

*Pak K. Auyeung, Lei Fu, and Zhixiang Liu*

---

## Double-Entry Bookkeeping in Early-Twentieth-Century China

Rare materials recently released by the Zigong City Archives shed light on the accounting system that was created by salt-mining businesses in Zigong. The materials include forty-seven accounting books prepared by eight firms in the industry from 1908 to 1930. In this study, the materials are used to reveal how the Zigong salt-mining firms used the double-entry system. The study draws on the archival documents to reveal how the firms' innovative reporting methods enabled them to calculate profit and loss, and it explores the ways in which improved accounting information guided the decisions of Chinese proprietors who were operating in a business environment characterized by inadequate financing, considerable risk, and long intervals between investment and return.

An important advance in Chinese accounting was the invention of a system of double-entry bookkeeping. The claim that the Chinese came up with the double-entry system independently of the Europeans has been asserted by Daoyang Guo in his work, *Chinese Accounting History Draft*, which represents the first comprehensive study of Chinese accounting from the earliest period of Chinese history up to the twentieth century.<sup>1</sup> Guo mentions the double-entry principle, which first appeared as the *sanjiao zhang* (the three-legged bookkeeping method) in the fifteenth century, and briefly describes a reporting system introduced in the seventeenth century, called the *longmen zhang* (the dragon-gate reporting method), which incorporated this great innovative principle. He claims that double-entry accounting took hold in China during the eighteenth century with the development of the *shijiao*

PAK K. AUYEUNG is senior lecturer at Griffith University in Queensland, Australia. LEI FU is professor of accounting at Capital University of Economics and Business in Beijing. ZHIXIANG LIU is associate professor of accounting at Capital University of Economics and Business in Beijing.

<sup>1</sup> Daoyang Guo, *Chinese Accounting History Draft*, 2 vols. (Beijing, 1982, 1988).

*Business History Review* 79 (Spring 2005): 73–96. © 2005 by The President and Fellows of Harvard College.

zhang (the four-legged bookkeeping method), but he offers differing views on the exact date.<sup>2</sup> His own view is based on the general consensus of historians that many of the necessary preconditions for double entry had been established in China, a line of reasoning that closely resembles the suggestions made by Ananias Littleton.<sup>3</sup> Guo amplifies his inductive approach with material drawn from secondary sources, adding his own interpretation.<sup>4</sup> He concludes that the invention of double entry was a landmark event that had an equally strong impact on both Chinese and European accounting and business history.

Some scholars have argued that double entry was the causal factor in the development of capitalism in Europe, because it endowed the economic world with accuracy, knowledge, and system. Double-entry accounting allows the dual effects of a business transaction to be recorded. A sale, for example, can be easily recorded under a single-entry system. Under a double-entry system, it cannot be recorded without first identifying the effect of the sale as an increase either in cash or in accounts receivable. Thus, the power of double entry “lies in its insistence on an explanation or in accounting for every resource change, which in fact impounds [*sic*] on the minds of managers and accountants the concept of cost (what was sacrificed) and profit (benefit obtained over and above what was sacrificed).”<sup>5</sup> This systematic analysis allows the accountant or bookkeeper to calculate profit or loss, to determine how much capital was employed, and to make a statement of financial position. “It is particularly these special characteristics of double-entry that economic historians have singled out in their thesis that ‘scientific bookkeeping’ has acted as an initiator, energizer, or stimulant in the development of capitalism.”<sup>6</sup> According to Joseph A. Schumpeter, “By crystallising and defining numerically, it [the profit calculation] powerfully propels the logic of enterprise.”<sup>7</sup> Max Weber defined “a rational capitalistic establishment” as “one with capital accounting, that is, an

<sup>2</sup> One view suggests that the double-entry principle was invented during the Song dynasty (AD 960–1279). Another view argues that it was invented during the Ming dynasty (AD 1368–1644), while some believe that it did not exist until the middle of the Qing dynasty (AD 1644–1911).

<sup>3</sup> Ananias Littleton, *Accounting Evolution to 1900* (New York, 1966).

<sup>4</sup> A sample of the literature includes: Kui Chen, *Commercial Encyclopaedia* (Shanghai, 1935); Shu Sheng, “Antique but Scientific Bookkeeping Methods of Our Country,” *China’s Economic Issues* 3 (1980): 15–23; and Xiliu Zhang, *General Principles of Accounting* (Guangzhou, 1937).

<sup>5</sup> Yuji Ijiri, *Studies in Accounting Research, Momentum Accounting and Triple-Entry Bookkeeping: Exploring the Dynamic Structure of Accounting Measurements* (Sarasota, Fla., 1989), 31.

<sup>6</sup> Basil S. Yamey, “Scientific Bookkeeping and the Rise of Capitalism,” *Economic History Review* 1 (1949): 106.

<sup>7</sup> Joseph A. Schumpeter, *Capitalism, Socialism and Democracy* (London, 1943), 123.

establishment which determines its income yielding power by calculation according to the methods of modern bookkeeping and the striking of a balance.”<sup>8</sup>

Although the double-entry invention had a profound effect on Western society, Chinese society remained relatively unmoved by this innovation.<sup>9</sup> The author of a German textbook on bookkeeping and accounting, who had spent many years in China as an administrator and a professor, for example, was apparently unaware of its existence, as indicated by this notation in his textbook: “It appears that double entry bookkeeping was not known at any time in any part of China.”<sup>10</sup> A plausible explanation for its virtual invisibility is that no industrial revolution had taken place in imperial China. In contrast, the growth in importance of joint-stock companies in the West following the Industrial Revolution resulted in the separation of ownership and management, a factor that sped the development of accounting information in order to satisfy the needs of investors in large-scale industrial enterprises. The relatively insignificant role of double-entry accounting in China may have diverted the attention of accounting or business historians, leading them to overlook the fact that double entry had made it possible (or had at least advanced) the ability to calculate profit or loss and had permitted the rationalization of action. Moreover, the lack of evidence concerning its use may have restricted research. In contrast to the government’s careful storage of official documents, the private sector made little effort to preserve source material on accounting, with the result that many documents deteriorated. Nor were they transferred to libraries, museums, and archives. Thus, historians writing after Guo had no access to materials from private companies.<sup>11</sup>

<sup>8</sup> Max Weber, *General Economic History* (New York, 1961), 275.

<sup>9</sup> This is similar to Needham’s extraordinary paradox that although printing, gunpowder, and the magnet, which had changed the face of the West, all reached Europe from China, they had not produced similarly profound effects on China. See Joseph Needham, *The Grand Titration: Science and Society in East and West* (London, 1969).

<sup>10</sup> Friedrich Otte, “The Evolution of Bookkeeping and Accounting in China,” *Annalen der Betriebswirtschaft* 2 (1928): 166–80.

<sup>11</sup> Maxwell Aiken and Wei Lu, “Perception, Culture and Research Method in Accounting History: Its Evolution in Modern China,” *Accounting History* 5 (1993): 11–20; Maxwell Aiken and Wei Lu, “Chinese Government Accounting: Historical Perspective and Current Practice,” *British Accounting Review* 25 (1993): 109–29; Maxwell Aiken and Wei Lu, “Historical Instances of Innovative Accounting Practices in the Chinese Dynasties and Beyond,” *Accounting Historians Journal* 20 (1993): 163–86; Maxwell Aiken and Wei Lu, “The Evolution of Bookkeeping in China: Integrating Historical Trends With Western Influences,” *Abacus* 34 (1998): 220–42; Maosheng Chen, “The History of Double-Entry Bookkeeping in China,” *Shanghai Accounting* 10 (1993): 30–1; Shimin Chen, “The Rise and Fall of Debit-Credit Bookkeeping in China: History and Analysis,” *Accounting Historians Journal* 25 (1998): 73–92; Jianmu Fu, “An Outline of Popular Double-Entry Accounting in the Qing,” *Chinese Economic History Research* 3 (1989): 73–77; Robert Gardella, “Squaring Accounts:

With the adoption of the “open door policy” under Deng Xiaoping, China began slowly to modernize its archives and to take steps both to preserve surviving commercial records and to make them available to the public. The Zigong City Archives have finally released some rare materials on the indigenous accounting system of salt-mining businesses in Zigong.<sup>12</sup> A study of forty-seven accounting books prepared by eight firms in the industry between 1908 and 1930 shows their amazing use of the double-entry principle and their method of balancing accounts based on the indigenous bookkeeping system, which allowed the firms’ bookkeepers to produce monthly financial reports. (See Appendix 1 for a list of the historical materials that have been newly released to the public archives.) In particular, sixteen accounting books kept by a salt-mining firm called Da Longjing (Big Dragon Well) from 1915 to 1922 have been so well preserved that it is possible to reconstruct the main features of the accounting system then in use. Transactions were recorded using the *sanjiao zhang* (three-legged bookkeeping method), and cash balances were calculated using the *shizhufu* (four-pillar balancing method). Advanced methods, called the *liuzhufu* (six-pillar balancing method) and the *longmen zhang* (dragon-gate reporting method), allowed the companies to measure and report profits at regular intervals.<sup>13</sup> These businessmen recognized the concept of depreciation, determined gains or losses for each cost center, such as the brine well, and accounted for unexpired expenses.

In this study, we will reveal how the double-entry system enabled salt-mining firms in Zigong to calculate profits or losses and will explore the degree to which improved accounting information might have guided Chinese proprietors in making business decisions. A number of

---

Commercial Bookkeeping Methods and Capitalist Rationalism in Late Qing and Republican China,” *Journal of Asian Studies* 51 (1992): 317–39; Robert Gardella, “Perspectives on the Development of Accounting and China’s Economic Transformation from the Late Ming to the Early Republic,” in Ampalavanar R. Brown, ed., *Chinese Business Enterprise in Asia* (New York, 1995); Jun Z. Lin, “Chinese Double-Entry Bookkeeping Before the Nineteenth Century,” *Accounting Historians Journal* 19 (1992): 103–22; Jun Z. Lin, “Chinese Bookkeeping Systems: A Study of Accounting Adaptation and Change,” *Accounting, Business and Financial History* 13 (2003): 83–98; Wei Lu, “Accounting Development in China During the Modern Era” (master’s thesis, La Trobe University, 1992); Wei Lu, “The Development of Chinese Accounting: Historical Perspective and Current Practice” (PhD thesis, La Trobe University, 1999); Youliang Zhao, “A Brief History of Accounting and Auditing in China,” in a joint research study by the Shanghai University of Finance and Economics and the Centre for International Accounting Development, University of Texas, *Accounting and Auditing in the People’s Republic of China: A Review of its Practices, Systems, Education and Developments* (Dallas, 1987); and Youliang Zhao, *Accounting and Auditing History of Ancient China* (Shanghai, 1992).

<sup>12</sup> Zigong is a municipality in the southwest section of Sichuan Province in central China, where salt mining has been an important economic activity for hundreds of years.

<sup>13</sup> These methods are explained below.

gaps in the archival holdings prevent us from claiming that accounting information was used in decision making. Nor can we be certain that evidence of such use ever existed in Sichuan. According to some skeptical historians, even in Europe, where business methods had been transformed during the Industrial Revolution, accounting did not guide management decisions. One historian even concluded, "The practice of using accounts as direct aids to management was not one of the achievements of the British Industrial Revolution."<sup>14</sup> Adherents of this skeptical school would probably dismiss any attempt to draw parallels between the invention of accounting methods and their subsequent utilization in China, where there had been no equivalent industrial revolution. However, some accounting historians, like Richard K. Fleischman and Lee D. Parker are convinced that the linkage did exist.<sup>15</sup> We concur with this view, holding that an accounting system, though simplistic, could have informed some of the management decisions made by Chinese businessmen. In this study, we will explore the possibilities that Chinese investors who oversaw the preparation of sophisticated accounting information could have developed the instincts required for using it appropriately in making certain kinds of decisions.

The record books that have been newly released from the archives probably represent the Chinese indigenous double-entry system. In this study, we will concentrate on business practices in late imperial China, the period extending from the nineteenth century into the early twentieth century. It is possible that double-entry accounting was brought to China after 1840, when the country was forced to open its door to Western powers. Nevertheless, Pak K. Auyeung and Paul Ivory have demonstrated that China was not receptive to foreign accounting methods, despite the potentially hospitable conditions that emerged in the post-1840 Qing period, when industrialization began to take hold. Auyeung and Ivory consider that the Chinese reluctance to adopt new accounting methods was a product of the country's complex political and sociocultural frameworks.<sup>16</sup> Between 1861 and 1895, the years of the so-called Self-Strengthening Movement, reformers were guided by the fundamental *ti-yung* (Chinese essence-foreign value) dichotomy. Preserving bureaucratic feudalism and traditional values and preventing

<sup>14</sup> Sidney S. Pollard, *The Genesis of Modern Management: A Study of the Industrial Revolution in Great Britain* (Cambridge, U.K., 1965), 248.

<sup>15</sup> Richard K. Fleischman and Lee D. Parker, "Managerial Accounting Early in the British Industrial Revolution: The Carron Company, a Case Study," *Accounting and Business Research* 20 (1990): 211-21.

<sup>16</sup> Pak K. Auyeung, and Paul Ivory, "A Weberian Model Applied to the Study of Accounting Stagnation in Late Qing China," *Accounting, Business and Financial History* 13 (2003): 5-26.

foreign invasion were the elements of *ti* (“substance,” “essence”). Western science, technology, and machinery made up the quality called *yung* (“instruments,” “utility”). The adoption of these elements by the Chinese in order to modernize the industries with links to the military was rational, because it served the purpose of maintaining their deeply rooted intellectual tradition. Western accounting techniques offered no perceptible tools for maintaining a stable society, and replacing indigenous accounting would have amounted to a direct challenge to the substantive rationality of *ti* by the formal rationality of *yung*. Moreover, adopting Western accounting would have required Chinese writing instruments to be replaced with Western pen, ink, and paper; Chinese numerals to be superseded by Hindu-Indian figures; and the custom of writing vertically in Chinese calligraphy to be replaced with a horizontal writing format. Calligraphy’s roots in Chinese culture were too deep to be easily discarded. Although industrialization had made some inroads, Chinese businessmen’s way of viewing the world had not changed. Cultural inertia hindered the adoption of foreign accounting techniques, and thus the traditional accounting system lingered on.

Some may argue that Western accounting concepts managed to penetrate China’s hinterlands, where they were adopted by the Zigong salt miners in what was perhaps an exception to Auyeung and Ivory’s generalization. A fair interpretation might be that not only were Chinese accounting practices insulated from foreign influences, but that Zigong itself, located in the interior of the country, witnessed few foreign travelers. Chinese businessmen, whose *gesit* (mentality or mindset) led them to preserve traditional methods, preferred holding on to entrenched accounting practices, rather than abandoning them. Thus, the forty-seven accounting books in the Zigong City Archives probably represent a singular example of the Chinese indigenous accounting system.

### The Zigong Salt-Mining Industry

Detailed studies of the salt-mining industry in Sichuan Province during the late imperial period have been conducted by Wei Wu, the Zigong Salt History Archives, and Madeleine Zelin.<sup>17</sup> To summarize their research, salt was mined with solutions in Zigong, a city in Sichuan, instead of using the alternative method, whereby salt was extracted from rock. Iron bits combined with percussion-action drills

<sup>17</sup>Wei Wu, *A History of the Sichuan Salt Administration* (Nanjing, 1932); Madeleine Zelin, “Capital Accumulation and Investment Strategies in Early Modern China: The Case of the Furong Salt Yard,” *Late Imperial China* 9 (1988): 79–122; and Zigong Salt History Archives, *A Discussion of Salt History in Sichuan* (Sichuan, n.d.).



were used to drill wells for brine; this type of drilling, which constructed deep, narrow-mouth wells, was an important innovation in premodern China. Yellow brine wells were between 1,200 and 1,300 Chinese feet deep, while black brine wells extended to a depth of between 1,600 and 2,800 Chinese feet.<sup>18</sup> Walls of pine or cypress, bound in canvas and bamboo and sealed with tong oil and lime, were built to keep the wells from collapsing and to prevent the seepage of fresh water. Salt in brine form was extracted from wells with piston-action bamboo tubes; the pumping required construction of a derrick-and-wheel apparatus that was propelled either by a large team of water buffalo or by a human workforce. Brine pumped to the surface was kept in bamboo containers, which were used not only for transport and storage but also as units of measurement for brine production.<sup>19</sup> Brine extracted from wells was either sold in its raw form or subjected to further processing and sold as salt. The processing entailed conveying the brine through a network of bamboo pipes to a furnace that housed large evaporation pans, called *woks*. The brine was tested for its salt content and purified by adding ingredients such as soy bean and lard. Water was then evaporated from the brine until the salt became crystallized. Once this process was completed, salt products were ready for human consumption and for use in food processing.

Salt mining in Qing China, then, was clearly no longer a small-scale enterprise. A large capital outlay had become necessary to pay for deep drilling, for advances in pumping technology, and for the construction of furnaces, evaporation equipment, storage towers, and the pipe networks. The cost of gaining access to a brine deposit ranged from 10,000 *liang* (Chinese currency) to 40,000 *liang* for a single well, depending on its depth.<sup>20</sup> However, there was little capital accumulation during China's early years of industrialization, primarily because there were no equity and debt-capital markets, a situation that did not improve during the early Republican period.<sup>21</sup> Another obstacle was the high risk entailed in salt mining. Geologists in late imperial China were unable to predict the location of salt deposits with precision, and there were documented failures caused by changes in the market for Sichuan salt, collapsed well walls, destruction of buffalo herds by rinderpest, and impenetrable rock, all adding to the uncertainty of capital investment.

<sup>18</sup> One Chinese foot = 33 centimeters = 1.094 feet.

<sup>19</sup> Zigong grew plenty of thick, tough bamboos. A section of the bamboo trunk was cut across just below the joint, allowing the hollow stem to be used as a container. The sealed joint at the other end was the bottom.

<sup>20</sup> Yong Li, *Literature Draft of the Thirteen Hill Library* (Beijing, 1933).

<sup>21</sup> Wellington K. K. Chan, "Sources of Capital for Modern Industrial Enterprises in Late Ch'ing China," in Ampalavanar R. Brown, ed., *Chinese Business Enterprise*, vol. 2 (London, 1996).

Furthermore, a single well might take several years to drill, and delays were frequent. The drillers of the Wufu well in Sichuan, for example, took ten years to reach their brine deposit.<sup>22</sup>

Thus, the salt-mining industry in Sichuan developed during the late imperial period under conditions marked by technological innovations, low levels of capital accumulation, high risk, and long intervals of waiting for profits on investments. Potentially high profits were expected to offset these drawbacks and thus to attract private investors to this industry. The expectation of high profits was a strong motivation for entrepreneurs to develop more advanced accounting techniques in order to measure profits accurately.<sup>23</sup> This explains why salt producers in Zigong adopted the more sophisticated three-legged and dragon-gate double-entry bookkeeping systems. Their accounting innovations not only enabled the Chinese to measure profits more accurately, a critical factor in this industry, but they also yielded better information than the simpler accounting systems had been able to generate and guided decisions about costs and cash flow.

Zigong salt-mining entrepreneurs compensated for the lack of long-term credit institutions in the late imperial economy by forming partnerships, which enabled them to pool financial resources and distribute risk. This form of ownership was apparently most common in Zigong after the mid-nineteenth century, when black brine wells dominated salt-mining development. The number of partners ranged from three to more than one hundred; archival studies reveal various patterns of partnership agreements. The arrangements commonly featured three kinds of partners: the landowner who owned the mining site, the backer who provided funds, and the managing partner. The landowner was called *zhu ren* (host), and the other partners were called *ke ren* (guests). The landowner provided both the site on which the well was sunk and the area for erecting the furnace and the derrick-and-wheel apparatus, but he did not contribute funds for drilling and constructing the infrastructure. Financial investors paid their capital contributions either in a lump sum when the partnership was formed or in installments of predetermined amounts, depending on the level of expenditure that was required for an investment. The managing partner, who provided technical and managerial skills, was responsible for drilling and operating the well. Often the landowner was not allowed to participate in the management of the well, a condition that established a clear separation between ownership and management and created a need for

<sup>22</sup> Wu, *History of Sichuan Salt Administration*; Zigong Salt History Archives, *A Discussion of Salt History*; Zelin, "Capital Accumulation."

<sup>23</sup> Fleischman and Parker, "Managerial Accounting."



financial reporting. Some partnerships had continuity of existence: partners' rights and obligations were passed to their descendants in perpetuity. Others existed for limited periods: the partners agreed to their length in advance.

Partners were normally rewarded both for their services and for their capital contributions to the business. The partnership agreement specified a method based on a specified fraction for sharing profits and losses. In limited-life partnerships, profits and losses were divided according to the number of days allocated to each partner in a month. Some of the common profit-sharing fractions are shown in the following tabulation:

| <i>Landowner</i><br>(days) | <i>Investor</i><br>(days) | <i>Managing Partner</i><br>(days) | <i>Total</i><br>(days) |
|----------------------------|---------------------------|-----------------------------------|------------------------|
| 4                          | 24                        | 2                                 | 30                     |
| 5                          | 23                        | 2                                 | 30                     |
| 6                          | 22                        | 2                                 | 30                     |
| 7                          | 21                        | 2                                 | 30                     |

The English version of a sample partnership agreement, executed in 1869, is presented in Appendix 2. The salt miners also established levels of ownership with different rights: *shangjie* (the upper level); *zhongjie* (the middle level); *shangzhongjie* (the upper-middle level); *xia-zhongjie* (the lower-middle level); and *xiajie* (the lower level).<sup>24</sup> For example, *A* and *B* might enter into a partnership agreement stipulating that the monthly profit from the sale of salt be divided equally, allocating fifteen days to each partner. Assume that, during the course of exploration, the partnership needed additional capital and *C* was invited to join it. Under the new profit-sharing arrangement, *A* and *B* would agree to receive equal shares of the profit derived from the first twenty days of the month (each would receive ten days' profit), whereas *C*'s share of profits would be derived from the remaining ten days. Should the well be depleted after twenty days of extraction, *C* would receive no profit in that month. Thus, *A* and *B* owned the upper level, while *C* owned the lower level. Assume then that the exploration required more capital, and *D* and *E* were admitted to the group. Each of the five partners would agree to receive six days' profit, but *A* and *B* would have priority over *C* to receive income, while *C* would have prior rights over *D* and *E*. Thus, *C* would own the middle level, while *D* and *E* would own

<sup>24</sup> Wu, *History of Sichuan Salt Administration*.

the lower level. In a perpetual-succession partnership, profits and losses were divided according to the number of shares (called *kou*, meaning mouth) allocated to partners. Other uncommon methods were also devised for sharing profits and losses.<sup>25</sup>

In the Chinese business community, business partners who were not part of management trusted the honesty of the executive partners based on their shared regional and family ties; and managers trusted their subordinates for the same reason. Breaches of trust were rare. The scale of personal connections in China gave the highest priority to family members, followed by persons born in the same village or geographic area as the family patriarch.

### Three Traditional Account Books in the Indigenous Accounting System

Salt-mining firms in Zigong used three traditional account books—*caoliu* (rough daybook), *xiliu* (journal), and *zongqing* (ledger)—which formed the backbone of the Chinese accounting system for centuries. Transaction data were entered and proceeded through the system; they composed the basis for monthly financial reports.

The structure of its accounting department depended on the size of the salt-mining firm. Da Longjing, for example, had an accountant, an assistant accountant, and a cashier. The accountant was responsible for preparing financial reports, maintaining the journal and ledgers, and carrying out other administrative duties. The assistant accountant was assigned the tasks of keeping accounting and production records, initiating purchases, and maintaining custody of the firm's assets. The cashier's duties included debt collection, distribution of pay packets, and handling and maintaining custody of cash. Among the salt-mining firms in Zigong, the accountant occupied a senior managerial position in the organization and reported directly to the general manager. He was often required to make decisions on urgent matters when the chief executive was absent or not available.<sup>26</sup>

Information about a transaction was first recorded in the *caoliu*, transferred to the *xiliu*, and posted to the *zongqing*.<sup>27</sup> Entries in the daybook were made sequentially. Because transactions had to be recorded at the moment they occurred, the daybook constituted a rough record, and it was used for memorandum purposes only. The entries

<sup>25</sup> Zigong City Archives, Beijing Academy of Economics and Sichuan University, *An Archival Collection of Salt Mining Agreements in Zigong* (Beijing, 1985).

<sup>26</sup> Zigong Salt History Archives, *A Discussion of Salt History*.

<sup>27</sup> Some mining firms in Zigong did not keep a daybook. Instead, transactions were recorded directly in the journal and posted periodically in the ledger.

did not classify the type of transaction, and the *caoma* (commercial form) numerals were used.<sup>28</sup> Because of the trust engendered by regional and family ties, roughly written records in the daybook were accepted as substantiation of economic transactions, often without supporting documents.

A unique feature of accounting in ancient China was its use of Chinese writing and stationery. The Chinese traditionally wrote their characters in vertical columns, from top to bottom and right to left. Account books were no exception. Transactions were entered in the daybook from top to bottom in vertical columns and listed from right to left. No standard account format was followed. No lines were printed on the page, nor were any recording symbols used. The basic components entered in the book were the nature of the transaction, the quantity, the price, and the total amount.

A peculiarity of Qing accounting was that transactions were recorded in different currencies in the same daybooks (both the rough daybook and the journal). The monetary system of the Qing government, which can be described as "parallel bimetallism," was a system in which both copper coins and silver circulated. Silver was used as cash in the form of *sycee*, a term referring to the shoelike shape of the silver ingot. The silver currency was not standardized; its value depended on its weight and fineness, as ascertained by money-exchange specialists. Added to these complexities was the absence of a standard weight in the country. The weight of the *tael* is about one-and-a-half ounces avoirdupois, but the actual *tael* measure differed not only between places but also between trades. The Shanghai *tael*, for example, with 565.65 grains avoirdupois and 0.935 fine, was known as the "ninety-eight convention currency." This situation resulted in a multiplicity of exchange rates between the value of copper and silver currency.<sup>29</sup> The payment of debts often involved laborious calculations requiring intensive use of the abacus.

At the end of each day, the accountant analyzed the transactions that had been recorded in the daybook in order to gauge their effects on the various ledger accounts before making entries in the journal. Whereas the daybook was a form of rough record, the journal contained

<sup>28</sup> China had three kinds of numerals, namely *caoma* (the commercial form), *hanti* (the standard form), and *kuaiji ti* (the accounting form). The accounting form consisted of elaborate characters, which were used when a numeral had to be safeguarded from falsification, and the other two forms consisted of simplified characters.

<sup>29</sup> Chaonan Chen, *Silver-Copper Exchange Rate Fluctuations During the Yongzheng-Qianlong Times* (Taipei, 1966); Xunwei Peng, *A History of Chinese Currency* (Shanghai, 1965); and People's Bank of China, Shanghai Branch, *Historical Materials on Shanghai Chien-chuan* (Shanghai, 1960).

a list of the daily transactions rewritten properly in chronological order and usually employing *kuaiji ti* (accounting-form) numerals. Unlike the daybook, vertical lines were printed on each page of the journal, and a horizontal line drawn in the middle of the page divided it into upper and lower columns. The so-called *shang shou xia fu* method (recording receipts in the upper columns and payments in the lower) was widely used to record transactions in the journal. *Shou* or *lai* and *fu* or *qu* (equivalent to debit and credit in Western accounting) were recording symbols for entries in the upper and lower columns.

Entries in the journal were posted to classified accounts, each with its own page, in the *zongqing* or ledger. Each page was divided into columns. The *zongqing* in Da Longjing comprised three separate ledgers: one to record wages, meals, and miscellaneous expenses (called the “expense ledger” here); one for accounts receivable and payable; and one to keep track of the owners’ equity.

The expense ledger consisted of accounts for a number of expenses, such as administrative salaries, workers’ wages, casual labor, imported freight, exported freight, transportation of brine, drainage costs, payments for maintaining and cleaning brine wells, payments of interest on loans, offerings of sacrifices, meals, construction costs, and purchases of vegetable oil, pine, cypress, lime, tong oil, kerosene, kitchenware, cement, nails, and buffalo. The ledger also contained a sales account. Since there was no distinction between capital and revenue expenditure, all purchases were treated as expenses, and fixed-asset accounts did not exist.<sup>30</sup> Accounts were classified, enabling various types of production costs to be readily extracted from this ledger.

The accounts-receivable-and-payable ledger consisted of individual receivable and payable accounts, the bank account, and two inventory accounts. A perpetual inventory system was maintained, constituting a continuous record of all daily brine inflows and outflows in the *jin yanshui bu* (brine production account) and the *chu yanshui bu* (brine sales account). A bamboo container was the unit used to measure the volume of brine production and sales. Each inventory record showed the quantity in terms of number of bamboo containers, which were converted to *tan* (a Chinese weight measure) at the official conversion rate.<sup>31</sup> Brine and salt prices were strictly controlled by the government salt authority, which based them on the commodities’ level of

<sup>30</sup> In today’s accounting terminology, capital expenditures bring future economic benefits to the business entity and are recorded in fixed asset accounts, whereas revenue expenditures are consumed in the current period and are expensed to match against revenue in order to measure profit.

<sup>31</sup> 1 *tan* = 50 kilograms = 110.23 pounds.

brinishness and purity. Inventory records were not concerned with either the unit price or the total monetary value of the products.

Partnership was the usual form of business ownership adopted by mining firms in Zigong, which made it necessary to keep a separate owners'-equity ledger. Da Longjing, for example, had eight partners in 1917, and its owners'-equity ledger contained eight capital accounts: Huang Rong Hua Company, Huang Shuang Gui Company, Yu Yuan Company, Ji Fu Company, De Xin Tong, Zhang Wan Mao Company, Rong Xin Company, and Yi Kui Company.<sup>32</sup>

### The Double-Entry System

According to Guo, the growth in interregional trade and commercial banks, called *qianpu* or *qianzhuang*, during the Ming dynasty was the impetus behind the invention of double-entry accounting. These banks were founded by merchants for the purpose of financing commerce, but as interregional trade increased, their services were extended to include currency exchange, deposit accounts, money lending, and the issuing and discounting of commercial papers, such as promissory notes. They also remitted funds over long distances to large cities. The double-entry principle thus evolved to ensure accuracy in recording voluminous banking transactions.

The historical records kept in the Zigong City Archives show that Da Longjing adopted a partial double-entry system, known as the *sanjiao zhang* (three-legged bookkeeping method). This method earned the name "three legs" because it combined single entry (one leg), used for recording cash transactions, with double entry (two legs), used for recording credit transactions and any transactions not involving a cash inflow or outflow, such as transfers from one personal account to another. Chinese merchants and bookkeepers recognized that credit transactions had a dual effect: an increase in sales (revenues) might be combined with an increase in accounts receivable (assets); or an increase in purchases (expenses) might be combined with an increase in accounts payable (liability), which had to be recorded in two accounts, resulting in two entries of an equal amount. They therefore either recorded credit sales in the upper columns of the journal and accounts receivable in the lower columns, or entered credit purchases in the lower columns and accounts payable in the upper columns. Increases in owners' equity, liabilities, and revenues were recorded in the upper

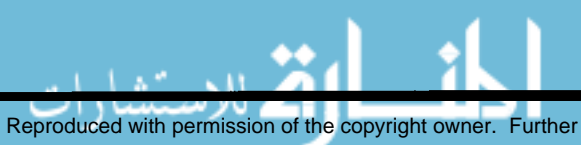
<sup>32</sup> Zigong City Archives, ref. no. 45-1-98. The list of partners shows that a partner often held shares in the partnership under a company name. These companies were retailers and bankers in Sichuan Province.

columns and *shou* or *lai* was written above each entry; whereas increases in assets and expenses were recorded in the lower columns, using the symbols *fu* or *qu*. Entries in the journal were posted to the appropriate upper and lower columns, identified as debtor, creditor, sales, and expense accounts in the ledgers. At the end of the month, a trial balance was prepared to ascertain whether the total assets and expenses in the lower columns agreed with the total liabilities and revenues in the upper columns, thereby proving the accuracy of the accounting records. The double-entry concept thus produced two benefits. The first was the practical benefit of ensuring that the accounts-receivable and accounts-payable entries had been correctly recorded and were thus supplying reliable information, enabling the business to keep track of the growing volume of outstanding account balances and to make credit-control decisions. Secondly, it allowed the company's accountants to identify and match revenues and expenses. Having done this, they could proceed to calculate profits and prepare financial reports.

However, cash transactions were recorded in the journal in only one direction, requiring a single entry. A cash sale was entered in the upper column of the journal as an increase in revenue, and a cash purchase was entered in the lower column as an increase in expense. The corresponding cash inflow and outflow were not recorded. Cash in Chinese bookkeeping represented only what was on hand; it did not include cash in the bank. There was no cash-on-hand account, and the bank account was treated as a debtor/creditor account. Out of the 127 entries in the *xiliu* (journal) of Da Longjing in March 1921, 94 were double entries and 33 were written as single entries.<sup>33</sup> This differential accounting treatment of cash and noncash transactions was probably due to the fact that the three-legged bookkeeping method was viewed as a record-keeping device to facilitate credit control, rather than as a means of improving cash control. Recording credit transactions as double entries served as a check on the accuracy of entries in accounts receivable and payable and provided a more effective means of controlling debts. However, the emphasis on personal trust and kinship ties in the nineteenth-century Chinese business world reduced the pressing need to safeguard cash against fraud. Persons who were assigned the responsibility for handling and acting as custodians of cash were either the owners themselves or their most trusted relatives.

Accounting scholars in late Qing China seemed to understand that measuring net profits on a simple cash basis (net profit being the excess of cash inflows from revenues over cash outflows for expenses) was not a satisfactory course of action for firms conducting a large portion of

<sup>33</sup> Salt Mine Accounting Books in Zigong City Archives, ref. no. 45-1-91.





their business on credit. They therefore developed an accounting technique that closely resembled what we now call the accrual basis of accounting.<sup>34</sup> The double-entry system had accomplished the shift from measurement based on cash to measurement based on accrual, because it allowed for the recognition of revenues earned but not yet received, and of purchases made but not yet paid for. Qing bookkeepers further realized that since not all inventory supplies purchased during the accounting period were consumed during the same period, it was not necessary to recognize the unused supplies as expenses for the determination of periodic profit. Following this principle, they measured some unused supplies and, instead of reducing total purchases, added them to the revenue, thus ensuring that the profit was not understated by the amount of unused inventory.<sup>35</sup> Apart from the calculation of unexpired supplies, depreciation was used in practice to determine unused capital expenditure. During the Taiping Rebellion of the 1850s, the Taiping rebels controlled the middle and lower parts of the Yangtzi River and blocked the transportation of salt to the capital, creating an endless demand for salt from Zigong mines. In order to alleviate the salt shortage, miners in Zigong increased productivity by investing in modern expensive equipment, such as the large woks required for the evaporation process. A wok weighing about one thousand *tael* cost forty to fifty *liang* during the 1880s, raising the question of depreciation. Chinese bookkeepers started to count the decline in future economic benefit of an expensive asset through wear and tear as a factor in profit measurement. Cost and estimated useful life were commonly used to determine the amount of periodic depreciation for a wok, called *wok di*. Nevertheless, depreciation was not calculated for immovable property, such as derricks, the wheel apparatus, and the brine storage tower, probably because these items would have had negligible residual value once they reverted back to the landowner after all the brine had been excavated.<sup>36</sup> Investors who were entitled to retain movable property were more interested in seeing the value of woks written down, as they could be used in new ventures. The double-entry system and the calculation of unexpired costs and depreciation provided more information, enabling better measurement of operating profit. This advance was important for the salt-mining industry in Zigong during the late imperial period in

<sup>34</sup> Under accrual-basis accounting, revenue is recognized when a sale takes place, and a purchase is expensed when the acquired benefit is consumed (not as money is received or paid). It thus recognizes the effect of a business event as it occurs and enables expenses incurred to be matched against the revenues earned during the same period in order to compute net profit or net loss.

<sup>35</sup> Salt Mine Accounting Books in Zigong City Archives, ref. no. 45-1-86.

<sup>36</sup> Zelin, "Capital Accumulation and Investment Strategies in Early Modern China."

China, which was plagued by conditions of inadequate financing, high risk, and long waits for returns on investments.

### Financial Reporting and Guidance for Decision Makers

Landowners and financial backers seldom took part in the daily management of the business, creating the need for financial reporting. Monthly reports prepared by the salt-mining firms in Zigong were based on the *longmen zhang* (dragon-gate method). According to Guo, Fu Shan created this technique, elaborating on the existing structure of the three-legged bookkeeping method, at a time when the Ming period was ending and the Qing period was beginning.<sup>37</sup> His conceptual innovation was to classify the accounts in the three ledgers into four distinct elements: *jìn* (revenues), *jiao* (expenses), *quan* (assets), and *jian* (owners' equity and liabilities). *Jìn* included sales and other revenues and any expenses that were unexpired at the end of the accounting period, while *jiao* comprised purchases, expenses, losses, and taxes. *Quan* consisted of cash on hand, cash in the bank, accounts receivable, and an inventory of supplies and other assets, while *jian* included owners' capital, accounts payable, loans, and other liabilities. The different elements contained a substantial amount of specific information that guided managers in making business decisions. Further, these four distinct elements made it easier for bookkeepers to prepare financial reports. (See Figure 1.)

*Jiao* was derived from the expense ledger. During the late imperial period, advances in deep drilling and pumping technologies increased productivity, but they also drove up the costs of mining. The meticulous expense ledger that was uncovered in Zigong indicates that the salt miners had good instincts about the costs of doing business in their environment. The ledger contained details of how expenses were incurred alongside a classification of costs into categories, and expenses were measured down to *mao* (a small Chinese monetary unit, as small as one ten-thousandth of a dollar). These entries not only made it possible for them to calculate periodic costs, which would be matched against revenues in order to measure monthly profits, but also apparently provided the information about costs that the firms needed for evaluating alternative opportunities. For example, pumping and transporting brine from wells or pipes to the furnace required a large workforce, and management had to decide whether to use water buffalo or humans. Sichuan

<sup>37</sup> Fu Shan was from Tai Yuan, the capital of Shanxi Province in northeast China, where commercial banks flourished during the Ming and Qing dynasties. He was both a merchant and a scholar of philosophy, literature, and medicine.

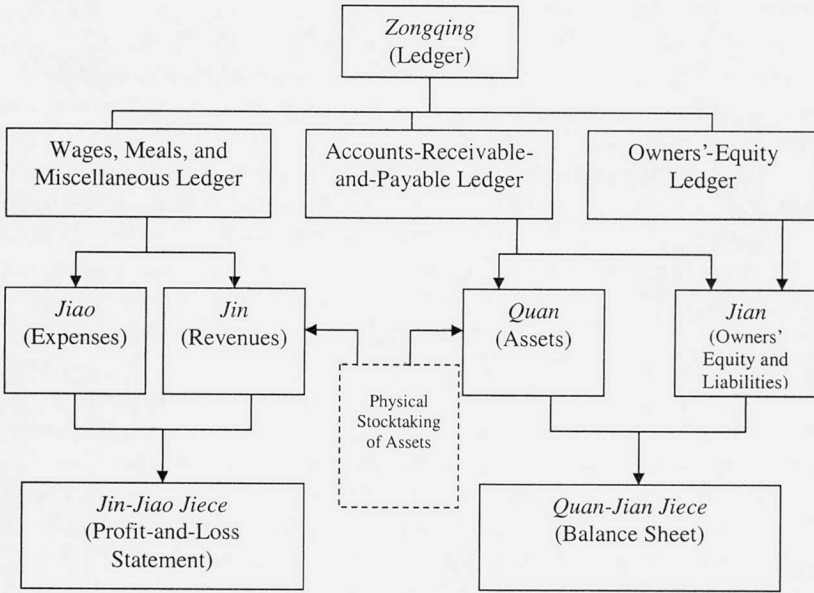


Figure 1. *Longmen Zhang* (dragon-gate reporting method).

salt miners switched from using humans, relying instead on animals to drive their pumps. Although this changeover increased their start-up costs, as they had to procure the buffalo and construct sheds and large water tanks in locations where water was not naturally available, the ongoing costs, such as the grass and beans provided for buffalo consumption, were considerably lower than the costs involved in maintaining human workers.<sup>38</sup>

The mining entrepreneurs also had to decide whether to use coal or gas, and they based the decision on a comparison of their costs. Fuel was a primary cost in the final stage of the mining operation, in which brine was evaporated into salt. Prior to the mid-Qing period, coal-fired furnaces were used. Although deep drilling during the late Qing period released natural gas, the salt miners chose not to import this gas from wells, called *huojing* (meaning fire well), rejecting this cost-efficient method of evaporating brine. Their decision was based on the fact that replacing coal with gas would have required the construction of gas-fired furnaces and an elaborate network of pipes to transport brine

<sup>38</sup> Guangrong Ran and Xuejun Zhang, *A Draft History of the Well Salt Industry in Sichuan During the Ming and Qing Period* (Chengdu, 1984).



from wells to gas sources, which could be as long as 20 *li*.<sup>39</sup> Gas was commonly purchased by leasing a fixed number of “fireballs,” called *huoquan*, for a specified period.<sup>40</sup> Coal was replaced when the cost savings from leasing fireballs were sufficient to cover the startup costs of constructing brine pipes and gas stoves.<sup>41</sup>

The expense ledger also provided cost-based details that permitted the intricate array of expenses entailed in buying or renting a wok to be calculated.<sup>42</sup> For example, Qing bookkeepers worked out that it took three days for the water to evaporate from the brine. Since a large wok could be used sixty times and had a useful life of 180 days, it was possible to determine both its operating costs and its rate of depreciation and thus to calculate the pros and cons of owning a wok. Maintaining an accurate and detailed expense ledger was important, because the partners often based the amount of their monthly capital contributions to the entity on the record of the previous month’s expenses.

*Jin* (revenues) included intake from sales, which was calculated from the total sales quantity as shown in the *chu yanshui bu* (brine sales account) multiplied by the officially prescribed price.<sup>43</sup> The total sales revenue so calculated had to equal the balance in the sales account. Because the four distinct elements (revenues, expenses, assets, owners’ equity), plus the brine sales account and the brine production account, formed six essential components in the accounting system, representing six pillars of a building, this system was also known as the *liuzhufa* (six-pillar balancing method).

*Quan* (assets) contained the inventory of supplies, a record of the cash on hand, and the accounts receivable. The inventory listed not only supplies used in production, such as timber, cement, nails, drills, tools, containers, hemp, buffalo harnesses, fuel, canvas, and woks, but also rice, cooking oil, and other foodstuffs provided by the mining firms for their employees’ consumption. However, the ledger did not list these inventories as asset accounts.<sup>44</sup> When supplies were purchased, they were recorded in the expense ledger. The inventory of unused supplies was determined by conducting a physical count at the end of the accounting period, and the total was multiplied by the market price to determine the value of the inventory balance, which was then reported

<sup>39</sup> 1 *li* = 0.5 kilometers = 0.33 miles

<sup>40</sup> A “fireball” was a unit of gas. Each fireball was capable of evaporating at least 3.5 *tan* (1 *tan* = 50 kilograms = 110.23 pounds) of brine, depending on its strength. In the late Qing, the cost of leasing a fireball was about 5 *liang* (Chinese currency) per month.

<sup>41</sup> Zigong Salt History Archives, *A Discussion of Salt History in Sichuan*.

<sup>42</sup> The cost of woks is discussed in the section entitled “The Double-Entry System.”

<sup>43</sup> For example, the price of brine was fixed at 5.76 *liang* of silver per *tan* in the late nineteenth century.

<sup>44</sup> Salt Mine Accounting Books in the Zigong City Archives, ref. nos. 45-1-93 and 45-1-94.

both as revenue and as an asset in the financial statements.<sup>45</sup> The recognition, measurement, and reporting of the inventory of supplies remaining at the end of every month enabled management to ensure, on the one hand, that sufficient quantities of each item were available to meet production schedules and, on the other, that partnership capital was not unnecessarily tied up by holding excessive inventory. This information was particularly critical during the late imperial period, when China experienced shortages of investment capital. Moreover, since most partnership agreements gave investors the right to retain movable property when the partnership came to an end, this accounting practice provided them with the details of the realizable value of unused supplies that belonged to them in the event of dissolution.<sup>46</sup>

There was no account for cash on hand in the ledger, because cash control was not essential. The balance of cash on hand was obtained by a physical count at the close of trading, and the balance was supposed to agree with the book figure calculated by using the *shizhufa* (four-pillar balancing method), which is illustrated in the following equation:

$$O + R - P = C$$

where *O* = opening balance brought forward

*R* = cash inflow

*P* = cash outflow

*C* = closing balance (at end of period)

Cash inflows and outflows were extracted from the single entries in the journal, and the closing balance was reported as an asset in the financial report.

The emergence of accounts receivable was a response to the widespread practice of extending credit to customers, which made it necessary to impose stricter control over credit. Accurate and timely information enabled salt miners to monitor receivables in order to ensure that the partnership could meet its maturing obligations and long-term funding requirements. Cash flows from operations were often ploughed back into further drilling operations in Zigong. Maintaining an accurate record of receivables and payables was essential in order to determine a potential partner's preadmission rights and obligations.<sup>47</sup>

*Jian* (owners' equity and liabilities) included the partners' capital that was recorded in the owners'-equity ledger. The partners' initial payments (*diquan*) and subsequent monthly instalments (*yuefei*) were recorded in the upper columns of their capital accounts. Thus, each

<sup>45</sup> Salt Mine Accounting Books in Zigong City Archives, ref. no. 45-1-86.

<sup>46</sup> Zelin, "Capital Accumulation and Investment Strategies in Early Modern China."

<sup>47</sup> Zigong City Archives, *An Archival Collection of Salt Mining Agreements*.

capital account presented the current total amount of their investment and allowed management to keep track of investors' contributions. This ability was vital, especially during the early stages of well development, when startup costs were high and funding was critical for maintaining drilling schedules. There were frequent withdrawals from partnerships, and many contracts required the outgoing partners to offer their shares to the remaining partners before the company went in search of outside investors.<sup>48</sup> When shares were transferred, the purchase considerations were calculated based on capital account balances.

The classification of ledger accounts into four distinct elements facilitated the preparation of two accounting reports, namely, the *Jin-Jiao Jiece* (whose closest equivalent is the profit-and-loss statement) and the *Quan-Jian Jiece* (whose closest equivalent is the balance sheet).

The monthly report also supplied statistics about the brine well, such as its depth at the beginning of the month, the amount of drilling that had occurred during the month, the depth of the well at the end of the month, the costs of drilling for the month, and the cumulative drilling costs. When the partners' capital was paid on an installment basis, the report detailed the amounts to be contributed.

The dragon-gate reporting method, which was built on the double-entry principle of three-legged accounting, reflected the main features of Sichuan's economic environment during late imperial China. The innovative techniques for calculating profits more accurately were a product of the paucity of capital accumulation, the high level of risk, and the long intervals between investment and payoff that accompanied salt-mining ventures. The Chinese three-legged bookkeeping method enabled the mining firms to balance their double-entry ledgers in an orderly and systematic way, and the monthly balancing process achieved the objectives of furnishing some proof that the ledger entries were accurate and providing the partner with two summary statements: one of profits and losses, and the other of assets, liabilities, and owners' equities. The Chinese system also relied to some extent on concepts of periodicity and accrual, allowing the computation of periodic profits to take into account unexpired portions of payments and depreciation. These special characteristics of the double-entry system equipped salt miners with better information, enabling them to make a realistic appraisal of their firms' financial health and future prospects. The resulting improvement in measurement of profit was important in two respects. First, since landowners and financiers were often absentee partners, the periodic profit figure became a basis for assessing the managing partner's stewardship of resources. Second, the calculation of profit

<sup>48</sup> Ibid.



revealed the balance that was available for distribution to the partners based on their level of ownership. Although landowners generally were entitled to receive a distribution when a profit was made, some contracts in late Qing China prevented them from receiving payments during the early period of production, at least until a certain level of profitability had been reached.<sup>49</sup> This arrangement would no doubt have caused conflicts between the landowner and the investor, since the former would have been anxious to receive a distribution, while the latter would have preferred to delay payouts in order to reinvest the resources for development. Hence a more reasonable basis for determining profit would have alleviated conflicts about when to start distribution.

A useful feature of the Chinese accounting system was that it required the collection and reporting of information—in the case of salt mining, for instance, about the depth and costs of drilling. The actual costs that had been incurred on the venture to date and the reported monthly profits would have been important considerations for the partners in making long-range decisions about investments, such as whether to drill further, whether to cease drilling, whether to abandon the project, or whether to admit new partners. For example, the study carried out by Zigong City Archives shows that decisions to redrill were made only after costs were considered.<sup>50</sup> Moreover, it was not uncommon for the entire partnership to be taken over by outside investors. Zelin's study shows that 35 percent of the well-drilling contracts in his sample involved the transfer of the whole partnership.<sup>51</sup> Financial data generated by the accounting system would have provided a useful quantitative basis for takeover considerations. The information allowed new investors to calculate capital expenditure in a rational way. Furthermore, it was not unusual for large salt producers, such as the Lis and the Wangs, to invest in several wells, and the financial reports would have allowed them to compare the performances of their wells.<sup>52</sup>

### Conclusion

Newly available source materials from the Zigong City Archives illustrate some of the uses of the double-entry principle in the accounting

<sup>49</sup> Ibid.; Zelin, "Capital Accumulation and Investment Strategies in Early Modern China."

<sup>50</sup> Zigong City Archives, *An Archival Collection of Salt Mining Agreements*; Furong contracts 68 and 69.

<sup>51</sup> Wu, *A History of the Sichuan Salt Administration*; Zelin, "Capital Accumulation and Investment Strategies in Early Modern China"; and Zigong Salt History Archives, *A Discussion of Salt History in Sichuan*.

<sup>52</sup> Zigong City Archives, *An Archival Collection of Salt Mining Agreements*. The Li and Wang families were active salt miners and landowners in Sichuan during the Qing dynasty.



system devised by salt-mining companies operating in that city. The new materials provide evidence that these companies employed a balance sheet listing periodic debit and credit balances drawn from a system that recorded the owners' equity. The system shows that Chinese accounting scholars adopted fundamental equations that required an equality of variables in an exchange transaction, which is the basis of Littleton's concept of duality.<sup>53</sup> The Chinese system allowed gains or losses from ventured capital to be more easily calculated, thus enabling businesses to determine their income-earning power. Furthermore, before these archival records were made available, most historians believed that certain features of nineteenth-century Western accounting, such as depreciation and the treatment of unexpired costs, were not being used in late Qing China.

This study shows that the improvements in accounting information that resulted from the invention of the double-entry system guided certain business decisions that were made by Zigong miners, such as whether to use human beings or buffalo as power sources, whether to use coal or gas as a source of energy, whether to buy or rent production equipment, or whether to continue drilling a well or to abandon the attempt. They were also guided by this system when making decisions about admission of new partners, capital contribution, profit distribution, inventory requirement, and credit control. However, it should not be concluded that double entry acted as "an initiator, energizer, or stimulant in the development of capitalism" in China, as it did in the West.<sup>54</sup> The contribution of this study is its reliance on original accounting records to describe the bookkeeping system of a manufacturing sector that adopted the double-entry principle and its scrutiny of how some of the actions might have been rationalized. These historical source materials are useful not only for the present inquiry but also as an aid to future researchers who wish to understand the business environment of the late Qing period, including the types of business organizations that prevailed, the practice of Chinese parallel bimetallism, the importance of trust in the Chinese business world, the details of partnership agreements, the methods of production in salt mining, the prices of materials, the procedures used to remunerate labor, and the methods of distributing profits. As China continues to modernize its archives, business historians can look forward to the release of more source materials that will be useful in reconstructing the past.

<sup>53</sup> Littleton, *Accounting Evolution to 1900*.

<sup>54</sup> Yamey, "Scientific Bookkeeping."

## Appendix 1

### The Forty-Seven Salt Mine Accounting Books in the Zigong City Archives

| Year    | <i>Account Books ( and Reference Numbers)</i>  |
|---------|--|
|         | <i>Da Longjing</i> (Big Dragon Well), 16 Accounting Books  |
| 1915    | Owners'-equity ledger (45-1-97); monthly report (45-1-83);<br><i>Xiliu</i> (journal) (45-1-92)   |
| 1916    | Owners'-equity ledger (45-1-99); monthly report (45-1-90)  |
| 1917    | Owners'-equity ledger (45-1-98); monthly report (45-1-86)  |
| 1918    | Monthly report (45-1-87)   |
| 1917-18 | Brine-production and sales accounts (45-1-89)  |
| 1919    | Owners'-equity ledger (45-1-96); accounts-receivable-and-payable ledger<br>(45-1-100)  |
| 1921    | <i>Xiliu</i> (45-1-91); brine-production and sales accounts (45-1-88); accounts-<br>receivable-and-payable ledger (45-1-95); meals account (45-1-94) |
| 1922    | Wages, meals, & miscellaneous expenses ledger (45-1-93)  |
|         | <i>Shi Zaojing</i> , 2 Accounting Books  |
| 1919    | <i>Xiliu</i> (45-1-101)  |
| 1920    | Accounts-receivable-and-payable ledger (45-1-102)  |
|         | <i>Ji Xingjing</i> , 3 Accounting Books  |
| 1908    | Miscellaneous-payments ledger (45-1-136); accounts-receivable-and-<br>payable ledger (45-1-135)  |
| 1909    | <i>Xiliu</i> (45-1-134)  |
|         | <i>Ren Huozao</i> , 11 Accounting Books  |
| 1908    | Brine-flows journal (45-1-104)   |
| 1909    | Noncash journal (45-1-106); [two] accounts-receivable-and payable<br>ledgers (45-1-108; 45-1-109); payments ledger (45-1-111)                        |
| 1910    | Cash journal (45-1-105)  |
| 1912    | Accounts-receivable-and payable ledger (45-1-110)  |
| 1913    | Payments ledger (45-1-107)   |
| 1914    | Accounts-receivable-and-payable ledger (45-1-112)  |
| 1915    | New debtors and creditors ledger (45-1-113)  |
| 1916    | Noncash journal (45-1-103)   |
|         | <i>Yi Zhengzao</i> , 4 Accounting Books  |
| 1915    | <i>Quan-Jian</i> (assets-liabilities & capital) monthly report (45-1-114);<br>monthly report (45-1-138)  |
| 1916    | Receipts and payments ledger (45-1-116)  |
| 1917    | Meals and miscellaneous (45-1-115)   |
|         | <i>Yi Chuanmei</i> , 3 Accounting Books  |
| 1929    | [Two] accounts-receivable-and-payable ledgers (45-1-131; 45-1-133)   |
| 1930    | Cash journal (45-1-132)  |
|         | <i>Yi Tongzao</i> , 4 accounting books   |
| 1917    | <i>Jin-Jiao</i> (revenues-expenses) and <i>Quan-Jian</i> monthly reports (45-1-118)  |
| 1919    | <i>Jin-Jiao</i> and <i>Quan-Jian</i> monthly reports (45-1-119); wages, meals,<br>& miscellaneous expenses ledger (45-1-120)                         |
| 1919-20 | Noncash journal (45-1-117)   |
|         | <i>Ji Fujing Bing Qizao</i> , 4 accounting books   |
| 1919    | Inventory journal (45-1-123)   |
| 1920    | Inventory ledger (45-1-125); accounts-receivable-and-payable ledger<br>(45-1-124)  |
| 1930    | Noncash journal (45-1-122)   |

## Appendix 2

### Section from a Partnership Agreement in 1869

Three parties, Zhang Pengfei, Xu Yongtai, and Ni Beihai (hereinafter called the “guests”), hereby enter into contract to form a partnership with Wang Yuanji (hereinafter called the “host”) for the purpose of developing the host’s well, called the “Zisun Brine Well” (hereinafter called the “well”), situated in a newly opened area in the Qing Gang Mountain. The guests will drill the well and extract brine from it. The well will comprise three parts: the well itself, the conveyance system, and the evaporation equipment. The guests agree to make repairs needed to maintain the well in good condition for the host without any reservations. The guests further agree to pay a deposit of eighty *string of qian* to the host on the same day that the contract is executed. The well will be renamed the “Yong Fu Well.” Profits from brine production during days and nights will be divided in proportion to the number of days allocated to each partner in a month of thirty days. Six days will be allocated to the host and twenty-four days to the guests. If a month has thirty-one days, the extra day will be shared by the guests equally. The guests agree to contribute capital, which will be used to pay all costs of development and production. When the well is fully depleted, it will be returned to the host, who will have no obligation either to refund the deposit or to reimburse the costs associated with development and production to the guests. No party shall attempt to gain more profit than that allowed under this contract. Where the well is subsequently redeveloped after depletion, the host will not pay the costs of redevelopment, and profits derived from subsequent production will be distributed to the partners according to the ratio specified in this contract. The guests will have the right to undertake all activities in connection with brine production in the said property without any obstruction by the host, including the construction of paths for horses and oxen; the transportation of boilers, charcoal, and brine; the disposal of wastes; the erection of fence; the removal of soil; the pumping of drinking water for people and cattle; and the demolition of weirs. In the event of the demolition of a weir, the guests will pay the host a compensation of three *shih* of grains each year. The guests agree not to lease the well to the third party. Oral evidence is inadmissible, and hence all parties agree to commit the agreement to writing. (Source: Zigong City Archives, Sichuan Province, China. No. 3-5-4017-22)