

# The Earliest Statistical Tables in China

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**Abstract:** This paper discusses the embryonic forms, the compilations, and the evolution of statistical tables from Shang Dynasty (1 600–1 700 B.C.) to West Han Dynasty (206–8 B.C.) in China. This paper emphasizes the work of the Chinese historian Sima Qian who compiled ten chronological tables in 91 B.C., the earliest statistical tables ever known in China. These tables consist of a combination of words and figures and provide basic information about the Dukedoms under the reign of Han Dynasty emperors. Sima Qian laid down explicitly the basic forms of statistical tables including headings, item titles, units of measurement, sequence of events, shape of

table, and the name of the indicator. There seems to be little difference between these tables and the modern ones as far as the form is concerned. Sima Qian also put forward some theories about statistical tables. The theories and techniques of statistical tabulation created by Sima Qian have had a great influence on the development of science and culture in China.

**Key words:** Statistical tables, statistical data; *Book of History*; *Records of History*; chronological table, Sima Qian; tortoise shell inscription; tax rating.

Statistical tables are an important element in the presentation and analysis of statistical data. These tables are widely used for collecting, processing, analyzing, storing and transmitting data. Statistical tables make it possible to use large amounts of figures in scientific research and economic management.

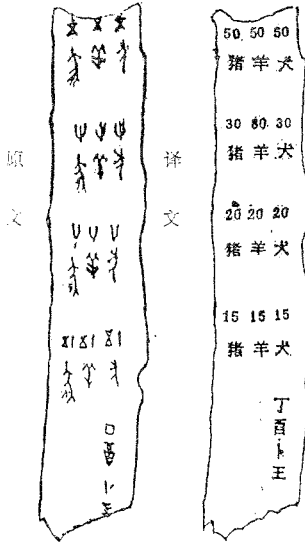
In this paper I will try to give some facts concerning the embryonic forms and the evolution of statistical tables in China.

## 1. Embryonic Forms of Statistical Tables in China

In China, rudiments of statistical tabulation can be traced back to the Shang Dynasty (16th – 17th century B.C.). Among the tortoise shell inscriptions of that period unearthed in 1899 near Anyang, Henan Province, there was a record of sacrificial livestock used by the king as offerings.<sup>2</sup>

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<sup>2</sup> Compilation of the First Part of the Engraved Writings Unearthed in the Yin Xuins, Vol. 3, Chap. 6, p. 23.



The original inscription, its transcription into modern Chinese characters and its English translation are provided below.

50 pigs	50 sheep	50 dogs
30 pigs	30 sheep	30 dogs
20 pigs	20 sheep	20 dogs
15 pigs	15 sheep	15 dogs

Divination of the Shang King,  
Year of Ding-You

It can be seen that, in this record, attention was paid to the classified arrangement of the data.

During the Warring States Period (475–221 B.C.), there were two texts referring to the use of statistical tables, namely, *Zhifangshi* and *Yu Gong*. The former was a chapter of *Rites of the Zhou Dynasty*, where it was written that “the *zhifangshi* was an official in charge of charts and household registration and must be well informed on the country’s figures about land, mountains, rivers, cities and towns, population, finances, grain, and livestock; he must let everybody know where the advantages and disadvantages were, so that all the nine-state country might strive for common benefit.”<sup>3</sup> The charts referred to here were primitive statistical tables.

In *Zhifangshi*, some general information was provided about the nine states in ancient China: their mountains, cities, rivers, lakes, products, population, livestock and crops. The eight categories mentioned above were displayed one by one in the sequence of the nine states. Of special interest is the sex ratio of the population in the nine states. The following figures are provided:

State	Sex ratio (male: female)	State	Sex ratio (male: female)
Yang	2:5	Yong	3:2
Jing	1:2	You	1:3
Yu	2:3	Ji	5:3
Qing	2:2	Bin	2:3
Yan	2:3		

*Yu Gong*<sup>4</sup> is an article in the *Book of History*, which is said to have been written by a Qin writer in the Warring States Period. It describes how matters stood in China in the period when Yu (the sovereign of the country who lived about the 21st century B.C.) fought the floods. The text also divides the country into nine states during the Xia Dynasty. The descriptions are similar to those in *Zhifangshi*. What is unique about this book is its classification of the farm land according to its fertility, as well as the taxes imposed on different states. Nine classes of land and taxes are identified.

Though statistical tables are not used in the below two texts, their expositions and their method of putting data together represent un-

<sup>3</sup> See note 62 of “*Zhifangshi*”, *Rites of the Zhou Dynasty*, Vol. 8.

<sup>4</sup> “The Taxes During Emperor Yu’s Reign”, in the *Book of History*.

State	Land fertility rating	Tax rating
Ji	upper upper	upper upper and middle upper
Yan	lower middle	lower middle
Qing	upper upper	upper middle
Xu	middle upper	middle middle
Yang	upper lower	middle lower
Jing	middle lower	lower upper
Yu	upper middle	upper and middle upper
Liang	upper lower	upper lower, middle lower, and lower lower
Yong	upper upper	lower middle

doubtedly the first step toward the development of tables later on.

## 2. The First Statistical Tables Compiled in China by Sima Qian in 91 B.C.

In his *Records of History*, completed in 91 B.C., Sima Qian (145–90 B.C.) of the Han Dynasty provided ten statistical tables: a genealogical table of the Three Ancient Dynasties (Xia, Shang and Zhou), a chronological table of 12 dukes and princes, a chronological table of six states (dukedom), a month-by-month table of events between the Qin and Chu States, a chronological table of dukes since the founding of the Han Dynasty, a chronological table of loyal ministers having rendered distinguished service, one of dukes during the period of Emperor Gaozu of the Han Dynasty, a chronological table of dukes of the Xiaohui-Xiaojing period, a chronological table of dukes since the Jianyuan period (one of the periods of reign of Emperor Wu of the Han Dynasty), a chronological table of princes of the same period, and a chronological table of noted generals and ministers since the founding of the Han Dynasty<sup>5</sup>. These are the earliest tables of statistics known in China and preserved up to our days. In the Appendix on page 43 we present one of the chronological

tables in its original form and Table 1 on the following page shows it in English version.

Let us have a look at the state of Bian. The Prince of Changsha had rendered distinguished service to the Dynasty. His son Wu Qian, therefore, was granted the title of Duke of Bian and enfeoffed with 2 000 households. He ruled the dukedom for 37 years (194–157 B.C.), namely, seven years during the reign of Emperor Xiaohui, the eight years of that of Emperor Gao, and 22 years during that of Emperor Xiaowen). He was succeeded by his son Wu Xin, who ruled the dukedom for six years and was succeeded in his turn by Wu Guangzhi, who was duke for 39 years. Wu Qianqiu, the great grandson of Wu Qian, ruled the dukedom for less than one year. His state was abolished because he had no son. The dukedom existed for a total of 82 years.

If we list only the number of households given to the dukes and the number of years their dukedoms existed, we will get the following table:

State*	Number of households given by the emperor	Number of years the state existed
Bian	2 000	82
Dai	700	83
Pingdu	1 000	48
Wu	500	69
Zhongyi	600	43
Leping	600	49
Chengtao	500	19
Liling	600	8
Yangxin	2 000	28
Zhi	10 000	40

<sup>5</sup> Sima Qian, *Records of History*, China Publishing House, Vol. 19, p. 978.

\* Here only ten of the 93 dukedoms are taken for example.

Table 1. Chronological Table of Dukes of the Xiaohui-Xiaojing Period

State	Bian	Dai	Pingdu
Merits for enfeoffment	Prince of Changsha, enfeoffed with 2 000 households	Chancellor of Changsha, enfeoffed with 700 households	Former general of the Qi State, having passed over to the Han Dynasty and being enfeoffed with 1 000 households
Reign of Emperor Xiaohui, 7 years (194–188 B.C.)	Sept., the 1st year, Wu Qian was granted the title of duke 7*	April, the 2nd year, Lichang was granted the title of duke 6	June, the 5th year, Liu Dao was granted the title of duke 2
Reign of Emperor Gao, 8 years (187–180 B.C.)	8	The 3rd year, Xi was granted the title of duke 2	8
Reign of Emperor Xiaowen, 23 years (179–157 B.C.)	The last 7th year, Xing was granted the title of duke 22 1	The 16th year, Pengzu was granted the title of duke 15 8	The 3rd year, Cheng was granted the title of duke 2 22
Reign of Emperor Xiaojing, 16 years (156–141 B.C.)	The 6th year, Guangzhi was granted the title of duke 5 11	16	The last 2nd year, duke Cheng committed crimes and his dukedom was abolished 14
From the Jianyuan period to the 6th year of the Yuanfeng period, 36 years (140–105 B.C.)	The 5th year of the Yuanding period, Qianqiu had not paid duly the sacrificial costs. The dukedom was abolished because he had no son. 29	The 1st year of the Yuanfeng period, duke Zhi, governor of Donghai, was guilty of mobilizing troops without authorization, and had his head cut off. His dukedom was abolished. 30	
After the Taichu period (104–B.C. –)			

\* The figures listed in the upper and lower right corner of each square show the length of the reign of the respective dukes during the period.

The Chronological Table of Dukes of the Xiaohui-Xiaojing Period is the seventh of the ten tables compiled by Sima Qian. It describes the basic events and conditions of the 93 dukedoms created during the period between the

first year of Emperor Xiaohui's reign and the 6th year of the Yuanfeng period of Emperor Wu's reign. Here only three of the 93 dukedoms are given as examples.

The tables made by Sima Qian already had the basic features of modern statistics. Sima Qian laid down explicitly the basic forms of statistical tables including headings, item titles, units of measurement, sequence of events, shape of the tables and the name of the indicators, etc. The tables are enclosed with thick lines on the margin, and thin lines are used inside. Top and bottom lines combined with horizontal and vertical ones inside make up a rectangular form. The old Chinese writing system follows the rule “from the top to the bottom, from the right to the left,” and this is also the way the words and figures are written in the tables. The heading is written to the right side of the table, and the item titles of the vertical and horizontal columns are written between the first two horizontal lines and the first two vertical lines, respectively. The objects being observed are classified according to their different nature, and they are listed under different titles, such as name of the state, number of households given to the duke, number of years of the duke’s reign, and the years of establishment and abolition of the state. Following this format, and following a certain sequence, the basic conditions and events of each state are recorded in the tables. In some of these tables, the names of the states are given in vertical columns, each state occupying one column. The number of households and the rise and fall of the states are also recorded. The time of the events is given in the horizontal columns, each period occupying a column. After having looked at the tables, you have an idea of the changes that took place in all these states.

### 3. The Theory About Statistical Tables Put Forward by Sima Qian

Sima Qian also put forward his theory about statistical tables. He said: “Confucians used to quote out of contexts, and persuasive talkers often indulged in exaggeration. They did not

seek to study the whole story comprehensively. Almanac writers only studied the years and the months, astrologers stressed predestination and fate, and heraldry specialists only made records of posthumous titles of emperors of different generations. All these records were simple and one-sided, making it difficult to view various important historical facts in a comprehensive way. For this reason, I have worked out a chronological table of 12 dukes starting from the Gonghe period of the Zhou Dynasty up to the Confucian period. I drew up tables of general information concerning the rise and fall of the states, events which had been used as allegory by scholars in the *Spring and Autumn Annals* and *Conversations from the States*. In this work, I avoided superfluous wording and tried to present the essentials, and I offered it as reference for those who engaged in academic research and political administration.”<sup>6</sup>

“I therefore followed the historical record of the Qin Dynasty and the example of the *Spring and Autumn Annals*. Starting from King Yuan of the Zhou Dynasty, I recorded all the events that happened in the six states up to the reign of the Second Emperor of the Qin Dynasty, covering a period of 270 years in total. The causes for the rise and fall of the states are explained. This record is left to future scholars for reference.”<sup>7</sup>

Here Sima Qian pointed out that statistical tables are useful for:

- 1) avoiding superfluous wording and depicting what is essential in a concise way;
- 2) organizing systematically and arranging rationally different important data, in order to make it easier to observe and compare them, and

<sup>6</sup> Sima Qian, *Records of History*, China Publishing House, Vol. 14, p. 511.

<sup>7</sup> Sima Qian, *Records of History*, China Publishing House, Vol. 19, p. 978.

3) facilitating the comprehensive study of the whole process of the march of events from the beginning to the end, as well as the laws governing its development.

Sima Qian's purpose in drawing up his tables was to provide general information about the rise and fall of the states as well as the management of state affairs. Such a theoretical view is still of importance today.

The theory and techniques of statistical tabulation created by Sima Qian have had a great influence on the development of science and arts in China, and have enabled a good many of China's famous scholars and practical workers to make important contributions in their academic and scientific research and state administrative activities.

#### 4. Some Evaluation Concerning the Statistical Tables Drawn Up by Sima Qian

Scholars of the past spoke highly of the statistical tables drawn up by Sima Qian. Liu Zhiji, a historian of the Tang Dynasty, said: "Looking at the tables drawn up by Sima Qian, I can see what happened throughout thousands of miles and nine generations of sovereigns, all condensed in an orderly way in a small table of a few square inches. Have a look at the tables, and you will know exactly what you want to know."<sup>8</sup>

Zheng Qiao, another noted historian of the Song Dynasty, said: "In drawing up these tables, Sima Qian made use of only six of the 60 combined pairs of the ten Heavenly Stems and the twelve Earthly Branches, beginning

from the first of the ten Heavenly Stems, to record events chronologically. The other 54 pairs were not used. With only a few words he managed to convey what was essential in the events, which means that once the essential thing is grasped, everything falls into place."<sup>9</sup> Then he talked about the importance of statistical tables. He said: "You can do without statistical tables if you just want to indulge in empty talk. But you cannot do without them if you really want to accomplish anything." And he ascribed the failure of many scholars and politicians after the Han Dynasty to their inability to use statistical tables.

#### 5. Summary

In his *Records of History*, completed in 91 B.C., Sima Qian (145–90 B.C.) of the Han Dynasty provided ten statistical tables. Examples are: a genealogical table of the Three Ancient Dynasties, a chronological table of six states, etc. These are the earliest tables of statistics ever known in China. Sima Qian also put forward his theory about statistical tables in his *Records of History*. He pointed out that statistical tables serve as an important means for the presentation and analysis of statistical data, facilitating the study of the whole process of the march of events from the beginning to the end, as well as the laws governing its development.

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<sup>8</sup> Liu Zhiji, Notes and Reflections on a Variety of Matters.

<sup>9</sup> Zheng Qiao's illustrative plates in *Comprehensive History*.

Appendix

A Chronological Table of Dukes in the Huijing Period in the Original Chinese

东海。 县名，属 平部 索隐 户。	以齐将高祖三 年降，定齐，侯千 亥，孝侯刘到 元。	江夏也。 县名，在 欽音大， 索隐 音大。	鞞音大， 索隐 音大。	鞞 集解 户。	便 索隐 千户。	汉志县 名，属桂 阳，音鞭。	侯功 长沙王子，侯，二 千户。	国名
将已上孝惠时 三人也。 索隐 故齐	五年六月乙 亥，孝侯刘到 元。	作（秋侯朱 仓）故长沙相。	二年四月庚 子，侯利仓元 年。索隐汉书	六年 二年四月庚 子，侯利仓元 年。	元。侯吴浅元 年。	元。侯信 年，恭	七年 元。侯吴浅元 年。	孝惠七
				二年四月庚 子，侯利仓元 年。				高后八
	八二 三年，侯成 元。		侯翳 元。	六十五 十六年， 侯彭祖 元。		后七 年，恭	八二十二 后七	孝文二十三
罪，国除。 侯成有 后二年，	后二年， 侯成有			十六 十六年， 侯彭祖 元。		元。侯广志， 前六年，	十五 前六年， 侯广志，	孝景十六
				十六三十 元封元 年，侯秩 为东海 太守，行 过不请， 擅发卒 兵为卫， 当斩会 赦。国除。		元。侯千 秋坐爵 金国除。	十一二十八 元鼎五 年，侯千 秋坐爵 金国除。	建元至元封 十年三十六
								太初已后

惠景间侯者年表年第七

