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Luca Pacioli and the Summa



Lorena C. Lommler

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First-time readers are apt to bring amused tolerance to a small treatise on bookkeeping written in 1494 by a Franciscan monk, Fra Luca Pacioli.¹ His book, titled *Summa de arithmetica, geometria, proportione et proportionalita* (Everything concerning arithmetic, geometry and proportion), contains thirty-six chapters which describe a system of bookkeeping by double entry which was in use in the Italian city of Venice.

With a feeling of condescension one begins what is, presumably, an elementary attempt by simple ancients to deal with the beginnings of a complex and demanding modern profession. Such presumption! Pacioli's outline of the proper use of the journal and general ledger could be used, with only minor alterations, by a bookkeeper working today. The writer was obviously not a "simple ancient." He was, in fact, one of the great mathematicians of his time.

The object of this paper is to acquaint the reader with Pacioli, and then review that section of the *Summa* entitled, "Of Reckonings and Writings" (*De computis et scripturis*), in which the double-

entry method of bookkeeping was set forth in detail for the first time.

Luca Pacioli was born around the year 1445 in Borgo San Sepolcro, a little town in central Italy. His family was one of modest means, and so young Pacioli was apprenticed to a merchant in the town. His religious training was acquired from Franciscan friars. In his early twenties, he became a tutor to the sons of the wealthy Rompiasi family of Venice. Later, he taught at the universities of Italy becoming the first professor to fill a chair in mathematics.

During his lifetime, Pacioli became learned in a diversity of subjects encompassing such areas as philosophy, theology, sculpture, painting, mathematics, and architecture—he was truly a "Renaissance Man." His life was one of fortunate circumstances: the guidance of Piero della Francesca, the famous painter who also was born in San Sepolcro; the friendship of fellow-student, Giuliano della Rovere, who later became Pope Julius II; access to the excellent library of the Duke of Urbino; the companionship of Leon Battista Alberti, well-known artist and

author with whom Pacioli lived for a while in Rome; a close friendship with the great Leonardo da Vinci; and the backing of a strong religious order, the Order of Franciscans Minor, which he joined in the 1470's. He became one of the most celebrated scholars of his day, a friend of seven successive popes, and associate of many great and powerful men.

Pacioli wrote his *Summa* for the purpose of summarizing existing knowledge of mathematics. The section

**...not a "simple ancient,"
but one of the great
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time.**

on bookkeeping was added almost as an afterthought. He explains its inclusion this way: "In order that the honorable subjects of the most gracious Duke of Urbino may have complete instructions in the ordering of business, I have decided to go beyond the scope of this work and add this most necessary treatise."² Pacioli makes clear that the system being described was not originated by him, but that "...the system employed in Venice will be adopted here, for it is certainly recommended above all others." While Pacioli did not invent double-entry bookkeeping, he was the first to bring the elements together into a coordinated system and present it in a printed work. It is for this he has earned the title, "The Father of Accounting."

How did Pacioli acquire such an amazing grasp of detail as is evidenced in his treatise? He was never a bookkeeper, and this has given rise to doubt that "he could have written on the subject with such clearness and wealth of detail without the help of some unknown author."³ However, it is quite likely that during his early apprenticeship, he observed the bookkeeping process or even assisted in it. He may also have thought it necessary to thoroughly investigate the subject during the period he served as tutor in the Rompiasi household in order to better instruct his young charges who would someday be expected to assist with their father's business affairs.

Pacioli begins his treatise by setting forth the "... three things necessary to one who wishes to operate a business successfully." He states: "The most important is cash, or some equivalent

economic power. The second... is to be a good accountant and a ready mathematician. The third... is that all the businessman's affairs be arranged in a systematic way so that he may get their particulars at a glance." The reader should keep in mind that Pacioli's work was not intended as a textbook; he was addressing his instructions to experts — the local merchants. His writings are interspersed with religious admonitions reflecting his Franciscan training: "But above all keep God before your eyes, never forgetting to attend to religious meditation every morning, as the holy verse says."; and are sprinkled with such advice as: "If each thing is not in its right place, great trouble and confusion will arise. As the saying goes, 'Where there is no order, there is chaos.'"

The businessman's first task is to prepare an Inventory. "Carefully record all personal property and real estate, item by item (even if there were ten thousand), entering their condition and nature, and whether deposited or loaned. Every item must be systematically recorded in the Inventory with all countermarks, full names, and in as much detail as possible. Because of the vast number of things that might occur, transactions can never be too clear to a businessman."

The entire inventory is to be completed on the same day...

Pacioli presents an example of an Inventory, parts of which are given next so that the reader can appreciate the author's style and attention to detail. Notice that the day, year, and place are recorded first. The entire inventory is to be completed on the same day, otherwise "there will be future difficulty in managing the business."

An Example of an Inventory with All Its Formalities

In the Name of God
November 8, 1493
Venice

The following is the Inventory of myself of Venice, Street of the Holy Apostles.

I have written down systematically, or have had written by Mr. Bookkeeper, all my personal and real property, as well as that which is owed me and that which I owe on this day.

First Item

I have cash composed of both gold and coin of so many ducats, of which so many are gold Venetians, so many gold Hungarians, and so many Papal, Siennese and Florentine large florins. The remainder consists of various kinds of silver and copper coins, that is troni, marcelli, and carlini of the Pope and of the royalty, Florentine grossi, and Milanese testoni.

...sapphires set for women, and unset rubies, and uncut diamonds...

Second Item

I have so many pieces of set and unset jewels among which are many rubies set in flat-surfaced settings and gold rings weighing so many ounces, carats, or grains per piece or in total, (you may express this in your own way). There are so many sapphires set for women, and so many unset rubies weighing so much. The remainder consists of uncut diamonds weighing in total so many points. Here you may describe the type and weight as you desire.

Third Item

I have clothes of so many kinds. You may describe their condition, colors, linings, and styles.

Seventh Item

I have goods of various kinds at home or in warehouses. There are so many marked cases of mechini ginger weighing so many pounds. Describe each kind of such goods in detail by their marks. Give in the most accurate manner their weights, numbers, and measurements.

Tenth Item

I have very fine Armenti seal skins and various sable skins of so many of each kind.

Carefully and truthfully describe each item in its turn. Let truth always be your guide. Carefully distinguish the items by numbers, weight, or

measurement, because it is customary everywhere to conduct business in these three ways. Certain things are classed by thousands, others by hundreds, others by pounds, others by ounces, others by number, others by unit (as with leather goods of skins), others by piece (as with jewels and fine pearls). Record each of them individually. These examples will guide you in determining other cases.

Eleventh Item

I have real estate of a house of so many stories, so many rooms, a courtyard, wells, gardens, and located on the street of the Holy Apostles over the canal, adjoining various specified places. Record the names of the adjoining properties, referring to the oldest and most reliable deeds available. If you have houses in other localities, enter them in a similar way.

Thirteenth Item

I have so many ducats on deposit with the Camera de l'Impresti and other Venetian banks, so many in the district of Canareggio, or part in one

Let truth always be your guide.

district and part in another. Give the names under which the ducats have been deposited, mentioning the book of the bank and the page number where your amount is stated. Give the name of the clerk who keeps the book so that you will be able to withdraw your money readily when you wish, because in such banks many accounts must be kept to serve the multitude that go to them. Carefully note the dates of their correspondence, so that you know the amount due you and what percentage they are answerable for.

Fourteenth Item

I have so many debtors. One is Mr. Buyer, who owes me so many ducats. Name the debtors by their full names, where they live, how much they owe, and why. Mention whether there are written papers or notarial instruments between you. Indicate that you have so many ducats of

good money to collect, which is the money due from reliable people. Otherwise, call their money bad.

Fifteenth Item

I have debts amounting to so many ducats. I owe so many to Mr. Seller. Give the names of your creditors in this way one by one. State whether everything is clear between you and if there are any written papers or instruments. Mention the persons present when the debt was incurred, how it was incurred, and the time and place; all these particulars may be necessary for any case in or out of court.

Notice that Pacioli arranges his assets in much the same order as they are listed on a modern balance sheet with cash and near-cash items listed first and then others of a more fixed nature. Notice also the labeling of bad debts in the Fourteenth Item.

Bookkeeping and The Summa

Memorandum, Journal, and Ledger

The merchant is advised to keep three books: the Memorandum the Journal, and the Ledger. The Memorandum is the book of original entry. Anyone who executes a transaction, whether an employee or member of the household, must enter in chronological order a complete explanation including the particular monetary unit used. No particular attention need be paid to form in the memorandum. Since there was no uniform monetary system in the Middle Ages, the bookkeeper's first task was to convert each item in the Memorandum to the monetary unit in which his accounts were kept. The Inventory, together with these entries, were then transferred to the Journal and there put in proper form for posting to the Ledger.

Beginning with the Journal, form became all-important. The debit is stated first, the credit next, with the explanation following — all in one continuous paragraph. There is only one column of money values. Pacioli carefully explains two terms: "Cash means the money on hand. Capital means the entire amount of what you now possess." And then goes on to give several examples of how the Inventory should be entered. Pacioli's first entry

follows:

8th day of November,
MCCCCLXXXIII, in Venice

First	Debit Cash, credit Capital of myself, Mr. Business man. At present I have cash in a certain place, consisting of gold, coin, silver, and copper of various coinage as shown on the first sheet of the Inventory, in total so many gold ducats and so many ducats in coin. In our Venetian money all is valued in gold, that is 24 grossi for each ducat and 32 piccoli for each grosso, and so many gold lire.
1	
2	

Value: lira, soldi, grossi, piccoli

The two numbers at the left indicate the page number of the debit and credit entry in the Ledger.

Pacioli now explains the use of the Ledger. He recommends that it contain an Index in which all debtors and creditors are listed in alphabetical order, together with the numbers of their respective pages. No explanation could be clearer than Pacioli's own: "Having numbered the pages of the Ledger and placed the date at the top right and left margin, enter Cash as a debit on the first page, as it is in the Journal. Reserve the entire first page for Cash; do not enter anything else as a debit or credit because cash entries are more numerous than all others. This is because money is almost continuously being received or withdrawn, therefore, it needs much space.

"Each of the entries made in the Journal must be posted twice in the Ledger, one to the debit and the other to the credit. In the debit posting, indicate the page number where the respective credit entry is to be found. All the items in the Ledger are cross referenced in this way, and you must never post a transaction to the debit without posting the related credit, nor must you ever make a credit entry without its respective amount being ready to be entered as a debit. The balancing of the Ledger depends on this. The books cannot be closed unless the debits equal the credits."

Ventures, Not Fiscal Periods

The modern practice of balancing at periodic intervals was not the custom during Pacioli's day; instead, each transaction was treated as a separate ven-

ture. As each venture was completed, its account balance was transferred to the Profit and Loss account. Uncompleted ventures were simply shown as a balance on the list of assets. This method of dealing with profit was the most convenient that could have been adopted for conditions of the times, and explains why bookkeepers did not keep a general goods account nor feel that it was necessary to balance at regular periods. Pacioli explains that a credit balance in the Profit and Loss account represents a profit, and a debit balance represents a loss "from which latter may God preserve every man who proves himself a true Christian."

The merchant is then instructed: "The Profit and Loss account will then be closed and transferred into the Capital account, which is always the last in all Ledgers. It is consequently the receptacle of all other accounts."

Trial Balance

Pacioli next explains the preparation of the Trial Balance. "So that everything regarding the closing will be clear, summarize all the debit totals that appear in the Ledger at the left of a sheet of paper,

a credit balance in the Profit and Loss account represents a profit, and a debit balance a loss "from which latter may God preserve every man....."

and all the credit totals at the right. Then sum all of the debit items (which is called the grand total), and likewise total all of the credit items (which is also called the grand total). The first is the grand total of the debits and the second the grand total of the credits. Now if the two grand totals are equal, you may conclude that the ledger was well kept and closed, ... However, if one grand total exceeds the other, it would indicate an error in the Ledger. This error must be searched out diligently..."

After balancing the Ledger, and before a new book is commenced, a careful comparison of the Journal and Ledger is to be made. Here is Pacioli's description of the process. "First, try to get a helper for it is difficult to do alone. Give the Journal to him for greater precaution, while keeping the Ledger for yourself. Then, beginning with the first entry in the Journal, tell him to call out the numbers of the Ledger pages

where the entry should have been posted, first the debit, then the credit. Always find the page in the Ledger that he calls and check to see that the entry (the kind, for what, whom, and the amount) he calls is the same. If it is the same, say so. Finding that it is the same in the Ledger as in the Journal, mark it off by checking or dotting it or placing any proper mark over the lire mark, or elsewhere, so that it can readily be seen. Ask your helper to make this mark (the one you use depends largely on the custom of your locality) in the Journal at the same entry. Take care that neither of you marks an entry without the other doing so, as great errors might then arise. Once an entry is marked it is assumed to be correct.

"Having proceeded in this manner through all the accounts in the Ledger and Journal, and having found that the debit and credit entries correspond, it will mean that the entries are properly placed and correct.

"Take care that your helper shall mark each entry in the Journal with two checks, dots, or other marks, while in the Ledger, you will make only one for each entry. This is because for every entry in the Journal there are two made in the Ledger.

"After finishing the checking of the Journal you find some account or entry which has not been checked off in the debit or credit in the Ledger, a mistake in the Ledger has been made. A superfluous debit or credit entry has been posted, and you should correct this error at once by posting a similar amount on the opposite side. If the superfluous entry was on the debit side, you would make similar entry on the credit side and vice versa, thus making everything correct.

"Should your helper find some entry in the Journal which is not found in the Ledger, an error in the Ledger has occurred. A correction should again be made, but in a different way. Immediately debit and credit the unposted entry to the Ledger, explaining the difference in the dates, for the entry would be made at a date much later than it should have been. A good bookkeeper should always mention these differences and why they are, so that the books are above suspicion.

"Sometimes entries are found in the Ledger which have not been checked to related entries in the Journal, because they cannot be found in the Journal. These represent the balances posted to the debit or to the credit to close ac-

counts carried forward. The correlative entries in the Ledger relating to these balances will be found on the page numbers indicated in these accounts. Finding the related entries in their proper places, you may conclude that your Ledger is in proper order."

In addition to those reviewed in this paper, Pacioli gives instructions covering such other subjects as Expense and Petty Cash account, Partnership and Agency accounts, and the proper precautions to take in dealing with public officials and with banks. He recommends that all documents be properly identified and filed, and even advises the businessman to keep a reminder book in which should be entered all things that he might forget, going over it each night before retiring, crossing off what has been done, and reviewing what is yet to be done.

Medieval Omissions

Enthusiasm for Pacioli may mislead the reader into thinking all accounting problems were anticipated by him at that early date, so consider some that were not dealt with in his treatise.

First, it was not the custom to compute profits annually. As a rule, books were closed and income determined on three occasions: (1) when the Journal and Ledger were full, (2) when a venture was completed, or (3) when the merchant died. There were several reasons for this lack of concern with the computation of annual profit. One was that more importance was placed on the ability of double entry to provide an orderly record of transactions rather than on its ability to report on the progress of the enterprise. This appears reasonable when it is remembered that the average business of the time was small and the owner-manager often was familiar enough with his business to forego the annual determination of income. It is also compatible with the venture-type transaction which was usually undertaken as a partnership and terminated at the completion of the venture. Many current procedures dealing with accruals, deferrals, and the distribution of burden are the result of the necessity to assign income to a particular time period.

Secondly, there were no provisions for financial statements. Form was more emphasized than summarized statements for control. The reason for such omission was the same as that given for the lack of annual income

determination; viz., the personal contact of the owner with his business.

Third, depreciation was not considered as a cost since the businessman did not attempt to assign the cost of his fixed assets to units of production, or to a series of productive periods.

Pacioli did not spend time theorizing; he was a practical man...

And finally, Pacioli did not spend time theorizing; he was a practical man intent on making available to his fellowmen the clearest possible instructions to guide them in the handling of their daily business affairs. To ensure the widest possible usage he had his treatise printed in Italian, the common language of the people, contrary to the custom of scholars of his day who published in Latin.

Enduring Concepts

On the other hand, many of the fundamental characteristics of the double-entry bookkeeping of Pacioli's day have remained basically unchanged.⁴ For example, the bi-lateral form which requires the grouping of like elements on one side, and related, but opposite, elements on the other so that subtraction by opposition is indicated resulting in a balance for the account.

The Trial Balance is still prepared from the Ledger by listing debit balances in one column, and credit in another. If the two columns have equal sums, the Ledger is in balance.

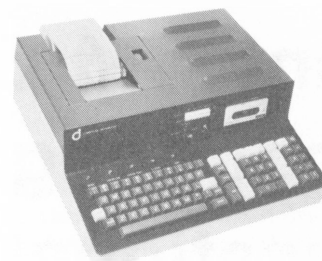
The sequence of bookkeeping operations remains the same: the entry of inventory; an original record of transactions; entry of transactions in the Journal arranged by debit and credit; posting into Ledgers; testing for balance; closing of the nominal accounts to Profit and Loss; and finally closing Profit and Loss to the Capital account.

It was inevitable that such a clear and practical guide as Pacioli's *De computis et scripturis* would become the standard. His treatise was translated into many languages and was widely used throughout Europe and the British Isles.

A reading of Pacioli's work is recommended to all newcomers to the field of accounting as a means of gaining proper historical perspective. It is also worthwhile for those already in the field.

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Today's public accountant often feels besieged and in danger of losing his equanimity. He is constantly harassed by taxing authorities, bankers, investment analysts, businessmen and politicians — all fighting for concepts that best serve their potentials for economic gain. Accounting concepts are, and probably always will be, under continuous attack and revision. In such an atmosphere, accountants can gain assurance from, and be justifiably proud of, their "ancestor" who advocated "...respect for the good bookkeeper."

Footnotes to Luca Pacioli

¹ Some controversy exists as to the correct spelling of Pacioli's name. Some writers maintain that the correct form is "Paciolo" rather than "Pacioli". For a discussion of the subject, several articles published in *The Accounting Review* are suggested: "The Name of Paciolo" by Alfred V. Boursy, July 1943, pp. 205-209; "Paciolo or Pacioli?" by Raymond de Roover, January 1944, pp. 68-69; "The Name of Pacioli" by R. Emmett Taylor, January 1944, pp. 69-76.

² Summa excerpts are from a translation in contemporary English: R. Gene Brown and Kenneth S. Johnston, *Paciolo on Accounting* (New York: McGraw-Hill Book Company, Inc., 1963).

³ Edward Peragallo, *Origin and Evolution of Double Entry Bookkeeping* (New York: American Institute Publishing Co., 1938), p. 56.

⁴ A. C. Littleton, *Accounting Evolution to 1900* (New York: Russell and Russell, 1966), p. 81.

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Editorial note:

Pacioli would have been astonished to have his story appear in a journal dedicated to women in the accounting profession because in his time education, of sorts, was a privilege limited to women of noble birth. A matter-of-fact revelation about the general illiteracy of women occurs in his discussion of the Memorandum Book when he admonishes the businessman to make sure that daily activities are recorded, even in his absence. Pacioli points out that the servants of the household can make the daily entries in the Memorandum, or they can also be made by the master's women if they know how to write.