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PAPER II. PAPER AND PAPERMAKING

PAPER

ii. Paper and Papermaking

PAPER AND PAPERMAKING (*kāḡaḏ wa kāḡaḏ-sāzi/kāḡaḏgari*), a survey of the paper industry in Iran in recent centuries.

Before the introduction of the art of papermaking in Persia, records were kept mostly on clay tablets under the Achaemenids (550-330 B.CE) and later also on papyrus. Other materials used included metal and stone. Under the Parthians (ca. 247 BCE-224 CE) and Sasanians (224-651 CE), the main vehicles for record keeping were papyrus and parchment-vellum or *diphtéra*, as it was referred to in Persia with the Greek word for skin and parchment, a word that is still used in modern Persian as *daftar* or notebook. By 650 CE, the Persians started to import Chinese paper made from the bark of the mulberry tree, though it was so rare a commodity that it was only used for important state documents (Ghirshman, pp. 48-49, 163-64; Laufer, pp. 559, 563).

Jonathan Bloom has argued recently that the story of the introduction of paper into Persia by Chinese papermakers captured after the battle of Talas (Ṭarāz) in 751 CE is just a story. He points out that papermaking was already practiced in Central Asia by the 8th century, including in Samarqand, before the battle of Talas. In addition, Chinese paper was made from bast fibers, while the early

paper produced in Persia was predominantly made from rag fibers. However reasonable Bloom's arguments are, he himself does not totally discount the story of the role of Chinese captives. Moreover, the diffusion of the papermaking technology from Samarqand into the Islamic lands has been documented so far only for the period after the battle of Talas (Bloom, pp. 42-45). Thereafter, papermaking technology spread so rapidly that, by the end of the 10th century CE, Samarqand paper and rag paper produced elsewhere had already entirely replaced papyrus and parchment in the Islamic lands (Barthold, *Turkestan*[3], pp. 236-37). The prevalence of *kāḡaḏ-e baḡdādi* (a well-known thick paper used for writing manuscripts and for the correspondence and records of the government administration), as well as other types of paper indicates the widespread geographical diffusion of papermaking technology in the Middle East (Māyel Heravi, pp. 746, 756).

Paper production in Persia prior to the Safavids. Such was the fame of Samarqand paper that the 10th-century text *Ḥodud al-ʿālam* records rather matter-of-factly that "Samarqand produces paper which is exported all over the world" (*Ḥodud al-ʿālam*, ed. Sotuda, p. 108; tr. Minorsky, p. 113). This fame lasted throughout the centuries. Samarqand was not the only town in the eastern Iranian lands to become a center of paper production. There was *kāḡaḏ-e ḵorāsāni*, *kāḡaḏ-e jeyhāni* (after the town Jeyhān in Khorasan), *kāḡaḏ-e jaʿfari* (after Jaʿfar b. Yaḥyā Barmaki), *kāḡaḏ-e maʾmuni*, *kāḡaḏ-e manṣuri* (after Manṣur b. ʿAbd-al-Raḥim, a paper maker of Samarqand), *kāḡaḏ-e solaymāni* (after Solaymān b. Rāšed, the treasurer of Khorasan), *kāḡaḏ-e ṭāheri* (after the Taherid amir Ṭāher b. ʿAbd-Allāh), *kāḡaḏ-e ṭalḥi* (after the Taherid amir Ṭalḥa b. Ṭāher), *kāḡaḏ-e nuḥi* (after the Samanid amir Nuḥ b. Manṣur),and *kāḡaḏ-e ferʿawni* "Pharaonic" (i.e., from Egypt). The latter, which was also a *ḵorāsāni* paper, remained in use until the 10th century. It vied with Egyptian papyrus for the market in the 8th and 9th centuries CE and soon replaced the latter, because it was cheaper to produce (Ebn al-Nadim, ed. Tajaddod, pp. 22-23; tr. Dodge, I, pp. 39-40; Māyel Heravi, pp. 747, 751,753-55, 757, 768; Huart and Grohmann; ʿAwwād, tr., pp. 109-15; Afšār, 1998, pp. 258-61).

Paper in Persia proper was also produced at various locations other than at Samarqand and Khorasan. There was *kāḡaḏ-e Āmol* (in Māzandarān; Māyel Heravi, p. 738; Aḏkāʾi, p. 51). Around the year 1000, there was a papermaking town between Marāḡa and Zanjān, founded by Amir Mišud of Zanjān and called Ḵunaj, which later became known as Kāḡaḏkonān "Papermakers" because of the excellent quality of the paper that it produced. It had, however,

fallen to ruins by the mid-14th century (Mostawfi, *Nozhat al-qolub*, ed. and tr. Le Strange, p. 66, tr., p. 70; Le Strange, *Lands*, p. 225). Other towns where paper was manufactured included Tabriz, Isfahan, Kerman, and Yazd.

Types of paper. Up to the 19th century, paper-mills produced writing paper (*kāḡaḏ-e taḥriri*), drawing paper (*kāḡaḏ-e naqša*), and cardboard (*moqawwā*). From the second half of the 19th century, envelopes (*pākat* < Fr. *paquet*), giftwrap (*kāḡaḏ-etazyini*), commercial wrapping paper (*kāḡaḏ-e ʿaṭṭāri*), and wallpaper (*kāḡaḏ-e divāri*) also were sold (Küss, pt. II, pp. 70-72).

Despite the existence of a domestic paper industry, paper remained a rare and expensive commodity in Persia. Salesmen in the bazaar did not wrap their goods in paper, but handed them to the buyer as is. An exception was made for fine sugar in the 19th century, but that was because the imported sugar loaves were wrapped in paper (Olmer, p. 105). They sometimes used discarded paper from badly printed Korans, but the practice was banned by the government (*Waqāyeʿ-e ettefāqiya* 1/14, 7 Rajab 1267/8 May 1851, p. 68).

The production process. The workers who produced paper were referred to as *kāḡaḏsāz,kāḡaḏgar*, or *kāḡaḏi.* They worked in a paper-mill, in Persian variously referred to as *kāḡaḏgari*, *kāḡaḏ-ḵāna*, *kāḡaḏgar-ḵāna*, *kārḵāna-ye kāḡaḏ-sāzi, kārgāh-e kāḡaḏ*,or *kārgāh-e kāḡaḏ-sāzi* (Māyel Heravi, pp. 575, 589, 634, 708-9, 748). The raw materials consisted of “old paper … mixed with old coarse fabrics, packing materials, known as gunnies” (Olmer, p. 105; Herbert, p. 234). These were “soaked in water and then it is ground in a mill under a round vertical stone, analogous to those of the henna mills. The sodden paper is then considerably reduced in pulp, but the rags are badly disaggregated and fibers of several centimeters remain” (Olmer, p. 104). After the soaking and the milling, “the pulp is then left to ferment several days in the sun, then it is put in coarse fabrics and washed in running water. The color and the glazing of paper are thus removed. Then the pulp is put in a large vat with much water which is constantly stirred by a laborer” (Olmer, p. 105). After this process of fermentation and cleaning has been completed, the papermaking begins. “Another laborer plunges some sieve in the liquid just like that which is used in Europe for forms. It was a longish square sieve and to get an appropriate quantity of pulp he shuddered it for as long as necessary to get an even distribution of the pulp over the sieve. However, the wire mould-mesh, instead of being brass-wire, consists of thin strings and sometimes is made of guts. The framework is wooden. The sheets obtained that way, instead of being put between two [pieces of] felt, are placed one on the other” (Olmer, p. 106).

However, in Persia pressing was not practiced, but rather drying in the sun. The resulting paper was loose and spongy and did not last long, and the only size produced was 40 x 50 cm. The paper was very coarse and grayish, and the gunny fibers still stuck to it. Often there were holes in the leaves, or they were at least of varying thickness. It was used as packing paper in the bazaar (Olmer, p. 104-6). The drying was probably done on the field (*fażā*)that was mentioned as being adjacent to the paper-mill in 16th-century Yazd, or the wet sheets were hung to dry on a smooth wall (Afšār, 1969-75, I, p. 634).

The paper sheets were ready for sale and export once they had dried out. The sheets, however, required a finishing process in order for the paper to be used for writing on rather than just wrapping paper. This additional treatment was not done when the paper sheets were exported to another town, but only for local use. The treatment consisted of starching and polishing (*mohrazadan*). First, the paper sheets were saturated with *āhār*, a starchy wheat-based compound (on this process, see Qāżi Aḥmad, p. 114; Ṣarafi, pp. 66-67). The end result was known as *kāḡaḏ-e āhār-e mohra*, or glazed and smoothed paper. It was different from *kāḡaḏ-e āhāri*, which was a paper that was made by gluing two sheets of very thin paper together with *āhār* or a starchy compound to make a more solid and thick sheet of paper. This kind of paper was mainly used for literary anthologies (*jong*) and cutouts (*moraqqaʿāt*) and was excellent writing paper (Māyel Heravi, p. 738). The polishing and glazing was not done by the papermakers, but by a separate group of workers, known as *mohrakaš* (Taḥwildār, p. 113; Qāżi Aḥmad, p. 114).

In the 16th and 17th centuries, paper production took place in Persia in Isfahan, Yazd, and Kerman, and in the 18th century probably in Rasht. In the 19th century it is known to have taken place in Tehran, Isfahan, Kerman, and Mashad. James Baillie Fraser (p. 355) implied that Isfahan was the center of paper production, but, according to James Morier (p. 156), there was only little production of this article. It seems likely that production also took place in other towns such as Tabriz.

The quality of produced and imported paper. Despite the good reputation that most early paper production in Persia in particular and in the Moslem world in general enjoyed, there was also production of inferior qualities of paper, and even very bad paper. Paper produced in Safavid Persia was mostly of inferior quality (Chardin, p. 275). Good, if not superior, quality paper came from China, which was referred to as *kāḡaḏ-ečini*, *kāḡaḏ-e ḵānbāleḡ* (Ḵān Bāleḡ, Turk. name of Peking),or *kāḡaḏ-eḵetāʾi* and was usually silk-based paper

(Māyel Heravi, p. 748).

Not only was the quality of paper important, but also its color, of which there were many. Secretaries did not like to write on *kāḡaḏ-e safid* or naturally white colored paper (Māyel Heravi, p. 750). They preferred *kāḡaḏ-e alwān* or colored paper , because it was believed that colored paper would bring out better the calligraphy or writing in general. A large range of colors were used such as yellow, red, red tinted (*āl*), dark blue (*kabud*), verdigris (*zangāri*), natural (*ḵodrang*), straw-colored (*kāhi*), russet or fawn (*ḥennāʾi*) beige-tan (*pašmini*), as well as compound colors such as aloe-wood-colored (*ʿudi*), lily-colored (*susani*), green, marble (*marmari*), orange (*nāranji*), watery (*māvi*), green like an unripe mulberry (*sabz-e tutaki*]), rose-colored (*golgun*), indigo, purple, bright mauve, lavender, apricot, sage green, light brown, yellow ochre, and heavily sprinkled with large flecks of gold. European paper was allegedly imported in as many as forty different colors (for an extended list, see Afšār, 1998, pp. 264-65; Ṣayrafi, pp. 59-66; Simi of Nišāpur, pp. 280 ff.; Qelij-ḵāni, ed., pp. 22, 209-12; Māyel Heravi, pp. 745, 768). In addition to uniformly colored sheets of paper, a different kind of paper was developed in Persia, the so-called *kāḡaḏ-e abri* or *abra*, that is, marbleized paper. This was a Persian invention, by the well-known artist Šehāb-al-Din ʿAbd-Allāh Marvārid (1460-1516), which spread from Persia to India and Ottoman Turkey, where it was known as *ebru* (Samsār; Uğur Derman; Qelij-ḵāni, ed., pp. 102-7).

Paper imports. Because of the inferior quality of Persian paper, varieties of better quality paper were imported (Chardin, p. 275), whose designation indicated their places of origin. They were imported from England (*engelisi* “English”), India (*kašmiri*, *dawlatābādi* [also called *kāḡaḏ-e solṭāni*] and, in particular, *aḥmadābādi*), and China (*kāḡaḏ-e ḵānbāleḡ*). According to Rafaël Du Mans, Samarqandi paper was so thin that painters could use it as a transparency to copy designs (Richard, II, p. 303; Afšār, 1998, p. 261). The royal library provided paper for the king’s correspondences, and the chief secretary (*monši-al-mamālek*) every year received payment (*kāḡaḏ-bahā*) for the price of thirty packages of *dawlatābādi* paper (Mirzā Rafiʿā, p. 545, tr. p. 158). In 1708, Shah Solṭān Ḥosayn (r. 1694-1722) even requested the Dutch to supply him with a large quantity of *ḵānbāleḡ* paper (National Archives [The Hague], VOC [Vereenigde Oostindische Companie] 1779, fols. 100-101, November 1708; Floor, 2003, pp. 289-90).

An analysis of 1,101 royal edicts and princely charters from the Qajar period (1797-1925) showed that most of the paper used was of European origin

(Ferāsati, chap. 9). Paper was imported mostly from Russia during the first half of the 19th century. Although most paper was imported from Europe there was still some local production, and some craftsmen made efforts to produce high-quality paper that could compete with the European product (Taḥwildār, p. 105). In the mid-1830s, Ḥāji Mirzā Āqāsi imported so much paper that, in years thereafter, government offices continued to use large stores of paper from that period (Maḥbubi Ardakāni, I, p. 200). To become less dependent on European imports, the reformist grand vizier, Amir(-e) Kabir (q.v., 1807-52) sent a few students to Russia to be trained, amongst other things, in the art of papermaking. Despite his execution in 1852, many of his plans survived, such as that of establishing modern industries in Persia. Āqā Raḥim Eṣfahāni, who returned from Russia in 1854, established a paper factory in the neighborhood below the Eṣfahān Gate in Tehran (Ādamiyat, p. 391). Additional paper-mills (*kārḵāna-ye kāḡaḏgari*) were also established in both Tehran and Isfahan under Nāṣer-al-Din Shah (r. 1848-96), although it is not clear whether this was the same as the one built by Āqā Raḥim Eṣfahāni (Eʿtemād-al-Salṭana, III, pp. 207, 222, 232). According to Mahdiqoli Hedāyat quoting his father, the paper factory in Isfahan failed because the government used the paper that it produced without paying for it (Hedāyat, p. 80). In 1892, a concession was granted to this Belgian group for the manufacturing of glass, pottery, candles, and paper. The production of paper was exempt of all taxes and customs duties and the government would support the industry in exchange for 2.5 percent of the net profits. The duration of the paper concession was fifty years, but the initiative fell through (Government of the Netherlands, no. 125, pp. 28, 33-34).

The consumption of paper in Persia was, relatively speaking, very low. Normal printing and writing paper imported per year via Tabriz (the main point of import for paper) amounted to about 3,000 British pounds for years in the 1800s; before 1800, the import level was considerably lower. It was only in 1896 that the level of 4,000 British pounds was reached. Thereafter, imports increased substantially and reached 6,000 British pounds in 1898, and by 1906 paper worth as much as 8,000 British pounds was imported via Tabriz. Imports via the Persian Gulf during that period were low and seldom reached the 2,000 British pounds level (except during the 1906-08 period). Usually, import levels were 10-30 percent lower in value (Floor 2003, pp. 270-310). Russia supplied about 60-75 percent of total consumption, followed, in the order of the amount provided, by Great Britain, Austria-Hungary, France, and Germany. The same relative order was found in the trade of luxury and

giftwrap paper, of which not more than 250 tomans worth was imported in 1910 (Küss, p. 129; Entner, p. 72, table 13; Floor, 2003, pp. 202-3).

There was a change in the nature of the paper imports after World War I. Imports via the Persian Gulf increased considerably after paper imports from Russia stopped following the October Revolution of 1917. Moreover, there was a trend to use more paper, as evidenced by the trade statistics. Paper imports almost doubled every two years between 1917 and1922. The report for the 1919-20 period, for instance, shows imports for writing and printing paper rising from 4,122 British pounds in 1918-19 to 8,461 British pounds in 1920-21 (Government of Great Britain, "Trade Report of 1919-20," p. 22, Table 3-A). This did not include the import of (a) papers, reviews and books, (b) other printed matters, (c) cardboard, and (4) paper objects, which also were separately listed in the customs statistics in some years. In Tehran there still was some local production of paper using old paper, but it was of a very poor quality. Needless to say, there was no export of paper from Persia (Government of France, pp. 58-60). Under Reżā Shah (r. 1925-41), two new modern paper mills were established in the 1930s (Floor, 1984, p. 59; idem, 2003, p. 305).

Nevertheless, most paper continued to be imported, which was subject to foreign exchange controls; for 1948 the quota was 50,000 British pounds (Roberts, p. 19). The output of the local paper industry remained insignificant. Before 1972, when the Pars Paper Mill (in Ahvāz) was built, Persia only produced 2,400 tons of writing paper and 40,000 tons of cardboard. All paper imports represented 1.8 percent of total goods imported in 1969 (*Echo of Iran*, 1972, p. 329). In 1972-73, the daily per capita consumption of newsprint paper in Persia was 790 g, and that of stationary and book paper was 4 kg. By international standards, this was one of the lowest per capita rations. Until 1970, almost all paper had to be imported, thereafter about 50 percent was produced locally. In 1976, the Ahvāz mill produced 105,000 tons of paper and a new paper mill was completed at Anzali in Gilān, which produced 150,000 tons annually. There was, still, however, a shortage of paper (*Echo of Iran,* 1976, pp. 119, 206). The Sāri Paper and Pulp Mill was completed in 1997 and produces 175,000 tons of newsprint, printing paper, and corrugated media annually (Internet Source 1). The Kārun paper mill uses bagasse as raw material. Persia still imports raw materials for the paper industry (pulp and waste paper) as well as finished products (paper and paper board). There is also some export of finished paper products to neighboring countries.

Table 1. Paper imports and exports, 1999-2003.

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