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CHARCOAL

CHARCOAL (*ḏoḡāl-e čūb*, *zoḡāl-e čūb*), carbonized wood and other vegetal material, an important household and industrial fuel in Persia and Afghanistan.

Charcoal in Persia. Traditionally it has most often been made in open-pit kilns, each essentially a hole in the ground about 1 m deep. Kindling wood is placed in the pit and set afire; then a large piece of wood is set on top of the flames and covered with dirt and rocks, a small hole being left to permit a flow of sufficient oxygen to sustain the fire. The wood is then left to carbonize. Three main types of charcoal are produced by this means: *ḏoḡāl-e bādām* (almond-wood charcoal; see bādām), the most common and preferred type, made from *Amygdalus scoparia* (*bādām-e kūhī*, mountain almond), which grows particularly on the southwestern flanks of the Zagros; *ḏoḡāl-e bīd* (willow charcoal), used in manufacturing gunpowder; and *ḏoḡāl-e mow*, made from vines (Schlimmer, pp. 36, 125-26). A variant process is used by the Lors, who simply set fire to a pile of wood, then cover it with soil; this method, however, produces proportionally less charcoal than does the open-pit kiln. Another method is to set fire to a circle of firewood around the base of a large tree, particularly an old or crooked tree that cannot easily be cut down with a saw; it eventually catches fire and is slowly carbonized (torrefied). After being allowed to dry out for about a year the tree provides an excellent fuel (for the above description see Feilberg, pp. 130-31). In Ḵūzestān F. R. Maunsell (p. 434) observed “the habit of using a hollow tree as the chimney for a fire lighted at the base, which ends in the destruction of the whole tree.” In the Caspian area

charcoal is produced in a slightly more efficient manner: “The kilns are small, requiring that the wood be reduced to 2 to 3 meters in length and to 10 to 20 centimeters in diameter. Sometimes large logs are split if that is easier than using small diameter material. Young trees are especially desirable as no splitting is required” (Overseas Consultants, III, p. 43). All these methods are, however, relatively inefficient, as approximately half the potential energy of the charcoal is lost, owing to incomplete carbonization.

Although more detailed information on the use and production of charcoal is scarce, it is known that the main fuel used in Persia until quite recent times was not wood or charcoal, which only the well-to-do could afford, but dung (q.v.). Because most of Persia has a semiarid climate (q.v.) wood is relatively scarce and has always brought relatively high prices. In the Caspian provinces and a few other forested areas wood and charcoal are cheaper. In fact, the Caspian area has long been the major source of charcoal for Tehran (Hadow, 1923, p. 7). In the mid-13th/19th century Tabrīz got its fuel mainly from the orchards surrounding the towns and villages and charcoal from the low forests in the neighboring area. The villagers, however, mostly used dung for fuel (Abbott, p. 224). Some charcoal was even exported from Rašt to Baku around 1318/1900 (McLean, p. 18). Charcoal was also produced wherever enough wood was available. C. G. Feilberg (p. 130) observed that Baḵtīārīs and Lors could always be seen in the street of the smiths in Dezfūl, in Ḵūzestān, with their donkeys carrying sacks full of charcoal. They sometimes went as far as Solṭānābād (Arak) if they could obtain a better price there.

Paul English hypothesized that the Kermān region was initially settled by charcoal-burning people in antiquity before the beginning of agricultural settlement. He observed that a similar cycle “is in progress in the mountain valleys to-day” (pp. 162 n. 27, 104). In the mountains around Kermān there are a number of small settlements that subsist by a “combination of agriculture, herding, charcoal burning, and fuel collecting” (ibid., pp. 38, 61, 68, 85). According to a 1345 Š./1966 census, about 1 percent of heads of households in the Māhān area were engaged in charcoal burning for the urban market (ibid., pp. 41, 86), which was an informal sector of the economy and not officially registered. The official statistics for Tehran in 1307 Š./1928 included only four charcoal sellers’ shops, operated by five masters (*ostād*s), an incredibly low number for a city of 210,000 inhabitants (Baladīya-ye Tehrān, pp. 80-81).

Although fuel is a basic necessity during the cold Persian winters, it was nevertheless subject to taxes. A tax known as *ḏoḡāl* was usually levied on

charcoal at the city gate, though the rate varied over time; this tax was still being collected in 1308 Š./1929 (ibid.). Peasants were required to contribute fuel (*hīzom*, *ḏoḡāl*)to their landlords as part of their corvée. This requirement was recorded in the early Safavid period but undoubtedly already existed much earlier (Schimkoreit, index, s. vv. *hizom*, *dhughal*). If wood was scarce, the peasants had to buy the fuel in the market in order to satisfy their masters' often burdensome demands (Khanishu, p. 122; Nweeya, p. 54). It was used for cooking, making tea, heating, and water and opium pipes (Olearius, p. 554; Sheil, pp. 100-01; Wills, p. 390; Sykes, II, p. 395; Bird, pp. 370 ill., 441). Usually only one room in a house was heated. The most economical method was to burn charcoal in a *korsī*, a brazier (q.v.) covered with a large blanket to keep the heat from dissipating, around which members of the household would sit with the edges of the blanket over their legs. In the 13th/19th century charcoal was used in the iron-ore furnaces at Nūr (Āmol), where pig iron and shot were produced. Three *man*s of charcoal were required for each *man* of ore processed (Abbott, p. 8).

Reliance on such fuels, however, led to the deforestation of much of Persia and adjacent regions. Already in the 11th/17th century wood and charcoal were very scarce at Isfahan (Chardin, III, p. 354; cf. Olearius, pp. 554, 559; Thévenot, II, pp. 94-95). Ambassadors and other visiting dignitaries were given wood as part of their daily rations (Hotz, pp. 47, 142). By the 13th/19th century the indiscriminate felling of trees to make charcoal had made most of the uncultivated land around cities look like deserts and was threatening wooded areas of the entire country (Sykes, p. 10). Wood has always been a rare, expensive, commodity in much of Persia (see, e.g., Tate, p. 216; Mahrad, p. 131; Brugsch, II, p. 329), yet Hoeltzer (p. 77) observed that the best charcoal, made from wild almond trees in Khorasan, could be purchased at a relatively low price. An inferior variety made from oak (*balūṭ*, q.v.) was imported from Luristan.

Despite some efforts at reforestation, wood was steadily becoming more expensive as the neighboring mountains were gradually denuded of trees, owing partly to demand for fuel and partly to clearing of land for cultivation of tobacco and opium. Moḥammad Shah (r. 1250-64/1834-48) is reported to have decreed in 1252/1836 that every landholder was to plant a thousand young trees (Perkins, p. 375). In Tabrīz buyers of wood for fuel were allowed 10 *bātman*s (q.v.) per *ḵarvār* as compensation for loss of wood damaged by moisture (DCR no. 2685, *Report on the Trade of Azarbaijan for the Year 1900*, p.

17). In the last quarter of the century firewood was a staple crop at Marnūn (Marnān), now a quarter of Isfahan (Wills, p. 364).

Nevertheless, the general situation continued to deteriorate. In the late 13th/early 20th century fuel was extremely scarce in many parts of Persia (Tate, p. 216; Savage-Landor, I, p. 377). As the 14th/20th century progressed, sources of charcoal continued to decline. What desert brush was left after heavy grazing was further depleted by fuel gatherers, who carried large quantities to the cities on mules, donkeys, camels, and later, trucks. The declining authority of tribal leaders, who endeavored to protect the woods against outsiders, and the spread of motor transport in the 1300s Š./1920s aggravated the situation. Now the charcoal-burner could carry the timber on donkeys to the roads, where it was loaded onto trucks (Harrison, p. 491; English, p. 107). Under Reżā Shah the government had already taken preliminary steps to halt major abuse of the forests (Overseas Consultants, III, p. 47), but after World War II motorized fuel collectors began to strip the plains of trees and shrubs to produce charcoal. Overgrazing aggravated the problem, and in some valleys and foothills hardly any vegetation was left at all (ibid., p. 45). The resulting degradation of the land and fuel shortages brought major changes to the villages. Fruit and shade trees were disappearing from the gardens (e.g., in Māhān and Jūpār in Kermān) as the “high price of charcoal . . . led to sharecropping agreements between villagers and charcoal burners or the outright sale of woodlots.” An inexpensive way of obtaining fuel was by soaking trees in kerosene (English, p. 107).

There was, however, some concern about deforestation in Persia, and consultants on economic planning were nevertheless able to persuade the government to adopt further measures to prevent uncontrolled exploitation of the already badly damaged forests. As a result of the cutting down of trees and subsequent grazing of the land, erosion had become serious. Commercial-quality oak and maple logs were cut into small pieces for charcoal production, whereas other logs, up to 30 m long, were simply stripped of their branches and left to rot. Construction of new roads contributed to the problem, for mule trains could penetrate more deeply into the remaining virgin forest. Devastation of the forests increased with the demand for charcoal. Mules and donkeys were employed to transport charcoal from kilns to depots where trucks were loaded. “For 10 to 20 kilometers from every truck highway all the best trees have been cut” (Overseas Consultants, III, p. 43). Furthermore the fact that charcoal burners and their families lived in the forest with flocks of

sheep meant an additional strain on the environment. The overcut areas around the kilns were easily accessible to animals, which ate the naturally regenerating young tree shoots of valuable species and killed the saplings; “several hectares around a charcoal kiln are denuded, often leaving tall coarse stumps and cut logs to decay. From two to three hectares of good forest is destroyed each season for each kiln, and there are thousands of kilns” (ibid., III, pp. 43-44). To put a halt to such deforestation consultants recommended popularizing substitute fuels, in particular, fuel oil and coal briquettes. Bakers’ ovens, lime kilns, brick kilns, and other big consumers of desert shrubs and bushes were specially targeted for fuel substitution (ibid., III, pp. 58-59). These developments culminated in nationalization of the forests in 1346 S./1967, a move intended to restrict the manufacture of charcoal (U.S. Government, 1975, p. 357). Only in a few areas were a limited number of entrepreneurs licensed to produce charcoal, using local laborers. Only dead wood could be collected and burned as firewood. Nevertheless charcoal continued to be manufactured illegally, both in the Caspian area and elsewhere (Bazin, II, p. 128).

Deforestation through illegal production of charcoal has continued under the Islamic Republic. Insufficient supplies of fossil fuels have led, especially in the Zagros mountains, to serious destruction of the forests in the last decade. Thousands of hectares of woodland have been destroyed; up to 1363 Š./1984 approximately 400,000 tons of charcoal were supplied annually to the domestic market. In Ābān 1363 Š./November 1984 the Ministry of Agriculture decided that, as part of a program for effective management of Persia’s remaining forests and pasturelands, only 70,000 tons of charcoal a year would be produced and distributed throughout the country (*Iran Almanac*, 1987, pp. 261--63).

Charcoal in Afghanistan. The situation in Afghanistan has differed little from that in Persia. In eastern Afghanistan firewood has been the main fuel for centuries. In other parts of the country, especially the north, dung, camel thorn, and reeds were traditionally the main fuel for cooking and heating. The *korsī* was and in most places still is the primary means of heating households (U.S. Government, 1973, p. 112; Wilber, I, p. 444). The main forest resources in Afghanistan are located in the eastern provinces of Paktīā, Nangrahār, Lāgmān and Konār (Arens, pp. 133-34; U.S. Government, 1973, p. 112). Owing to overcutting for fuel and other needs, Afghanistan also suffers from deforestation (U.S. Government, 1973, p. 112), which began in the 13th/19th century and even earlier in many parts of the country. For example, the

establishment in Kabul in the 1310s/1890s of an arsenal requiring large quantities of fuel caused a “fuel famine” there. Various other industrial enterprises in Kabul had to be shut down owing to the extreme scarcity of wood at the turn of the 20th century (Hamilton, p. 396). Wood and charcoal are transported to the urban centers by nomads (Wald, pp. 56, 93). Kabul obtains its supplies from the forests of Paktīā province and Nūrestān (U.S. Government, 1973, p. 112). Estimates of fuel consumption in Afghanistan are not reliable, for instance, the consumption of firewood in Kabul in 1343 Š./1964 was officially estimated at about 180,000 tons a year, while consumption of firewood, charcoal, and dung in 1348 Š./1969 was estimated at 126,000 tons. Other observers have noted that in 1348 Š./1969 approximately 108,000 tons of various biomass fuels were sold, in addition to the officially estimated 126,000 tons (Arens, p. 180). Whatever the actual figures, firewood and charcoal were becoming more expensive as wood became scarcer, partly because of timber smuggling into Pakistan (Wald, pp. 56, 100).

See also coal; dung; and fuel.

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