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SILK

Originally from China, **SILK** (Pers. **ABRĪŠAM**) has been known in Iran since ancient times

i. Etymology

The etymology of *abrīšam* (also *abrīšom* with dialectical labialization of *a* or delabialization of *o*, and *barīšam*) is not entirely certain. At present its apparent connection with New Persian *reštan/rēs-* "to spin" and its derivation from some such form as **upa-raišma-* may be maintained. NPers. *reštan* would traditionally correspond to Old Indic *riś-áti* "he plucks, tears off." The Middle Persian has *parēšam* (H. W. Baily, "Three Pahlavi Notes," *JRAS* 1931, p. 425). *Abrīšam* appears as a loan word from Iranian in Armenian *aprišum, aprešum*, Syriac/Mandean *ʾbryšwm*, and Arabic *ebrīsam*. The NPers. *rēšam/rīšam* is evidently only a shortened form of *abrēšam.* In dialects either the Mid. Pers. or the NPers. form, often considerably changed, occurs. Connected with *abrīšam* and its base are *rē/ĕšma* "belt;" *rīšm(ī), rīšmān(ī)* "silken, of silk;" *rīsmān* "cord, string" (thus not related to NPers. *rasan* "cord" and Old Indic *raśmí-*, masc., "cord"); *bād-rīs(a)* (from *pati*^{o} with *vr*$_{o}$*iddhi*) and *ǰag̃-resta* (*ǰag̃* "distaff") "spindle," etc. In East Iranian in place of *abrīšam* we have *pīl(e)*, which

corresponds to NPers. *pīla* “silkworm, cocoon.” In dialects one also finds *čolla* (borrowed in Turkic dialects as *čille*), from **čullak*, arabicized as *ṣollaǰ* (see W. Eilers, *Westiranische Mundarten*, Wiesbaden, 1976, I, p. 347; II, p. 650) properly speaking, “very fine cotton.”

Bibliography:

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A. Hübschmann, *Persische Studien*, Strassbourg, 1895, p. 12, no. 65.

Idem, *Armenische Grammatik* I, Leipzig, 1897, p. 107, no. 56.

G. Morgenstierne, *An Etymological Vocabulary of Pashto*, Oslo, 1927, p. 90.

C. Brockelmann, *Lexicon Syriacum*[2], repr. Hildesheim, 1966, p. 3b.

M. Mayrhoffer, *Altindisches etymologisches Wörterbuch* III, Heidelberg, 1976, p. 61 (*rištan* under *risati*).

J. Pokorny, *Indogermanisches etymologisches Wörterbuch* I, Bern, 1949-59, p. 858 (*rištan* under *rei-k-*).

(W. Eilers)

ii. Trade and production of silk and its use in crafts

Historical background. Silk, originally from China, has been known in Iran since ancient times; the “Silk Road” linking the two countries is well named, for from the 4th century B.C. until around the 7th century A.D. silk was the most important article of trade between them. The security of this famous caravan route, which linked China to the Mediterranean by way of the basin of the Tarim, Soḡd, Marv, and Persia and practically monopolized the silk trade between East and West, was maintained in turn by the Seleucids, the Parthians and the Sasanians (see G. F. Hudson, *Europe and China: A Survey of their Relations from the Earliest Times to 1800*, London, 1931, pp. 86f.; J.

Needham, *Science and Civilization in China* I, Cambridge, 1954, pp. 181ff.; B. Laufer, *Sino-Iranica*, Chicago, 1919, pp. 537-39).

But the cultivation of the silkworm only spread into Iran toward the end of the Sasanian period, probably by the 6th century A.D. This innovation may have come from Khotan, where a Chinese princess, fiancée of the king, is said to have introduced silkworm eggs in 419 and taught the art of their cultivation (R. J. Forbes, *Studies in Ancient Technology*, Leiden, 1956, IV, p. 53). The budding sericulture found a favorable terrain in Iran, which possessed its own variety of mulberry (*Morus nigra*). Moreover, it seems probable that the tow provided by pierced cocoons was already spun before the introduction of techniques for raising the silkworm, just as it is spun today (N. Rondot, *Les soies*, Paris, 1885, I, p. 357). Sericulture expanded first into the region bordering the Caspian Sea, Ṭabarestān, then into central Iran. According to Eṣṭaḵrī's report, taken up again by Ebn Ḥawqal, silk was produced in most of the regions of the plateau in the 4th/10th century. However, the peasants continued to have silkworm eggs brought from Marv.

Silk production was one of the first things that attracted European merchants to Iran. At the time of Marco Polo, the traders of Genoa, then at the summit of its glory, had recently included the Caspian provinces within the sphere of their activity. Italian sources of the 13th and 14th centuries thus mention *seta ghella* (the silk of Gīlān), *seta masandroni* (the silk of Māzandarān), and *seta strativana* (that of Astarābād; see Marco Polo, *La description du monde*, ed. in modern French by L. Hambis , Paris, 1955, p. 25; I. P. Petrushevsky in *Camb. Hist. Iran* V, pp. 504-05). In the middle of the 16th century occurred the unfortunate attempt by Anthony Jenkinson and other British agents of the Moscovy Company to gain control of the silk market of Gīlān by establishing a new commercial itinerary through the Caspian Sea and the Russian empire (J. Hanway, *An Historical Account . . .* , London, 1762, I, pp. 2-8). Throughout the 17th century, the Dutch dominated the main part of silk exports, by way of the Persian Gulf. After a new British attempt by Elton and Hanway in the 18th century, the Caspian regions passed under the political and economic influence of Russia in the 19th century. Exports to Europe by way of Baku intensified and numerous Armenian, Greek, Russian, Italian and French commercial firms were established in Gīlān. At first limiting themselves to the purchase of raw silk, towards the end of the 19th century they increased their influence over the regional economy by controlling the trade in silkworm eggs, organizing production through a system of loans and advances to the

landowners and peasants, and processing the cocoons. From 1892 onward, the principal commercial houses began to purchase by preference fresh cocoons rather than raw silk. Then they carried out the suffocation in their own installations before exporting the dry cocoons to the principal European centers of silk weaving (G. Ferrand, “Perse, La sériculture et le commerce des cocons au Guilan,” *Le moniteur officiel du commerce*, no. 964, 19 Decembre 1901, pp. 522-25; F. Lafont and H. L. Rabino, *L’industrie séricicole en Perse*, Montpellier, 1910, pp. 18, 91). Not long ago exported to distant markets, today Iranian silk is consumed exclusively by the domestic economy. A government office for sericulture (*Edāra-ye nowgān va kerm-e abrīšam*) was created in 1937. It monopolizes the sale of eggs and controls the greatest part of the marketing of the cocoons.

It is difficult to have a very precise idea of the quantities of raw silk produced and exported since the 17th century, since notable discrepancies are observed among the estimates of various authors, estimates which were brought together by Curzon in 1892 (*Persia and the Persian Question*, repr. London, 1966, pp. 366-68) and by Lafont and Rabino in 1910 (*L’industrie séricicole*, pp. 128-31). One reason for these discrepancies is the difficulty in converting the traditional systems of measurement; thus, for the period 1864-77, Lafont and Rabino seem to have confused the *man-e šāh* (6 kg), used locally, with the *man-e tabrīzī* (3 kg), resulting in a doubling of Curzon’s figures. However, the overall tendency is clear enough to be incontestable. The production of silk reached its apogee in the 17th century. In 1637 the whole of the Persian empire (extending far beyond the present-day Iran) produced 1944 tons; of this amount 782 tons were from Gīlān (A. Olearius, *The Voyages and Travels . . .* , London, 1672, p. 324). According to J. Chardin (*Voyages du Chevalier Chardin en Perse et autres lieux de l’Orient*, Amsterdam, 1735, III, p. 123), in 1669-70 production reached 22,000 bales of 276 pounds or 2,970 tons, of which 1,350 tons were from Gīlān, whose silk was valued the highest, before that of Širvān (“Carabac,” 270 tons) and Māzandarān (270 tons). The troubles of the 18th century brought about a sharp drop in production—only 200 tons in Gīlān (Hanway, *An Historical Account,* p. 289)—and the almost total disappearance of sericulture from the neighboring region of Māzandarān (W. R. Holmes, *Sketches on the Shores of the Caspian, Descriptive and Pictorial*, London, 1845, p. 95).

Silk production gained renewed vigor during the first half of the 19th century. In order to respond to the growing demand of the European market, forested

areas were cleared in the Caspian provinces to establish mulberry plantations (Holmes, *Sketches*, p. 96). Gīlān's production reached 1000 tons in 1854 and 1864; the great part of this was exported to foreign countries, but not insignificant quantities found their way to the cities of the plateau famous for their textile industries, such as Isfahan, Kāšān, and Yazd. From the beginning of the 19th century to the 1860s, the domestic market absorbed from 1/5 to 1/3 of the total exports of Gīlān (J. B. Fraser, *Travels and Adventures . . .* , London, 1826, p. 358; Seidlitz, "Handel und Wandel an der Kaspischen Süd-Küste," *Petermanns Mitteilungen* 15, 1869, p. 256).

This upsurge in silk production was brutally interrupted by the ravages of pébrine, a disease of caterpillars, which appeared in Europe in 1845 and spread into Iran in the 1860s. In 1877 the production of silk in Gīlān was no more than 99 tons. It is not impossible that pébrine was introduced intentionally into Iran by European merchants of silkworm eggs in order to prevent a surge in prices and a reorganization of the international market to the advantage of those producing countries untouched by the disease (H. L. Churchill, "Report by Consul Churchill on the Silkworm Disease in Ghilan," *Reports from her Majesty's Consuls on the Manufactures, Commerce etc. . . . of their Consular Districts Published During the Year 1876*, part 1, London, 1877, pp. 69-71). The fall in production brought about grave problems in the Caspian provinces. Unable to pay their taxes, the inhabitants of the villages took refuge in mosques while an atmosphere of riot prevailed in Rašt (K. E. Abbott, "Persia, Ghilan, Report upon the Trade and Resources of the Province of Ghilan for the Year 1869," *Commercial Reports from Consuls*, part 1, London, 1871, pp. 234-36). The peasants survived by turning to the cultivation of other crops: tobacco, introduced successfully around 1875, and especially rice, favored by a great demand in the Russian market. Up until this point silk had been Gīlān's "staple produce" (Fraser, *Travels*, p. 358; H. H. Ongley, "Report by Mr Acting-Consul Henry H. Ongley on the Trade and commerce of Ghilan for the Year 1866," *Commercial Reports Received at the Foreign Office from her Majesty's Consuls During the Year 1867*, London, 1867, pp. 295-300); now its place was largely overtaken by rice. In the silk raising districts of central Iran, the cultivation of the opium poppy replaced silkworm raising.

The pébrine crisis also ended the local production of silkworm eggs and thus brought about the disappearance of Iranian races of the silkworm (Lafont and Rabino, *L'industrie*, pp. 30-32). The introduction of Japanese eggs, and more especially those of Brussa in Turkey, produced by the cellular method of

Pasteur, permitted a rebirth of sericulture beginning in 1890. Lafont indicates that in 1908 the annual production stabilized at around 500 tons. However, henceforth sericulture was only a complementary activity, as it has remained down to our own day. Since World War I the invention of synthetic fibers and the competition of natural silk of the Far East have kept the Iranian production at a modest level.

Today Gīlān remains the principal region of sericulture, furnishing 80 per cent of the national production, which varies between 200 and 400 tons per year (Figure 14), as a function of the rather rapid fluctuation in price. Māzandarān follows with 12-13 per cent. In these two rice producing provinces, sericulture is well integrated into the agricultural calendar at the end of spring, a stagnant period in the masculine work of rice cultivation. The rest of production is divided among the mountainous regions of northern Iran (eastern Azarbaijan and especially Khorasan) and a few oases of central Iran (Kāšān, Naṭanz and Yazd).

The raising of the silkworm. The techniques of raising the silkworm remain similar to those described by Chodzko in the middle of the 19th century ("Le Ghilan ou les marais caspiens," *Nouvelles annales des voyages et des sciences géographiques*, 5th series, vol. 6, July 1850, pp. 69-74) and by Lafont and Rabino at the beginning of the 20th (*L'industrie*, pp. 68-88).

The raising of silkworms rests upon the cultivation of mulberry, chiefly the white variety (*Morus alba*), in homogeneous plantations or in rows at the boundaries of plots. When a share-cropping system was employed, the traditional formula which governed sericulture was equal division of the harvest between landowner and peasant (K. E. Abbott, *Narrative of a Journey . . . .* , fol. 27); or, at the end of the 19th and beginning of the 20th centuries, division of the production of cocoons into three parts: one part going to the provider of the eggs, the second to the landowner, and the third to the peasant. This kind of contract was called *moṯallaṯa* "three-way partnership" (Lafont and Rabino, *L'industrie*, p. 21).

The cycle of raising silkworms lasts about forty-five days, beginning at the outset of Ordībehešt (April 21-May 21), when the first mulberry leaves appear. The boxes of selected eggs (nowadays of Japanese stock) purchased from the Office of Sericulture, are placed in a warm place to accelerate the hatching of the larvae. At the end of seven or eight days, the eggs hatch and the tiny caterpillars are placed in receptacles (*qālebī*) made of a mixture of earth and

cow manure. The caterpillars are fed chopped mulberry leaves and then, after the first molting (“sleep” *ḵᵛāb*), whole leaves. After the second molting the silkworms (*kerm*) are transferred to the nursery (*telembār* or *talībār; teləmbār* in Gīlān); this building, characteristic of the vernacular architecture of Gīlān, is a sort of long shed built on pillars: Three rows of posts support a double framework of horizontal posts, the first of which holds up a floor of intersecting laths, quilted with straw (the “bed” *kat; ket* in Gīlān) upon which are deposited the young silkworms; on the second rests an open-work platform (the “bridge” *pord*), upon which the silkworm breeder (*nowḡānī*) is moved to feed the caterpillars. The roof, the two sides of which descend very low, is covered with a dense mat of rice straw or rush. The walls are lined with reeds, box-wood branches or rice straw, carefully placed. All these arrangements serve to maintain both darkness and a constant temperature. The silkworms feed upon the leaf-covered mulberry branches, renewed twice a day during the third and fourth stages, then three and even four times a day during the fifth stage, after the fourth and last molting. Eight or nine days after this, the silkworms cease eating. Then small huts are constructed from slender branches or stalks of ferns, and the silkworms climb up on them to spin their cocoons (*pīla*).

The raising of silkworms in a nursery made of vegetable materials apart from human dwelling places is only seen in the Caspian provinces. In the districts where sericulture is practiced on the plateau, the severity of the climate and especially the cold nights prevent such a formula. The silkworms are raised in the houses themselves (Lafont and Rabino, *L’industrie*, pp. 102, 106, 111).

As in other regions of the ancient world, sericulture in Iran was the subject of a series of customs and beliefs which, for the most part, have gradually died out since the end of the 19th century. Curzon reports that the women of Gīlān hatched the eggs by placing them under their clothing against their skin (*Persia*, p. 366). They avoided approaching the nursery during their menstrual periods (Olearius, *Voyages*, p. 313). The people claimed that the presence of a black snake (*Coluber aquaticus*) in the nursery guaranteed the success of the harvest (Abbott, *Narrative*, fol. 27).

Once the silkworms have formed cocoons, harvesting of the cocoons (*pīlačīnī*) begins, a task which mobilizes friends and neighbors in an atmosphere of collective rejoicing. The cocoons are removed from the branches, summarily cleaned, and then sorted and packed. Healthy cocoons are separated from rejects: defective, spotted (*lakkadār, šalla, šaʿrsīāh*), pierced. From these

damaged cocoons the women prepare floss silk (*kaǰ; kəǰ* in Gīlān) by a technique that will be explained below. As for the healthy cocoons, most of them are sold at a guaranteed price to the local bureau of the Office of Sericulture. The personnel of these bureaus, which number ten in Gīlān (FIGURE 15), carry out the suffocation, then sort the cocoons once more before sending them to the great government spinning-mill in Rašt. However, the state does not completely control the market and processing of silk; appreciable quantities of cocoons are sold to private merchants residing in the regions of greatest production (Āstāna and Lāhīǰān in eastern Gīlān) or in the great centers of the manufaccture of silk carpets (Kāšān, Tabrīz, Mašhad). Finally, in eastern Gīlān some peasants continue to practice suffocation and the winding off of a portion of the cocoons they harvest without any outside help. To each of these methods (preparation of the floss silk; industrial or domestic suffocation and winding off of the silk) corresponds, as will be seen, a particular kind of preparation of skeins. However, within the limits of the present article all the technical operations for obtaining and employing silk thread and floss silk cannot be detailed. Only the principal steps of a complex cycle will be mentioned, while a certain number of original processes which are or have been specific to Persian craftsmen will be emphasized. Contemporary industrial techniques have been purposely ignored.

Preparation of the skeins of silk. The techniques of domestic suffocation have perceptibly evolved since the 18th century. Hanway (*Historical Account*, p. 290) mentions three procedures utilized in Gīlān at the time of his visit in 1744: “They suffocate it (1) by covering with blankets or (2) by the heat of the sun, unless (3) they wind off the silk immediately for then warm water answers the same purpose.” In this last case, suffocation is combined with soaking in boiling water preliminary to winding off. Such a method could not be utilized except in the case of very small quantities or when the total production is wound off just after harvest. Of these three procedures, only the second (suffocation in the sun) is mentioned at the beginning of the 20th century (Lafont and Rabino, *L’industrie*, p. 90). In fact, the most common technique in Gīlān in the 19th century, as in our own day, has been to suffocate the chrysalids by keeping the cocoons for about twenty hours in a “smoke room” (*dūd-oṭāq*), where a mixture of wood and rice bran is burned.

The introduction of industrial suffocators into Gīlān at the initiative of Greek, French, Italian, Armenian and Russian merchants dates back to the end of the 19th century, a period when foreign merchants controlled not only the silk

market but also its production (the sale of selected eggs, export of dry cocoons and raw silk, etc.). This new apparatus spread rapidly throughout the province. Toward 1910 Lafont and Rabino counted one hundred suffocators in Gīlān, almost all of which were owned by foreign firms. Theses suffocators were of two types: suffocator-dryers, with a rotating drum (using hot and dry air), allowing the cocoons to be treated in a few hours; and steam suffocators, more rudimentary devices that had the advantage of never causing the silk to deteriorate, but from which the cocoons emerged wet; then they had to be dried over a period of two or three months in vast hangars (Lafont and Rabino, *L'industrie*, pp. 91-93; Ferrand, "Perse," p. 524). A perfected apparatus based on the same principles (suffocation with hot air or steam) treats cocoons today in the factories of the state monopoly (Wulff, *Traditional Crafts*, p. 183).

At the completion of suffocation, the cocoons are once again sorted according to quality and cleaned. These diverse operations, performed today as at the beginning of the century with minute care in the industrial establishments, are carried out with less rigor in the domestic units, where only the most defective cocoons are discarded.

The next step after suffocation is the winding off of the cocoons (*abrīšam-kašī); closely connected to it is the perennial problem of the dimension of the skeins. The technique utilized today for domestic winding off (see the photograph in Objets et Mondes 11/1, 1971, p. 32) is similar to that described by travelers of the 17th and 18th centuries (Olearius, Voyages, p. 313; C. Le Brun, Voyage de Corneille Le Brun par la Moscovie en Perse et aux Indes Orientales, Paris, 1718, I, p. 165). A few cocoons are dropped into a basin (ṭašt, tīān) of boiling water. The operator, usually a woman, strikes them with a small broom in order to separate the external layers, the floss ("frisons," lās); then she pulls the filaments of silk, passes them over a hook and around a winding wheel (čar, čarḵ) activated by means of a crank. The threads of raw silk are obtained without twisting ("croisure") and so "present many defects (inequalities, knots, fluff, gumming)" (Lafont and Rabino, L'industrie, p. 46).*

Much more than these defects, the size of the skeins (*kalāf*) was the constant preoccupation of the European merchants of the 18th and 19th centuries. In effect, the winding reel traditionally employed in Gīlān was much larger in diameter than the old winding reels used in England, France and Italy. Consequently, the skeins of silk of Gīlān were ill adapted to the apparatus of European manufacturers. Special winders ("tavelles") had to be provided to carry out the unwinding, such as the "tours d'Espagne" reserved for "silks of

the Levant of large size" illustrated in the *Encyclopédie* (ed. d'Alembert and Diderot, Amsterdam, ca. 1765, vol. of plates, s.v. soiezie, pl. VI, p. 39). The merchants, consuls and travelers—especially the British—of the 18th and 19th centuries attempted many times to convince the landowners and peasants of Gīlān to adopt the smaller winding reels (see notably Hanway, *Historical Account*, pp. 289-91; Holmes, *Sketches*, p. 100; and especially Abbott, "Report on the Silk Trade of Ghilaun," cited in C. Issawi, *The Economic History of Iran 1800-1914*, Chicago and London, 1971, p. 233; Abbott, *Narrative*, fol. 14). Abbott, declaring that "The Persian skein of silk is too long for general use in England and the thread is usually uneven and knotty," proposed vainly to the Gīlānīs in 1842 to modify the size of the winding reel. He tried again in 1844, providing a smaller and more productive winding reel constructed at his own expense. However, the introduction of this new type of winding reel was not followed up, in spite of certain isolated attempts (Lafont and Rabino, *L'industrie,* p. 46). Many technical and economic factors explain why this innovation did not spread in Gīlān. As was pointed out, the traditional method of obtaining raw silk does not involve twisting, a process which not only makes the thread more regular, but also partially airs and dries it (see E. Pariset, *Les industries de la soie*, Lyon, 1890, pp. 94-96). This reduces the risk of gumming, i.e., the sticking together and blackening of the threads through contact with the cross bars of the winding reel. In such a method, the use of winding reels of small diameter is no obstacle to the quality of the skein. In contrast, in Gīlān, where twisting is not practiced and the climate is particularly humid, the risks of gumming are much more important. Winding the filament on a small reel would result in the formation of skeins of bad quality, with many spots of gumming. The persistent use of a winding reel of large dimension is not, as certain people have imagined, a phenomenon resulting from inertia, but an appropriate technological response. Indeed, this is what Hanway understood very well, paying heed to the explanation of the Gīlānī peasants: "In moist weather the silk wound on a large wheel is not so apt to stick or to be gummed together in those parts where it lays on the bars, or divisions of the wheel, where it is often rendered black and so hard that it cannot without great difficulty be separated" (*Historical Account*, pp. 289-90). It should be added that with the use of a small reel, as the Gīlānīs explained to Abbott, "So much more labour and time would be required that it would not be practicable on a large scale because, on account of the excessive dampness of the climate, the cocoons become injured if not quickly wound off" (Abbott, "Report," in Issawi, *Economic History*, p. 233).

From the middle of the 19th century, concern for obtaining thread more in conformity with European norms and the intensification of the silk trade resulted in the creation of "industrial" establishments for winding off. After several abortive attempts, a "filature in European style" was constructed in Rašt in the 1890s with equipment provided by Maison Berthaud of Lyon. The system it utilized was called "à la tavelette" (Lafont and Rabino, *L'industrie,* p. 47), which permitted the twisting of the thread. Around 1910 this establishment employed more than 300 workers. In other words, the modern filature of Rašt, which processes most of the production today, is not the first attempt at centralizing and mechanizing the winding off of silk.

The different qualities of silk. The quality and price of the skeins vary as a function of the cocoons employed and the precautions taken before winding off. The traditional nomenclature records the differences in quality. Thus, at the beginning of the 20th century, six principal varieties were distinguished in order of decreasing value: *šaʿrbāfī, aʿlā, tāǰerī, tāʾī, ʿalāqa-bandī* (for lacemaking) and *dovīl* (derived from double cocoons and reserved for crude silk goods); in addition, there were a large number of subvarieties (see Lafont and Rabino, *L'industrie,* pp. 50-52). Between the lowest quality (*dovīl*) and the highest (*šaʿrbāfī*), prices in 1909 varied by a factor of two. The latter category was reserved for export to the great Persian centers of silk carpet manufacture or to foreign countries (especially to Milan, from whence derives the name *mīlānī* silk [Chodzko, "Le Ghilan," p. 86]). In addition, different varieties could be employed for specialized purposes in the manufacture of a single product. Thus, of the three categories distinguished nowadays, the first grade (*dāna*) is employed in making the piles of silk carpets, the second (*haštī*) for making silk warps for carpets, and the third and crudest grade (*pūdī*) for the threads of the weft that separate the rows of pile in silk carpets (Wulff, *Traditional Crafts*, p. 183).

Preparation of skeins of floss silk. The methods employed for fabricating yarn from pierced cocoons and waste are related to those employed for other textile fibers such as cotton and wool. A continuous filament is not wound off; a tuft of discontinuous threads is twisted, drawn out, and then spun (*reštan*). The cocoons are first plunged in boiling water, an operation which cleans them and separates the threads from foreign matter. The tangled clump of threads is dried and then spun by women with a spindle (*kəǰdūk* in Gīlān). The skeins are formed by winding the yarn around a small wooden frame (*ačkāvazən*) made of three sticks. One should note that contrary to the winding of silk, making

floss silk yarn, and more generally employing it in domestic handcrafts, remain activities wide-spread throughout eastern Gīlān.

Dyeing. Diverse operations are necessary to achieve effective dyeing, notably degumming and mordanting. Degumming, designed to make the threads supple and render them more permeable to the dye, consists of soaking the skeins in a mixture of water and ashes. The main mordant used is alum (*zāǰ*). As for dyes, before the widespread use of chemical substances (anilines), they were derived mainly from plants. For example, gall nuts (*māzū*) were employed for black, indigo (*nīl*) for blue, madder (*rūnās*) for red, and turmeric (*zarḍčūba*) or dyer's weed (*esperak*) for yellow. The best red color was derived from the female cochineal insect (*qermez-dāna*). As for bleaching, it comprises two operations: the immersion of the silk in a decoction of stems and roots, then washing in lye (Lafont and Rabino, *L'industrie,* p. 54). These diverse very delicate operations are carried out in the ateliers of professional dyers.

Preparation of bobbins and setting up the warp. Having been dyed, the skeins are first unwound and then rewound in order to form the bobbins which are utilized for preparing the weft or setting up the warp. Once the thread is wound around the spindle of a winder (*čar, čarḵ*), it is doubled by twisting the threads coming from different cage spools (for Yazd, see Wulff, *Traditional Crafts*, p. 183; for Gīlān, M. Bazin and C. Bromberger, *Gilāŋ* , Paris, 1981, pp. 60-61). An additional winding may be necessary to form the small shuttle-bobbins (*māsūra*) adapted to the shuttle (*mākū*) used by the weavers.

The techniques of preparing the warp (*čella, tān, tūn*) vary considerably in different regions. The simplest method, attested in Gīlān, consists of winding threads coming from different bobbins around pegs. Another procedure, described by Wulff (*Traditional Crafts*, p. 184) and observed in Yazd, constructs the warp around pegs fixed on the wall of a house, while the bobbins rest on the ground. Finally, in Isfahan rotary warp winding frames (*čarḵ-e čeheltābī*) are employed.

Weaving. The traditional looms utilized for weaving fabrics of pure or mixed silk or floss silk also present a great variety throughout Iran. Here only three types will be mentioned, types whose distribution once more illustrates the technical lag between the silk producing regions (the provinces of the north) and the silk consuming regions (the cities of central Iran). Of these three types, the simplest is the *pāčāl* employed in Gīlān for weaving the *čādoršab* (or *čādəršab; a fabric with geometric motifs that women tie around their*

waist when they work or over their shoulders to carry a child). It is a loom of relatively simple construction, with treadles and two rows of heddles (vard). It includes a warp beam upon which the warp is fixed and from which it is unwound as the work advances, while the operator winds the woven cloth around the breast beam (for more details of the morphology and function of this loom, see Bazin and Bromberger, Gilān, p. 62). Much more complex are the looms traditionally employed in the cities of the interior, such as the celebrated draw loom (dastgāh-e naqšbandī) and the velvet loom (dastgāh-e maḵmalbāft). The first, for which a dual Chinese and Syrian origin has been recognized (Wulff, Traditional Crafts, pp. 174-75) and the functioning of which was fully mechanized at the beginning of the 19th century by Charles-Marie Jacquard of Lyon, permits the weavers to go beyond the stage of producing geometric designs to achieve any sort of figurative design. A supplementary harness, operated by a worker perched above the loom, permits the weavers to cause the thread of the warp to appear or disappear according to different combinations at each shed and thus to form the most varied decorations. As for the velvet loom, employed notably in Isfahan, Kāšān, and Tehran, in certain of its details it resembles the draw loom, i.e., in its use of a double warp and its application of the draw harness to produce embossed velvet (Wulff, Traditional Crafts, p. 209).

Textile products. Although it is the principal region of silk production, Gīlān has never been a great center for the crafts connected with silk weaving, a fact which is corroborated by the rather rudimentary techniques that have traditionally been used there for winding off and weaving. In contrast, the great urban centers distinguish themselves by a flourishing and diversified production. The inventories taken by Fraser (*Travels*, pp. 354-68) or by Lafont and Rabino (*L'industrie,* pp. 57-60) throw this difference into high relief. Knotted silk carpets and highly reputed brocades are the traditional specialties of Arāk (Ṣolṭānābād), Isfahan, Kāšān, Kermān, Tabrīz, and Yazd. In this last city, 1800 weaving factories employing about 9000 workers were counted in the 1850s before the silkworm crisis. In the same way, the main centers for the manufacture of silk velvet were all the cities of Iran's interior, including Isfahan, Kāšān, Mašhad and Tabrīz. A large portion of the silk fabrics (often mixed with cotton) that were produced in these cities were used for clothing and household furnishings (curtains, hangings, etc.).

In short, the principal products of Gīlān never attained the fame of those of central Iran, except for embroidery (*goldūzī*), a specialty of Rašt. Among these products one can mention striped and checkered taffetas, *long* (a cloth which

one knots around the waist at the public bath), unicolored sashes (exported to Georgia), and *kəǰīnī* (fabrics of floss silk, often mixed with cotton, employed for making the clothing of the popular classes, such as the celebrated *čādəršab; see the inventory of these traditional products in Chodzko, "Ghilan," pp. 78-79).*

These brief remarks concerning silk commerce and crafts connected with it confirm the unique position of Gīlān, the main producing center, within the Iranian space. A region of specialized crops, throughout its history this province has been dominated economically by near or far countries and by the central provinces of Iran itself.

See Silk Road and Silk Trade.

Bibliography:

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(M. Bazin and C. Bromberger)

iii. Silk textiles in Iran

Achaemenid, Parthian and mid-Sasanian Iran. The silk trade and use of silk in luxurious textiles are mentioned with some frequency in the Roman and Byzantine sources, but there are no comparable accounts by Iranian authors (See Otto von Falke, *Kunstgeschichte der Seidenweberei* I, Berlin, 1913, pp. 25-31; H. J. Schmidt, *Alte Seidenstoffe*, Braunschweig, 1958, pp. 30-32, 37). Silk weaving is said to have been practiced in Iran in Achaemenid times; and Kallixenos of Rhodes is said to have seen Persian silks embroidered with animals at a banquet given by Ptolemy Philadelphus (Schmidt, *Seidenstoffe*, p. 51); these would have been made with imported yarn. Nothing survives of this period, although the Achaemenid-style carpet found at Pazyryk witnesses to the skill of Achaemenid weavers (S. I. Rudenko, *Frozen Tombs of Siberia*, Berkeley and Los Angeles, 1970, pp. 298-302, pl. 174). Early Han silk fabrics comparable to those found at Palmyra (P. Pfister, *Textiles de Palmyre*, Paris, 1934, 1937, 1940) and 4th to 6th century Chinese silks must have been imported, but the Iranian climate has destroyed their traces. As in the Roman empire and Byzantium, Iranian weavers must have used imported silk yarn. Procopius relates that, in the mid-6th century, silkworms and the secret of their culture were given to the emperor Justinian. Sericulture can be assumed to have reached Iran, possibly from Sogd (see further below), at the same time or a little earlier.

It now appears that the Western type of drawloom evolved in the Syrian wool-weaving centers in the 2nd-3rd century A.D., perhaps under stimulus of imported Chinese silks. One of the few documented events in the history of Iranian silk weaving is the establishment by Šāpūr I or II of a silk weaving industry in Ḵūzestān (Ṯaʿālebī, *Ḡorar*, p. 530; Yāqūt, II, p. 496; Masʿūdī, *Morūǰ* II, p. 186). The weavers coming from eastern Byzantine centers probably brought newly evolved drawloom techniques, but they probably continued, for some time, to use imported yarn or to work with silk unraveled from imported textiles. A controversy has arisen as to whether the weavers were moved to Iran by Šāpūr I or II. R. Pfister, in his study of one of the earliest non-silk fabrics found at Antinoopolis in Egypt, argued for the early date of this event ("Les premières soies sassanides," *Études d'orientalisme publiées par le Musée Guimet à la memoire de Raymonde Linossier* II, Paris, 1932, pp. 461-79).

This line of reasoning and the early dating he proposed were adopted by Doro Levi in the discussion of Sasanian motifs in his influential *Antioch Mosaic Pavements* (I, Princeton, 1947, p. 479). J. F. Flanagan has shown more recently, however, that there were errors in the technical analyses on which Pfister based his early dating of the experimental Iranian fabric from Antinoopolis (in *The Relics of Saint Cuthbert*, ed. C. F. Battiscombe, Oxford, 1956, pp. 485-86); moreover Pfister did not have a clear perception of the stylistic development of Sasanian art. Historical sources may have confused the construction of the Kārūn dam by Roman prisoners (probably under Šāpūr I) and the movement of Syrian weavers; the Syriac sources suggest these two things were unrelated and happened in different reigns (N. Pigulevskaja, *Les villes de l'état iranien*, Paris, 1963, pp. 159-69).

Because certain of the patterns used in silks excavated at Antinoopolis reflect the formal design or even the actual motifs of Han silks, these textiles probably constitute the earliest surviving group of Sasanian silks; thus a 5th century date for the commencement of Iranian sericulture may be preferred. In this group of Antinoopolis silks the patterns are in registers, frequently with an alteration of three different design elements (a basic scheme of Han silks that probably derived from the characteristic Chinese warp-faced or warp-patterned weave). The motifs and style used are comparable to mid-Sasanian works of art in other media (see Plate XI/1; see Deborah Thompson, *Catalogue of the Late Antique and Medieval Textiles at Dumbarton Oaks*, in preparation, no. 162; cf. Schmidt, *Seidenstoffe*, pp. 42-46). A debt to such Sasanian silks has been demonstrated for a group of Coptic wool hangings from Antinoopolis (Ernst Kitziner, "The Horse and Lion Tapestry: A Study in Coptic and Sasanian Textile Design," *Dumbarton Oaks Papers* 3, 1946, pp. 1-72). Examples of "Antinoopolis silks" are found in church treasuries and were excavated in smaller numbers at other Egyptian sites such as Aḵmīn (See, e.g., Falke, *Seidenweberei*, pp. 31-33; E. Chartraire, *Les tissus anciens du trésor de la Cathédrale de Sens*, Paris, 1911, nos. 3, 6-9; R. Forrer, *Römische und Byzantische Seidentextilien aus dem Gräbefelde von Achmim-Panopolis*, Strasbourg, 1891, pls. VIII, IX).

Late and post-Sasanian silks. More rarely found in Egyptian excavations were silks with large-scale patters of single animals; these are undoubtedly late and post-Sasanian (mid-6th to mid-7th and a little later). Characteristically, the patterns of this textile group are shared with Sasanian decorative art in other media (metalwork, stucco, and seals) and with Sasanian wool textiles. These

silks have long been classified as Sasanian; indeed they have been regarded as exemplifying Sasanian decorative art without regard to distinctions between early, middle, and late Sasanian art, because textiles with this kind of pattern are depicted in the rock reliefs of Ṭāq-e Bostān. (These are best published in E. Herzfeld, *Am Tor von Asien*, Berlin, 1920, pp. 121-39; and S. Fukai and K. Horiuchi, *Taq-i Bustan* I, *Plates*, Tokyo, 1969.) A small number of such silks were found at Antinoopolis, and some made their way into early church burials (see, e.g., P. Lauer, *Le Trésor du Sancta Sanctorum*, Monuments Piot, Paris, 1906, pls. I, II, fig. 18; Chartraire, *Sens*, no. 15; Victoria and Albert Museum, *Catalogue of Early Medieval Woven Fabrics*, by A. F. Kendrick, London, 1925, no. 1000, pl. I; and R. Ghirshman, *Persian Art: The Parthian and Sasanian Dynasties*, New York, 1962, fig. 375). The last two citations refer to fragments of one silk with *sēnmurw*s from the relics of Saint Lupus; other *sēnmurw* silks were found in church treasuries (Jacques Dupont, "Le linceul de Saint-Rémi," *Bulletin de Liaison du Centre International d'Étude des Textiles Anciens* [*BCIETA*] no. 15, January, 1962, pp. 38-39; F. Guicherd and G. Vial, "Dossier de recensement [linceul de Saint-Rémi]," pp. 41-47; idem, "Dossier de recensement [coussin d'Aupaïs]," pp. 48-50). The textile reliefs at Ṭāq-e Bostān also include diaper patterns, which were traditional in ancient Near Eastern design; the specifically late Sasanian patterns with large single (or paired) motifs, usually in roundels, were more influential in medieval silk designs. Silks in this style continued to be made into the succeeding period and are sometimes difficult to date precisely. R. B. Serjeant refers to a silk fabric called *ḵosravānī* and suggests it was made in the Sasanian palace workshop; possibly these late Sasanian silks with roundels were given this name ("Material for a History of Islamic Textiles up to the Mongol Conquest," *Ars Islamica* 9, 1942, p. 64, citing *Alf layla wa layla* I, Beirut, 1914, p. 133; Serjeant's study is hereafter referred to by his name and the volume numbers of *Ars Islamica*).

Excavated wall paintings from Central Asian sites, e.g., Panjikent, Tepe Balalyk, Varakhsha, and Afrāsīāb, as well as from Ḵerbat al-Mafǰar near Jericho, offer a range of patterns in this style for comparison with extant textiles and the reliefs of Ṭāq-e Bostān (see bibliography below).

Typical late Sasanian silks manifest scaling—the manipulation of the pattern (binding) warp in groups of three rather than singly, as in the earlier "Antinoopolis silks" and their counterparts in European churches. This technique speeds up the weaving process, because a larger segment of line is produced with each passage of the shuttle; it results in a jagged outline and

contributed to the enlargement of patterns (J. F. Flanagan, “Early Figured Silks: The Effect of the Scale Harness on Early Islamic Silks,” *The Burlington Magazine* 68, 1936, pp. 145-46; idem in *Saint Cuthbert*, pp. 487-88). Plate XI/2 is an example of a scaled late Sasanian silk. Perhaps the most famous scaled Sasanian silk is the boar’s head fragment found by Sir Aurel Stein in a late 6th century context at Astana (*Innermost Asia*, Oxford, 1928, pl. LXXVI). It is quite possible that such large-scale patterns were not originally developed in Iran. The basic format with pearled borders reflects that of Chinese mirrors; other features may be specifically Sogdian (M. W. Meister, “The Pearl Roundel in Chinese Textile Design,” *Ars Orientalis* 8, 1970, pp. 255-67; A. A. Ierussalimskaya, “On the Formation of the Sogdian School of Artistic Silk Weaving,” in *Srednyaya Aziya i Iran*, Leningrad, 1972, pp. 1-56). Once adopted, however, this textile format was subjected to a stylistic development in late Sasanian and early Islamic Iran that made it the most important source of textile design, in overall scheme and individual motifs, in western Asia and Europe until the Mongol conquest.

Although the Iranian climate does not favor the preservation of silks or other fabrics, discoveries by Soviet scholars in the Caucasus have begun to supplement our knowledge. Two silk caftans or surcoats have been found, one with a *sēnmurw* silk (Ierussalimskaya, “A Newly Discovered Silk with the Sēnmurw Pattern,” *Soobshcheniya Gosudarstvennogo Ermitazha* [*Soobshcheniya*] 24, 1972, pp. 11-15), and one with a geometric horse-and-rider pattern, unlike contemporary or earlier Egyptian, Syrian, and Byzantine silks with horsemen (idem, “The ” Chelyabinsk” Fabric, a Post-Sasanian Silk,” *Trudy Gosudarstvennogo Ermitazha* [*Trudy*] 10, 1969, pp. 99-100; idem, “Le tissu de soie au Bahram Gour du sépulcre de Mochtchevaya Balkha,” *Trudy* 5, 1961, pp. 40-50; idem in *Soobshcheniya* 24, 1963, pp. 35-39).

East Iranian silks of the 8th and 9th century are marked by a taste for geometrical design that may derive from the angular line of the earlier scaled silks. The large Zandanīǰī group, preserved in numerous European churches and museums, of which one with a Sogdian inscription betrays its origin in the town of Zandana near Bokhara, exemplify such a taste (D. G. Shepherd and W. B. Henning, “Zandanīǰī Identified?” *Aus der Welt der islamischen Kunst. Festschrift für Ernst Kühnel*, ed. R. Ettinghausen, Berlin, 1959, pp. 15-40; see also Schmidt, *Seidenstoffe*, pp. 100-06; Plate XII/1). The elephant silk from the abbey of Saint-Josse inscribed with the name of Qāʾed Abū Manṣūr Boḵtagīn is in a more elaborate but even more emphatically geometrical style (M. Bernus,

H. Marchal, G. Vial, "Dossier de recensement," *BCIETA* 33/1, 1971, pp. 22-57.

Medieval and post-medieval literature of silk. In contrast to the missing physical evidence, there are abundant references to the manufacture and trade in Iranian silk fabrics; but it is risky to relate the trade- and place-names of these goods to the silks now preserved. Particularly difficult is the use of the word *dībāǰ* "brocade." This textile term has a specific and limited meaning to experts but has long been used loosely by non-specialists, probably with a generic meaning of "figured silk" (Serjeant, *Ars Islamica* 10, p. 72, n. 9; cf. *Vocabulary of Technical Terms*, CIETA, Lyon, 1964, p. 4; I. Emery, *The Primary Structures of Fabrics*, Washington, D.C., 1966, pp. 171-72). The outstanding collection of medieval written sources remains that of Serjeant (*Ars Islamica* 9, 1942, pp. 54-92; 10, 1943, pp. 71-90; 11/12, 1946, pp. 98-145; 13/14, 1948, pp. 75-117; 15/16, 1951, pp. 29-85; see also, concerning Iran, S. D. Goitein, *A Mediterranean Society; The Jewish Communities of the Arab World . . .* I, Berkeley and Los Angeles, 1967, p. 103). Serjeant organized his survey according to established workshops (*ṭerāz*, *Ars Islamica* 10) and then geography. A summary of the pertinent information concerning Iranian silk textiles and fiber production follows. (References to *ṭerāz* establishments and most unspecified textiles are excluded. For primary sources in each case see Serjeant, as indicated.)

The silk goods from Ḵūzestān include brocade (*dībāǰ*) from Tostar/Šūštar; *sūsanǰerd* (Sūs and Qorqūb); *Qaḷʿa-ye Šūštar;* striped silk (*raqm al-Qorqūbī); kingly silks (ḵazz molūkī); heavy silks (ḵozūz ṭaqīla) from Sūs; ḵazz silks and eżrīǰ (red silks) and silks used in turbans (from Sūs); silk veils (maqāneʿ); silk garments from several cities, including Rāmhormoz and Jondayšāpūr. Fārs was a source of ḵazz-silks and brocade (Shiraz is specified for both); qazz-silk curtains (especially Sīnīz); curtains or veils of ḥarīr; qazz-silk robes and garments (Sīnīz and Fasā); ebrīsam-silk curtains (Fasā); ḵazz-silk robes (Ṭārom); sūsanǰerd (especially Fasā and Sīnīz, although the latter was noted for its fine linens; Serjeant, Ars Islamica 10, pp. 71-90). Mostawfī mentions Bešāvūr as a production center for silk in Il-khanid times (Serjeant, ibid., p. 89).*

Ṭabarestān was noted for carpets and robes and as a heavy producer of silk yarn; specific mention of woven silk and garments of it is made by Eṣṭaḵrī and Ebn Ḥawqal (Serjeant, *Ars Islamica* 11/12, pp. 100-03). Other, probably all-silk, textiles—satin (*aṭlas*), *ʿattābī*, brocade, *seqlāṭūn, abrīsam, parda* (curtains)—are mentioned by Ebn Esfandīār (Serjeant, ibid., p. 102). Silk saddle cushions are mentioned by the same author as a specialty of the province in the time of *espahbad*s (ibid., p. 98). Gorgān was noted for its woven silks, garments of

ḥarīr, brocade, and large silk production. It is also mentioned for its black silk textiles and garments and raw silk. Astarābād is said to have been a source of woven silk as well as two silk textiles, *mobram*, and *zaʿfūrī*, with many weavers of *qazz*-silk. After the Mongol conquest, silk was still available in these two cities, according to Mostawfī (ibid., pp. 104-05).

In the Jebāl, Ray was a noted textile center, but many of its specialties bear names that do not reveal their fiber—e.g., the famous *monayyar* cloth, which was reputed to have two warps. (A number of possibilities exist in attaching the name to known silk fabrics; it could refer to double cloth, or to the figured, lampas, silks with extra series of inner warps.) Silk (*ḥarīr*) production and export are mentioned by Ebn al-Faqīh and Jāḥeẓ. The fine curtains (*sotūr*) and cloth (*ṭawb*) made and exported in Isfahan may have been of silk. *ʿAttābī* and silk cloaks are also mentioned for Isfahan, as is *seqlāṭūn* in the *Ḥodūd al-ʿālam* (Serjeant, ibid., pp. 106-09).

In Khorasan *abrīsam* silk is mentioned in connection with Nīšāpūr and Marv, and the *abrīsam* and *qazz*-silk industry of Marv is said to have been the origin of the silk industry of Ṭabarestān and Gorgān. The Marv silks were of fine quality, much exported and imitated (ibid., pp. 111-14). Nīšāpūr was a center for cloth weaving of various kinds and for exported silk (ibid., pp. 115-16). In addition to the more usual *dībāǰ*, *qazz*-silk, *ʿattābī*, and *seqlāṭūn*, other fabrics are mentioned as specialties—*tāḵatanǰ* and *raḵtanǰ;* it is not known whether these two were of silk. After the Mongol conquest, silk garments of *naḵḵ* and velvet (*kamḵā*) were said by Ebn Baṭṭūṭa to have been woven there for export (ibid., p. 116). Other towns in Khorasan are mentioned for their silk textiles; woven *qazz*-silk and garments of it at Nesā and Abīvard; brocade and tafetta at Herat (Maqdesī, Ṭaʿālebī, Ṭabarī; ibid., pp. 117-19). The *abrīšam* silk of Farḡāna was produced at Balḵ before its destruction by the Mongols (ibid., p. 118). Ebn Baṭṭūṭa reported that much silk was produced at Jām; in the Il-khanid period, silk production was carried out at Toršīz, Tūn, Zīrkūh, Jonābād, Zāva, and Ḵᵛāf, while a famous silk (*ḥarīr*) called Ṭabas silk was said to have been exported from Ṭabasayn (ibid., pp. 119-20).

No monographic study comparable to Serjeant's has been made of post-Mongol Iran, although the sources are more numerous than for the earlier period. Much of what exists is intertwined with descriptions of costume and interiors, e.g., the work of Neẓām-al-dīn Maḥmūd Qārī of Yazd, the so-called poet of clothes (Browne, *Lit. Hist. Persia* III, pp. 351-53), and that of Vaččā and Abu'l-Moṭahhar al-Azdī. (For the last two see Muhammad Ferid Ghazi, "Un

group social: ” les raffinés”,” *Studia Islamica* 11, 1959, pp. 41-71, especially p. 55; also Abu’l-Moṭahhar al-Azdī, *Hikāyat Abi’l-Qāsim*, ed. A. Mez, Heidelberg, 1902.) Later descriptions of locales famous for silk production also provide information (e.g., Sayyed ʿAbdallāh Šūštarī, *Taḏkera-ye Šūštar*, ed. M. Bakhsh and M. Husain, Calcutta, 1914, pp. 7-8, cited by Serjeant, *Ars Islamica* 10, p. 74, n. 29). Accounts by European travelers are useful for the Safavid period (e.g., R. de Mans, *Estat de la Perse en 1660*, ed. C. Schefer, Paris, 1890, p. 186, describing textile workers and goods in Isfahan; see Serjeant, *Ars Islamica* 11/12, p. 109).

Medieval Silk Textiles. The gaps between the few types of early Iranian medieval silks, the scarce Il-khanid silks, and the numerous Safavid silks were bridged somewhat by the commercial excavation of a tomb tower, Naqqāraḵāna at Ray, in 1924-25. A considerable number of fragmentary silks were brought to light. Of the corpus now given the Ray label, a few may be of late ʿAbbasid date; some use Buyid formulations (Plate XII/2) and are in a style known previously only in a few fragments from late 19th-century collections (e.g., Boston, Museum of Fine Arts, acc. no. 04.1621; see A. C. Weibel, *Two Thousand Years of Textiles*, New York, 1952, no. 113); some reflect the technique and patterns of Byzantine silks and are probably imports; some are comparable to works of Saljuq style; and a few appear to be later, for technical and stylistic reasons. In the last group are silks that became known several years later than the first silks from the site; a few of them may be of dubious origin (see Thompson, *Catalogue*, no. 178). For an important contribution that helps to distinguish the relatively limited number of questionable textiles, see Nobuko Kajitani, “The Physical Characteristics of Silk Generally Classified as ” Buyid”,” *Irene Emery Roundtable on Museum Textiles. 1974 Proceedings. Archeological Textiles*, Washington, D.C., 1975, pp. 191-204. Buyid and Saljuq textiles will continue to come to light in unquestionable circumstances that are comparable with silks of the Ray corpus, e.g., a textile in a binding datable to the 12th century (Erzbischof Garegin Howsepian, “Ein Leinwand aus der Sassanidenzeit im Einband der Etschmiadzin Handschrift Nr. 1759,” *Hamdes Amsorya* N.F. 49, 1959, cols. 252-63 [Armenian], pp. 351-52 [German summary]); this textile, neither linen nor Sasanian, appears to be silk of a relatively archaic, possibly 11th-century style.

Under Erich Schmidt in the 1930s, the Ray Expedition of the University of Pennsylvania Museum and the Museum of Fine Arts, Boston, unearthed hundreds of smaller silk fragments in the same burial ground at Ray. None of

these has been published, but plans are under way at the University of Pennsylvania to publish the finds of the Ray Expedition. (An unpublished report on some of these silks by Florence E. Day is on file in the Philadelphia Museum of Art.) One fragment found by the Ray Expedition is from the same inscribed textile as Dumbarton Oaks acc. no. 30.1 illustrated in Plate XIII/1 (see H. W. Glidden in Thompson, *Catalogue*, no. 177, b); it is probably Saljuq of the 11th century and illustrates one of the ascension legends popular at that time in both East and West.

Some of the first silks from Ray were exhibited in 1931 (London, Royal Academy of Arts, *Catalogue of the International Exhibition of Persian Art, 7th January to 28th February 1931*, 2nd ed., pp. 26-28, nos. 38, a, b, h, k, l-q; 39, 40). Subsequently some Ray silks, with others given the same attribution, were published by P. Ackerman in the *Survey of Persian Art* (III, pp. 1995-2042); by A. U. Pope (and Ackerman) in *Masterpieces of Persian Art* (Westport, 1945, pp. 72f.); and by Weibel (*Textiles*, nos. 102-12, 115-20). A certain amount of disbelief greeted the Ackerman, Pope, and Weibel volumes; the doubts of reviewers (M. Aga-Oglu, review of Pope, *Masterpieces*, *The Art Bulletin* 29, 1947, p. 58; M. S. Dimand, review of ibid., *Gazette des Beaux-Arts* 32, November-December, 1947, pp. 187-88; Florence E. Day, review of Weibel, *Textiles*, *Ars Orientalis* 1, 1954, pp. 241-42) were exacerbated by these uncritical publications. A cloud rested over the “Ray silks,” which have often been referred to as the “Buyid silks.” This uneasiness was not dispelled by the continued appearance on the market of different types of silks with the Ray label, as well as of more fragments of the original silks. A major collection of the former, formerly that of M. Matossian, was published by G. Wiet (*Soieries persanes*, Mémoires de l’Institut d’Egypt 52, Cairo, 1948); its publication added to the controversy surrounding the “Ray silks” (review by F. E. Day, *Ars Islamica* 15/16, 1951, pp. 231-44; rebuttal by R. Ghirshman, *Artibus Asiae* 14, 1951, pp. 246-48; further reply by Day, *Ars Islamica* 15/16, 1951, pp. 250-51).

There can be no doubt that silks from other sources, many of which are genuine, were given the Ray attribution by dealers, further clouding the authenticity of the silks excavated in 1924-25. A study in 1973 of 39 silks in the Abegg-Stiftung Bern by the conservator, M. Lemberg-Flury, a chemist with background in European dyeing, J. Hofenk-de Graaff, and G. Vial, weaving analyst of the Centre International d’Étude des Textiles Anciens, attempted to settle the question. This publication (*BCIETA* 37, 1973) received a monographic reply by D. G. Shepherd, who has studied the “Ray silks” for many years

("Medieval Persian Silks in Fact and Fancy [A Refutation of the Riggisberg Report]," *BCIETA* 39/40, 1974, pp. 1-135). Her study contains technical appendices by various specialists on the characteristics and condition of the thread and yarn of the Ray silks, including microphotographs. Further bibliography is given below; see also Thompson, *Catalogue*, chap. 15 (intro.).

Post-Mongol conquest silks. Few silks survive datable between the silks of Saljuq style from Ray (Naqqāraḵāna) and the large body of Safavid silk textiles. One reason for this, already mentioned, is climate. Another has to do with the development of an active silk textile industry in Europe, superseding the former European dependence on luxury silk imports from Byzantium and the Islamic countries. The general disruptions arising from the Mongol invasions also interrupted trade with Europe. The result is the absence of silks attributable to Iran of this period in European royal and church treasuries, unlike the situation in the earlier period. The Il-khanid decorative arts, like the 13th and 14th-century Italian silks, were strongly marked by influences from China, thereafter a source in Iran of design borrowings. In the post-Mongol period, the schemes of textile patterns finally changed from the dominant large-roundel format developed in the late Sasanian period to ones featuring greater overall foliation, arabesques, gridwork, and serpentine and diagonal frameworks, as well as individual motifs taken from Chinese design.

Safavid silk textiles are in a limited number of weaves. Among them are compound cloths and twills, brocaded in various bindings; cut and uncut solid and voided velvets; and (warp) satin. They include some which are sumptuous in the extreme, with gold and silver wefts used for large areas of the background (N. A. Reath and E. B. Sachs, *Persian Textiles*, New Haven, 1937, pp. 5-6). Many patterns consist of relatively small repeats arranged overall in a variety of schemata; such silks were used for garments. Other silks suited for hangings and covers feature a limited number of repeats on a larger scale (including the types already mentioned, with metallic backgrounds) or may be of voided silk velvet. In some larger repeat patterns and inscribed textiles, the influence of earlier and contemporary Turkish and Indian silks is apparent. Quite a few Safavid silks contain inwoven names, evidently those of their master weavers, an indication of the high reputation they enjoyed (P. Ackerman, "Some Problems of Seljuk and Safavid Textiles," *Mémoires, III^e Congrès International d'Art et d'Archéologie Iraniens, Leningrad, Septembre, 1935*, Leningrad, 1939, pp. 1-5, especially p. 4). The colors of Safavid silks are more numerous and delicate than the colors of pre-Mongol silks, sometimes

with pastel shades in the latest examples that may betray influence from silks imported from France. Many silks are purely decorative, but a number depict generic and literary scenes as repeating motifs (Plate XIII/2). A study of the scenes selected for use on textiles would probably cast considerable light on the popular literary and folk preferences of the Safavid age.

Silk was used in the greatest Safavid royal knotted-pile carpets (while none survive, silk carpets are known in the literature of pre-Mongol Iran). Safavid weavers also made silk velvet carpets, for they excelled in the weaving of velvet (Reath and Sachs, nos. 78, 79, 86).

The silk textiles of the post-Safavid and Qajar periods have received little systematic attention; as in the case of the other arts of this period, the inevitable European influences previously tended to discourage students. The field presents real possibilities for study, and the recent scholarly interest in Qajar art will probably attract attention to silks of this period.

Non-drawloom woven textiles using silk. Work still remains to be done on the material in extant collections to classify the silk tapestry weavings from medieval Iran. Such textiles were undoubtedly made, although they were probably less common than drawloom weaves; for an example of a silk tapestry insertion attributed to 9th or 10th century Iran, see G. Migeon, “Les tissus archaïques musulmans,” *Art et Décoration* 55, January-June, 1929, p. 141. All-silk *ṭerāz* (*ṭarāz*) were woven in Iran, but this highly perishable group has few survivors; it is possible that a survey of collections would uncover more examples of the type. One such rarity is said to have been excavated at Ray (Dumbarton Oaks Collection, acc. no. 26.2; Thompson, *Catalogue*, no. 215).

See also Silk Trade.

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