

THE FARM AS AN ACCOUNTING LABORATORY
An Essay on the History of Accounting and Agriculture

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The shop, the factory, the office: these appear, to the popular imaginary, as natural sites for accounting, and for accountants. They are the places where accounting is usually said to be invented and practised, the places where accounting sustains business. The shop stands for commerce, which reportedly saw the emergence of double-entry bookkeeping in the so-called ‘commercial revolution’ of the early-modern times. The factory stands out as the chief target of management accounting from the nineteenth century and its ‘industrial revolution’. The office is where accounting clerks work, but also itself an object of productive accountability in the ‘service economy’ of the twentieth century.

The farm, on the contrary, seems like a distant, almost exotic site for accounting. Who would ever picture the accountant in the fields? This impression is the consequence of a long-standing and more general historiographical bias in the study of agriculture. It is not just agricultural lands that were enclosed in the late-modern period; scholarship on agriculture was also a victim of enclosure. Even

though agriculture continued to employ more than a third of the global population until very recently, whatever happened in the rural areas was generally understood as a side effect of changes, or even of ‘revolutions’, initiated elsewhere, in the cities, in other sectors of the economy. When it was not their decline – for instance their demographic decline – that was emphasised, farms and fields were seen as objects of ‘modernisation’, under the exclusive influence of methods born outside of agriculture. They were not considered as spaces that were part and parcel of these changes, as quasi-laboratories where practices and technologies, even when imported from outside, were (re)invented and tried for the specific purpose of the productive exploitation of plants and animals and within the specific historical contexts of agricultural production.

This view has however receded in recent years. For the past two decades, historical research, along with neighbouring disciplines like sociology, and incited like them by the multiplication of health scandals and environmental issues such as the mad cow and swine flu diseases or the worldwide proliferation of Genetically Modified Organisms, has been paying closer attention to the importance and specificities of agricultural settings. This new focus makes it timely for accounting history to also fully open the gates of the farm, to firmly set foot in the fields. This new focus also provides historians of accounting with a sound basis on which to ground this new research. We can identify various streams of historical research that have explored agriculture anew and, in doing so, raised new questions for accounting history. These streams include: the history of inscriptions; the history of capitalism; the history of science; the history of government; and the history of business.

This paper proposes a selective stroll through these fields of research, in search for promising lines of enquiry in accounting history. In doing so, it visits, more

or less chronologically, a variety of historical settings, from antiquity to the present, where accounting and agriculture were tied together. It aims to thereby exhibit, in an inviting manner, the rich and stimulating world that remains to be studied, at the interface of accounting and agriculture. The paper indeed reveals the inexistence of ‘agricultural accounting’ as a stable historical object whose development and circulation could be traced, simply and linearly, from century to century, from country to country. It puts forward instead the multifarious ways in which, in each of the visited settings, agricultural production and accounting techniques were constituted and tied together. The resulting picture of the history of accounting and agriculture is a fragmented one, it is a series of snapshots, which demonstrates forcefully the degree to which the forms and uses of accounting techniques are dependant on the highly specific economic, social, political, legal and moral contexts in which they are observed.

Epigraphy

The birth of agriculture in the Neolithic period seems concomitant with the emergence of what some consider as the first accounting systems. Archaeologists have regularly collected in the Near East, over the past century, numerous small stone or clay pebbles of similar, geometric shapes, which they have dated to the period between 8000 BC and 3000 BC. Some of the more recent of these artefacts were found encapsulated in egg-shaped clay envelopes (known as ‘*bullae*’) on the surface of which cuneiform inscriptions listed livestock, in numbers matching the number of pebbles within the envelope: ‘21 ewes that lambed, 6 female lambs, 8 full grown rams, 4 male lambs, 6 nanny-goats that kid, 1 billy goat, 2 female kids’ (Schmandt-Besserat 1992, 8-9). Following earlier hints (Amiet 1966; Lambert 1966), this

observation led their main analyst to hypothesise in the 1980s that the pebbles – these and earlier ones – were in fact counters, or calculi, or tokens, used as records of property and debt, for livestock and crops. In their enthusiasm, some scholars even argued that such counters, used as stamps, were actually at the origins of writing, their geometric shapes resembling that of some cuneiform types (Mattessich 1994, 1998, 2000; Schmandt-Besserat 1992).

Similar enthusiasm has surrounded, more recently, the renewed analysis of another intriguing type of artefact: the systems of tied cords known as *kipus*, used in the Inca state in the thirteenth to sixteenth centuries, and often found in depositories containing many of them, along sometimes with agricultural products, like beans (Urton and Brezine 2005). Made of cotton or camelid fibres, dyed or not, kipus are made of a primary cord, to which are attached a variable number of thinner strings (sometimes hundreds), to which a third category of strings are sometimes attached, the two last categories of strings having knots of different types tied in them (Urton 2009b, 810). The knots were shown, early on, to consist in a decimal system of registry used to record agricultural product quantities (Ascher and Ascher 2013), but all of their characteristics, like for instance their chirality, have not yet been fully explained (Hyland 2014). Evidence also exists of such ‘cord-keeping’ being used as instruments in support of the narration of past events, which has led one of their main analysts to interpret kipus, recently, as more than sheer recording and mnemonic devices, as a code, which, if cracked, would give us access to detailed narrative information (Urton 2009a).

In both cases, especially in that of Neolithic tokens but also to an extent in that of Incan kipus, the desire to interpret the mysterious ancient artefacts as instruments of accounting and, further, of writing, has proved highly controversial:

they may well have been given more sense by their contemporary analysts than they originally had (Déléage 2009; Macve 1993; Zimansky 1993). Accounting in agriculture may not be at the origins of writing systems, and it is even debatable that tokens and khipus can be considered as instruments of ‘accounting’ as we understand it today. It is clear, however, that such artefacts were used for counting and recording purposes in agricultural settings. More interestingly, they performed these functions within specific economic, social and religious systems of human relationships that are slowly and tentatively being unearthed. The understanding of Neolithic tokens can only be improved by taking into account the specificities of agricultural practices at the time of their use: the meaning of specific tokens can indeed be deciphered thanks to the parallel knowledge of the types and quantities of livestock being kept by their users (Zimansky 1993). The three categories of cords of the khipus have, on their side, been related to the three hierarchical levels of Incan society, from the top of the Inca city-state down to the labourer in the field (Urton 2007). Accounting and agricultural practices are intricately tied within broader institutional contexts.

Focusing on agriculture in the history of accounting thus opens up a wealth of instruments and practices sometimes extremely distant from the ones with which we are familiar today, and thus hard to interpret. Studying these exotic instruments and practices reveals the historical pervasiveness of recording practices, and even of systems of double-entry recording (Mattessich 1994; Urton 2009b), thereby deflating what was initially understood as the radical originality of early forms of double-entry bookkeeping in Europe, such as late medieval and early-modern charge-and-discharge accounts. It also reminds us to consider accounting instruments and techniques within their specific contexts. Recent works in the history of accounting in other, yet slightly more accessible, ancient settings, such as the Egypt of the New Kingdom (1552–1080

BC) or Greek and Roman antiquity, confirms this observation, by emphasising the integral embedding of accounting systems of representation within broader cultural and institutional orders: the relations between the gods, the Pharaoh, his or her subjects, and the dead in ancient Egypt (Ezzamel 2009); or Roman law and its conceptions of personal responsibility, like for instance that of the landowner and of his farmers (Minaud 2008). Finally, cases like those of Neolithic tokens and of khipus, invite us to pay further attention to the material forms of the accounting instruments under study. This includes, for instance, noticing the durable use of other artefacts such as tally-sticks, normalised containers, or weighing scales, for the measurement and recording of agricultural production.

Capitalism

Paying attention to the materiality of accounting also means analysing the exact role of writing and of paper in its different forms (rolls, notes, receipts, books, etc.) in the considered settings. When, where and how do accounting books penetrate agricultural settings, and with what consequences? The history of accounting books would benefit from taking inspiration from the recent ‘history of the book’ (Darnton 1982; Johns 1998) and, more generally, media studies (Kafka 2012; Kirschenbaum 2008), in their careful analysis of the involved paper artefacts – of their production, circulation, reception and conservation. One of the notable consequences of the diffusion of paper and of writing is the availability, today, of more abundant sources for historians of accounting from that period on – as early as the first century BC in China (Hoskin and Macve 2012; Hoskin, Ma and Macve 2013; Ji 2003); from the seven hundreds in the Islamic world (Napier 2009; Zaid 2000; Zaid 2004); and from the late-medieval period in Europe, on which (English-language) accounting history

has until now too abundantly focused, untouched as it has regrettably been by the rise of global history. These sources include accounting treatises as well as accounts from different types of agricultural estates.

Beyond the frequent assumption according to which accounting would have developed primarily in the world of commerce and then of industry, these sources reveal the presence and rise of sophisticated accounting techniques and practices in at least some parts of European agriculture from the year 1200. In late-medieval eastern England, for instance, goose rearing relied widely on detailed livestock inventory practices, where the age, weight, and selling price of the geese were recorded, allowing precise animal population management by the lords and their reeves (Slavin 2010). The country wool merchant Heritage kept comparable accounts for his stock of sheep in 1495-1520, along with records of deposits given to other sheep herders as advances for future purchases, on account books he purchased in London where he went to sell his production (Dyer 2012). Similarly, over the same period (1200-1540) and in the same country, ‘complex networks of accountability and information flows’ existed within monastic houses and estates; the production of accounts was sometimes centralized in the hands of a bursar or treasurer (Dobie 2008, 141). Correspondence played a crucial role in the maintaining and shaping of such information flows, as it appears for instance in the management of their manorial estates by the Lisle family between 1533 and 1540 (Miley and Read 2016).

These accounting systems were made possible by the availability of paper and of literate and numerate users, but they were also the consequence of broader institutional contexts. Detailed accounts were required for instance by the obedientary system, which had developed with the growth of monastic houses and whereby specific office holders ‘ran their own departments and were allocated their

own sources of revenue to do this, which might include the income from certain specified manors' (Dobie, 2008: 147). Evolutions of accounting practices within the Royal Exchequer, such as the use of charge-and-discharge accounts, also generated models that were then used in monastic houses (153). Finally, a changing Royal justice, which started requiring written documentation as legal evidence in court, incited the production of accounts, as a possible 'remedy against fraudulent or negligent stewards', who could consequently be imprisoned (154). Comparable detailed accounting for agricultural production and the trading of agricultural products spread further with the enclosure movement in the eighteenth century. Other forms of detailed agricultural accounting could also be found elsewhere in Europe, for instance in some regions of Spain, where seed banks known as "*pósitos*", regulated by the royal administration from the sixteenth century, issued loans to farmers and kept precise records of the ensuing credit relationships (Prado-Lorenzo, García-Salinero and González-Bravo 2017). Colonial plantations were another institutional setting that shaped the development of detailed forms of agricultural accounting, in particular for the valuation and oppression of slave populations treated as livestock (Barney 1994; Fleischman and Tyson 2004; Fleischman, Oldroyd and Tyson 2004, 2011; Oldroyd, Fleischman and Tyson 2008; Rodrigues et al. 2015; Rosenthal 2013a, 2013b, 2016; Tyson, Fleischman and Oldroyd 2004, 2005).

Observing these sophisticated practices has led some authors to conclude that the 'progenitors of modern management accounting and mensurations' could be found in pre-industrial England (Scorgie 1997) – or, similarly, in colonial plantations (Rosenthal 2013a). In spite of the durable paucity of 'full' double-entry bookkeeping (Macve 2002) in English agriculture (and even more elsewhere in Europe, cf. Garrabou, Planas and Sagner 2012; Mussari and Magliacani 2007; Planas and Sagner

2005) well into the nineteenth and even twentieth century, it does seem clear that the circulation of accounting techniques and practices did not consist of a one-way movement from commerce and industry to agriculture, which would have been 'modernised' last. This point should not lead us to conclude, however, as the mentioned authors do, that accounting in agriculture was 'modern' early on, and thus that the movement went the other way. The notion of modernisation is indeed altogether unhelpful here, as it carries in its wake the idea of an ever-increasing rationality and efficiency in the accounting techniques and practices under consideration. Such techniques and practices were developed conjointly in different sectors of activity, as a result of changing organisational, political, legal and moral contexts, and their economic effects are unclear. There is indeed no evidence of increased productivity in agriculture in England until the 1780s: until then, agricultural product prices grew in proportion with population; the 'agricultural revolution' took place primarily in the following century (Overton 1996, 69; see also: Turner, Becket and Afton 2001).

Not only was detailed accounting not correlated with increased productivity in eighteenth-century England, but it seems that, in some settings, the rise of a market economy for agricultural products, and increases in agricultural productivity, were associated with a decrease in the sophistication of accounting systems used. This is what can be observed soon after in the USA, where 'farmers displayed less interest in formal record keeping as time went on. Account books from the antebellum decades recorded fewer transactions than account books from the late eighteenth century', in spite of greater market exposure (Lamoreaux 2003, 16; see also Bruegel 2002, 97-98). A strong explanation for this phenomenon can be found in the growing availability of cash. In the earlier, mostly cashless economy (Gervais 2004), accounts were kept

primarily as records of debt between parties, and they became less relevant when immediate cash payment for transactions became more frequent. The study of agricultural accounting thus invites us to be extremely cautious in the assumptions that we make regarding the relations between accounting, efforts towards increased productivity, and what is usually assumed to be their consequence: increased rates of capital accumulation.

Science

How apparently unsophisticated accounts can be related to increased productivity is an issue that agricultural accounting proselytiser Arthur Young (Juchau 2002) could not fathom when considering the state of American agriculture. He asked his correspondent, then President George Washington: ‘Is it possible, that the inhabitants of a great Continent (...) can carry on farming as a business, and yet never calculate profit by per centage on capital?’ (Washington 1803, 141) To which Washington replied, writing about the American farmer: ‘Instead of calculating, he labours and enjoys’ (148). It indeed appears that, in many cases, farmers can be economically minded and even keen calculators without detailed account books, or at least without financial account books. Agricultural production involves other forms of optimisation, which the studies of the agricultural revolution have clearly emphasised, pointing to the crucial role played in it by improvements in crop rotation, field fertilising, livestock selection, and animal husbandry, more than in accounting techniques and practices (Overton 1996; Turner, Becket and Afton 2001). Yet these practices do in fact involve some forms of accounting.

An interesting example can be found in the period between 1760 and 1860 in the United States, when the quality of farm accounting was a source of general

lamentation, but a specific genre of agricultural disclosure developed: cattle portraiture, which consisted in the wide diffusion of printed depictions of well-bred cows (Pawley 2016a). Such portraits were promotional for the breeders whose cows were thus displayed to the public; they were educative for others: ‘images of animals were intended and expected to change real animal bodies, training their audience in the taste necessary for the art of selection, which was also the art of purchase’ (38). Perhaps more than financial accounting, alternative types of accounts, like these visual ones, proved important to agricultural communities (regarding accounts of farm product characteristics and quality, see also Pawley 2016b, on the standardization of fruit varieties around the same period). This reliance on other types of accounts is also visible in the diaries of small farmers of the same period, this time in France, such as that of Julien Gabriel Sugy (Herment 2012) who, in spite of his basic level of literacy and numeracy, showed great interest in various types of economic information (market prices, harvest dates, etc.), as well as in precise, and often numerical data on the biological aspects of farm management, gathered from conversations with other small farmers, and deriving indirectly, sometimes, from trade journals.

As these examples suggest, the concentration on non-financial dimensions does not preclude the use of some forms of accounting. Depecker and Vatin show this exceptionally well in the French setting (Depecker and Vatin 2016): the discipline of agronomy, which developed over the same period, put forward accounting methods that did not differentiate between chemical/physical/biological measures and economic/financial ones, their main focus being the improvement of agricultural yield, an intricately economic and material phenomenon (see also Lampe and Sharp 2017 on the Danish and North German settings). Notions of balance in the chemistry of Lavoisier were for instance aligned with balancing issues in farm production

accounts. Besides, in agriculture, where prices could be volatile and where much of the production inputs, like animal feed, were produced internally on the farms, the use of monetary value as a general equivalent in the calculation of yield is not necessarily the most obvious option. It was long resisted against, and many other equivalents were proposed by early agronomists, such for instance as the ‘manure-equivalent’ (see also Simmons 2006). The importance as well as difficulties of such non-financial performance metrics have not entirely receded since then, as is revealed for instance by the study of the different animal and plant ‘selection regimes’ that have coexisted in the twentieth century, in relation with specific intellectual property rights on animal and plant breeds (Bugos and Kevles 1992; Kevles 2007; Kevles 2013), up to the current focus on ‘genetic indexes’ (Labatut et al. 2011). Also, the rise of normative and legal requirements for food quality has sustained, mainly from the twentieth century, a need for farmers to ‘account for food’: for its dietary properties, for instance, or its compliance with standards for organic food, such non-financial information being disclosed either to specific auditing and certification bodies, or to the end consumers themselves through food packaging (Frohlich 2012).

Agro-economic accounting was simultaneously at the heart of many debates in political economy, in the late-eighteenth and early-nineteenth centuries. Depending on its design and thus results, questions regarding tax setting, the freedom of trade, population growth, but also for instance the abolition of slavery (Oudin-Bastide and Steiner 2015) were answered differently. Physiocratic economists Like Quesnay, Mirabeau, Dupont de Nemours and, among their close allies, Lavoisier himself created experimental farms where they developed (more or less) controlled programmes of experimentation, so as to test the promises of Physiocratic theory: did the ‘net product’ increase if one increased the level of ‘annual advances’? David

Ricardo studied the effects of increased labour input in agriculture in his own experimental farm (Morgan 2005, 2012). National-level gathering of information also complemented these micro-economic experiments. The Physiocrats launched various such ventures, for instance sending out questionnaires to the local *Sociétés d'Agriculture*, so as to compute a synthetic measure of the agricultural 'wealth' of the French kingdom, and to compare yield measures between regions of *petite* and of *grande* culture (Charles and Théré 2012). Malthus, a bit later and on the other side of the Channel, referred to demographic measures on human and animal/plant population to support his theory of differential growth (Pullen 2016). Agricultural accounting, be it at farm or national level, and reformulated in the measurement categories of the agro-economists, was an instrument of scientific method at the service of political economy.

In the USA, the Morrill Act (1862) and the creation of the land grant universities, followed by the Hatch Act creating 'agricultural experiment stations' in 1887, established a stable and durable institutional base for further agricultural experiments and statistics, out of which 'agricultural economics' would grow in the following decades (Franklin 2014, 547). Soon, however, agricultural economists started competing with farm management experts – for example, from 1910, in the Farm Management Association. From a 1911 survey of farms conducted by the Cornell agricultural experiment station in New York, they developed 'efficiency factors' such as output per labour unit, which both differed from the in-kind measures of agro-economists and did not require the detailed records of full costing – such factors were thus more readily available. Agricultural economists progressively distinguished themselves from farm-management experts by distancing from precise production issues in individual farms, and dealing rather with policy issues at the state

and federal level (Banzhaf 2006). Simultaneously, they started concentrating more fully on broad economic and financial metrics than on agronomic or precise financial accounting ones. The Cornell model was used as a reference point in the 1936 creation of the British Farm Management Survey, the predecessor of the current Farm Business Survey, which similarly, and against the desire of some promoters of cost accounting (Juchau and Hill 1998), avoided going into detailed cost considerations, but still required farmers to produce some economic and financial numbers (Brassley et al. 2013).

The dominance of detailed cost accounting in agriculture appears as a late, difficult and incomplete development, which would be characteristic only of the long-twentieth century. It may perhaps even have been a temporary one. Related to growing environmental concerns in the new geological era that has been called the ‘anthropocene’, the recent and on-going rise of ‘environmental’ or ‘green’ accounting indeed suggests a move, or a return, to more integrated financial and non-financial metrics (Hopwood 2009; Repetto 1992). On farms, such Input-Output Accounting (IOA) systems for instance include farm gate nutrient balances, pesticide use per hectare and energy use per kilogram product (Halberg, Vershuur and Goodlass 2005). Outside of the farm’s gates, a more general concern for the maintenance of biodiversity arose in the late twentieth century, in reaction to the dramatic shrinkage in animal and plant population diversity, a consequence of more than a century of worldwide breed and seed selection efforts aimed at improving yield. This has led to the development of new forms of ‘natural inventory’ and preservation initiatives, such as the Svalbard Global Seed Vault (Fava 2013, 125-126), which echoes systematic early-modern inventories of natural resources, like mineralogical and botanical ones.

The history of accounting in agriculture would be incomplete without taking into account all kinds of in-kind accounting.

Government

Financial metrics, and especially detailed cost accounting, were pushed into farms in the twentieth century, and it was in great part a State-led movement. The initiatives of eighteenth and nineteenth century agro-economists were in parts already stimulated by governmental demand, such for instance as competitions for accounting manuals (Joly 2016). In the USA, the government however went further: the Smith Lever Act of 1914 created the cooperative extension service, with its state-level farm bureaus and country agents, tasked with providing farmers with various forms of personal training and support, as well as gathering statistics. The concomitant creation of the income tax, following the passing of the sixteenth amendment in 1913, made the accounting advice provided through this support particularly welcome to farmers: ‘Cost accounting became more popular because of the income tax. In many states, extension workers spent a good part of the fall and winter helping farmers figure out their accounts and complete income tax forms’ (Fitzgerald 2003, 47). From the early 1920s, agricultural economists had gained a position of power in the Department of Agriculture, which followed their advice in resisting the pressures of the ‘farm bloc’ lobby in favour of the reintroduction of forms of price control akin to those that had been put in place during the First World War (Franklin 2014). Rather, they advocated the education of farmers, in particular to accounting and overhead cost control, the supply of loans to support their activities, and some tariff protection against foreign production. These principles, tainted with New Deal welfare principles, would dominate in the following decade in the provision of ‘standard rural rehabilitation

loans' by the Resettlement Administration. This form of 'supervised credit' came along with 'supervised accounting': small farmers, victims of the depression, were thus compelled to fill in a 'farm and home plan' and a 'farm family record book' (Walker 2014).

In Britain, the agricultural extension service, created in 1946 to promote productive efficiency in a context of controlled food prices (Dancey 1993), struggled to assess the management of individual farms. It was especially hard, in practice, to compare their records, for example their tax filings, with the standard data in the Farm Management Survey. Agricultural 'gross margin planning and analysis' was developed, and implemented from the 1960s, to solve this issue: it would 'enable farmers to create budgets based on optimising marginal income through marginal changes to product (i.e. crop/livestock) mix' (Jack 2006, 231). As in the USA, but contrary for instance to Australia, where an excessively sophisticated computer-based initiative failed in the 1960s (Jack 2015), cost accounting techniques penetrated the farms under government initiative and supervision (see also Brunier 2016, on the French case at the same period). The system stayed in place for more than fifty years, enforced by extension workers but also, very early on, by the private consultants who replaced them, working sometimes for chemical and feed companies who had a direct interest in reaching out to farmers (Jack 2006, 234). Ironically, however, agricultural gross margin appeared, in 2006, as a remnant of past times, many farmers seeking more precise and targeted accounting methods to manage their costs. In a context of higher price volatility, following the reform of European Union subsidies in 2005, many British farmers, and their professors, advisers and consultants, were indeed turning towards other sectors in search for alternative accounting techniques.

The role of government as a promoter of accounting techniques in the farm is intertwined with its role as an auditor of the promoted accounts, which sometimes takes precedence over the other one. A striking example of this role can be seen in the case of ‘animal controls’ conducted by the French State administration as part of the animal traceability programme that it put in place in the wake of the Mad Cow Disease crisis of the 1990s (Joly and Weller 2009). The agent in charge of controlling the farm can notice a mismatch between the animals that she inventories on it and the National Identification Database, where all animals are (supposed to be) registered: a given cow may be absent of the database or, more dramatic yet, it may have gone missing from the farm, which triggers a complex series of checks, to explain the disappearance, be it from the lists or from the barn. Yet more striking is the case of controls in place in the European Union prior to its 2005 reform instituting the Single Farm Payment, a subsidy based exclusively on a per-hectare basis, and not on the crops grown. Before 2005, a specific type of account was created: a geographical account, indicating the surface of land devoted to given crops by each farmer. These statements were then controlled by ‘teledetection’, that is with the use of satellite Spot4, able to visually identify different types of crops. Thereby, an agent of the French Interprofessional Office of Cereals could in 2003 pay a visit to a small farmer who was suspected of subsidy fraud, for having ill-reported the surface of his wheat field, forgetting to declare a large part of his own land and counting a small part of his neighbour’s as his own (Weller 2006).

Such forms of extremely precise accounting control can be contrasted with those in place in authoritarian regimes. Kolkhoz accounting for instance seems to reveal a much looser grain of control (Humphrey 1998; Wegren 1998, 2005). Introduced in the 1950s in Soviet enterprises, including agricultural ones, and kept

until the early post-socialist period, ‘independent cost accounting’ (*khozraschetnyye*) required collective farms to produce an account of all their direct and indirect ‘production costs’ (*sebestoimosti*) and all their sources of revenue, as well as, for each item of output and for the enterprise as a whole, to calculate an amount and rate of ‘surplus’ (*rentabel’nost*). These accounts were used as a basis for the setting by the State of production targets and procurement prices, which seems to have led to various forms of game-playing on the part of farmers (Kitching 2001). However, the exact forms and uses of these agricultural accounting practices, as of those that were and are in place in many other authoritarian regimes, remain underexplored. They are too often presented as entirely irrational, or else as excessively focused on efficiency but morally unacceptable, when historical research should render their precise inscription within specific economic, social, political, legal and moral contexts. Accounting forms of control are not the only ones available in the hands of governments, and can be combined in multifarious ways with other types of surveillance.

Business

In *The Grapes of Wrath* (1939), Steinbeck famously described the stand-off between tenant farmers of the Dust Bowl and the spokesmen for the owners of their land as follows:

‘The owners of the land (...) were caught in something larger than themselves. Some of them hated the mathematics that drove them, and some were afraid, and some worshiped the mathematics because it provided a refuge from thought and feeling. The Bank – or the Company – needs – wants – insists – must have – as though the Bank or the Company were a

monster, with thought and feeling, which had ensnared them. (...) We're sorry. It's not us. It's the monster. The bank isn't like a man' (31)

To which the tenant men replied:

'But where does it stop? Who can we shoot? I don't aim to starve to death before I kill the man that's starving me. I don't know. Maybe there's nobody to shoot. Maybe the thing isn't men' (38).

The entities involved, outside of the farmers and their families, who are nothing more than their bare persons, are not individuals, nor humans; they are corporations, and cannot be shot. The relationships with these other entities go along with the use of specific types of accounting instruments, starting with records of debts. The types of debts tying Steinbeck's farmers or their landowners to the banks were the successors of the infamous 'guano notes', which bore the name of a prized bird dung fertilizer from the mid-nineteenth century and which tied small farmers in the post-Civil War USA to their landlords or other lenders, from whom they desperately needed loans, year after year, so as to acquire the fertilizers that would stimulate the yield of their exhausted lands (Johnson 2015).

Chemical and feed companies are, in fact, other types of organizations that farms are connected with, along with the rest of what has since the 1960s been called 'agri-business': food processors, packagers and distributors; farm machinery producers; etc. (Hamilton 2016). Few historical studies emphasise the influence of these types of organizations on accounting practices over the twentieth century, but they developed diverse mode of control of their supply-chains and of prices, for instance, in recent decades, through the practice of open-book accounting, which gives them access to the financial position of farmers (Free 2008). There are also

reasons to believe that the pressure they exercise, along with banks, on farm finances, incites farmers to rely on always more detailed forms of accounting. If the pressure from banks pushes cash-strapped farmers to monitor their cash position on a daily basis, the pressure from a multitude of agri-business firms – their customers and suppliers – seems to sometimes lead them to search for salvation in the instruments of so-called ‘Strategic Management Accounting’, which emerged in the 1980s, like benchmarking, value-chain analysis, the balanced scorecard and target-costing (Jack 2007). Some farmers even put forward the importance of a specific skill: that of writing a business plan, as if the new frontier of the relations between accounting and agriculture was to be found in start-up accounting (Jack 2009).

Yet it would be incorrect to consider that agriculture is entirely a world of small and more or less entrepreneurial farms and farmers confronting or surviving under other ‘monster’ entities such as banks and agri-business firms. If the history of the corporation intersects with that of agriculture, it is also, and crucially, in the sense that some farms developed in shapes akin to those of industrial corporations. This history could legitimately start with that of the plantation but, at least in the USA, its more direct origins can be found in the early- to mid-twentieth century, when the choice of agricultural concentration, high technology and specialisation was made in many states, by local governments and farmers, in reaction to a number of conjoint circumstances including: the development of trucking, which created a nationwide food market (Hamilton 2008); the growth of suburbs, which reinforced competition for land; and the lavish use of the 2,4-D herbicide, which increased yield per acre (Fitzgerald 2005). Various forms of this transformation can be identified, depending on the local circumstances. The Californian model stands out particularly clearly, its large, concentrated, high-value organic agriculture of the last decade being ‘the legacy

of the state's own style of agrarian capitalism' (Guthman 2014). Similar evolutions have been observed in other countries over the same period (on the case of France, for instance, see: Laferte 2014; Nguyen and Purseigle 2012; de Raymond and Goulet 2014), the recent case of Russian agriculture, which became in 2016 the first producer of wheat worldwide, following intensive land reform in the past two decades being particularly striking (Lezean 2012). In all of these cases, the use of the standard industrial management and financial accounting techniques of the time seems pervasive, making 'every farm a factory' – be this factory Taylorian, Fordian, Toyotist...

Further, it is entire regions that appear as having been thus managed. In many ways, these large transformations seem to turn what was previously described as a 'hinterland', passively feeding the neighbouring cities, into an 'operational landscape', which can be controlled and acted upon as a machine, or as a factory (Brenner and Schmid 2015). Beyond such a metaphorical approach, there is evidence that, in a case like that of the City of Chicago, the deep economic and environmental transformation of the countryside at the service of the city was cautiously managed by the Easterners who provided the capital for it, and controlled through multiple accounting techniques (Cronon 2009). The role of the Chicago Board of Trade should be noted, especially, as it presided over the standardisation of agricultural products, and established regular futures trading on them. Similar phenomena can be observed in Europe, with big and distant investors shaping up entire regions – as it has for instance been the case in Camargue in France, turned into an 'object-space' (Picon 1978). The exact role of accounting in such an enterprise is yet to be determined, but the introduction from 2001 of International Accounting Standard 41 for agriculture is likely to have an impact on the behaviour of investors regarding the agricultural firms

that they control. The standard requires that biological assets be accounted for at fair value when it is possible to do so reliably and, while some have advocated strongly in its favour (Argilés 2001; Argilés and Slof 2001), others have pointed out that it would, for instance, lead to greater volatility in reported income for timber producers (Herbohn and Herbohn 2006) and have a positive impact on earnings in the wine industry (Azevedo 2007). It would, also, require deep and potentially unsettling changes in legal and accounting norms in certain countries, while not introducing much consistency and comparability between reporting entities given the diversity of calculation methods for different types of biological assets (Elad 2004; Elad and Herbohn 2011).

Conclusion

The farm, understood broadly as the locus of agricultural exploitation of plants and animals, may not appear to the popular imaginary as a natural site for accounting and accountants. Yet, the rapid stroll that we have just taken through some of the literature that touches upon the history of the relations between accounting and agriculture does reveal the wealth of settings, of actors, of techniques, and of major stakes that makes up this decidedly rich history. Agricultural accounting, as it appears, stands at the intersection between multiple histories: the history of inscriptions; the history of capitalism; the history of science; the history of government; the history of business. At this intersection, accounting techniques or all sorts, from token record keeping to satellite auditing, have constantly crystallised and been manipulated, in diverse ways, by countless actors. The farm, thereby, comes out as a particularly active accounting laboratory, where these techniques have historically been under constant experimentation, put to the test, tried out – to the

relative dissatisfaction of many of the involved actors, it seems, but perhaps simply because, in the end, there is no essence of agriculture, nor of accounting: there is only a diverse set of productive practices and inscription techniques, preventing the stable existence of such a thing as ‘agricultural accounting’. The inexistence of agricultural accounting as a consistent historical object should not prevent us, quite on the contrary, to write all the missing histories of accounting and agriculture, focusing especially on the many geographical regions and historical periods that remain unexplored in this perspective.

References

- Amiet, P. 1966. “Il y a 5000 Ans les Elamites Inventaient l’Écriture,” *Archeologia* 12: 16-23.
- Argilés, J. M. 2001. “Accounting Information and the Prediction of Farm Non-Viability.” *European Accounting Review* 10 (1): 73-105.
- Argilés, J. M. and E. J. Slof. 2001. “New Opportunities for Farm Accounting.” *European Accounting Review* 10 (2): 361-383.
- Ascher, M. and R. Ascher. 2013. *Mathematics of the Incas: Code of the Quipu*, Mineola, NY: Dover Publications.
- Azevedo, G. M. C. 2007. “The Impact of International Accounting Standard 41 ‘Agriculture’ in the Wine Industry.” *Available at SSRN*. doi: <http://dx.doi.org/10.2139/ssrn.975508>
- Banzhaf, H. S. 2006. “The Other Economics Department: Demand and Value Theory in Early Agricultural Economics.” *History of Political Economy* 38 (1): 9-31.

- Barney, D. and D. Flesher. 1994. "Early Nineteenth-Century Productivity Accounting: The Locust Grove Plantation Slave Ledger." *Accounting, Business and Financial History* 4 (2): 275-294.
- Brassley, P., D. Harvey, M. Lobley and M. Winter. 2013. "Accounting for Agriculture: The Origins of the Farm Management Survey." *Agricultural History Review* 61 (1): 135-153.
- Brenner, N. and C. Schmid. 2015. "Towards a New Epistemology of the Urban?" *City*, 19 (2-3): 151-182.
- Bruegel, M. 2002. *Farm, Shop, Landing: The Rise of a Market Society in the Hudson Valley, 1780–1860*. Durham, NC: Duke University Press.
- Brunier, S. 2016. "The Work of Agricultural Advisers: Between Technical Instruction and Political Mobilisation." *Sociologie du Travail* 58(1): 21-40.
- Bugos, G. E. and D. J. Kevles. 1992. "Plants as Intellectual Property: American Practice, Law, and Policy in World Context." *Osiris*, 7: 74-104.
- Charles, L. and C. Théré. 2012. "The Economist as Surveyor: Physiocracy in the Fields." *History of Political Economy* 44 (1): 71-89.
- Cronon, W. 2009. *Nature's Metropolis: Chicago and the Great West*. New York: WW Norton and Company.
- Dancey, R. J. 1993. "The evolution of Agricultural Extension in England and Wales. Presidential Address." *Journal of Agricultural Economics* 44 (3): 375-393.
- Darnton, R. 1982. "What Is the History of Books?" *Daedalus* 111 (3): 65-83.
- Déléage, P. 2009. "Les Khipu: une Mémoire Locale?" *Cahiers des Amériques Latines* 54-55: 231-240.

- Depecker, T. and F. Vatin. 2016. "Taking Stock to Yield a Return: Agricultural Accounting, Agronomometry and Chemical Statics in the Early-Nineteenth Century." *Accounting History Review* 26 (2): 107-129.
- Dobie, A. 2008. "The Development of Financial Management and Control in Monastic Houses and Estates in England c. 1200–1540." *Accounting, Business and Financial History* 18 (2): 141-159.
- Dyer, C. 2012. *A Country Merchant, 1495-1520: Trading and Farming at the End of the Middle Ages*. Oxford: Oxford University Press.
- Elad, C. 2004. "Fair Value Accounting in the Agricultural Sector: Some Implications for International Accounting Harmonization." *European Accounting Review* 13 (4): 621-641.
- Elad, C. and K. Herbohn. 2011. *Implementing Fair Value Accounting in the Agricultural Sector*. Edinburgh: Institute of Chartered Accountants of Scotland.
- Ezzamel, M. 2009. "Order and Accounting as a Performative Ritual: Evidence from Ancient Egypt." *Accounting, Organizations and Society* 34 (3-4): 348-380.
- Fava, S. 2013. *Environmental apocalypse in science and art: designing nightmares*, London: Routledge.
- Fitzgerald, D. K. 2003. *Every Farm a Factory: The Industrial Ideal in American Agriculture*. New Haven, CT: Yale University Press.
- Fitzgerald, D. K. 2005. "Eating and Remembering." *Agricultural History* 79 (4): 393-408.

- Fleischman, R. K., D. Oldroyd and T. N. Tyson. 2004a. "Monetising Human Life: Slave Valuations on US and British West Indian Plantations." *Accounting History* 9 (2): 35-62.
- Fleischman, R. K., D. Oldroyd and T. N. Tyson. 2004b. "Accounting in Service to Racism: Monetizing Slave Property in the Antebellum South." *Critical Perspectives on Accounting* 15 (3): 376-399.
- Fleischman, R. K., D. Oldroyd and T. N. Tyson. 2011. "Plantation Accounting and Management Practices in the US and the British West Indies at the End of their Slavery Eras." *The Economic History Review* 64 (3): 765-797.
- Franklin, J. S. 2014. "Truly Handmaidens to Policy? Evaluating Agricultural Economists' Claim to a Distinct Tradition of Applied Economics." *History of Political Economy* 46 (4), 545-571.
- Free, C. 2008. "Walking the Talk? Supply Chain Accounting and Trust Among UK Supermarkets and Suppliers." *Accounting, Organizations and Society* 33 (6): 629-662.
- Frohlich, X. 2012. "Accounting for Taste: Regulating Food Labeling in the 'Affluent Society,' 1945–1995." *Enterprise and Society* 13 (4): 744-761.
- Garrabou, R., J. Planas and E. Sagner. 2012. "The Management of Agricultural Estates in Catalonia in the Nineteenth and Early Twentieth Century." *Agricultural History Review* 60 (2): 173-190.
- Gervais, P. 2004. *Les Origines de la Révolution Industrielle aux États-Unis : Entre Économie Marchande et Capitalisme Industriel (1800-1850)*, Paris: Éditions de l'EHESS.

- Guthman, J. 2014. *Agrarian Dreams: The Paradox of Organic Farming in California*, Berkeley: University of California Press.
- Halberg, N., G. Verschuur and G. Goodlass. 2005. "Farm Level Environmental Indicators: Are They Useful? An Overview of Green Accounting Systems for European Farms." *Agriculture, ecosystems and environment* 105 (1-2): 195-212.
- Hamilton, S. 2008. *Trucking Country: The Road to America's Wal-Mart Economy*. Princeton, NJ: Princeton University Press.
- Hamilton, S. 2016. "Review Essay: Revisiting the History of Agribusiness." *Business History Review* 90(3): 541-545.
- Herbohn, K. and J. Herbohn. 2006. "International Accounting Standard (IAS) 41: What Are the Implications for Reporting Forest Assets?" *Small-scale Forest Economics, Management and Policy* 5 (2): 175-189.
- Herment, L. 2012. *Les Fruits du Partage: Petits Paysans du Bassin Parisien au XIXe Siècle*. Rennes: Presses Universitaires de Rennes.
- Hopwood, A. G. 2009. "Accounting and the Environment." *Accounting, Organizations and Society*, 34 (3-4): 433-439.
- Hoskin, K., D. Ma and R. H. Macve. 2013. "A Genealogy of Myths about the Rationality of Accounting in the West and in the East." *Available at SSRN*. doi: <http://dx.doi.org/10.2139/ssrn.2389309>
- Hoskin, K. and R. H. Macve. 2012. "Contesting the Indigenous Development of 'Chinese Double-Entry Bookkeeping' and its Significance in China's Economic Institutions and Business Organization before c.1850." *LSE Economic History Working Paper* 160. URL:

<http://www2.lse.ac.uk/economicHistory/workingPapers/economicHistory/home.aspx>

- Humphrey, C. 1998. *Marx Went Away, But Karl Stayed Behind*. Revised Edition of *Karl Marx Collective: Economy, Society, and Religion in a Siberian Collective Farm*. Ann Arbor: University of Michigan Press.
- Hyland, S. 2014. "Ply, Markedness, and Redundancy: New Evidence for How Andean Khipus Encoded Information." *American Anthropologist* 116 (3): 643-648.
- Jack, L. 2006. "Protecting Agricultural Accounting in the UK." *Accounting Forum* 30 (3): 227-243.
- Jack, L. 2007. "Accounting, Post-Productivism and Corporate Power in UK Food and Agriculture." *Critical Perspectives on Accounting* 18 (8): 905-931.
- Jack, L. 2009. *The Adoption of Strategic Management Accounting Tools in Agriculture Post Subsidy Reform: A Comparative Study of Practices in the UK, the US, Australia and New Zealand*. London: Chartered Institute of Management Accountants.
- Jack, L. 2015. "Future Making in Farm Management Accounting: The Australian 'Blue Book'." *Accounting History*, 20 (2): 158-182.
- Ji, X.-D. 2003. "Concepts of Cost and Profit in Chinese Agricultural Treatises: With Special Reference to Shengshi Nongshu and Pu Nongshu in the Seventeenth Century." *Accounting, Business and Financial History* 13 (1): 69-81.
- Johns, A. 1998. *The Nature of the Book: Print and Knowledge in the Making*. Chicago, IL: University of Chicago Press.

- Johnson, T. 2015. "The Documents That Trapped Poor Southern Farmers in a Dangerous Form of Debt." *Slate* online, 22 January 2015. URL: http://www.slate.com/blogs/the_vault/2015/01/22/history_of_farm_debt_guan_o_notes_used_as_promissory_documents.html [Accessed 15 April 2016].
- Joly, N. and J. M. Weller. 2009. "En Chair et en Chiffres. La Vache, l'Éleveur et le Contrôleur." *Terrain. Revue d'ethnologie de l'Europe* 53: 140-153.
- Joly, N. 2016. "Educating in Economic Calculus: the Invention of the Enlightened Peasant via Manuals of Agriculture, 1830–1870." *Accounting History Review* 26(2): 131-160.
- Juchau, R. 2002. "Early Cost Accounting Ideas in Agriculture: The Contributions of Arthur Young." *Accounting, Business and Financial History* 12 (3): 369-386.
- Juchau, R. and P. Hill. 1998. "Agricultural cost accounting development in Britain: the contributions of three men from Wye – a review note." *Accounting, Business and Financial History* 8 (2): 165-174.
- Kafka, B. 2012. *The Demon of Writing: Powers and Failures of Paperwork*, New York: Zone Books.
- Kevles, D. J. 2007. "Patents, Protections, and Privileges." *Isis* 98 (2): 323-331.
- Kevles, D. J. 2013. "Primer of A, B, Seeds: Advertising, Branding, and Intellectual Property in an Emerging Industry." *University of California at Davis Law Review* 47 (2): 657-678.
- Kirschenbaum, M. G. 2008. *Mechanisms: New Media and the Forensic Imagination*, Cambridge, MA: MIT Press.

- Kitching, G. 2001. "The Concept of Sebestoimost' in Russian Farm Accounting: A Very Unmagical Mystery Tour." *Journal of Agrarian Change* 1 (1): 57-80.
- Labatut, J., F. Aggeri, B. Bibé and N. Girard. 2011. "Construire l'Animal Sélectionnable." *Revue d'anthropologie des connaissances* 5 (2): 302-336.
- Laferté, G. 2014. "L'Embourgeoisement Agricole. Les Céréaliers du Châtillonnais, de la Modernisation Agricole à nos Jours." *Sociétés contemporaines* 4 (4): 27-50.
- Lambert, M. 1966. "Pourquoi l'Écriture Est Née en Mésopotamie." *Archeologia* 12: 24-31.
- Lampe, M. and P. Sharp. 2017. "A Quest for Useful Knowledge: the Early Development of Agricultural Accounting in Denmark and Northern Germany." *Accounting History Review* 27(1): 73-99.
- Lamoreaux, N. R. 2003. "Rethinking the Transition to Capitalism in the Early American Northeast." *The Journal of American History* 90 (2): 437-461.
- Lezean, E. 2012. "L'Agriculture Russe en Transition: Entre Stagnation et Modernisation Post-Soviétiques." *Économie rurale* 5(325-326): 159-173.
- Macve, R. H. 1993. "Book review of Schmandt-Besserat (1992, Vol. I)." *Accounting and Business Research* 23 (92): 526-527.
- Macve, R. H. 2002. "Insights to be Gained from the Study of Ancient Accounting History: Some Reflections on the New Edition of Finley's The Ancient Economy." *European Accounting Review* 11 (2): 453-472.
- Mattessich, R. 1994. "Archaeology of Accounting and Schmandt-Besserat's contribution." *Accounting, Business and Financial History* 4 (1): 5-28.

- Mattessich, R. 1998. "Recent Insights into Mesopotamian Accounting of the 3rd Millennium B.C. – Successor to Token Accounting." *Accounting Historians Journal* 25 (1): 1–27.
- 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)*. London: Taylor and Francis.
- Miley, F. M. and A. F. Read. 2016. "Spies, Debt and the Well-Spent Penny: Accounting and the Lisle Agricultural Estates 1533–1540." *Accounting History Review* 26(2): 87-106.
- Minaud, G. 2008. "Appréciations des Risques Économiques et Traitements des Faillites dans le Monde Romain." *Droit Prospectif: Revue de la Recherche Juridique* 33 (123): 1651-1668.
- Morgan, M. S. 2005. "Experimental Farming and Ricardo's Political Arithmetic of Distribution." *LSE Economic History Working Paper* ('Nature of Evidence: How Well Do Facts Travel?' series) 03/05. URL: <http://www.lse.ac.uk/collections/economicHistory/pdf/>
- Morgan, M. S. 2012. *The World in the Model. How Economists Work and Think*. Cambridge: Cambridge University Press.
- Mussari, R. and M. Magliacani. 2007. "Agricultural Accounting in the Nineteenth and Early Twentieth Centuries: The Case of the Noble Rucellai Family Farm in Campi." *Accounting, Business and Financial History* 17 (1): 87-103.
- Napier, C. 2009. "Defining Islamic Accounting: Current Issues, Past Roots." *Accounting History* 14 (1-2): 121-144.

- Nguyen, G. and F. Purseigle. 2012. “Les Exploitations Agricoles à l’Épreuve de la Firme: L’Exemple de la Camargue.” *Études rurales* 190 (2): 99-118.
- Oldroyd, D., R. K. Fleischman and T. N. Tyson. 2008. “The Culpability of Accounting Practice in Promoting Slavery in the British Empire and Antebellum United States.” *Critical perspectives on Accounting* 19 (5): 764-784.
- Oudin-Bastide, C. and P. Steiner. 2015. *Calcul et Morale: La Pensée Économique de l’Anti-Esclavagisme au XVIII^e siècle*. Paris: Albin Michel.
- Overton, M. 1996. *Agricultural Revolution in England: The Transformation of the Agrarian Economy, 1500-1850*. Cambridge: Cambridge University Press.
- Pawley, E. 2016a. “The Point of Perfection: Cattle Portraiture, Bloodlines, and the Meaning of Breeding, 1760-1860.” *Journal of the Early Republic* 36 (1): 37-72.
- Pawley, E. 2016b. “Cataloging Nature : Standardizing Fruit Varieties in the United States, 1800-1860.” *Business History Review* 90(3): 405-429.
- Picon, B. 1978. *L’Espace et le Temps en Camargue : Essai d’Écologie Sociale*. Paris: Éditions Actes Sud.
- Planas, J. and E. Sagner. 2005. “Accounting Records of Large Rural Estates and the Dynamics of Agriculture in Catalonia (Spain), 1850–1950.” *Accounting, Business and Financial History* 15 (2): 171-185.
- Prado-Lorenzo, J. M., R. García-Salinero and M. I. González-Bravo. 2017. “Operational and Accounting Regulations in Spanish Municipal Pósitos.” *Accounting History Review* 27(1): 27-72.

- Pullen, J. 2016. "The Other Correspondence of T. R. Malthus: A Preliminary List and Selected Commentary." *History of Political Economy* 48 (1): 65-110.
- De Raymond, A. B. and F. Goulet. 2014. *Sociologie des Grandes Cultures: Au Cœur du Modèle Industriel Agricole*. Paris: Editions Quae.
- Repetto, R. 1992. "Accounting for Environmental Assets." *Scientific American* 266 (6): 94-100.
- Rodrigues, L. L., R. J. Craig, P. Schmidt and J. L. Santos. 2015. "Documenting, Monetising and Taxing Brazilian Slaves in the Eighteenth and Nineteenth Centuries." *Accounting History Review* 25 (1): 43-67.
- Rosenthal, C.C. 2013a. "Plantations Practiced Modern Management" (interviewed by S. Berinato). *Harvard Business Review* 91 (9): 30-31.
- Rosenthal, C. C. 2013b. "From Memory to Mastery: Accounting for Control in America, 1750–1880." *Enterprise and Society* 14 (4): 732-748.
- Rosenthal C. C. 2016. "Slavery's Scientific Management". In *Slavery's Capitalism: A New History of American Economic Development*. Edited by S. Beckert and S. Rochman. Philadelphia: University of Pennsylvania Press: 62-86.
- Schmandt-Besserat, D. 1992. *Before Writing, vol. I: From Counting to Cuneiform*, Austin, TX: University of Texas Press.
- Scorgie, M. E. 1997. "Progenitors of Modern Management Accounting Concepts and Mensurations in Pre-Industrial England." *Accounting, Business and Financial History* 7 (1): 31-59.
- Simmons, D. 2006. "Waste Not, Want Not: Excrement and Economy in Nineteenth-Century France." *Representations* 96 (1): 73-98.

- Slavin, P. 2010. "Goose Management and Rearing in Late Medieval Eastern England, c. 1250–1400." *The Agricultural History Review* 58 (1): 1-29.
- Steinbeck, J. 1939. *The Grapes of Wrath*. New York: Viking Press.
- Turner, M. E., J. V. Beckett and B. Afton. 2001. *Farm Production in England, 1700-1914*. Oxford: Oxford University Press.
- Tyson, T. N., R. K. Fleischman and D. Oldroyd. 2004. "Theoretical Perspectives on Accounting for Labor on Slave Plantations of the USA and British West Indies." *Accounting, Auditing and Accountability Journal* 17 (5): 758-778.
- Tyson, T. N., R. K. Fleischman and D. Oldroyd. 2005. "Accounting, Coercion and Social Control During Apprenticeship: Converting Slave Workers to Wage Workers in the British West Indies, c. 1834-1838." *The Accounting Historians Journal* 32 (2): 201-231.
- Urton, G. 2007. *Information Control in the Palace of Puruchuco: An Accounting Hierarchy in a Khipu Archive from Coastal Peru*. Cambridge: Harvard University Press.
- Urton, G. 2009a. *Signs of the Inka Khipu: Binary Coding in the Andean Knotted-String Records*. Austin, TX: University of Texas Press.
- Urton, G. 2009b. "Sin, Confession, and the Arts of Book- and Cord-Keeping: An Intercontinental and Transcultural Exploration of Accounting and Governmentality." *Comparative Studies in Society and History* 51 (4): 801-831.
- Urton, G. and C. J. Brezine. 2005. "Khipu accounting in ancient Peru." *Science* 309: 1065-1067.

- Walker, S. P. 2014. "Accounting and rural rehabilitation in New Deal America." *Accounting, Organizations and Society* 39 (3): 208-235.
- Washington, G. 1803. *Letters from His Excellency George Washington, to Arthur Young... and Sir John Sinclair... Containing an Account of His Husbandry, with His Opinions on Various Questions in Agriculture; and Many Particulars of the Rural Economy of the United States*, Alexandria: Cottom and Stewart.
- Wegren, S. 1998. *Agriculture and the State in Soviet and Post-Soviet Russia*, Pittsburgh, PA: University of Pittsburgh Press.
- Wegren, S. K. 2005. *The Moral Economy Reconsidered: Russia's Search for Agrarian Capitalism*. New York and London: Palgrave-Macmillan.
- Weller, J.-M. 2006. "Il Faut Sauver l'Agriculteur Poulard de la Télédétection: Le Souci du Public à l'Épreuve du Travail Administratif." *Politiques et Management Public* 24 (3): 109-122.
- Zaid, O. A. 2000. "Were Islamic Records Precursors to Accounting Books Based on the Italian Method?" *The Accounting Historians Journal* 27 (1): 73-90.
- Zaid, O. A. 2004. Accounting Systems and Recording Procedures in the Early Islamic State. *The Accounting Historians Journal* 31 (2): 149-170.
- Zimansky, P. 1993. "Book Review of Schmandt Besserat's Before Writing. Volume I: From Counting to Cuneiform." *Journal of Field Archaeology* 20 (4): 513-517.