 1989). Research conducted by these scholars has appeared in ancient and business history outlets (Finkelstein, 1968; James, 1968), sometimes published many years ago (Lau, 1906; Myhrman, 1910; Nesbit, 1914; Lutz, 1927). Arguably, the scattered nature of this research renders its impact on and implications for the theorizing of accounting marginal in mainstream accounting literature.

In this paper, we acknowledge from the outset the difficulties of conducting research on ancient societies. In any research project, the quality of what a researcher can do is limited by his/her own intellectual powers and the amount of evidence available, but this problem is more exacerbated in the case of ancient history because of additional obstacles (Keister, 1963), especially if the study attempts to emphasize context-embeddedness of such remote societies. The latter approach bears risks of “presentmindness” (Previts and Bricker, 1994), as a consequence of the difficulties arising from dispersed and incomplete records, translation and understanding of dead languages, appreciation of extinct religious and social beliefs, and interpretation of remote societal and political institutions (e.g., the state) (Miller and O’Leary, 1987). The choice is either to attempt to forge as carefully as possible accounts of the ancient past, no matter how incomplete, or to refrain from writing on ancient history altogether. Finley (1992, p. 25) has lamented ancient historians who rely on anecdotes, calling for “abandoning the anecdotal technique of dredging up an example or two as if that constituted proof”. While we would endorse Finley’s position when evidence is plentiful, we would disagree if all that is available as evidence is of an anecdotal nature (e.g., Fleischman *et al.*, 1996). Even small fragments of evidence can reveal interesting insights, but a careful researcher should highlight these limitations and their implications on the findings of the study (Mattessich, 2000; Parker, 2004).

“Accountability” in the ancient world

Our use of the term “accountability” in the context of Mesopotamia and ancient Egypt is likely to attract immediate objection from some because this term is typically seen as the product of modernity (see Hoskin, 1996). Not so long ago, the idea of secrecy was not only negatively perceived by firms’ constituencies but was even a matter of pride for business persons. For example, Ivar Kreuger, the well-known entrepreneur said in an interview to the press at the time of his retirement:

Whatever success I have had may perhaps be attributable to three things: One is silence, the second is more silence, while the third is still more silence (quoted from Previts and Bricker, 1994).

However, it is not our intention to extend modern notions of accountability to the ancient world. Rather, we intend to examine accounting practices that underpin accountability in ancient economies. In this respect, we focus upon the notion of “rendering” an account to others as well as to oneself. In focusing on accounting for accountability, we acknowledge the importance of social and moral codes in these contexts. The notion of accountability has been described by Garfinkel (1967) as a

pervasive way of making sense of the world by rendering it observable and reportable. The process of giving and receiving information can involve different meanings that are contingent on the frame of reference (e.g., economic, political, social) and the time-space intersection (Stewart, 1992). As Willmott (1996, pp. 24, 26) has noted, "accountability is a widespread phenomenon that occurs whenever people strive to account for their experience-in-the-world . . . Accountability is at the center of human relations and interactions." While our focus in this paper is upon accountability via accounting, we acknowledge that accounting is but one possibility through which accountability may function.

We wish to note from the outset that formal accountability, which is the focus of the literature we review, is embedded in the wider, historically developed, frameworks of accountability of a particular culture (Stewart, 1992; Willmott, 1996). Hence, the following section provides a brief discussion of the historical contexts of Mesopotamia and Ancient Egypt. Given that our focus is upon accountability manifest in accounting entries, we see accounting as a structure of meanings through which the significance of the activities upon which accountability is centered is delineated and performance targets are defined (Roberts, 1996).

Our analysis emphasizes the embeddedness of ancient processes of accounting and accountability in their wider socio-political and economic contexts. We propose a framework comprising levels and spheres of accountability. The levels of accountability consist of: hierarchical (involving superiors and subordinates); horizontal (involving two sides outside formal power structures, for example two individuals performing a lease contract of cattle); and self (rendering an account to self, emphasizing notions of morality and identity). All these levels entail both accounting and non-accounting elements. Furthermore, we analyze accountability at three spheres: the individual-state, the state-individual, and the individual-individual, and provide some reflection on challenges facing researchers in this field and suggest some future research areas.

This remainder of the paper is organized as follows. In the next section, we provide a discussion of the wider contexts of ancient economies, paying special attention to Mesopotamia and Ancient Egypt. We then organize our synthesis of the literature on accounting and accountability in these two ancient civilizations around key issues, such as research focus, method of investigation, and findings. In a discussion and conclusion section, we summarize the main themes emerging from our synthesis of the literature, suggest a number of issues for future investigation, and allude to some of the challenges facing scholars in conducting research into ancient accounting.

Contextualizing Mesopotamia and ancient Egypt as ancient economies

Ancient economies

Given that accounting practices can be traced back before the invention of writing (Schmandt-Besserat, 1992), and indeed before the emergence of the economically rational being, any approach that subordinates research in ancient accounting history to rational economic thinking is problematical. Our preference is for an understanding of accounting that is underpinned by the socio-political and economic contexts in which it operates. Hence, it would be difficult to understand the rationale for holding someone, say an ancient operator, accountable without considering the specific context of his/her activities, such as gender, age, and social status (Gelb, 1965). In examining

this context, we have to draw upon a specific terminology, and the question here is to what extent could contemporary terms, such as “economy” and “market”, be used to provide sensible descriptions of ancient societies.

According to Finley (1992, p. 21), the ancients did not have a concept similar to the notion of what we now understand as “the economy”:

[The ancients] in fact lacked the concept of an “economy”, and a fortiori, they lacked the conceptual elements which together constitute what we call “the economy”. Of course they farmed, traded, manufactured, mined, taxed, coined, deposited and loaned money, made profits or failed in their enterprises. And they discussed these activities in their talk and their writing. What they did not do, however, was to combine these particular activities conceptually into a unit, in Parsonian terms into “a differentiated sub-system”.

Sure enough; the ancients did not develop a conceptual construct similar to the modern term “economy”, and care should be exercised when interpreting ancient practices to avoid conflating them with meanings the ancients would not have recognised. This difficulty, however, should not hamper efforts to study ancient societies. Our use of the term “economy” in ancient societies entails planning and conducting economic activities of the kind mentioned in Finley’s quote above, but without assuming that it involved an ensemble of conceptual elements akin to those used today, for example such as a “price mechanism”.

A similarly controversial issue is the extent to which markets existed and functioned in ancient economies. Briefly, there are two schools of thought. The first affirms the existence and importance of markets, even though it acknowledges that such markets did not exhibit all the characteristics associated with what we now call market mechanisms. Under this view, the market consisted of a place where commodities were exchanged for a price was paid in kind rather than in coins (Janssen, 1975; Renger, 1984)[2]. The alternative school argues that ancient societies such as Mesopotamia either had no markets (Oppenheim, 1964) or had a notion of a market price that might have been fixed by the government rather than by free trade (Goetze, 1956; Leemans, 1960; Dalton, 1968). Polanyi (1957, 1977, p. 125) developed the notion of “market elements” in order to emphasize the institutional characteristics that constitute what he considers to be the market:

... a site, physically present or available goods, a supply crowd, a demand crowd, custom or law, and, equivalences... Whenever the market elements combine to form a supply-demand-price mechanism, we speak of price-making markets. Otherwise, the meeting of supply and demand crowds, carrying on exchange at fixed equivalences, forms a non-price-making market. Short of this we should not speak of markets, but merely of the various combinations of the market elements the exchange situation happens to represent.

It is clear from the evidence we analyze below that local markets as locales of exchange existed in both Mesopotamia (e.g., Renger, 1984) and ancient Egypt (e.g., Janssen, 1975). In these market locations, buyers and sellers exchanged items that were in the main “valued” using a money of account in order to render them comparable and to ensure value reciprocity. In both civilizations, some of the key elements suggested by Polanyi were present; well defined market locales, buyers and sellers exchanging commodities at agreed prices but without coinage mediating the exchange, and markets that satisfied local needs.

Some commentators have suggested that the notion of the state applies to ancient societies if three conditions are met: a geographical area, a population and a recognized legal authority (see Eisenstadt, 1969; Ball, 1995; Barry, 2000; Warburton, 1997). All three elements were present in both Mesopotamia and ancient Egypt. Drawing on Marx's contentious notion of "oriental despotism" and "Asiatic mode of production" (quoted in d'Encausse and Schram, 1969), Wittfogel (1963) argues that the centralizing power of government emerged in the Orient as an automatic response to the necessity of an economical use of water in agriculture via building canals and waterworks. The alternative to centralized government, in the form of voluntary associations that developed some centuries later in Flanders and Italy to deal with the same problem, could not be pursued in the Orient because, it is claimed, the Orient civilizations were too low and their territorial extent too vast compared to the abovementioned European settings. The emergence of the state with centralized authority, such as that of ancient Egypt, claims Wittfogel, was associated with feudalism, and slavery was used to develop irrigation systems. Many writers have since refuted this thesis, for example by showing that the ancient Egyptian state was not developed in response to the demands of irrigation (e.g., Schenkel, 1978, cited in Warburton, 1997, p. 40). Later writers, while not completely denying the presence of forms of forced labour, document the existence of private labour commanding wages, or rations. In our subsequent analysis of accountability, we will be dealing with much of this paid-for labour.

Mesopotamia

During the period 8000-3700 BC the Fertile Crescent witnessed the spread of small settlements (Postgate, 1992). Economic activities in this area benefited from the floods of the rivers Tigris and Euphrates, which enabled two bountiful harvests of cereals per year and provided conditions suited to cattle husbandry. In contrast, the area lacked natural resources such as wood, stone, and precious metals, hence the use of "international" trade to acquire these resources (Oppenheim, 1954). Tokens, shaped into simple geometric forms, such as cones or spheres, were used for stewardship purposes, inscribed in lists of personal properties (Lau, 1906, pp. 43-4) in order to identify and secure a surplus for maintenance of farming communities (Schmandt-Besserat, 1982). Then some time after 5000 BC city-states began to emerge with treasury functions, and the tokens were developed to assist with tax and tribute assessment and collection exacted by the treasury.

The Mesopotamian civilization emerged during the period 3700-2900 BC amid the development of innovations that increased agricultural efficiency (e.g., the plough), speeded up transportation (e.g., sailing boats), and the use of better metal tooling (e.g., copper) (Postgate, 1992; Maisels, 1993). Clay tablets with pictographic characters were used to record commercial transactions performed by the temples (Schmandt-Besserat, 1982), and these preceded the earliest found examples of cuneiform writing in the form of abstract signs incised on clay tablets (Powell, 1981, pp. 419-20), which were written in Sumerian by 2900 BC (Rivero Menéndez, 2000, pp. 40). Around 3250 BC tokens began to be impressed onto the damp clay envelopes before enclosure, and later complex tokens were incised on the surface of envelopes with a stylus as a representation of the items deposited inside them before being sealed (Schmandt-Besserat, 1992). This was the means of assuring the recipient of the sealed clay envelopes that the internal contents matched exactly the record impressed

or incised on the external surface, providing a form of horizontal accountability. In a later development, clay tablets replaced incised representations on external surfaces of sealed envelopes as a space on which accounting entries were made. These tablets were kept by scribes, who were carefully trained to acquire the necessary literary and arithmetic skills and were held responsible for documenting commercial transactions (Nissen *et al.*, 1993).

The Sumerian civilization (2900-2335 BC) featured small, rich city-states that engaged in continuous wars to resolve issues of property rights related to irrigation water. By the middle of the third millennium, the size of city-states reduced significantly which in turn exacerbated the process of division of labour and provided a basis for the hierarchization of society around military (led by the royal palace) and religious classes (Snell, 1997). Although temples had a subordinate role vis-à-vis the royal palace, they constituted an important center of economic activity, enjoying extensive ownership of land and having an active role in the construction of the public infrastructures (e.g., irrigation channels, see Rivero Menéndez, 2000).

The Old Babylonian Empire (2335-1595 BC) witnessed the emergence of private property in the Fertile Crescent; royal palaces and temples sold and leased land to private individuals. The turbulent period of wars in this era came to an end under Hammurabi, who developed a centralized system for the administration of public affairs involving the enactment of districts headed by governors, who replaced the local kings, and the separation of temples and the royal palace (Harris, 1961). The Middle Babylonian and Assyrian periods (1595-1077 BC) witnessed greater intensification of commercial activities with ancient Egypt.

Ancient Egypt

Ancient Egyptian history divides into pre-dynastic and dynastic eras (Kemp, 1989; Grimal, 1992). The Dynastic era comprises the Early Dynastic Period, (3300 BC-2700 BC), the Old Kingdom (2700 BC-2200 BC); the Middle Kingdom (2050 BC-1780 BC), the New Kingdom (1552 BC-1080 BC), and the Late Dynastic Period (1080 BC-332 BC). These kingdoms were interspersed with Intermediate Periods, when Egypt became divided, and except for these periods, the state played a major role in administration, the economy, civil life, and the military. Although accounting and writing emerged at least two centuries before the unification of Egypt (Davies and Friedman, 1998), it was not until the emergence of Egypt as a centralized state that accounting practices began to be used on a more systematic basis.

Much of the economic activities undertaken in ancient Egypt belonged to the royal, or public, domain, although there was always some scope for private activities (Janssen, 1975)[3]. In ancient Egypt, kingship was vested in divinity, with the Pharaoh considered a god ruling on earth on behalf of other gods in the sky. The Pharaoh was assisted by a Vizier (two Viziers in later Kingdoms)[4] and a bureaucracy with various layers of administrators and scribes who were trained in writing and arithmetic. The economic domains of the state and temples oversaw large projects, such as building and renovating tombs, temples, palaces, and royal workshops, in addition to land cultivation, bakeries and breweries, and the manufactory of textiles and metals. Impost (or "tax") was assessed and levied against crops and then collected by the scribes to be stored in granaries for use as future rations for the royal palace and to the Pharaoh's subjects. The significant role played by the state in the economy of ancient Egypt has

led many writers to describe it as a “redistributive system”: a centrally-based bureaucracy that collected from its subjects only to redistribute to them later (e.g., Janssen, 1975).

Temples also played an important role in ancient Egypt, not only as places of worship that helped stabilise the right of the monarchy to the throne, but also as significant economic institutions (James, 1968; Janssen, 1979). Pharaohs throughout history have boasted about their considerable endowments to temples which also owned major economic resources (Kemp, 1989). Parts of these resources were used for the upkeep of priests, but also for the payment of rations to workers, artisans and administrators engaged in temple activities. These activities required substantial organisation of work practices, allocation of tasks, monitoring of achievements, and determination of rations (Kemp, 1989; Quirke, 1990).

Although the state and temples dominated the economic landscape of ancient Egypt, a significant private sphere also existed (Janssen, 1975; Kemp, 1989; Warburton, 1997). Ordinary individuals were frequently able to make things on the side and exchange them through semi-barter transactions with other goods in designated places that functioned as local markets, at a mutually agreed price. Usually, these exchanges were recorded by a scribe, who also served as a witness to the transaction (Janssen, 1975). As in Mesopotamia, in the absence of coinage, a money of account system functioned in Egypt as a common denominator, which converted baskets of different commodities into value equivalence and recorded these values in accounting books (see footnote 2).

Accounting and accountability in Mesopotamia

Research on accounting in Mesopotamia owes a great debt to the pioneering work of Schmandt-Besserat (1977, 1978, 1979, 1980, 1981a, 1981b, 1983, 1984a, 1984b, 1986a, 1986b, 1992, 1997) on the genesis of accounting, counting and writing. Her path-breaking work demonstrated that token accounting was invented before both abstract counting and writing. Building on her work, Mattessich (1987, 1989, 1991, 1994, 1998a, 1998b, 2000) has provided a major scholarly contribution to Mesopotamian accounting. However, as much of Mattessich’s exemplary work focuses upon the technical attributes of ancient accounting, we will only draw on his work that is relevant to ancient systems of accountability

Keeping records of commercial transactions

In the 4th millennium BC, Mesopotamian scribes assigned tokens of different shapes to different commodity accounts. Mattessich (1987), following the lead of Schmandt-Besserat, notes that a sealed envelope containing tokens inside and impressions of the same tokens on the outside surface could have functioned as a personal account of a steward or debtor as well as an inventory list of his investments. Simple tokens were used for such items as grain and cattle whereas more incised and perforated tokens recorded services and manufactured items. This finding was supported by an envelope discovered in the 1920s (Schmandt-Besserat, 1992, p. 8). The counters represented small sheep and were signed by the shepherd Ziqarru; this form of accountability was vested in an enumeration of different types of sheep:

21 ewes that lamb
6 female lambs

8 rams
4 male lambs
6 she-goats that kid
1 he-goat
3 female kids.

Mattessich (1989, p. 76, 2000) interprets each token shape as a type of account, and the number of tokens contained in a clay envelope or on a string indicates the quantity of specific items. Furthermore, according to Mattessich (1989, p. 80), these transactions were not limited to tangible assets but occasionally included a claim for services. Furthermore, he stresses the dual significance of these tokens; being both a set of individual assets in their detail and a representation of equity in their totality[5]. This early accounting was capable of monitoring obligations and levies from stewards and tax payers and recording the actual payments in kind by debtors. He then argues that not only did every piece of commercial reality (such as a jar of oil) correspond to a specific token, but also the relations (such as property rights) had proper correspondence through the location of certain tokens in a particular aggregate.

With the evolution of writing, the accounting contents of the tablets became more informative for the parties involved in the transaction, as language-related designations began to be added to the entries to clarify the function of records and their relationships. Nissen *et al.* (1993, p. 47) point out: "Whereas during the archaic age [3000 BC] the addition of further information concerning product quantities was restricted to placing a numerical sign at a predetermined place within the text format, such information was incorporated into grammatically structured sentences in later Old Sumerian texts from pre-Sargonic Lagash [2500-2300 BC]".

The entries kept in the tablets were recorded at the moment of the transaction. According to Rivero Menéndez (2000, p. 283), it was customary to call the scribe to the temple, palace, or private domain to record commercial transactions, irrespective of their volume. Written accounts of transactions were signed by the transaction parties, witnesses and the scribe (Keister, 1963, p. 371; Chatfield, 1977, p. 5). From the archaic period onwards, the name of the debtor was identified through his seal on the envelope (Schmandt-Besserat, 1978). The following tablet, recording a lease of cattle, illustrates the level of details in recording such transactions, stating dates, naming and counting items of cattle, stating the names of accountable individuals, and stipulating precise sanctions in cases of failure, and listing witnesses (Finkelstein, 1968):

92 ewes
20 rams
22 breeding lambs
24 [spring(?)] lambs
33 she-goats
4 male goats
27 kids

Total: 158 sheep; total:64 goats,

Which Sinšamuh has entrusted to Dadā the shepherd.

He (i.e. Dadā) assumes liability (therefore) and will replace any lost (animals).

Should Nidnatum, his (i.e. Dadā's) shepherd boy, absent himself, he (i.e. Nidnatum) will bear responsibility for any (consequent) loss, (and) Dadā will measure out 5 *kōr* of barley.

Three witnesses; date; Samsuiluna year 1 (?), fourth month, 16th day.

Monitoring performance

Nissen *et al.* (1993) provide evidence on accounting for various domains, one of which relates to Kushim, either an official or an institution (the meaning rendered is not exact) responsible for a storage facility for the ingredients required for beer brewing (malt and cracked barley or barley groats). The tablets recording these activities specify the amounts of the product, its quality, location, or connected responsibility for a given period. As barley left the granaries of Kushim for processing, the quantities were added up, with each entry quoting the title of the official and signed by both Kushim and the official, thereby locating responsibility for the allocated barley with that official. The amounts of barley were differentiated by type as to whether they were barley groats or malt, the individual quantities of each type were then aggregated into a total for each type, before these two totals were finally aggregated into a grand total of barley groat and malt. In another tablet, the scribe noted the exact ingredients required for nine different cereal products and eight different kinds of beer in a tabular format. As this tablet was unsigned, Nissen *et al.* (1993, p. 43) have suggested that it was “some sort of supplementary annotation to the proper administrative document.” Finally, the actual beer produced was recorded, as well as the names of the persons who received the beer, with the possibility that, Nissen *et al.* (1993, p. 46) surmise, labour time required for beer production was recorded. According to Mattessich (1998a, p. 18), this reveals an *ex post* juxtaposition of budgeted amounts to actual amounts produced and the recording of the discrepancy in the form of a “balancing” entry.

As shown in this case, bookkeeping procedures can be traced back to the archaic period, but it is not clear when the systematic comparisons of theoretical and actual amounts began. Deficits in one year, arising from shortage of actual amounts compared to theoretical amounts, were carried forward to the following year and were liable to later reimbursement. The use of “‘theoretical’ amounts in the form of future calculations, debit posts, standardized obligation, and similar non-empirical accounting procedures” prompted Mattessich (1998a, p. 25) to invoke the contemporary term “budgetary procedures” when discussing these tablets, ultimately suggesting the existence of a form of ancient human accountability.

Some tablets from the later Old Sumerian period detail bread baking, where a given amount of bread is listed against the specification of its cereal ingredients, depending on quality as reflected in a production rate for a particular type of bread. Other tablets included entries for bread and beer rations and the ingredients required to make them. These tablets began by listing the names of individuals with the largest rations followed by those with smaller rations. At the end of the tablet, the amounts of bread and beer were aggregated by type and the grand total for the flour and barley used was also recorded. The tablets were dated daily, and the scribes showed how the amount of flour corresponded exactly to the amount actually used in baking the bread, and the same applied to barley and beer, leading Nissen *et al.* (1993, p. 49) to suggest that this checking of actual against theoretical amounts was “perhaps the most important accounting operation introduced during the third millennium BC”.

A considerable amount of the surviving accounting records from Ur-III relates to the temples and their role in agriculture. The records traced the expenses incurred in farming the land, such as fodder of oxen, tooling, and compensation paid to labourers in barley, clothing, and silver, as well as the concomitant performance of land (Rivero

Menéndez, 2000, p. 300). Nissen *et al.* (1993) argue that, by 2100 BC (Ur-III), accounting for theoretical (expected) and actual performance reached its most developed form. From then onwards, the entries record labour performance, along with theoretical credits and duties. The balancing of expected and actual labour performance was recorded at regular intervals for the foremen of the state-controlled labour force, using an accounting period of a 12-month-year, with each month 30 days long (similar to ancient Egypt). Balances were carried forward to next periods; most frequently the balances were deficits (overdrawn) as the expected performances seem to have been “fixed as the maximum of what a foreman could reasonably demand of his workers” (Nissen *et al.* (1993, p. 49). Such balancing periodic entries were underpinned by some measure of standardization of performance and a value equivalence system:

A precondition for the feasibility of such global balancing of all expected and real performances was the standardization and calculability of the expected performances, as well as a means of comparing all performances. Because the economy of the Ur-III period was still based predominantly on natural payment and exchange, an innovation was required for the realization of such control through a statewide recognized system of accounting. The introduction of unifying norms of performance and a system of value equivalence was in fact the consequence by which the normed natural performance became comparable to each other. Although we are often only able to trace the performance standards and value equivalences through calculation of account entries, there can be no doubt of the existence of explicitly formulated norms which were strictly adhered to. They can be reconstructed from conversions of labor performances and products into equivalent products specific to the respective center of the economic organization. Depending on the economic sector, the means of comparison or the measure of standardized norms and duties could be silver, barley, fish or “laborer-days”, that is, the product of the number of workers by the number of days they worked. The reconstruction of the conversions established the fact that they were based on specified conversion factors for different labor performances and produced goods (Nissen *et al.*, 1993, pp. 49-51).

The organization of the accounting texts of this era can be illustrated by reference to a more complete account of female labour (Nissen *et al.*, 1993, pp. 52-4). The top left-hand of the obverse side contains entries of debit balance carried forward from the previous period, and the expected (theoretical) performance for the current period, with the aggregate of these two items clearly written. The lower part of the left-hand and the whole right-hand of the obverse side have entries showing credits as amount of delivered flour, converted into female workdays, and other labour performance by female labour force. The reverse side contains other credit entries, the aggregation of all performed labour as credit, and the final balance to be carried forward for the next period. In commenting on how these remaining balances were traced, Nissen *et al.* (1993, p. 54) state:

From other texts we know what drastic consequences such continuous control of deficits meant for the foreman and his household. Apparently the debts had to be settled at all costs. The death of a foreman in debt resulted in confiscation of his possessions as compensation for the state. One consequence of such a confiscation was that the remaining members of the household could be transferred into the royal labor force and required to perform the work formerly supervised by the deceased foreman.

There is considerable evidence concerning the distribution of rations and organization of labour, although as expected the level of detail increases as we move from the

archaic period to the Old Sumerian era. The archaic evidence simply shows names of workmen and entries of rations, equivalent to 0.8 liter of grain per workman daily irrespective of the workman's particular employment, which approximates the minimum level of subsistence, and this figure remained virtually the same throughout the third millennium BC (Rivero Menéndez, 2000, pp. 195-7). Workmen were organized into gangs of 10 each plus a foreman and their rations were delivered to them through a chief supervisor. It was not until the Old Sumerian period (2450 BC) that the first evidence on calculation of expected work performance emerges, which quantified work duties (e.g., the amount of barley a labourer had to harvest, or the amount of soil that had to be excavated in a workday). Levels of expected performance varied according to the sex and age of the labourer. Accounts of a grain processing workshop reveal detailed measures of control at work for 36 female labourers and entries made for each day of the month, for several months. Furthermore, during Ur-III, Rivero Menéndez (2000, p. 291) reports cases of strict control over sick labourers, with details about payments made to absentees and names of those that replaced them. At the same time there are traces of records of raw and finished products recorded, and the finished products converted into the standard value unit of barley. Such conversion ratios were fairly stable over time, leading Mattessich (1998a, pp. 14-15) to surmise "These fixed conversion ratios may also have fulfilled a function similar to transfer prices so important in an economy of regulated and manipulated values.". The entries also record the labour time of the millers to an exactness of 10/60 of a work-day in the total balance. The balance shows the difference between raw materials and labour force expressed in labourer days at the end of an accounting period against delivered products and the work actually performed, with deficits cleared directly (Nissen *et al.*, 1993, pp. 83-4).

Further evidence from the administration of fields attests to the use of length measures to calculate areas in order to determine the amount of grain seeds required to sow a particular field, which typically came from central grain supplies administered by large granaries (Powell, 1984; Maekawa, 1990). Farmers calculated the distance between seeds, the number of furrows to be deployed in a given area and the amounts of grain required to plough and sow a particular field. During the Ur-III period, for example, the standard was 10 furrows per nindan[6] (Rivero Menéndez, 2000, p. 123). On this basis, farmers estimated the distance that oxen had to cover and, hence, the necessary amount of fodder. Figures on the obverse of a tablet typically represented the grain needed to sow the filed area stated on the reverse of the tablet, accompanied by entries of the name or title related to the activity/field.

Land production was measured and recorded with criteria similar to those used in recording human performance. The following tablet from Ur-III shows the crop of a date palm plantation in gur or qa, whose breakdown comprises groups of palms (Myhrman, 1910, p. 63-5). Interestingly, control over production covers palms whose dates were stolen:

7 date palms, 1 gur each.
2 trees, 249 qa each.
12 trees, 180 qa each.

40 date palms, whose dates have been stolen.
Total: 190 date palms cropped.

Total: 40 date palms stolen.
Total: 44 gur 180 qa of dates.
Mes Shu-kul (4th) day.
Year in which the country Zaba-ali was devastated.
(7th year).

The sets of accounts also refer to animal husbandry. For example, they contain estimates of offspring for bovine cattle over a 10-year window (Rivero Menéndez, 2000, p. 292). In particular, a document of the Old Babylonian period shows a lease contract of sheep establishing that 100 lambs should produce 80 offspring in a year and makes provisions for animal death and amounts of wool that should be produced over such period (Stol, 1985; see also Nissen *et al.*, pp. 98-101).

In the archaic period, texts record compilation of flocks differentiated by type and sex, and amounts of “dairy fat”. Nissen *et al.* (1993, p. 93) comment that “The modalities by which the processing of animal products was organized complied with the centralized structure of the administration of livestock herds itself”. In the Old Sumerian period, cheese delivery quotas of herdsman in charge were recorded, using jars with standardized liquid capacity as measures (the traditional grain measures), in contrast to archaic times when cheese was counted in discrete units (Nissen *et al.*, pp. 96-7). Cattle breeding was also accounted for, and the authors cite a document which calculated annual production of “dairy fat” and cheese for four milk cows over ten years. This document does not appear to be a record of actual activities, but rather a theoretical calculation of expected reproduction of consecutive generations of cows. The text assumes a cow mortality rate of zero, and is based on calving at regular intervals and producing the same amount of milk irrespective of the cow’s age. Annual reproduction of cattle was based on the rate of one calf for every two adult cows, in addition to fixed amounts of “dairy fat” and cheese per cow per year. The total amount of “dairy fat” and cheese production over the ten-year period was calculated and converted into its corresponding value equivalence expressed in silver, using the exchange rate of 10 sila of dairy fat or 150 sila of cheese for one shekel of silver (Nissen *et al.*, pp. 97-102).

Overall, our examination of accounting and accountability in Mesopotamia reveals an active interest to keep records of all commercial transactions (Rivero Menéndez, 2000). Our analysis indicates the powerful role of the scribes in using fairly sophisticated systems of record-keeping (e.g., tablets and envelopes). Furthermore, our analysis points to the existence of transactions between private individuals, which reveal cases of horizontal accountability that were context-embedded. At the same time, we have identified an interest of scribes in using the notion of “normal” performance. Such interest went beyond the desire to need to deploy mechanisms of human accountability (Ezzamel and Hoskin, 2002), by intervening into the domains of animal husbandry (e.g., number of expected offsprings in a 10-year window, see Rivero Menéndez, 2000), and land production (Myhrman, 1910) to work out estimates of future product. There is also evidence of hierarchical accountability expressed through various relationships between the individual and the state.

Accounting and accountability in ancient Egypt

The royal palace and the temples constituted two influential institutions in the economy of ancient Egypt (Stone, 1969; Janssen and Janssen, 1990; Warburton, 1997).

The importance of the temples arose from their imposing role in the rituals of worship and death that characterized ancient Egypt (Assmann, 2002), and the significance of the palace was underpinned by its symbolic position as the residence of the Pharaoh and its central role in Egypt's redistributive economy. Below, we organize our discussion by distinguishing the different economic domains.

Accounting for the public domain: the royal palace and the temples

Sparse evidence remains from the records that were kept for royal palaces throughout ancient Egyptian history. The most complete and detailed evidence dates to the Middle Kingdom in the form of summary accounts of a royal visit to Thebes from the Thirteenth Dynasty (Spalinger, 1985a). The royal entourage included the Pharaoh, his family, immediate dependents, the Vizier, high officials, and courtiers covering the treasury, the priesthood and the military. The papyri included:

- statements of account, covering the provisions, special deliveries, remainders, balances and surplus;
- orders of provision earmarked for specific individuals;
- expenditure of valuable commodities as lists of offerings; and
- official reports and documents, detailing specific items received in the presence of witnesses.

The accounts reveal an intricate web of redistribution that co-ordinated the inflows and outflows of commodities. For example, the accounts were kept on a daily basis, with separate columns for each type of commodity, and they matched daily supplies and provisions. These accounts linked sources of revenues and provisions to specific institutions which helped to trace and monitor the accountability of these institutions to the state (Ezzamel, 2002b).

Ezzamel (2005) examined a set of documents from the Old Kingdom relating to the temple of King Néferirkarê-Kakai (Fifth Dynasty). The documents in the papyri contain lists of attendance and allocation of work duties on a daily basis, along with daily and monthly accounts detailing collection of goods and their distribution, and inventory lists of equipment and various items. In the case of inventory lists, a grid-structure was used whereby items were grouped within specific categories organised under a three-tier hierarchy of classification, reflecting gradual finer details for each item listed. At the end of its period of work (usually two months), the departing *phyle* (gang/team) delivered the equipment to the stores and the scribe noted the exact state of each equipment and the repairs required. A mixture of red and black ink was used to differentiate the entries and the columns of the inventory list to enhance visibility. Lines were drawn by the inspectors to indicate that inspection took place. The departing *phyle* and the incoming *phyle* each prepared a report indicating the state of the equipment they left behind or received upon arrival (Parkinson, 1991). The temple income accounts also used a grid structure and black and red inks to note for every day of the month deliveries, by name of porter and source, remainder, and the place to which these deliveries were sent as provisions; thereby making possible a tracing of accountability to each individual and source.

In the case of inventory lists, recording items using a combination of black and red ink in a tabular format (organisational visibility), and the enumeration of quantities of

items and the classification taxonomy (technical visibility) made it easy for the scribe to signal damaged items as well as the nature of the damage. This made it possible to both trace responsibility for damage to the appropriate (departing) *phyle* and to plan the repair of damaged items in time for the arrival of the new *phyle* (Parkinson, 1991). In the monthly income accounts of the temple, the scribes were able to trace a particular delivery to its exact amount and original source with visibility of accountability enshrined into accounting entries. Through the use of a grid system and the judicious combination of black and red ink the scribe could differentiate between amounts due as revenue, actual quantities delivered and remaining balances (Kemp, 1989), hence late deliveries could be monitored. Accounting played a key role in determining the precise allocations of provisions for every member of temple staff and tracing the delivery of these provisions. Crops were collected as tax or impost in kind, and transported to the state granaries where they were stored, with responsibility for transportation charged to ship captains (Gardiner, 1941). Ezzamel (2005) provided a reconstruction of the network of institutions that were involved in this complicated chain of provision and distribution, thereby emphasizing the individual and institutional accountability that bonded them to the temple.

Further evidence on accounting for the temple comes from the Middle Kingdom (Spalinger, 1985a). The evidence is in the form of ten contracts intended to be executed after the death of a high ranking official. Ezzamel (2002b) shows how accounting practices underpinned the contractual arrangements of the dead that were finalised in their life times. The intervention of accounting was not simply restricted to the writing of a will, whereby items were enumerated and/or valued; it also involved determining the precise amounts of offerings to be made of each type of commodity. These contracts were sanctioned by social norms as well as by incentives built into the contracts to motivate the priests held responsible for the execution of the contracts to ensure the measured giving on behalf of the dead.

Tax formed a significant source of state revenues, and its assessment, collection and redistribution was a major occupation for scribes and other state officials. While the genesis of levying and collecting tax goes back to pre-Dynasty Zero (3300 BC onwards; Davies and Friedman, 1998), work on ancient Egyptian taxation in the accounting literature has so far focused on the era from the Middle Kingdom onwards (2050 BC onwards). Ezzamel (2002b) reviews evidence pertaining to the levying and collection of tax from the Twelfth Dynasty, where specific individuals were held accountable for collecting given amounts of tax (e.g., wheat, corn, ducks) levied as dues on the Pharaoh's subjects. Further light is shed on taxation practices in the New Kingdom (Gardiner, 1941), which Ezzamel (2002a) draws on to trace out what he terms the "cycle of taxation" "which involves the definition of taxable entities, the estimation, final assessment, collection, transportation and storage of taxes" (Ezzamel, 2002a, p. 17). Tax subjects were the temples, state officials (whose taxation was exceptional, because tax was typically levied on physical produce but not on mental, administrative and scribal activities), Khato-lands (lands earmarked to supply revenues to the Crown), and ordinary people. The scribes measured the lands whose crop was to be taxed, and converted the size of a given plot of land into a taxable equivalent crop using some common denominator in the form of a capacity measure. The evidence suggests that tax assessment varied in a strict linear proportionality to two parameters: the measured area of the land, and its fertility assessed through rates (multipliers) varying

between 5, 7.5, and 10, the higher the multiplier the more fertile the land was judged to be, and this determined the accountability of taxable subjects to the state, in terms of the amount of tax they had to pay.

Once tax was assessed and collected, it was transported to the state granaries, and this process was organized and documented carefully by the scribes. For every case of tax collection/delivery, the scribes recorded the date and location of the activity, the precise threshing floor for the crops, the exact amount of tax whose collection was entrusted to an official/scribe, the names of the ship captains that transported the tax collected, the amount of tax carried by each boat, the rations allocated out of the tax collected for the consumption of the crew of each ship, and finally the delivery of tax collected to the state granaries and the deficit remaining (Gardiner, 1941). Tax assessment was quantified using capacity measures, such as the *khar*, *oipe*, and *hin*. A case of tax defalcation went on undetected for nine years until it was ultimately uncovered, thanks to the detailed and careful recording of the amounts of tax due to state granaries. In this system of accountability, expected assessments and deliveries of tax were compared against actual deliveries, with responsibility being traceable to specific dates, locations and individuals (Gardiner, 1941).

The 12th Dynasty (Middle Kingdom) provides detailed evidence relating to construction projects for the Pharaoh Sesostris I and the activities of royal workshops for making and repairing items such as tools, boats and building material (Simpson, 1963, 1965, 1969). Daily attendance lists for individual workers were kept, detailing names, titles, days spent by each workmen on project work, days of absence, days in transit (between projects) and total days, payroll or provision allocations per day, tasks (work targets) allocated to workmen converted into equivalent man-days, work completed and work remainder. Workshop accounts included details of items delivered to be worked on, either for a whole job or on a daily basis, converted in their diversity into equivalent amounts using money of account (*deben*), amount of work completed and the remainder. The evidence reveals a system of ancient human accountability based on division of labour, allocation of predetermined work targets, regular reporting on actual achievements, remainder of work to be completed and a payment structure (in the form of fixed provisions) which reflected the rank of different task categories, individual position in the hierarchy, and specific responsibility (Ezzamel, 2004). Failure to pay assessed taxes, unauthorised absence from work, and embezzlement were dealt with through punitive measures extending beyond the individual to his/her immediate family (Hayes, 1955).

Accounting for the private domain: bakeries and households

The accounting literature dealing with the private domain in ancient Egypt is remarkably sparse. In part, this is because much of the activities of ancient Egypt centered on the state, with its various establishments, and the temples. Further, much of the evidence relating to private transactions was recorded on *papyri* or *ostraca* (shreds of pottery); the first is easily perishable unless kept in dry places, and the second probably re-used for writing, hence obliterating evidence of earlier transactions. However, there is still a reasonable amount of evidence on the private domain which has hardly been exploited.

Janssen (1975) collated the prices of many commodities covering a period of approximately 150 years, in the necropolis village of Deir El-Medina during the New

Kingdom, but his focus has been in the main upon documenting and comparing prices rather than being concerned with accountability. Ezzamel and Hoskin (2002) examined the development of monies of account in ancient Egypt and explored how it, along with accounting technology, were used by the ancient scribes to constitute value reciprocity that underpinned semi-barter exchange and became enshrined in ancient accountability. We suggest that there are important arguments to be made here concerning both horizontal accountability and accountability to self. In the case of transactions underpinned by monies of account, the detailing of precise payments was a means through which both buyer and seller could demonstrate to each other their honesty as visualized by accounting entries and valuation, to show that what has been received exactly equalled what has been given in exchange. Such demonstration of economic reciprocity by both parties, in the presence of the scribe, as a supposedly dispassionate expert, endowed the exchange process with legitimacy. Artistic representation, depicting semi-barter exchange via a pair of balances showing absolute equality of both sides were precisely modeled on the balances used in the afterlife to decide the fate of the individual; accountabilities in life and death were therefore brought into a close symbiosis. Both sides to the transaction could thus clearly claim, with justification, that they uphold *Maat*, the quintessential quality that for the ancient Egyptians signified truth and justice. By demonstrating own honesty to the self, an individual could boast about such a quality both socially and in their autobiographies inscribed in their tombs (Leichtheim, 1988). By observing *Maat* through economic reciprocity, an individual can also be hopeful of eternal salvation in the afterlife (Leichtheim, 2002).

There are some pictorial representations and detailed accounts for baking in ancient Egypt (Spalinger, 1986). The cycle of ancient accountability for baking began with the receipt of grain by the bakers from the Pharaoh's granaries, followed by accounting for the different stages entailed in the process of baking.

To illustrate the above arguments, we use a detailed example of accounting for a baking cycle. This process of accountability involved the preparation of four types of accounts:

- (1) emmer accounts;
- (2) bread accounts;
- (3) bread summaries; and
- (4) baking accounts (see Figure 1).

The above baking accounts illustrate the intersection of processes of accountability between individual bakers and their state superiors. This process involved determining allowances for natural baking loss, weight conversion rates to calculate number of loaves of a given weight/size expected of a specific input, dilution (baking/cooking) ratios to control for the proportions of water and flower in making the dough, equivalent weight of baked bread transferred from the bakery to the storehouse, and a final comparison of numbers of breads of given weights and dilution actually produced against expected output from the input of grain. The accounts compared actual and expected output per baker every day, using weighing, pure counting, a measure of quantity equivalence, a quality adjustment (the baking ratio), predetermined natural loss in baking, output targets, measures of actual output and

(a) Emmer account:

Year 2, 4th month of Shomu, Day 23...

.....

Document of receipt of emmer from the Granary of Pharaoh, LPH (may he live, be prosperous and happy), in Memphis, to make it into bread in the bakery which is under the authority of Neferhotep, Mayor of Memphis.

What was handed over to the storehouse of the Pharaoh, LPH:

4 th Shomu, 23	grain	sacks, 100
[4 th] Shomu, 28	„	sacks, 150

(b) Bread account:

Receiving the bread from (of) the bakery which is under the authority of Neferhotep, Mayor of Memphis, in the store house of the Residence:

.....

1 st Akhet, 16: received in the Residence stores from (the Scribe Of the pure stores, Ramose & the Scribe Nakht)	: kyllestis loaves, 1,400	making 4,590 deben	at fixed rate of 10 kyllestis loaves (making) 33 ½ (deben).
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(c) Bread summary:

1,601 (sacks), 1 oipe: 392,325
(one line space)

Total, small loaves: 107,893, making 364,371 deben.

Small loaves, 6171, and large loaves, 1800, making 21,600 deben.

Total, 385,971 (deben)

Balance, 6,354 deben.

(d) Baking account:

1st Akhet, Day 16:

The baker Djadja: flour 2 ¼ sacks. Produced, kyllestis loaves, 360, each of deben 4, when coming out baked.

The baker Khuru: (flour), 1 ¾ sacks. Produced, (kyllestis loaves), 255, ditto.

Balance, 30.

The baker Nu-amun: (flour), 1 ¾ sacks. Produced (kyllestis loaves), 280, ditto.

The baker Ankhtu: (flour), 1 ¾ sacks. Produced (kyllestis loaves), 280, ditto

Total, flour, 7[1/2] sacks. Produced, kyllestis loaves, 1175; each of 4 deben on coming out baked. Balance 10.

Figure 1.
Detailed example of accounting for a baking cycle

Source: Kitchen (1993)

calculation of variances between targets and actual achievements. This made possible a form of control and human accountability that visualized the performance of individuals and institutions, accounted for differences between theoretical targets and actual performance and calculated deficits (Ezzamel, 1997).

Ezzamel (2002c) analyzed a set of business letters and accounts belonging to a farmer from the Middle Kingdom, the only surviving evidence of household and farm accounts from ancient Egypt. The household part of the letters and accounts deals with a new set of provisions for every member of the household, which were reduced substantially following a drop in the level of the Nile. The rations demonstrate how the farmer Hekanakhte discharged his responsibility towards members of his household, and how he provided for them even during difficult times. The accounting entries defined the responsibility of his agent and eldest son, Merisu, who was entrusted with the distribution of these rations in Hekanakhte's absence, and hence provided a measure of the agent's accountability. The letters also cover farm activities, including cultivation and land rental, managing herds and their fodder, some agricultural produce, and private debt. The accountability of Merisu in undertaking all these tasks on behalf of the absent principal and father was measured and affirmed, with accounting intervention making possible a process of accountability at a distance. These accounts served not only to monitor the performance of Merisu by Hekanakhte, but equally importantly to inform Hekanakhte of what was going on in his household during his absence and his own responsibility toward them, and also to inform Merisu of his own ability to handle the responsibility entrusted to him. Therefore, this example serves to illustrate how accountability to self operated in ancient times.

Overall, the detailed, multi-part account of the bakery provides a good example of the cycle of accountability in ancient Egypt and, hence, helps summarize our findings. Hierarchical accountability is traced from the highest relevant administrative level (the city Mayor) by noting the amount of grain issued from the Pharaoh's Granary (part a), through to very aggregate bread accounts (part b), to less aggregate bread summaries (part c), ultimately reaching the level of individual bakers on a daily basis (part d). With the exception of part bread summaries (part b), individuals responsible for the accounts are named, and the activities undertaken are related to specific dates and places. Here again, this naming of responsible individuals served both monitoring and self accountability purposes.

Discussion and conclusions

The above analysis of the literature on accounting and accountability in Mesopotamia and ancient Egypt reveals a number of common themes. We have not sought to extend contemporary notions of accountability to ancient Egypt and Mesopotamia. Rather we employ the term to signify the act of one institution or individual rendering an account to another, be that the state, a superior, or an individual of an equivalent standing. We have also indicated from the outset that while our emphasis in the main is upon how accounting practices underpin ancient notions of accountability, we acknowledge the significance of social and ethical values buttressed with sanctions as supportive, or even alternative, means of accounting for accountability. With these provisos in mind, our analysis has emphasized the importance of embedding accounting and accountability practices within the prevailing wider socio-political and economic contexts of Mesopotamia and ancient Egypt, and it is with this embeddedness in mind

that we comment on the extent of sophistication of accounting as a technology that underpinned ancient accountability. Far from being rudimentary, accounting practices in both ancient civilizations displayed remarkable levels of detail. Accountability through accounting operated in various settings, ranging from the private sphere to the public sphere, and from the activities of the living to the affairs of the dead. Accounting intervention reached many aspects of accountability, subjecting them to the technologies of calculation, valuation and reporting, and the accounting craft was practised by highly educated and well trained scribes who occupied respectable positions in society (Macve, 2002). The range of activities embraced by accounting covered three levels of accountability in both the private and public domains: hierarchical, horizontal and self. In the public domain, this included accounting for the estimation and collection of taxes (or impost), work on state projects, in royal workshops or manufactories, and in temples. In the private domain, conversely, accounting for accountability covered semi-barter exchange, stewardship, the household, and the will of the dead, all being underpinned by notions of honesty, justice and reciprocity. The degree of detail in accounting entries increased over time simultaneously with further developments in writing (e.g. greater detail in the contracts for lease cattle reported by Schmandt-Besserat, 1992, p. 8; Finkelstein, 1968, p. 31) and also because of calls by state administration for more accurate accountability.

Spheres and levels of accountability

Accountability was documented in three spheres: individual-state, state-individual, and individual-individual. In the individual-state sphere, accounting entries emphasized the exercise of accountability via the specification of prior targets, the allocation of tasks to individuals, the measurement of actual performance, the identification of differences between targets and actual achievements, and the reporting of action taken to deal with the differences. In setting expected levels of performance for individuals, differences in gender or age were taken into account, as was potential productivity of land (for tax levies), but within a particular group, say grown up men, it seems that expected performance was invariable, assuming all individuals within a category to be equally able (Myhrman, 1910; Rivero Menéndez, 2000).

This evidence points to a form of ancient accountability for human effort. This almost inevitably invites a risky comparison with contemporary systems of accountability. We wish to stay clear of such a problematic comparison, but we believe that a clarification of how human effort was measured in time units would be helpful. Unlike contemporary tendencies to quantify human effort via precise time targets, such as standard time required for an operator with acceptable competence to perform a particular task, ancient accountability converted amount of work expected into a number of work days, noting days spent on a particular task and away from it, and emphasizing authorized or unauthorized absences. Concerning the actions taken when actual achievements fell below expected targets, it is most likely that workers simply stayed on the job until it was completed, before being moved to other jobs.. It may be that the conversion of tasks into equivalent number work-days was used only for planning purposes, rather than for ensuring that work was completed on time.

Frequently, accountability entailed a two-way reporting process, whereby the report by each party provided formal proof of the extent of their own accountability to avoid confounding it with elements outside their control. This also ensured that the circle was squared; providing a complete cycle of human accountability through such two-way reporting. The sphere of the individual- state was therefore enshrined in a sense of duty to perform a task well and to meet the targets set, with accounting entries visualizing the extent to which the individual attended to the level of accountability expected by the state.

In such an ancient framework of accountability, responsibility for results was firmly located either in humans (subordinates reporting to superiors) or institutions (e.g., temples provisioning for their personnel) and, hence, illustrating cases of hierarchical accountability. Deficits (balances between theoretical expectations and actual results) were calculated and traced to the relevant accountable entity. The concept of an accountable entity, particularly in the case of individuals, merged an individual with his/her family, so if the individual ran away from his duties or even died, accountability shifted to immediate relatives. Sanctions for embezzlement or work avoidance were extremely punitive, involving both corporal punishment and payment in kind. This seemingly unique definition of accountable entity offers some contrast to contemporary Western forms of accountability, where the locus of responsibility is firmly located in the individual but never beyond. To be charged with the responsibility of a given task in this ancient world meant that the family was forced to act as insurance, a kind of collateral or guarantor, for the individual. This may have acted to sharpen the individual's sense of accountability, for the consequences of failure now extend beyond the individual to his immediate family.

Although these accounts underpinned an ancient temporal and spatial framework of accountability that seems to have functioned well, nevertheless, just like system of human accountability, they were prone to human manipulation, as in the case of tax defalcation reported in ancient Egypt (Gardiner, 1941; Ezzamel, 2002a, 2002b). Once systems of accountability are imposed upon recalcitrant subjects, possibilities for gaming the system abound.

At the sphere of the state-individual, the state was entrusted with the responsibility of honoring its commitments to its subjects. In a redistributive economy such as that of ancient Egypt, and even in the less centrally driven economy of Mesopotamia, this responsibility entailed providing at least adequate provisions to ensure the survival of the population (Maisels, 1993). In economically prosperous times, more was expected beyond sheer survival, as evidenced by accounting entries detailing the distribution of foodstuffs and drinks in state festivals in ancient Egypt (Kemp, 1989). Accounting entries served to demonstrate to all concerned how the state met its responsibility towards its subjects, again visualizing how the needs of each individual were accounted for (Ezzamel, 2002a).

Our examination of the sphere of the individual-individual involved issues such as exchange transactions in the private domain. In this case of horizontal accountability, context-embeddedness helped in the interpretation of the entries and clarified the debits and credits (Finkelstein, 1968). Thus, at the level of the accountability of one individual to another, the loci of responsibility were the two transacting parties, in the presence of the scribe who made the accounting entries (Janssen, 1975; Rivero Menéndez, 2000). While such entries could not be taken to be equivalent to a legal text, the intervention

of the scribe and the technology of accounting mediated this form of accountability. This mediation was underpinned by technical, expert accounting knowledge, coming as it did between the transacting parties to quantify, and in many cases value, the items exchanged, thereby ensuring an element of reciprocity that at once emphasized the accountability of each party to the other. While this accountability was in the main vested in the process through which the transactions were inscribed (via the intervention of accounting technology and the scribe as its artisan), in other cases it was buttressed by social norms; for example inciting other individuals to be watchful of the party entrusted to perform certain tasks (Spalinger, 1985b).

Efforts to develop the notion of ancient accountability to self may be frustrated by the familiar problems of the incompleteness and fragmentation of ancient records. Nevertheless, we contend that the following quote from Vickers (1965, p. 165) is relevant:

Even a few decades ago, the rich man, carrying on his business with his own wealth, was common enough; and the fact that he was "independent" and "accountable to no man" was not only a source of pride to himself but was acceptable and even admirable to his society.

Yet, what the above quote does not state explicitly is that even in such a scenario of a business man who felt he was not accountable to any one, this does not obviate the possibility that he felt accountable to himself. It is also our view that similar inferences on accountability to the self can be attributed to many of the ancient accounts we have reviewed, even though because of the lack of sufficient information about context we can never be sure of the intended purposes for which the accounts were kept. For example, the Hekanakhte accounts from ancient Egypt could be interpreted to imply that Hekanakhte used them to demonstrate to himself his sense of accountability towards his family and dependants, and for his son and agent Merisu to inform himself of how he discharged his responsibilities as an agent to his father. Similarly, the farming and land accounts along with those stipulating provisions for workers, while may have been in the main intended for monitoring purposes, could have underpinned workers accountability to the self. Thus, accounts recording actual achievements compared to targets of seed or crop would show to each worker how she/he performed, and accounts of rations would have reflected a measure of the worth of an individual to himself, even though the calculus of rations would have been determined not by the individual but by the scribes. These inferences hold despite the difference in context between Mesopotamia and ancient Egypt. Thus, a land account in ancient Egypt is in the main an account on behalf of the state or temples that owned most of the land, while a similar account in Mesopotamia would likely relate to private ownership, yet the inferences on accountability to the self remain the same.

Such ancient practices further embedded accountability by relating it to a number of characteristics: time, space, quantity, quality, and type. Thus, each entry was dated precisely, and the location in which a transaction or activity took place was clearly noted (e.g., account and accountability of baking, see also Ezzamel, 1994). In this sense, accounting entries functioned as ancient temporal and spatial ordering devices. Accountability could therefore be traced to specific temporal and spatial details. Quantities were noted and also classified by type of item via the counting of identities of a particular category (e.g., cattle husbandry; Schmandt-Besserat, 1992, p. 8). When deemed relevant, quantities were converted via a money of account into a value, or

adjusted to reflect qualities (e.g., numbers of loaves of a particular type of bread converted into *deben* in ancient Egypt).

The extent to which ancient accountability was traced down to the level of the individual has been seriously questioned by some researchers. For example, Macve (2002) argues that the main difference between “ancient” and “modern” accounting lies in the kind of individual that is “held to account”. Thus, being “stewardship” accounting, Mesopotamian entries for labour performance focused on the foreman responsible for a given group of operators (as was the case also in ancient Egypt) rather than directly upon the performance of the workers themselves. According to Macve, it was not until the 19th century AD that the writing of normalized, statistical, large-scale industrial populations accompanied a new form of accounting. In contrast to ancient times, such a new form of accounting enabled the identification of “ordinary” individuals through their degree of divergence from standardized norms. In this manner, modern forms of calculation enabled the creation of calculable individuals in calculable spaces (e.g., Miller and O’Leary, 1987; Hoskin and Macve, 1994; Carmona *et al.*, 1997, 2002). Yet, because of the embryonic state of research on ancient accounting, and the lacunae in much of the surviving evidence, this matter cannot be decisively put to rest. Concerning the lacunae, we simply do not know if additional forms of inscription, other than those used in the accounts, were utilized to produce more controlled populations in work on large state projects, such as those of the pyramids or large temples. Nor do we know whether or not there were lower ranks of employment below those reported upon in the accounts that survived; for example the individual bakers in the case of Egypt and Kushim in the case of Mesopotamia. Similarly, the evidence on keeping daily lists of attendance and wages/rations for individual operators leaves open the possibility, no matter how remote, that ancient accountability systems may have reached individual workers.

All the forms of accountability discussed above were underpinned by social and religious norms and beliefs. Not only were state sanctions the source of compliance, ethical and religious arguments had a powerful role in shaping accountability. In the case of ancient Egypt, observing *Maat* was a quality aspired to by all Egyptians, kings included. To observe *Maat* meant to preserve justice and order on earth and in the cosmos. Accounting practices visualized how *Maat* was observed, by demonstrating that reciprocity underpinned the way individual attended to their responsibilities towards the state and the state towards them. Similarly, Mesopotamians were influenced by the fear of chaos as represented in the Gilgamesh epic (Roux, 1985) where Marduk overpowers ancient chaos to establish the order that enabled human life on earth (Pritchard, 1969, pp. 61-2). As order was intrinsically weak, it required the oversight of Shamash, god of the sun, as the benefactor of justice and the enactor of law (Pritchard, 1969, pp. 163-165). Further, the fourth law of the Code of Hammurabi addresses fraud in business: “If he came with false testimony concerning grain or money, he shall bear the penalty of that case” (Pritchard, 1969, p. 164), and this was paralleled by the Nauri decree during the reign of Seti I in ancient Egypt (Gardiner, 1952). In these ancient civilizations we are therefore confronted with accounting practices that played both on the economic impulse of individuals engaged in exchange, by emphasizing “measure-for-measure” equivalence, and on prevalent ceremonial tendencies. Accounting for ancient accountability was therefore invested in

all aspects of the economic and the ceremonial. Yet, the evidence on the latter is far too brief (see below).

Furthermore, accountability was not necessarily always linked to accounting or ancient forms of record keeping. But the intervention of accounting even in its earlier forms helped clarify accountability; for example, the use of cylinder seals from the Late Uruk period helped to identify individuals and this, in turn, served to: “name those who took part in or were responsible for an operation”; and “here, for the first time, there was a protection against manipulation” (Nissen, 1988, p. 87). Consequently, the use of cylinder seals helped to render individuals accountable for their specific activities by tracking their performance through record-keeping. In a largely-based agricultural economy, scribes were also charged with the responsibility of overseeing “the maintenance of irrigation canals, registering the rations of the labor force and the storage of the harvest, and controlling the supply of and guarding the agricultural tools” (Nissen *et al.*, 1993, p. 107).

Hence, rather than being confronted with an ancient inadequacy and rudimentary accountability, we encounter developed accounting and accountability forms embedded in socio-political, religious and economic contexts. These forms of accounting and accountability played key roles in facilitating economic and social order in these ancient civilizations. In this sense, accounting from its genesis has been a powerful mediating institution among individuals, organizations and society.

Some implications for future research

What of the way forward? Our analysis of the literature on ancient accounting reveals many interesting insights on the role of accounting in underpinning processes of ancient accountability. At the same time, for all its valuable insights, this literature has only scratched the surface of an enormous area of study. Future research can progress on a number of fronts.

First, contemporary scholars researching ancient accounting could confront more directly some of the challenges posed by the major lacunae characterizing much of the data, the problems caused by translation from dead languages, and the lack of sufficient detail on the contexts within which accounting and accountability practices functioned (Vollmers, 2003). The problem of translation seems to be intractable: given the remoteness of the ancient world, how can we sensibly analyze ancient accountability using linguistic terms that may bear little resemblance to how the ancients understood their world. If equipped with our modern language systems, to what extent would the ancients have recognized what we have termed ancient accounting and ancient accountability practices? What would have they made of the roles that we as modern researchers have attributed to their accounting and accountability practices, let alone the roles we have ascribed to their institutions, exchanges and activities? Lying at the heart of this concern is the constitutive power of language and its effect on forging a picture of the remote past; contemporary researchers are almost certainly creating a picture of the ancient world, rather than describing it. Some of these issues have long been debated in the literature on ancient history as well as in accounting history. (see the different positions of Miller and Napier, 1993; and Fleischman *et al.*, 1996; Parker, 2004). As noted at the outset of this paper, we support the position of investigating ancient archives carefully, no matter how fragmented they are or how anecdotal the evidence may be judged to be, for

otherwise the alternative would be to refrain from studying the role of accounting in ancient organizations and society. In doing this, accounting historians could benefit from the insights, wisdom and methods used by ancient historians. Most accounting historians, present authors included, have not had a genuine training in history, let alone in ancient history, and hence they are at a considerable disadvantage in prosecuting research in this area. Perhaps one way to sensibly confront these daunting shortcomings is for accounting historians to seek help from ancient history scholars, either in the form of securing the latter's commentary on the former's work or by working together on joint projects. This possibility could be tantalisingly exciting, although we do not wish to marginalise potential conflict in joint research of this kind, given the vastly different backgrounds and training of these two research communities.

Second, there is an ongoing considerable debate in ancient history on matters relating to the nature of the state, economy, trade and markets in the ancient world. The literature examined above has not engaged with this debate to any significant degree, and in turn, in this paper we have provided an extremely brief sketch of some of the key themes of this debate. Future research on ancient accounting and accountability needs to take full account of this debate, and consider its implications for processes of accountability and the role of accounting therein. Given the importance of locating ancient processes of accountability within their socio-political and economic contexts, it is imperative that future accounting researchers engage fully with ancient history literature. Accounting researchers could contribute to a better understanding of accounting for accountability under different conceptions of the state, economy, trade, and markets. Indeed, even the terms "accounting" and "accountability" as applied to the ancient world, and what practices could be said to be entailed by them need to be debated fully. Such an undertaking would provide a better understanding of contexts within which accounting and accountability are assumed to have functioned, demonstrating the extent to which the understandings gained could contribute towards a better theorizing of accounting and accountability.

Third, a more direct approach to examining the implications of ancient accountability practices for the theorizing of accounting needs be pursued. A number of distinct, yet strongly related, research questions can be raised in this connection. One question relates to the temporal dimension of accountability, given the limited evidence we have that points to time measurement for an individual in terms of day-work. How widespread were these measures in ancient times? How were differences between actual and expected measures dealt with? Was there ever a more fine tuning of time measures, than that reported in the extant literature, to reflect more precise measures? Another important area that generates similar challenges for future research concerns the debate on the extent to which ancient accountability was traced down to the individual worker. The evidence examined in this study points to some possibility of a tracking down of accountability to specific individuals. What remains unclear is whether this was a common feature of ancient accountability systems, or that the sparse evidence cited was an exception. In both Mesopotamia and ancient Egypt, literacy was restricted to a very small percentage of the population. It is possible that those individuals cited in our review were educated, and relatively high ranking, an exceptional sub-class in the workforce. If the tracking down of accountability to the level of the individual was the order of the day, then we need to

address the important question of how targets were communicated and actual achievements measured and inscribed for the illiterate. Was it a case of blind, almost forced, trust by the worker in accepting, or submitting to, the instructions communicated verbally by the scribes and foremen? How did this process of accountability unfold and function over time? Or was accountability in the main held at higher levels, those with some ability to read? And how did the spread of literacy much later impact on this level of accountability? Also, the possibility of different modes of accountability emerging under different kinds of money requires further research. More evidence is needed on how accountability might have been expressed differently under different money regimes. Further, the focus thus far has been on notions of accountability that were underpinned by mainly by economic reciprocity. It would be instructive to explore the extent to which ancient accountability practices were invested in notions of reciprocity that emphasize the spiritual, religious, and ceremonial, rather than the measure-for measure reciprocity we have come to expect, and the implications that this may have on the way we may theorize accounting and accountability. Similarly, what lessons, if any, can we learn from analyzing accountability practices that are not invested in an explicit notion of money, of whatever form, and how do these impact on theorizing of accounting? These, and numerous other questions, await the efforts and endeavours of future researchers.

Fourth, much of the research analyzed above, particularly in the case of ancient Egypt, has been dealing with the public domain of society. Greater attention should be given to providing a more systematic examination of the impact of accountability on, and the role of accounting in, ordering the lives of individuals and communities. We know precious little about how accountability impacted on the lives of workers, peasants not only at work but also in their private activities and within the household. More research in these areas would further our understanding of the roles of accounting and accountability in organizations and society.

Fifth, of necessity, much of the extant literature has tended to focus on providing a detailed analysis of accountability for particular activities within specific historical episodes. This has allowed researchers to focus on individual issues in some detail. Missing in this analysis, however, is an appreciation of the trajectories of accounting and accountability across different historical episodes; a project that is perhaps more suited to research monographs and books than to journal articles. Such a macroscopic analysis, while perhaps could be short on the fine details found in journal articles, would offer a unique opportunity to chart changes in accountability across time and space.

One further point of some importance is return-time calculus that may discourage new entrants into this research field. More than any era of study in accounting history, ancient history requires a substantial investment in time by researchers for what may reasonably be considered to be a meagre return in the form of number of publications, and reception of such published work in the academic community. This is a difficult issue to resolve, but we believe it can be addressed at two levels. First, even today, there is still the perception that ancient accounting (if it is considered accounting at all) is far too remote to be worth taking seriously. Hence, there is a greater need for academic outlets to promote research in this area by seeking out contributions through special journal issues as well as and opening up regular journal issues to this type of work. Second, despite the frustrations of working with highly incomplete records,

translation difficulties, and remoteness of ancient contexts, the intellectual rewards to the researchers concerned can be substantial. We would therefore hope that many more researchers would devote more of their scholarly time to take up the project of ancient accounting history

Concluding remarks

Our knowledge of ancient accounting owes a great debt to the contributions of accounting historians as well as to the pioneering work of Assyriologists and Egyptologists. In the present paper, we provide a critical analysis of the scattered literature in the hope that this would enhance our understanding of the roles of accounting and accountability in organizations and society. In doing this, we have focused upon context-embeddness of accounting and accountability at the expense of technical aspects of record keeping. Such a contextual approach to the examination of ancient accounting, we argue, should enrich our understanding of accounting and accountability practices as well as contribute to their theorization. Our analysis suggests that ancient accountability functioned in three spheres: the individual-state, the state-individual, and the individual-individual. In turn, such spheres operated via channels through which accounts were rendered: hierarchical, horizontal, and self. These levels of accountability were underpinned by religious and social norms and beliefs but accounting played a major role in their functioning.

Notes

1. Other streams of historical research have proposed alternative understandings of the emergence and evolution of ancient civilizations (e.g. in the case of ancient Egypt, see Hornung, 2001). To adjudicate between these literatures, while a worthwhile undertaking, is beyond the scope of this paper. Hence, we focus on in this on studies in mainstream historical literature.
2. Monies of account in Mesopotamia and ancient Egypt were either weight or capacity measures. In Mesopotamia, weight measures included: 1 sicla approx. 8.30 grammes; 1 mine = 60 sicles approx. 500 grammes; 1 talent = 60 mines approx. 30 kilos (Snell, 1997). Capacity measures included: 1 qa, approx. 0.84 litres; 1 pi = 36 qa, approx. 30 litres In ancient Egypt, weight measures included: 1 deben, approx. 91 grammes. Capacity measures included: 1 hin = 10 hoipe = 40 khar, approx. 18.17 litres. The capacity and weight measures were intertranslatable, in the sense that the ability to combine them using equivalences. Thus, the sniw, another capacity measure, was equivalent to 5 deben, 1 hin = 1 deben (Janssen, 1975).
3. Of necessity, this is a broad brush and very brief description (for a more detailed discussion see for example Kemp, 1989; Grimal, 1992; Trigger, 1993; Assmann, 2002).
4. The Vizier was considered the second in command to the Pharaoh, hence this post was similar to those presently held by a prime minister in a ruling monarchy.
5. Mattesich (1987) argues that the logical structure of record keeping systems by Sumerians was virtually identical with that of modern double entry.
6. Approximately 60 centimeters between rows.

References

- Assmann, J. (2002), *The Mind of Egypt: History and Meaning in the Time of the Pharaohs*, Metropolitan Books, New York, NY.

- Ball, T. (1995), *Reappraising Political Theory: Revisionist Studies in the History of Political Thought*, Oxford University Press, Oxford.
- Barry, N.P. (2000), *An Introduction to Modern Political Theory*, 4th ed., St. Martin's, New York, NY.
- 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, pp. 411-46.
- Carmona, S., Ezzamel, M. and Gutiérrez, F. (2002), "The relationship between accounting and spatial practices in the factory", *Accounting, Organizations and Society*, Vol. 27 No. 3, pp. 239-74.
- Chatfield, M. (1977), *A History of Accounting Thought*, Krieger Publishing Company, New York, NY.
- Costouros, G.J. (1978), "Development of an accounting system in ancient Athens as a response to socioeconomic changes", *Accounting Historians Journal*, Vol. 4 No. 1, pp. 37-54.
- Dalton, G. (1968), "Introduction", in Dalton, G. (Ed.), *Primitive, Archaic and Modern Economies – Essays of Karl Polanyi*, Doubleday Anchor, New York, NY, pp. 27-58.
- Davies, V. and Friedman, R. (1998), *Egypt Uncovered*, Stewart, Tabori & Chang, New York, NY.
- d'Encausse, H.C. and Schram, S.R. (1969), *Marxism and Asia*, The Penguin Press, London.
- de Ste. Croix, G.E.M. (1956), "Greek and Roman accounting", in Littleton, A.C. and Yamey, B. (Eds), *Studies in the History of Accounting*, Sweet and Maxwell, London, pp. 14-74.
- Eisenstadt, S.N. (1969), *The Political Systems of Empire: the Rise and Fall of the Historical Bureaucratic Societies*, Free Press, New York, NY.
- Ezzamel, M. (1994), "The emergence of the 'accountant' in the institutions of Ancient Egypt", *Management Accounting Research*, Vol. 5, pp. 221-46.
- Ezzamel, M. (1997), "Accounting, control and accountability: preliminary evidence from Ancient Egypt", *Critical Perspectives on Accounting*, Vol. 8, pp. 563-601.
- Ezzamel, M. (2002a), "Accounting working for the state: tax assessment and collection during the New Kingdom", *Ancient Egypt, Accounting and Business Research*, Vol. 32 No. 1, pp. 17-39.
- Ezzamel, M. (2002b), "Accounting and redistribution: the palace and mortuary cult in the Middle Kingdom, Ancient Egypt", *Accounting Historians Journal*, Vol. 29 No. 1, pp. 61-103.
- Ezzamel, M. (2002c), "Accounting for private estates and the household in the twentieth century BC Middle Kingdom, Ancient Egypt", *Abacus*, Vol. 38 No. 2, pp. 235-62.
- Ezzamel, M. (2004), "Work organization in the Middle Kingdom, Ancient Egypt", *Organization*, Vol. 11 No. 4, pp. 497-537.
- Ezzamel, M. (2005), "Accounting for the practices of funerary temples: the intertwining of the sacred and the profane", *Accounting and Business Research*, Vol. 35 No. 1, pp. 29-51.
- Ezzamel, M. and Hoskin, K. (2002), "Rethorizing Accounting, writing and money with evidence from Mesopotamia and Ancient Egypt", *Critical Perspectives on Accounting*, Vol. 13 No. 3, pp. 333-67.
- Ezzamel, M., Hoskin, K.W. and Macve, R.H. (1990), "Managing it all by numbers: a review of Johnson and Kaplan's Relevance Lost", *Accounting and Business Research*, Vol. 20 No. 78, pp. 153-66.
- Finkelstein, J.J. (1968), "An old Babylonian herding contract and Gen 31:38f", *Journal of the American Oriental Society*, Vol. 88, pp. 30-6.
- Finley, M.I. (1992), *The Ancient Economy*, Penguin Books, London.

- Fleischman, R.K., Kalbers, L.P. and Parker, L.D. (1996), "Expanding the dialogue: industrial revolution costing historiography", *Critical Perspectives on Accounting*, Vol. 7 No. 3, pp. 315-37.
- Fu, P. (1971), "Governmental accounting in China during the Chou Dynasty (1122-256 BC)", *Journal of Accounting Research*, Vol. 9 No. 1, pp. 40-51.
- Gardiner, A.H. (1941), "Ramesside texts relating to the taxation and transport of corn", *Journal of Egyptian Archaeology*, Vol. 27, December, pp. 19-73.
- Gardiner, A. (1952), "Some reflections on the Nauri Decree", *Journal of Egyptian Archaeology*, Vol. 38, pp. 24-33.
- Garfinkel, H. (1967), *Studies in Ethnomethodology*, Prentice-Hall, New Jersey, NJ.
- Gelb, I.J. (1965), "The old Mesopotamian ration system", *Journal of Near Eastern Studies*, Vol. 24, pp. 230-43.
- Goetze, A. (1956), "The laws of Eshnunna", *The Annual of the American Schools of Oriental Research*, Vol. 31, pp. 1951-2.
- Grimal, N. (1992), *A History of Ancient Egypt*, translated by I. Shaw, Blackwell, Oxford.
- Hain, H.P. (1966), "Accounting control in the Zenon Papyrus", *The Accounting Review*, Vol. 41 No. 4, pp. 699-703.
- Harris, R. (1961), "On the process of secularization under Hammurapi", *Journal of Cuneiform Studies*, Vol. 14, pp. 117-22.
- Hayes, W.C. (1955), *A Papyrus of the Late Middle Kingdom in the Brooklyn Museum*, Brooklyn Museum, Brooklyn, NY.
- Hornung, E. (2001), *The Secret Lore of Egypt*, Cornell University Press, Ithaca, NY.
- Hoskin, K. (1996), "The 'awful idea of accountability': inscribing people into the measurement of objects", in Munro, R. and Mouritsen, J. (Eds), *Accountability: Power, Ethos and the Technologies of Managing*, pp. 265-82.
- Hoskin, K.W. and Macve, R.H. (1994), "Writing, examining, disciplining: the genesis of accounting's modern power", in Hopwood, A.G. and Miller, P. (Eds), *Accounting as Social and Institutional Practice*, Cambridge University Press, Cambridge, pp. 67-97.
- James, T.G.H. (1968), "An early Middle Kingdom account", *Journal of Egyptian Archaeology*, Vol. 54, pp. 51-6.
- Janssen, J.J. (1975), *Commodity Prices from the Ramessid Period*, E.J. Brill, Leiden.
- Janssen, J.J. (1979), "The role of the temple in the Egyptian economy during the New Kingdom", in Lipinski, E. (Ed.), *State and Temple Economy in the Ancient Near East*, Vol. II, Department of Orientalstiek, Leiden, pp. 505-15.
- Janssen, R.M. and Janssen, J.J. (1990), *Growing Up in Ancient Egypt*, The Rubicon Press, London.
- Keister, O.R. (1963), "Commercial record-keeping in ancient Mesopotamia", *The Accounting Review*, Vol. 38, pp. 371-6.
- Kemp, B. (1989), *Ancient Egypt: Anatomy of a Civilization*, Routledge, London.
- Lau, R.J. (1906), *Old Babylonian Temple Records*, Columbia University Press, New York, NY.
- Leemans, W.F. (1960), *Foreign Trade in the Old Babylonian Period*, E.J. Brill, Leiden.
- Leichtheim, M. (1988), *Ancient Egyptian Autobiographies Chiefly of the Middle Kingdom*, Universitätsverlag Freiburg, Schweiz, Vandenhoeck & Ruprecht, Groningen.
- Leichtheim, M. (2002), *Religion and Magic in Ancient Egypt*, Penguin Books, New York, NY.

- Littleton, A.C. (1968), "The antecedents of double-entry bookkeeping", in Chatfield, M. (Ed.), *Contemporary Studies in the Evolution of Accounting Thought*, Dickenson Publishing Company Inc., Belmont, CA, pp. 48-56.
- Lutz, H.F. (1927), *Neo-Babylonian Administrative Documents from Erech (2 parts)*, University of California Press, Berkeley, CA.
- Macve, R. (2002), "Insights to be gained from the study of ancient accounting theory: some reflections on the new edition of Finley's 'The Ancient Economy'", *European Accounting Review*, Vol. 11 No. 2, pp. 453-71.
- Maekawa, K. (1990), "Cultivation methods in the Ur-III period", *Bulletin on Sumerian Agriculture*, Vol. 5, pp. 115-23.
- Maisels, C.K. (1993), *The Emergence of Civilization*, Routledge, London.
- Mattessich, R. (1987), "Prehistoric accounting and the problem of representation: on recent archaeological evidence of the Middle-East from 8000 BC to 3000 BC", *Accounting Historians Journal*, Vol. 14 No. 2, pp. 72-91.
- Mattessich, R. (1989), "Accounting and the input-output principle in the ancient and prehistoric world", *Abacus*, Vol. 25 No. 2, pp. 74-84.
- Mattessich, R. (1991), "Counting, accounting, and the input-output principle: recent archaeological evidence revising our view on the evolution of early record keeping", in Graves, O.F. (Ed.), *The Costing Heritage – Studies in Honor of S. Paul Garner*, Monograph No. 6, Academy of Accounting Historians, Harrisonburg, VA, pp. 25-49.
- Mattessich, R. (1994), "Archaeology of accounting and Schmandt-Besserat's contribution", *Accounting, Business and Financial History*, Vol. 4 No. 1, pp. 5-28.
- Mattessich, R. (1998a), "Recent insights into Mesopotamian accounting of the 3rd millennium BC – successor to token accounting", *Accounting Historians Journal*, Vol. 25 No. 1, pp. 1-27.
- Mattessich, R. (1998b), "Follow-up to: 'Recent Insights into Mesopotamian Accounting of the 3rd Millennium BC': correction to Table 1", *Accounting Historians Journal*, Vol. 25 No. 2, pp. 147-9.
- Mattessich, R. (2000), *The Beginnings of Accounting and Accounting Thought – Accounting Practice in the Middle East (8000 BC to 2000 BC) and Accounting Thought in India (300 BC and the Middle Ages)*, Garland, New York, NY.
- Miller, P. and Napier, C. (1993), "Genealogies of calculation", *Accounting, Organizations and Society*, Vol. 18 Nos 7-8, pp. 631-47.
- Miller, P. and O'Leary, T. (1987), "Accounting and the construction of the governable person", *Accounting, Organizations and Society*, Vol. 12 No. 3, pp. 235-65.
- Mouck, T. (2004), "Ancient Mesopotamian accounting and human cognitive evolution", *Accounting Historians Journal*, Vol. 31 No. 2, pp. 97-124.
- Munro, R. and Mouritsen, J. (1996), *Accountability: Power, Ethos and the Technologies of Managing*, International Thompson Business Press, London.
- Myhrman, D.W. (1910), *Sumerian Administrative Documents Dated in the Reigns of the Kings of the Second Dynasty of Ur from the Temple Archives of Nippur Preserved in Philadelphia*, H.V. Hilprecht, Philadelphia, PA.
- Nesbit, W.M. (1914), *Sumerian Records from Drehem*, Columbia University Press, New York, NY.
- Nissen, H.J. (1988), *The Early History of the Ancient Near East: 9000-2000 BC*, University of Chicago Press, Chicago, IL.

- Nissen, H.J., Damerow, P. and Englund, R.K. (1993), *Archaic Bookkeeping*, translated by P. Larsen, The University of Chicago Press, Chicago, IL.
- Oldroyd, D. (1995), "The role of accounting in public expenditure and monetary policy in the first century AD Roman Empire", *The Accounting Historians Journal*, Vol. 22 No. 2, pp. 117-29.
- Oppenheim, A.L. (1954), "The seafaring merchants of Ur", *Journal of the American Oriental Society*, Vol. 74, pp. 6-17.
- Oppenheim, A.L. (1964), *Ancient Mesopotamia: Portrait of a Dead Civilization*, The University of Chicago Press, Chicago, IL.
- Parker, L.D. (2004), "Presenting the Past: perspectives on time for accounting history", *Accounting, Business and Financial History*, Vol. 14 No. 1, pp. 1-27.
- Parkinson, R.B. (1991), *Voices from Ancient Egypt*, The British Museum Press, London.
- Polanyi, K. (1957), "Trade and market", in Polanyi, K., Arsenberg, C.M. and Pearson, H.W. (Eds), *Trade and Market in the Early Empires – Economies in History and Theory*, The Free Press, New York, NY.
- Polanyi, K. (1977), *The Livelihood of Man*, Academic Press, New York, NY.
- Postgate, J.N. (1992), *Early Mesopotamia*, Routledge, London.
- Powell, M.A. (1981), "Three problems in the history of cuneiform writing: origins, direction of script, literacy", *Visible Language*, Vol. 15 No. 4, pp. 419-30.
- Powell, M.A. (1984), "Late Babylonian surface mensuration", *Archiv für Orientforschung*, Vol. 31, pp. 32-66.
- Previts, G.J. and Bricker, R. (1994), "Fact and theory in accounting history: presentmindedness and capital market research", *Contemporary Accounting Research*, Vol. 10, pp. 625-41.
- Pritchard, J.B. (1969), *The Ancient Near Eastern Texts*, Princeton University Press, Princeton, NJ.
- Quirke, S. (1990), *The Administration of Egypt in the Late Middle Kingdom: The Hieratic Documents*, SIA Publishing, New Malden.
- Rathbone, D. (1994), "Accounting on a large estate in Roman Egypt", in Parker, R.H. and Yamey, B. (Eds), *Accounting History: Some British Contributions*, Oxford University Press, Oxford, pp. 13-56.
- Renger, J. (1984), "Patterns of non-institutional trade and non-commercial exchange in ancient Mesopotamia at the beginning of the second millennium BC", in Archi, A. (Ed.), *Circulation of Goods in Non-Palatial Context in the Ancient Near East*, Edizioni Dell'Ateneo, Roma, pp. 31-123.
- Rivero Menéndez, M.R. (2000), *La Formación de los Registros Contables en Mesopotamia*, Dimasoft, Madrid.
- Roberts, J. (1996), "From discipline to dialogue: individualizing and socializing forms of accountability", in Munro, R. and Mouritsen, J. (Eds), *Accountability: Power, Ethos and the Technologies of Managing*, International Thompson Business Press, London, pp. 40-61.
- Roux, G. (1985), *La Mésopotamie*, Éditions du Seuil, Paris.
- Schenkel, W. (1978), *Die Bewässerungsrevolution im Alten Ägypten*, S DAIK, Mainz.
- Schmandt-Besserat, D. (1977), "An archaic recording system and the origin of writing", *Syro-Mesopotamian Studies*, Vol. 1 No. 2, pp. 1-32.
- Schmandt-Besserat, D. (1978), "The earliest precursor of writing", *Scientific American*, Vol. 238 No. 6, pp. 50-8.
- Schmandt-Besserat, D. (1979), "Reckoning before writing", *Archaeology*, Vol. 32 No. 3, pp. 23-31.

- Schmandt-Besserat, D. (1980), "The envelopes that bear the first writing", *Technology and Culture*, Vol. 21 No. 3, pp. 357-85.
- Schmandt-Besserat, D. (1981a), "Tablets and tokens: a re-examination of the so-called 'Numerical Tablets'", *Visible Language*, Vol. 15, pp. 321-44.
- Schmandt-Besserat, D. (1981b), "Decipherment of the earliest tablets", *Science*, Vol. 211, pp. 283-85.
- Schmandt-Besserat, D. (1982), "The emergence of recording", *The American Anthropologist*, Vol. 84, pp. 871-8.
- Schmandt-Besserat, D. (1983), "Tokens and counting", *Biblical Archaeologist*, Spring, pp. 117-20.
- Schmandt-Besserat, D. (1984a), "The emergence of recording", *American Anthropologist*, Vol. 84, pp. 871-8.
- Schmandt-Besserat, D. (1984b), "Before numerals", *Visible Language*, Vol. 15 No. 1, pp. 48-59.
- Schmandt-Besserat, D. (1986a), "The origins of writing – an archaeologist's perspective", *Written Communication*, Vol. 3 No. 1, pp. 31-45.
- Schmandt-Besserat, D. (1986b), "The precursor to numerals and writing", *Archaeology*, November-December, pp. 32-8.
- Schmandt-Besserat, D. (1992), *Before Writing, Volume I: From Counting to Cuneiform*, University of Texas Press, Austin, TX.
- Schmandt-Besserat, D. (1997), *The History of Counting*, Morrow – Junior Books, New York, NY.
- Scorgie, M. (1990), "Indian imitation of invention of cash-book and algebraic double-entry", *Abacus*, Vol. 26 No. 1, pp. 63-70.
- Simpson, W.K. (1963), *Papyrus Reisner I: The Records of a Building Project in the Reign of Sesostris I*, Museum of Fine Arts, Boston, MA.
- Simpson, W.K. (1965), *Papyrus Reisner II: Accounts of the Dockyard Workshops at This in the Region of Sesostris I*, Museum of Fine Arts, Boston, MA.
- Simpson, W.K. (1969), *Papyrus Reisner III: The Records of a Building Project in the early Twelfth Dynasty*, Museum of Fine Arts, Boston, MA.
- Snell, D.C. (1997), *Life in the Ancient Near East*, Yale University Press, New Haven, CT.
- Spalinger, A. (1985a), "Notes on the Day Summary Accounts of P. Bulaq 18 and the Interdepartmental Transfers", *Studien Zur Altgyptischen Kultur*, Vol. 12, pp. 179-241.
- Spalinger, A. (1985b), "A redistributive pattern at Assiut", *Journal of the American Oriental Society*, Vol. 105 No. 1, pp. 7-20.
- Spalinger, A. (1986), "Baking during the reign of Seti I", *Bulletin De Institut Francais D'Archeologie Orientale*, Vol. 86, pp. 307-52.
- Stevelinck, E. (1973), *La Comptabilité à Travers les Âges*, Bibliothèque Royal Albert 1er, Bruxelles.
- Stevelinck, E. (1985), "Accounting in ancient times", *The Accounting Historians Journal*, Vol. 12 No. 1, pp. 1-16.
- Stewart, R. (1992), "Pluralizing our past: Foucault in accounting history", *Accounting, Auditing and Accountability Journal*, Vol. 5 No. 2, pp. 57-73.
- Stol, M. (1985), *Fragment of a Herding Contract, Miscellanea Babylonica*, Editions Recherche sur les Civilisations, Paris.
- Stone, W.E. (1969), "Antecedents of the accounting profession", *The Accounting Review*, Vol. 44 No. 2, pp. 284-91.
- Trigger, B.G. (1993), *Early Civilizations*, The American University Press, Cairo.

-
- Vickers, G. (1965), *The Art of Judgment*, Sage Publications, Thousand Oaks, CA.
- Vollmers, G. (1996), "The Persepolis Fortification Texts: accounting and control in ancient Persia from 509 to 494 BC", *Accounting Enquiries*, Vol. 6 No. 1, pp. 1-43.
- Vollmers, G. (2003), "Accounting historiography using ancient sources: problems and rewards", in Fleischman, R.K., Radcliffe, V.S. and Shoemaker, P.A. (Eds), *Doing Accounting History*, Elsevier, Oxford, pp. 49-62.
- Warburton, D.A. (1997), *State and Economy in Ancient Egypt*, Vandenhoeck & Ruprecht, Göttingen, University Press Fribourg, Fribourg.
- Willmott, H. (1996), "Thinking accountability: accounting for the disciplined production of self", in Munro, R. and Mouritsen, J. (Eds), *Accountability: Power, Ethos and the Technologies of Managing*, International Thompson Business Press, London, pp. 23-39.
- Wittfogel, K. (1963), *Oriental Despotism: A Comparative Study of Total Power*, Yale University Press, New Haven, CT.

Further reading

- de Ste. Croix, G.E.M. (1981), *The Class Struggle in the Ancient Greek World*, Duckworth, London.
- Kitchen, K.A. (1993), *Ramesside Inscriptions*, I, Blackwell, Oxford.

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