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ABACUS The abacus has taken several physical forms: a board covered with dust or wax, or simply a patch of sand on the ground which could be marked out; a tabulation or table marked out in columns within which counters (usually discs but in China bamboo rods) could be placed and moved about; a series of grooves in which counters could slide; and a frame with rods or strings on which beads could be strung so as to slide along.

These all have in common a principle of 'placing'. The columns or rods represent units, tens, hundreds, thousands, and so on. Or they may represent units of currency of increasing value, such as the former English pence, shillings, and pounds. A counter placed in the units column represents one, in the tens column ten, and in the hundreds column a hundred. Calculations then could be performed relatively mechanically by literally adding to or taking away counters. To multiply was to perform successive additions, to divide, successive subtractions. Many more sophisticated techniques evolved for performing the arithmetical manipulations, with accessory aids such as multiplication tables being found in the manuscripts. But the only fundamental rule which had to be grasped was that of the hierarchy of columnar values.

An abacus working on this system was commonplace in the Mediterranean world several centuries BC. The Greek historian Herodotus in the fifth century says that the Egyptians arranged their columns from right to left while the Greeks worked in the opposite direction. Roman authors mention the abacus too, describing the sand or dust board, or its variant the wax tablet, the table with lines drawn on it, and also the board with grooves. Examples survive.

In the Middle East, a rod (or wire or string) and bead abacus was the normal type. This is also found in Russia. In the Far East the Chinese at first (from at least 600 BC) seem to have used bamboo rods instead of round counters and to have drawn up the board differently. This method spread to Korea and Japan, where it persisted for centuries. The Chinese themselves adopted a bead abacus in about the twelfth century, which evolved and in its turn made its way to Japan.

Mathematically and conceptually speaking, some of the most advanced work was done after the importation into the West of Arabic works on the abacus from the tenth or eleventh century. This was also the period of transition from the use of Roman numerals to the actual adoption of

Arabic numerals in northern Europe. The numerals had been known since the end of the tenth century, partly through the work of Gerbert of Aurillac (Pope Sylvester II). We find manuscripts describing the abacus and how to use it still employing counters with Roman numerals until several generations after his death, however.

The crucial addition in shifting thinking on to new ground was the counter for zero. This first appears in these texts with various names (such as *sipos*, *rota*) along with the Arabic numerals, in a purely decorative row at the tops of the columns. It then became apparent that if a counter was placed in a column to represent zero, and Arabic numerals used, the columns themselves ultimately could be dispensed with, for it became possible to write, say, 306, with a built-in 'placing' of the units, tens, and hundreds.

It is puzzling that these Western mediaeval abacus treatises normally give twenty-seven columns. It would thus be possible to calculate very large numbers with their aid, far bigger than any figure for which contemporaries can conceivably have had a use. There was some discussion of fractions in the same treatises, and a general indication that the interrelationships of numbers were beginning to be more thoroughly understood. Boethius' *Arithmetica* was still the theoretical treatise of choice, but these practical manuals sometimes import scraps of his work into their introductory discussions. The *rithmochachia*, a mediaeval arithmetical board-game which uses the Boethian patterns, is commonly found with treatises on the abacus of this location and period.

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See also: Computation: Chinese Counting Rods

MADDE YATIMLANDIKTAN
SONRA GELEN DOKÜMAN

— Abacus.

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CORRESPONDENCE IV.—ÇORTKA

Das Kanboh and Chandra Bhan Barahman (d. 1068/1657-58). *Enšā'-e Harkarn* provides useful evidence on the drafting of official correspondence in the Mughal chancellery. Chandra Bhan was a more significant literary figure; although he adopted traditional Persian forms, he maintained his identity as a Brahman, and Hindu beliefs and ways of thought are common in his work in all genres. His *Monša'āt-e Barahman* (cf. Edinburgh University library, ms. 334) is a collection of petitions addressed to Shah Jahān; *Čahār čaman* (Four meadows; British Library, ms. 1892) is a collection of his *roqa'āt* and *enšā'*. Barahman wrote succinct and sober prose, though with considerable ease and fluency, apparently in imitation of the style of Sa'dī's *Golestān*. He did not indulge in secretarial pomposity, nor did he emulate the flowery diction and majesty of Abu'l-Faẓl. His influence can be perceived in the epistolary compositions of later Hindu *monšīs*, like Bal Krishn Barahman and Ānand Rām Mokleş (q.v.).

Abu'l-Barakāt Monīr, or Mollā Monīr, Barahman's friend and admirer, was a prominent poet and prose stylist (*enšā'-pardāz*). Like most *monšīs* in the time of Shah Jahān he was essentially a dilettante, who wrote in a very ornate style (see, e.g., *Enšā'-e Monīr*). Others in his circle included Toḡrā Mašhadī, 'Abd-al-Qāder Bidel, Qatīl, and Mīrzā Asad-Allāh Gāleb, all admirers of the style of Amīr Kōsrow and his follower Mollā Zohūrī (see above), whose *Se naṭr-e Zohūrī* and *Panj roqa'āt* they considered models of pedantic *enšā'* and *tarassol* respectively. Among this group eloquence (*fašāḥat*) meant indulgence in rhetorical devices, a diction chosen to match the rhythm of the phrases, and the revival of literary artifice.

With the decline of the Mughal empire in the later 17th century both prose and poetry became more affected and insipid. The decadence of the Persian language in Indian literature generated a controversy between Persian and Indian connoisseurs, focused on the prevailing idiom and proliferation of *monšīs*, particularly Hindus. The pretensions of Persian immigrants and visitors to literary superiority were countered by such Indian writers as Mawlānā Monīr Lāhūrī, Moḥammad-Šāleḥ Kanboh, and Mollā Šaydā Fatḥpūr. Mīrzā Jalālā Ṭabāṭabā'ī, author of *Riāz al-fayz*, a treatise on epistolography, and *Enšā'-ye Jalālā Ṭabāṭabā'ī* (Āṣafīya Library, Hyderabad, *Fehrest* I, p. 132 no. 20), considered himself a more elegant chronicler than Abu'l-Faẓl, but he had to discontinue work on his *Šāh-Jahān-nāma* owing to rivalry at court. It was in connection with this controversy over style that critical dictionaries began to be compiled by Indian authors, mostly Hindus.

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(MOMIN MOHIUDDIN)

ÇORTKA (or *čortaka*, *čotka* < Russ. *schety* "abacus"), an ancient calculation device, a rectangle strung with parallel metal wires along which clay, metal, or wooden beads can be moved. It is still used in the Middle East. There appears to be no reference to such abacuses in surviving early Persian writings, but Ḥamd-Allāh Mostawfī (13th-14th centuries; *Nozhat al-qolūb*, p. 42) made reference to a calculating device called *taḳta-ye farangī* that may have been similar to the *čortka*. According to him, it was Avicenna (q.v.) who introduced the use of "finger calculations" (*ḥesāb al-'oqūd*), which relieved mathematicians of the inconvenience of counting beads (*mohra-šomārī*) and the use of other devices (*dīgar maṣṣūbahā*) like the *taḳta-ye farangī*. The term *taḳta-ye farangī* suggests that the device was probably introduced from the West; it is not, however, found in any early Persian encyclopedia or dictionary.

Although it is slowly being replaced by modern calculators, the *čortka* is still in use among shopkeepers, cashiers, and farmers in rural villages. It is used in some government offices and agencies as well. Normally the rectangular frame is strung with twelve horizontal wires. The first wire on the right is strung with four wooden beads, the second and third with ten each, the fourth with four, and the other eight with ten each. Normally the color of the two central beads on each wire (the second and third beads on the wires with four beads and the fifth and sixth beads on those with ten) is black, in order to assist in rapid and correct manipulation during calculations. On some smaller examples colored rings are used instead of beads. Generally the frame is open on both sides, but in some smaller *čortkas* a thin sheet of wood closes one side, as in a shallow box.

Before the adoption of the riyal as the Persian monetary unit five beads on the second string were equal to

در ۱۲۹۹، چرام خالصه دولت بود که در مقابل مبلغی به نصیرالملک شیرازی واگذار شد و او نیز بعد از مدتی چرام را به بختیاربها فروخت (ضرابی، ج ۹، ص ۲۹۹؛ نیز غفاری، ص ۳۶). فسانی در تاریخ فارسنامه ناصری (ج ۱، ص ۲۷۳)، قصبه آن را ناحیه تلگرد در ده فرسخی بهبهان آورده و ناحیه ریون را سردسیر و ناحیه بلاد شاپور را گرمسیر وصف کرده است. در زمان پهلوی اول، بختیاربها چرام را به موسوی (رئیسالتجار) اجاره دادند و او نیز آن را به چرامبها اجاره داد. این قرارداد تا ۱۳۲۰ ش برقرار بود. پس از آن، خانهای چرام آنجا را رسماً تصرف کردند. بعد از ۱۳۲۲ ش، مدتی چرام در اختیار عبداللّه‌خان ضرغام‌پور بود و پس از ۱۳۲۳ ش در اختیار چرامبها قرار گرفت (ضرابی، همانجا). در ۱۳۴۱ ش، املاک چرام مشمول قانون اصلاحات ارضی شد و به کشاورزان واگذار گردید (غفاری، ص ۳۹).

۳) ایل چرام. از ایلات لر زبان منطقه بویراحمد در استان کهگیلویه و بویراحمد که در منطقه‌ای به وسعت ۶۱۱۵۰ کیلومترمربع به سر می‌برند. نیمه غربی این منطقه، گرمسیری و نیمه شرقی آن سردسیر است. منطقه گرمسیری چرام پرآب‌ترین و حاصلخیزترین منطقه کهگیلویه است (صفی‌نژاد، ۱۳۴۷ ش، ص ۴۵).

ایل چرام از ایل چهار بنیچه از طایفه جاکی کهگیلویه است (فسائی، همانجا؛ اقتداری، ص ۳۴۹). این طایفه چندین محل از ناحیه بلاد شاپور و ناحیه ریون کهگیلویه را تصاحب نموده که به ناحیه چرام مشهور گشته است. تیره‌های این طایفه عبارت‌اند از: بگلر بناری، پروخوری، تارمونی، حسام بهاء‌الدینی، دیلگون، شیخ گلبار، گشتاسب، کمان‌کشی و مسیح‌شاهی (فسائی، همانجا).

در دوره صفویه، گشتاسبیها به دلیل اعتقاد به مذهب شیعه، از وفادارترین حامیان صفویه بودند و سلاطین صفوی نیز از آنان حمایت می‌کردند، اما نادرشاه، پس از به قدرت رسیدن، گشتاسبیها را به فارس کوچاند که در جریان این کوچ برخی از گشتاسبیها در منطقه چرام (قلعه کَر) و برخی دیگر در منطقه خیرآباد (قریه گراب) ساکن شدند (تقوی مقدم، ص ۸۲).

در ۱۳۰۲ ش، منطقه چرام بین دو کلاتر، حسینقلی‌خان و امان‌الله‌خان، تقسیم گردید. حسینقلی‌خان در قلعه تلگرد و امان‌الله‌خان در قلعه کَر و تل‌بابونه مستقر شدند. این کلاتران به منظور حفظ ایل خود از تهدیدات ایلات هم‌جوار، به‌ویژه ایل بویراحمد، با حکومت رضاشاه برخوردی نداشتند و در صورت

لزوم با آنها همکاری هم می‌کردند (همان، ص ۳۳۲-۳۳۳). در ۱۳۱۵ ش، به دستور حکومت مرکزی، همه عشایر منطقه، از جمله عشایر منطقه چرام، مجبور به اسکان شدند (صفی‌نژاد، ۱۳۶۶ ش، ص ۴۳).

منابع: ابن‌بلخی؛ بدالله افشین، رودخانه‌های ایران، تهران ۱۳۷۳ ش؛ احمد اقتداری، خوزستان و کهگیلویه و ممسنی: جغرافیای تاریخی و آثار باستانی، تهران ۱۳۵۹ ش؛ بنوار الیما، وار: زبان، ادبیات، تاریخ و فرهنگ قوم بختیاری، تهران ۱۳۷۹ ش؛ ایران. وزارت کشور. معاونت سیاسی. دفتر تقسیمات کشوری، نشریه اسامی عناصر و واحدهای تقسیماتی (به همراه مراکز)، تهران ۱۳۸۴ ش؛ همو، نشریه تاریخ تأسیس عناصر تقسیماتی به همراه شماره مصوبات آن، تهران ۱۳۸۲ ش؛ مصطفی تقوی مقدم، تاریخ سیاسی کهگیلویه، تهران ۱۳۷۷ ش؛ عباس جعفری، گیتاشناسی ایران، تهران ۱۳۶۸-۱۳۷۹ ش؛ محمد میرکین مسعود حسینی منشی، زیاض الفردوس خانی، چاپ ایرج افشار و فرشته صرافان، تهران ۱۳۸۵ ش؛ حمدالله مستوفی، نزهةالقلوب؛ رزم‌آرا؛ جواد صفی‌نژاد، اطلس ایلات کهگیلویه، تهران ۱۳۴۷ ش؛ همو، «عشایر و کوچی: بررسی وضعیت کوچ در عشایر کهگیلویه و بویراحمد»، فصلنامه عشایری ذخائر انقلاب، ش ۱ (زمستان ۱۳۶۶)؛ منوچهر ضرابی، «طایفه کهگیلویه»، فرهنگ ایران زمین، ج ۹ (۱۳۴۰ ش)؛ یعقوب غفاری، شناسنامه ایلات و عشایر کهگیلویه و بویراحمد، تهران ۱۳۷۴ ش؛ فرهنگ جغرافیایی آبادیهای کشور جمهوری اسلامی ایران، ج ۹۱ بهبهان، تهران: سازمان جغرافیایی نیروهای مسلح، ۱۳۷۰ ش؛ حسن‌بن حسن فسانی، تاریخ فارسنامه ناصری، چاپ سنگی تهران ۱۳۱۲-۱۳۱۳/۱۸۹۵-۱۸۹۶، چاپ افست [۱۳۴۰ ش]؛ هایتس گاربه، ارجان و کهگیلویه: از فتح عرب تا پایان دوره صفوی، ترجمه سعید فرهودی، چاپ احمد اقتداری، تهران ۱۳۵۹ ش؛ نورمحمد مجیدی کرانی، تاریخ و جغرافیای کوهگیلویه و بویراحمد، تهران ۱۳۷۱ ش؛ مرکز آمار ایران، سرشماری عمومی نفوس و مسکن ۱۳۷۵: شناسنامه بخشهای کشور، کل کشور، تهران ۱۳۷۸ ش؛ همو، سرشماری عمومی نفوس و مسکن ۱۳۷۵: نتایج تفصیلی کل کشور، تهران ۱۳۷۶ ش؛ نقشه تقسیمات کشوری جمهوری اسلامی ایران، مقیاس ۱:۳۰۵۰۰۰، تهران: سازمان نقشه‌برداری کشور، ۱۳۸۳ ش.

۱ تصویر منسوری.

چرتکه، وسیله‌ای کمکی برای نمایش عدد و انجام دادن عملیات ساده حسابی. در این ابزار، میله‌های موازی مسطح شده در یک قاب چوبی، متناظر با ارزش مکانی رقمها، و مهره‌های حرکت‌کننده بر روی آنها بیانگر رقمهای تشکیل‌دهنده عدد هستند. نام چرتکه از واژه روسی سچتی گرفته شده است (دهخدا، ذیل واژه «خرهنگ روسی

4815- ^{- Abacus} Gandz, S., "Did the Arabs know the abacus?", *Amer. math. monthly*, 1927, 34: 308-16.

Shows that despite views of earlier historians of mathematics Muslims did have the abacus.

نشان می دهد که علی رغم نظریه مورخان ریاضی در گذشته مسلمانان دارای چرتکه بوده اند.

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13 ABALIK 1995