Siyāqat was a popular system for keeping financial accounts in some Middle-Eastern countries in the Islamic period. In this article, the origin of Siyāqat and of its name is mentioned. Based on historical references, it is shown that Siyāqat was an arabicized form of the pre-Islamic Iranian accounting system. This fact is reconfirmed by showing the similarity between the mathematical structures of Siyāqat and the pre-Islamic Iranian numeration system. Two main branches of Siyāqat, cash and kind, are described. Information on the earliest extant samples of Siyāqat, and on modern researches and publications on the subject is provided.

Introduction

Siyāqat or Siāq was a particular method used in Iran and some other Middle-East countries for writing numbers in financial records to represent amounts in cash or in kind. There remain many historical documents containing accounts registered in Siāq from the Qājār dynasty who ruled Iran for about one and half century down to 1925, and from the Ottoman Empire that lasted about six and half centuries, ending in 1922. Siāq was used to keep the financial accounts of everyday business of ordinary people, merchants, and the courts.

Siāq used to be taught in Iranian old-fashioned elementary schools, and it continued to be taught in modern schools down to the 1930s. It is no longer taught now. However, some old merchants and a few scholars dealing with historical documents are familiar with it. There are many manuscripts about the Siāq method in the libraries of Iran, some of which were lithographed, mainly in the Qājār period.

In 1915, an Iranian scholar, Hossein Kazem-zadeh Iranshahr published a French article on Siāq entitled “Les chiffres Siyāk et la comptabilité persane” in RMM. In 1952, Prof. Walther Hinz (1906–1992) published in Wiesbaden a Persian work on Siāq entitled Risāla-yi falakiyya, composed by ‘Abd-Allāh b. Muḥammad b. Kīā-al-Māzandarānī around 865/1460. Under Prof. Hinz’s supervision, other treatises on the subject entitled Shams al-hisāb, Qānūn al-saʿāda and Saʿādat-nāma, were edited and published by his students. A major contribution to Siāq was by the Hungarian...
scholar Lajos Fekete who published a precious work in German on Ottoman Siāq, in 1955. During World War I, Fekete was captured and sent to concentration camps, where he learned Turkish from other captives. After freedom, he began his research on the Ottoman period financial documents in Hungary and other European countries. His two-volume work contains photos of about one hundred documents with their transliterations and translations. A facsimile publication of an 18th-century treatise entitled Majma' al-argām ("Collection of numerals") by Mirzā Bādi'-Diwān, containing ample data about the use of Siāq at the court of Bukhara, edited and commented with a Russian translation by A. B. Vildanova, appeared in 1981 (see References).

History

After the Arabs' conquest of Iran in the 1st/7th century, they needed the help of Iranian experts to run their administrative affairs. On the other hand, the Iranians intended to penetrate the Arab administration in order to save the Iranian civilization legacy, as much as possible, and to assimilate the new rulers. Apparently this design turned out to be more efficient than local armed resistance to Arabs. Until the last decades of the 1st/7th century, the Arab government's financial accounts were kept by Iranians and according to the pre-Islamic Sasanian methods. Then, the Arabs, after having firmly established their sway, decided to convert the financial accounts from Persian into Arabic. Even for this purpose, they needed Iranian experts who were familiar enough with the Arabic language.

According to the 3rd/9th century Arab historian Baladhuri in his Futūḥ al-buldān, this conversion was carried out by Šāliḥ b. ʿAbd al-Raḥmān (d. about 90/708-9), an Iranian scribe in the service of Ḥajjāj b. Yūsuf (d. 95/713-4) whom ʿAbd al-Malik Marwān had nominated as the ruler of ʿIrāq. An Iranian scribe, Zādān Farrukh son of Piri, who had introduced Šāliḥ to Hajjāj, strongly opposed this conversion. After Zādān Farrukh died in 84/703-4, his son Mardānshāh argued with Šāliḥ that the conversion was impossible; further, some Iranians wanted to pay 100,000 dirhams to Šāliḥ in order to prevent him from executing his plan. However, he insisted on carrying out the ruler's scheme. After Šāliḥ accomplished his mission, Mardānshāh cursed him for his treacherous anti-Iranian attempt (Baladhuri, pp. 300-1). The official accounts of Syria under the Caliph ʿAbd al-Malik Marwān were converted from Greek into Arabic around the same time (Baladhuri, p. 193). The similar conversion was made much later in other districts of the Islamic territory; for example, it took place in the province of Khurāsān in eastern Iran 40 years later, i.e., in 124/741-2 (Jahshiyārī, p. 67), and even later in Isfahān by an agent of Abū Muslim Khurāsānī (d. 137/754-5) (Ibn Rustah, pp. 196-7). The earliest records of Siāq relate to the financial accounts written by ʿAlī b. ʿIsā for the Abbasid Caliph al-Muqtadīr bi'llāh in 306/918-8 (Kremer).

Siāq or Siyāq is an Arabic word, originally meaning "style", "method" and also "to drive, to lead and to arrange". The earliest extant reference to this term is
found in *al-Fihrist* (composed in 377/987–8) by Ibn al-Nadîm, who just mentions “Sîaq”, besides the religious books written by reed pens (Ibn al-Nadîm, p. 22). Elsewhere (ibid., p. 303) he repeats the story related by Baladhuri. The description of the nature of Sîaq is given in the *Ta’rikh-i Fakhri* (“Fakhri History”) by Ibn Tıqtaqa who flourished in the second half of the 7th/13th century. He says that the Mongol rulers supported the sciences of Sîyâqat, medicine, and astronomy – in his own words: ‘îlm al-siyâqat wa ‘l-hisâb li-žabt al-mamlakat wa hašr al-dakhṭ wa ‘l-kharj (“the science of Sîyâqat and accounting to keep the country and to determine the incomes and expenses”) (Ibn Tıqtiqa, p. 22). Elsewhere (p. 146), he writes that in the time of the Umayyad caliph ʿAbd al-Malik Marwân (gov. 65/684–5), the official accounts were converted from Persian into Arabic and the style of Musta’rabin was innovated. This term refers to non-Arab peoples who had adopted the language and customs of the Arabs, and imitated their characteristic manners. Ibn Tıqtaqa refers to the new method as Sîyâqat al-musta’rabin which was later abbreviated as Sîyâqat and Sîaq.

Nâşir-i Khusraw (1003–1088), the great Iranian poet, prose writer and Ismâ‘îli thinker, has a reference to Sîaq in his *Safrnâma* (“Travel account”). He narrates that in 437/1045–6, he once attended a lecture by ʿAlî Nasawi in Simnân, east of Tehran. ʿAlî Nasawi said: “I know nothing about Sîaq and I would like to learn some arithmetic”. Nâşir was astonished, and thought: “Knowing nothing, how can he teach?” (Nâşir-e Khusraw, p. 3).

An early example of Sîaq is found in a treatise entitled *Dastâr-i dabîrî* (“The rules of secretarship”) by Muḥammad b. ʿAbd al-Khâliq Mihâni, composed in 585/1188–9, during the Seljukid period (ms. Fatih 4074, fol. 99b, Istanbul). In an encyclopedic work entitled *Nafâ’is al-funi’n fi ʿarâ’is al-ʿuyûn* by Shams al-Din Muhammad b. Mahmûd ʿAmûlî (8th/14th century), there is a short chapter on writing the integers and fractions in Sîaq (*ʿAmûlî, vol. 1, pp. 303–11*). Ghiyâth al-Dîn Jamshïd al-Kâshi, a prominent Iranian mathematician of the 9th/15th century, has referred to the official accountants who used Sîaq, in the first and 12th sections of the second book of his great mathematical work *Miṣfâh al-hisâb*, where he describes the multiplication of the fractions dâng (1/6), tasûj (1/24), and shaʾr (1/96) (al-Kâshi, pp. 42, 59). Again, in the fifth book, where he gives forty examples of miscellaneous mathematical problems, he also gives the solutions in Sîaq, in the 21th, 28th, 29th, and 30th examples which deal with cash quantities (id., pp. 219, 231, 234, and 235).

This list of the works written in Sîaq or about the Sîaq method is by no means exhaustive.

Sîaq continued to be used and improved in Iran, and it was transmitted to some Arab countries, Egypt, Asia Minor, India and China. In China, it was called isti-fi, probably from Arabic istifâ (“administration”). The Indian official records were converted from Indian into Sîaq in the 16th century. In Iran, after the revolution of 1906 which led to the establishment of a constitutional regime Sîaq was officially abolished.

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In the conversion of official accounts from Persian into Arabic, the Sasanian Pahlavi numerals were substituted by relevant Arabic words in their stenographic form. However, the mathematical structure of the numeration system was preserved. The Pahlavi numeration system belonged to the group of the ciphered numeration systems which are essentially different from Hindu-Arabic positional numeration system, presently used all over the world. In the ordinary Hindu–Arabic decimal system, all numbers are registered using just 10 symbols or digits, and each digit has a value depending on its position or order in the whole number. In the ciphered numeration systems, there are symbols for 1, 2 ... up to 9, then for 10, 20 ... up to 90, then for 100, 200 ... up to 900, and so on. In these systems, the value of a number is merely the sum of the absolute values of the symbols that constitute it. The Pahlavi numeration system was actually an incomplete ciphered system in which, e.g., 12 was written as $\text{بیپنا}^2$ and 6 was written as twice the symbol for 3: $\text{یپنا}^2$. The same additive system is used in Siāq where 12 is written as $\text{یپنا}$. Moreover, in Siāq as in Pahlavi numeration, the symbols used for multiples of 100 and 1000 are formed by multiplicative combinations of the symbols for 100 or 1000, and the relevant coefficient. For example, in Pahlavi, 200 is written as $\text{یپنا}^2 \text{یپنا}^2$ where $\text{یپنا}^2$ stands for 2 and $\text{یپنا}^2$ for 100. By a similar combination, 2000 is written as $\text{یپنا}^2 \text{یپنا}^2 \text{یپنا}^2$ where $\text{یپنا}^2$ stands for 1000. Similarly, in Siāq, the multiples of 100 and 1000 are written by using the symbols $\text{یپنا}^2$ and $\text{یپنا}^2 \text{یپنا}^2$, with the relevant coefficients.

Another point of similarity is the form of the symbols for 1000 in Pahlavi and in Siāq, which are written as $\text{یپنا}^2$ and $\text{یپنا}^2 \text{یپنا}^2$, respectively. Both are possibly related to the Arabic word $\text{الف}$ for thousand, because of the Semitic origin of the Pahlavi alphabet. Therefore, mathematical similarity confirms the historical accounts of the pre-Islamic Iranian origin of Siāq.

Siāq was divided into two branches: Siāq for cash amounts (siyāq-i naqdi) and Siāq for amounts in kind (siyāq-i jinsi). In Siāq for cash amounts, the numbers actually showed dinars. For showing other quantities, such as weights, a slight change was made in their left end. For example, 10 dinars was written as $\text{یپنا}^2$, while 10 mans (30 kilograms) was written as $\text{یپنا}^2$, and 10 kharvārs (3,000 kilograms) was written $\text{یپنا}^2$.

As it is well known, the Iranian mathematicians played an important role in transmission, advancement and propagation of the Hindu-Arabic numerals. This rises the following question: Why did they not use it for financial and administrational affairs? The same phenomenon is observed down to World War II, in the case of the Iranian zijes and calendars which were written in abjad numerals taken from the Arabic alphabet in their original Phoenician order which is still kept in Hebrew alphabet. The answer may be found in the reason given by recent advocates of Siāq that, when documents and books were written by hand, the ciphered systems of Siāq and abjad, were less subject to deliberate or unintentional alterations, while in working with the Hindu-Arabic numerals, for example, by simply adding a zero, a noticeable change in the registered amount was possible. In the Risāla-yi falakiyya, there is a chapter on

Hindu-Arabic numerals. However, the author mentions that this system is not used in accounts, because it is dependent on “points”, so some flaws may occur in it (al-Mázandarâni, p. 24).

References


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