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A Heritage of Small Things:
Archaeological and Ethnographic Aspects of the uses of Plant Materials in Bannu District, Pakistan

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Abstract: Natural materials derived from plants and animals are used for a diverse range of purposes by people, both in the past and in recent times. In this paper, consideration is given to the non-food uses made of plant materials, especially fibre-rich tissues such as leaves and stems, and the various types of fibres that may be obtained from leaves, stems, seeds, and fruits. Following a review of the evidence for the use of plant fibres from Harappan and pre-Harappan sites in Pakistan and of the ethnobotany of some fibre-yielding wild plants in Bannu District, evidence is presented on the present-day use of plant fibres (at village Bharat and as evidenced in traditional artefacts from the bazaar in Bannu City) and in the archaeological record from the early village sites of Sheri Khan Tarakai and Lewan. There are striking similarities between the techniques used both today and in the past to make matting from leaves and basketry from leaves and stems. These traditional crafts, both past and present, represent elements of both tangible and intangible cultural heritage, the latter being made more tangible by considering modalities of production (i.e., of the chaînes opératoire adopted). Of particular interest are the social processes underlying the cultural transmission of traditional knowledge of the handicrafts considered here, and the impressive persistence of such knowledge over very long spans of time. It is suggested that even small things such as these traditional handicrafts deserve to be recognised as a precious element in a nation's cultural heritage.

Keywords: Plant fibres, Ethnobotany, Ropes and cordage, Wattle and daub, Matting, Basketry, Fabrics, Cultural heritage, Sheri Khan Tarakai, Lewan, Bannu District.

Introduction

Bridget Allchin observed that 'In the whole of South Asia traditions of all kinds survive with remarkable tenacity' (Allchin 1994: 1). She noted that certain ways of doing things are well adapted to their regional environments and this is often most clearly seen in practical traditions, such as those associated with agriculture, food preparation and storage, and crafts. It is such 'practical traditions' that will be the principal consideration of this paper, with special reference to the use of stems, leaves and fibres of plants in the past and in recent times.

A diverse array of natural organic materials that derive from plants or animals are used for a range of non-food purposes by crafts people in the present, and in the past. Such materials include wood, stems, bark, and bamboo; bone, antler, ivory, and horn; feathers, fleece, and leather; animal dung; fibres from animals (most importantly silk, hair, wool, and tendons); plant fibres extracted from leaves (such as sisal) and stems ('bast' fibres, such as flax, hemp and jute), and fibres associated with seeds (cotton) or fruits (coir). From a world perspective, they are obtained from a diverse range of wild and domesticated species of animals and plants and processed and used in a great variety of ways across all regions. Here we will be considering only materials obtained from plants, such materials being used for a diverse range of purposes such as building, tools, fuel, handicrafts, and fabrics. The most obvious plant material which is widely used for a range of purposes is wood, but this has been discussed in a paper recently published in this journal (Thomas and Cartwright 2020) and will not be considered

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here. The focus will be on plant fibres, including tissues such as leaves and stems with properties that are determined by their high fibre content. As should be clear within specific contexts, the use of the term 'plant fibres' will refer either to specific types of fibres or to fibrous tissues such as leaves and stems. Excluded from the present discussion are natural organic products, broadly defined as chemical compounds or substances, which are extracted from the tissues of plants or from other living organisms such as algae or fungi.

The preservation of plant fibres in the archaeological record

Cellulose is the principal structural macromolecule in all plant fibres and fibrous tissues and is the sole constituent of cotton fibres. Most other types of plant fibres also contain lignin and, especially in the case of stems and leaves, an additional range of minor components including hemicelluloses, other polysaccharides, and lipids. These energy and nutrient rich compounds are a food resource for a range of organisms including bacteria, fungi and insects, the activities of which cause the biodegradation or decay of plant fibres. Plant fibres may be preserved in a relatively unaltered state in specific environmental (often climate-related) conditions in which biodegradation is inhibited, such as intense cold (preservation by freezing), very wet (preservation by waterlogging) or very dry (preservation by desiccation). The condition of fibres, and the fabrics, ropes, mats, or baskets made from them, that are preserved in such conditions can be excellent and a great deal of information can be gained about the technology of their production and of their use (Gleba and Harris 2019). Plant fibres, and the artefacts made from them, can also be preserved after being modified in various ways, such as chemical alteration by mineral replacement, by direct contact with objects made of metals that may be toxic to decay-causing organisms, or by being charred by fire. Fibres occurring in the archaeological record because of these latter processes are often very fragmented and highly fragile. Specific identification of the plants from which such fibres were derived can be very difficult, although high-powered microscopy can help, as can the recovery and identification of accessory materials such as phytoliths, most commonly those of silica or opal (Weiner 2010: 135-149).

Plant fibres from Harappan and pre-Harappan sites in Pakistan: an overview

The first published report of plant fibres from an archaeological site in Pakistan was by Marshall (1931: 33), who found fragments of a cotton fabric and a piece of cotton string preserved in contact with a silver vessel at Moenjodaro. Cotton, either in the form of fibres or seeds, has been identified at several other sites in South Asia. There is early evidence of cotton fibres at Mehrgarh dating from the 6th millennium BCE (Moulherat *et al.* 2002). A few seeds attributed to the cotton plant (*Gossypium* sp.) have also been found at Mehrgarh in a 5th millennium BCE context (Costantini 1984: 32). As Moulherat *et al.* (2002) acknowledge, the fibres and the seeds from Mehrgarh are insufficient evidence that cotton was domesticated and cultivated in the Kachi Plain during the Neolithic, and the use of wild cotton fibres is just as likely. Fragments of cotton string have been found inside a carnelian bead from a grave dated to the 4th millennium BCE at Shahi Tump in southern Baluchistan (Moulherat *et al.* 2002: 1399).

As reviewed by Fuller (2008), there is a range of other evidence for cotton, such as pollen (at Balakot) and charred seeds (at Banawali, Harappa, Kanmer, and Kunal), dating to the mid to late 3rd millennium BCE. Cotton is both a fibre and food crop, and cotton seeds, which constitute some 50% by weight of the harvested cotton (Cotton Australia 2022), can be crushed to extract and edible oil, and the residual crushed seeds fed to animals. Although strongly suggestive of the use of cotton fibres, finds of cotton seeds in archaeological contexts do not unequivocally indicate this.

According to Kenoyer (2004: 18) cotton appears to be the fibre most used in the Indus Valley, although various types of wool and jute or hemp fibres were probably also used, there are no reports of the positive identification of these, but see Wright *et al.* (2012), discussed below. Kenoyer (2004: 20) notes that terracotta spindle whorls

become quite common at sites throughout the Indus valley, and these provide indirect evidence for the spinning of yarn. For example, during the Ravi phase occupation at Harappa (3300-2800 BCE), different sizes of spindle whorls were found, probably used for producing different types of threads: heavier spindle whorls for thick woollen yarn and lighter spindle whorls for fine wool or cotton thread.

Charred seeds of flax (*Linum usitatissimum* L.) from Miri Qalat, dated to the 4th millennium BCE, were identified by Tengberg (1999) and seeds of flax have been found at other sites Fuller 2008). A principal use of flax is to make cloth and cordage, using the bast fibres in the stems of the plant. In addition, flax seeds may be used directly for food or extracts from them for food supplements and oil (Washburn 2006). As noted above for cotton, finds of flax seeds in archaeological deposits are indirect indicators of the probable use of flax fibres, but they might also indicate other important uses.

Another important bast fibre is jute. Jute fibres have been identified as casts in clay coatings on a ceramic vessel from Harappa dated to 2200-1900 cal. BCE (Wright *et al.* 2012), which they reasonably assign to the species *Corchorus capsularis* L. As these authors note, this is the first direct evidence for jute fibres from an Indus Valley context, although charred seeds of jute were reported by Weber (1991) from contemporary contexts at Rojdi in Gujerat. As for cotton and flax, seeds of jute in archaeological contexts are likely indicators of the use of jute fibres, but the seeds (and leaves and young shoots) of jute are also used as food supplements and in traditional ('folk') medicine (Duke 1983).

Thomas *et al.* (2012) report that the fire which had partly destroyed a 4th millennium BC building at Shahi Tump, in Baluchistan, led to the preservation by of a net which was found as a charred heap of knotted cords on the burnt floor. Despite its charred condition, the net was wonderfully preserved (Thomas *et al.* 2012: fig. 3) and had been recovered by painstaking and exceptionally skilful excavation. Detailed examination of the highly fragile remains showed it was made from two-stranded plied cord which had been knotted to produce the net. Microscopic examination of the spherical phytoliths extracted from the net suggests the twine was made from the leaves of the locally common desert plant, the Mazri Palm *Nannorrhops ritchieana (Griff.)* Aitch.

Ethnobotanical aspects of some important fibre-yielding plants in Pakistan, with special reference to Bannu District

Numerous and botanically diverse species of wild and domesticated plants are potentially important sources of fibres, especially of fibrous tissues such as stems and leaves. Three species of wild plants are especially important in this regard: Bullrush, Mazri Palm, and *Munja* grass.

The Bullrush, *Typha latifolia* L., also known as Common cattail and, in Pashtu, *Deelai*, has a very wide geographic distribution and thrives in a diverse range of climates. It is an obligate wetland species, growing in low-lying flooded areas in water depths of 0.5 to 0.8 metres (Fig. 1). Champion *et al.* (1966: 100) record it as the principal species of their 'Typha Swamp' plant association found growing in stagnant shallow water. Stewart (1972: 28) describes it as being common in the Kurram valley. The plant is 1.5 to 3 m high and has broad leaves 2 to 4 cm wide. The rhizomes are edible after cooking and removing the skin, while peeled stems and leaf bases can be eaten raw or cooked. In the Bannu region its leaves and stems (Fig. 2) are used as a fuel for pottery kilns (Khan and Thomas 2020) and for a range of handicrafts (as described below).

Figure 1. *Typha latifolia* (*Deelai*) growing in a low-lying swampy area (Photograph from '*Wikipedia, The Free Encyclopedia*' Retrieved 26 January 2019).

The Mazri Palm, *Nannorrhops ritchieana*, also has a wide geographical distribution from the Arabian Peninsula eastwards to Pakistan, where, according to Stewart (1972: 33), it occurs in Sind, Baluchistan, the lower Kurram Valley, and the Salt Range. Nasir *et al.* (1995: 256) record its preference for hot dry mountainous and hilly places. Champion *et al.* (1966: 123 -124) describe it as part of a plant association they term 'Mazri Palm Scrub', which occurs on lower hills and chiefly on sandy soils. It is a shrub-like clumping palm, with several stems growing from a single base. The stems grow slowly and often tightly together, reaching a height of 1 to 2 m or more. It is a fan palm, the leaves having a long, smooth petiole terminating in a rounded fan of 20 to 30 leaflets, each 12 to 30 cm (or more) long. According to Stewart (1972: 33), these leaves make good matting, while Nasir *et al.* (1995: 256) note their use for mats, sandals, baskets, etc. As noted in the previous section, its leaves were used to make a two-stranded twine which was sufficiently fine and flexible to be knotted to produce a net (Thomas *et al.* 2012). The leaves of this palm are rather tough, so it is probable that this fine and flexible twine was made from thin strips of leaf tissue sliced along the lengths of the leaflets.

The large clump-forming wild grass *Saccharum munja* Roxb. (= *Tripidium bengalense* (Retz.) H.Scholz), known as *Munja*, occurs on river flood plains throughout Pakistan (Stewart 1972: 113). Nasir *et al.* (1995: 263) report that it grows in open places or sandy areas subject to periodic flooding, while Champion *et al.* (1966: 124) note that it sometimes occurs in plant associations with Mazri Palm (*N. ritchieana*). It grows up to 2 m in height and its leaves may exceed 1 m in length. These leaves can be used for thatching roofs, for making baskets, ropes (Fig. 3), hand fans, brooms, mats, and woven shelters for crop protection; the stems are used for cane furniture and window blinds (Nasir *et al.* 1995: 263). In the Tochi Valley clumps of Munja are managed by burning to promote new and vigorous growth, yielding fresh and soft young leaves for animal fodder and large tougher leaves and stems for craft purposes (K.D. Thomas, personal observation, December 1978).

At this point, it is of interest to note that the classifications and nomenclatures applied to the above plants by botanical scientists do not always correspond to the nomenclatures employed by local traditional craft workers. Also, such traditional nomenclatures can vary from village to village. The name '*Deelai*' is a good example of this. In village Bazaar Azmat Khan, the traditional taxon *deelai* appears to correspond to the botanical taxon *Typha latifolia*. In this village it is used both as a fuel and a source of fibrous leaves and stems for ropes, matting, and so on.

Figure 2. Stacks of *Deelai* awaiting use as either fuel in pottery kilns or as the raw material for craft purposes, such as rope making. Village Shabaz Azmat Khel, Bannu District (Photograph by the author. Unless stated otherwise, all other photographs and images in this paper were produced by the author).

Figure 3. Leaves of *Munja* to be made into rope, Bharat Village, Bannu District.

In village Bharat the very long and narrow plant leaves (Fig. 3) we observed being used to make rope were almost certainly of *Saccharum munja* and not *Typha latifolia*, although the name used by the villagers for these leaves was '*Deelai*'. In this village it appears that is the term for all long and narrow leaves and stems used for craft purposes, whether of the botanical species *T. latifolia* or *S. munja*.

Investigating the archaeology and ethnography of fibrous plant materials in Bannu District

An excellent starting point for linking the archaeology with the ethnography of Bannu District is the work of Farid Khan (Khan 1994), who showed that certain aspects of recent 'traditional' ways of building, of storing food, and certain cultural practices, are echoed in the archaeological record from at least the 4th millennium BCE. During an ethnographic survey of village-based potters in Bannu District in December 1991 (Khan and Thomas 2020), opportunities were taken to make somewhat less structured observations of other traditional technologies and crafts, including of agricultural equipment (especially for the tillage of soils) and, more especially, ways of working with natural plant materials to produce ropes, mats, and baskets. It is these handicrafts that are considered here, within the broader context of the use of plant fibres and the ways in which this might be represented in the archaeological record.

Modern data were obtained from observations made at the village of Bharat and on traditional, village-made, craft products purchased from the bazaar in Bannu City. Archaeological data are from the early village sites of Sheri Khan Tarakai and Lewan. Fig. 4 shows the locations of the modern settlements and ancient sites that are mentioned in this paper.

The early village sites of Sheri Khan Tarakai and Lewan

The results from the investigations at Sheri Khan Tarakai have been published in full (Khan *et al.*, 2010) and only a brief outline will be given here. The site is located in the west of Bannu District (Fig. 4) on part of a substantial alluvial fan and on the left bank of a minor ephemeral torrent, the Barrai Khuarra. Excavations, over a number of seasons dating from 1986, showed the settlement was a small village, populated by perhaps a few hundred people living in mud walled houses,

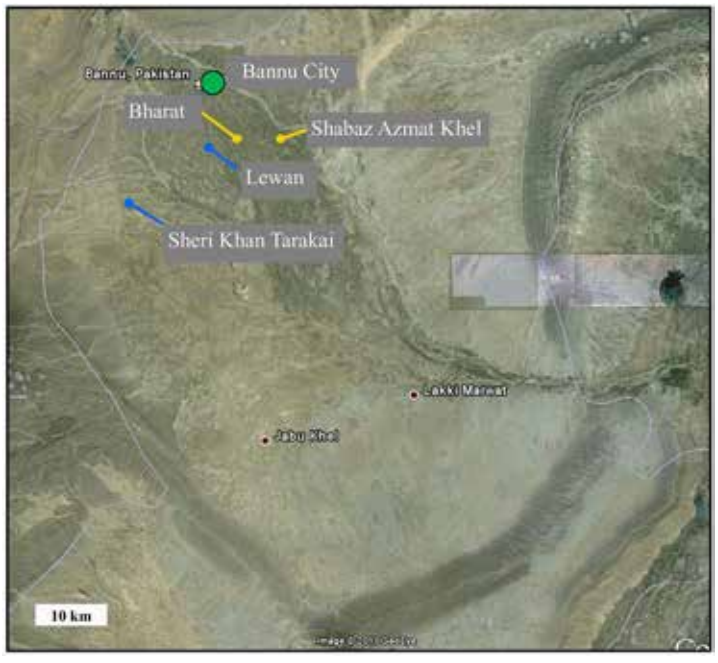

Figure 4. Google Earth™ Image of the Bannu basin, north-west Pakistan, showing the locations of Bannu City, the villages of Bharat and Shabaz Azmat Khel, and the archaeological sites of Sheri Khan Tarakai and Lewan.

some with cobble stone footings. The range of pottery, lithic tools and small finds, along with associated production debris, indicate a diversity of on-site craft activities. The inhabitants of Sheri Khan Tarakai deployed a range of subsistence strategies, including the cultivation of barley and wheat, the management of domestic sheep, goat and cattle, the collection of a range of wild plants (including wood), and the hunting of wild animals. The relative and absolute chronological evidence indicate occupation was principally from the late fifth to the early third millennium BCE. The most reliable radiocarbon dates suggest the main period of occupation occurred between *c.*3800 and 2900 cal. BCE.

The site of Lewan, located in the *doab* between the Baran and Tochi-Gambila rivers (Fig. 4), was discovered by Farid Khan during his 1975-1976 surveys of the Bannu area (Khan 1986: 190-191). He was struck by the abundance and diversity of the surface artefacts, which included characteristic Kot Dijian pottery, terracotta bangles, miniature pots, fragments of alabaster vessels, terracotta figurines, pieces of several precious stones used in the manufacture of jewellery, and, most numerous of all, microliths and the debris of their production. A short season of excavations at the site was undertaken in 1977-78 and the results published (Allchin *et al.* 1986). Subsequent research by the Bannu Archaeological Project at the site resulted in significant re-interpretations which have been published by Khan *et al.* (2000). Lewan was occupied in three successive cultural phases: the earliest with pottery resembling that of Sheri Khan Tarakai, a later occupation attributed to the Tochi-Gomal Phase, and the latest of the Kot Dijian period.

Modelling the diverse uses of plant fibres and fibrous tissues in Bannu District

Before considering specific case studies of the craft uses of plant materials, it is worth thinking in broader terms about the range of uses to which different plant materials can be put. Here this is done with a simple systems model or flow chart (Fig. 5), constructed with knowledge gained from years of observation of diverse practices in Bannu District and elsewhere in Pakistan. Although of animal origin, dung is included because it is principally composed of plant materials such as

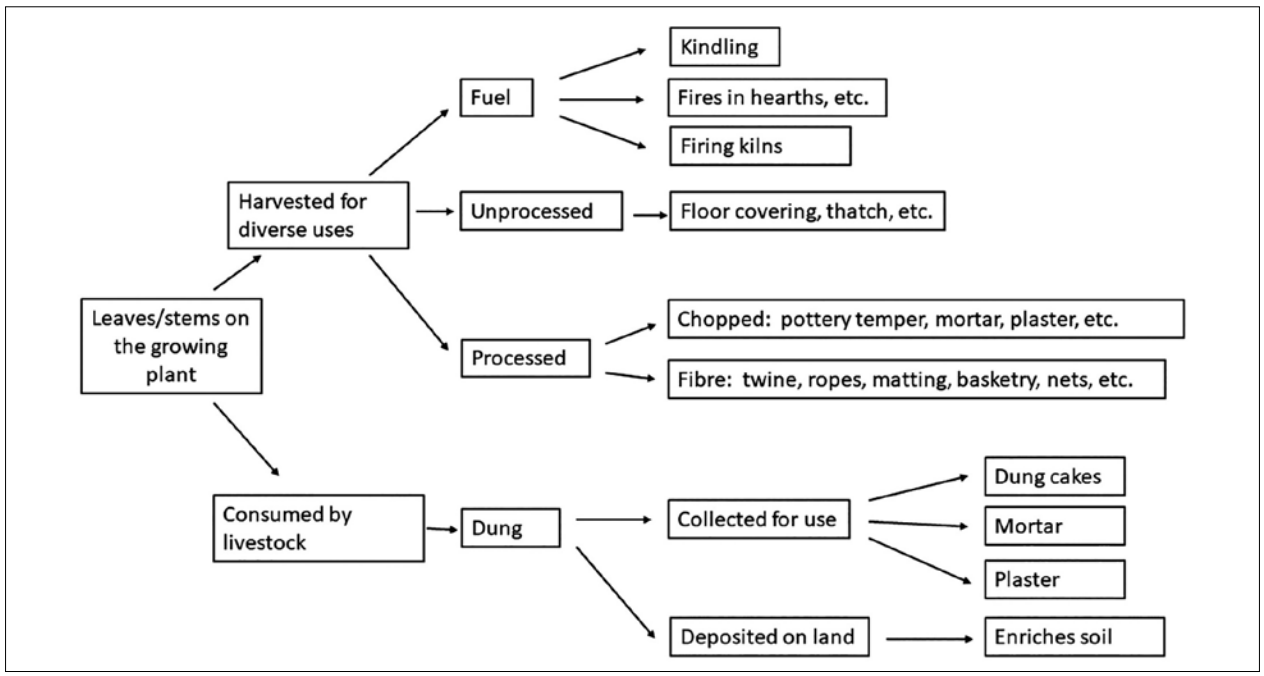

Figure 5. Flow chart modelling the diverse ways in which leaves and stems of plants may be used for non-dietary purposes, as discussed in this paper.

partially digested stems, leaves, chaff, seeds, etc. Dung is a valued resource and, although not a principal concern of this paper, it can validly be considered an important component of the model (Fig. 5). A very useful review of dung in the archaeological record has been written by Shack-Gross (2011).

Traditional rope making at Bharat village

Ethnography of rope making - use of either *Munja* or *Deelai* (but note issues of 'local traditional nomenclature' versus 'scientific botanical nomenclature', discussed above). Here, leaves of *Munja* are used (Fig. 3), along with a simple but effective, hand-held and hand-operated rotational device for twisting the stems and leaves into rope (Fig. 6). This device has a ratchet mechanism that permits it to be turned in one direction only, so if the rotational beam is released the ratchet will lock it, preventing any movement in the converse direction which would loosen the twists in the rope. As the handle is turned the ratchet makes a rattling sound, which resembles one of the calls made by the *Karkare*, the Demoiselle Crane (*Anthropoides virgo*), one of three species of cranes which are captured and kept was pets in various parts of Bannu and Lakki-Marwat Districts, as described by Farid Khan (Khan 1991). Because of this resemblance, the rope-twisting device is known as a 'karkare'. As the lengths of *Deelai* or *Munja* are twisted by the man operating the karkare (Fig. 7a), another man maintains the tension at the other end and plaits new stems and leaves into it (Fig. 7b, c). This progressively increases the length of the rope (Fig. 6). Ropes made in this way are used for a wide range of purposes, including being woven into a webbing 'mat' which is then lashed into a wooden frame to make the traditional charpoy (Fig. 8).

There is no direct evidence for the making or use of ropes from any archaeological site in Bannu, although Wright (1986: 179-180) observed

Figure 6. A coil of rope made from leaves of *Munja* and the hand-held gadgets ('karkare') which are used to twist the leaves into rope, as described in the text. Bharat Village.

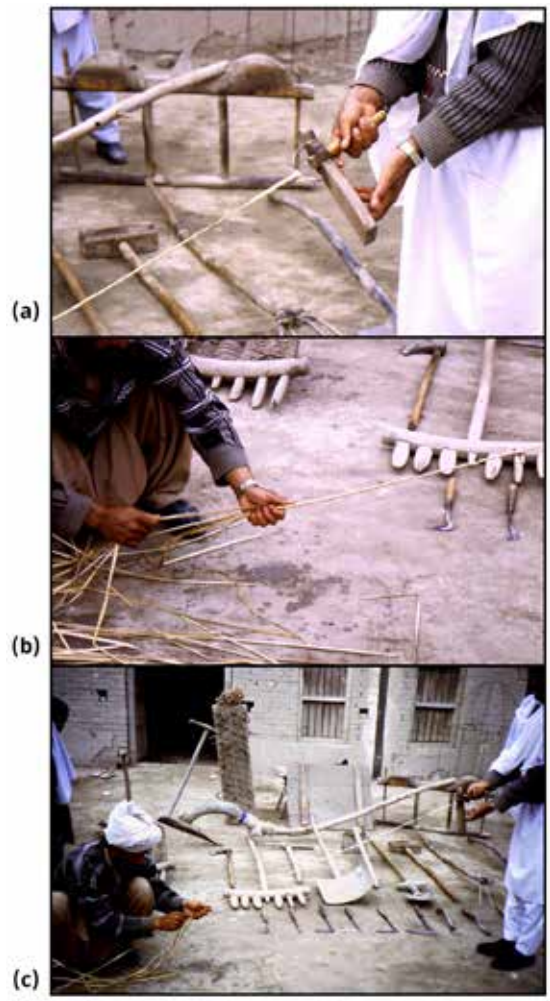

Figure 7. Turning leaves into rope, Bharat Village: (a) showing the use of the karkare to twist the leaves and stems; (b) new leaves and stems are progressively plaited in at the other end of the forming rope to increase the length of the rope; and (c) a photo of the whole procedure which involves two people (note, too, the old wooden agricultural tools in the background which had been brought out of storage for us to see).

impressions of twine in a clay sealing from Lewan (discussed below). Given the ready availability of the natural materials and the simple technology required it is unlikely that ropes were not made or used by the inhabitants of early village sites in Bannu, but so far, the evidence is elusive.

The use of stems

Stems, along with leaves, can be used to make ropes, as described in the previous section. Sheri Khan Tarakai provides archaeological evidence for another use of stems, in the form of 'wattle and daub', which has been preserved by burning (Fig. 9). Fragments of this were found on the surface of the site and recovered throughout the stratigraphy exposed by excavation. It appears to have been an important component of structures at the site, possibly internal walls, which have a lesser load-bearing requirement. The robust stems selected for use in the wattle and daub structures at Sheri Khan Tarakai cannot be identified to species. Much finer stalks and stems are employed in handicrafts such as basketry, as described in the section after next.

Leaves for matting

Here we will consider the evidence from archaeological sites for the use of mats made from leaves. Impressions of matting were found in a fragment of the base of a pot from Sheri Khan Tarakai (Fig. 10), indicating that the pot had been constructed on a mat before being dried and fired. The impression clearly shows the woven nature of the mat, being formed of strips, the width of which suggest that the leaves of *Typha latifolia* were used. The structure of the weave (alternating 'two strips over, two strips under') and the width of the strips correspond exactly with the weave of a mat from the bazaar in Bannu City (Fig. 11).

Although from a site in Dera Ismail Khan District but discovered by members of the Bannu Archaeological Project (Khan *et al.* 2004), there

Figure 8. Ropes made from leaves (most commonly of *Deelai* or *Munja*) are woven into a webbing and lashed to the wooden frame, making a traditional charpoy. Bharat Village.

Figure 9. Fragments of wattle and daub from the site of Sheri Khan Tarakai: clay ('daub') with impressions of plant stems ('wattle'). The structure of which this was a part had been destroyed by fire which consumed the wattle but left the impressions of it in the fired clay. After Khan *et al.* (2010: fig. 4.34).

is evidence of matting on a large fragment of a terracotta cake from the site of Jhandi Babar A, period II (the Tochi-Gomal Phase). This has woven mat or basket impressions on both flat surfaces (Fig. 12) which are very like the mat impressions on the pot from Sheri Khan Tarakai (Fig. 10) and especially the type of weave in a modern mat (Fig. 11).

Leaves and stems for basketry

Here the principal focus will be on the evidence for basketry and basket construction techniques from the archaeological site of Sheri Khan Tarakai. We noted above the mat impression on a pot sherd from the site, but many other pots from this site have impressions of coiled basketry on their bases (Fig. 13, upper image). These impressions closely resemble the traditionally made basketry that can be purchased in the bazaar in Bannu City (Fig. 13, lower image). Detailed examination of the coiled basket impressions in the ancient pottery has enabled a reconstruction of how they were made (Fig. 14). Detailed examination of a modern coiled basket (Fig. 15) shows precisely the same technique. Small bundles of fine stems, probably from wild grasses, or stalks from domesticated cereals, such as wheat, barley, or rice, are bound together by narrow strips of fibrous tissue cut from long leaves, most probably of '*Munja*'. These long bundles are then coiled to form the basket. In modern basketry of this type, the coils are held together by stitching, but there is no evidence for how the coils of the ancient baskets were kept together.

Evidence for fabrics

There is, of course, abundant evidence for the use of a wide range of fabrics in the present-day, these fabrics being made not only from diverse types of fibres of plant and animal origin, but increasingly from synthetic fibres. These factory-made fabrics are manufactured on a large scale, and, except for knitted materials, there is little evidence that small-scale craft production of fabrics occurs in Bannu District in present times.

We have little evidence from archaeological sites in Bannu District for the former use of fabrics, although anthropomorphic terracotta figurines are sometimes portrayed as wearing some form of fabric apparel. Otherwise, the evidence is very

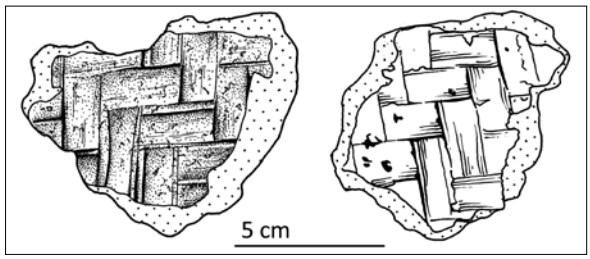

Figure 10. Impressions of matting in the base of a pot from the site of Sheri Khan Tarakai. After Khan *et al.* (2010: fig. 5.69).

Figure 11. Base of a pot from the site of Sheri Khan Tarakai with matting impressions, photographed on a modern mat purchased in the bazaar of Bannu City. After Khan *et al.* (2010: fig. 8.9).

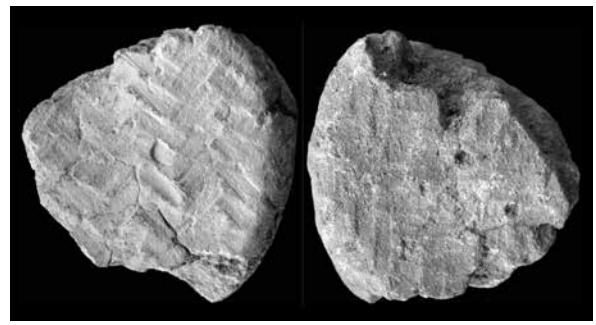

Figure 12. A large fragment (77 x 79 mm) of a terracotta cake from Jhandi Babar A, period II (Tochi-Gomal Phase) which has woven mat or basket impressions on both flattened surfaces (c.f. similar impressions in Figs 10 and 11, especially the type of weave in the modern mat in Fig. 11). The cake is identified as 'CISI Jdb-39' in the system employed for the *Corpus of Indus Seals and Inscriptions* by Parpola and Koskikallio (2021). From a surface collection made by Farid Khan and K.D. Thomas in December 1998. Photograph by courtesy of Asko Parpola.

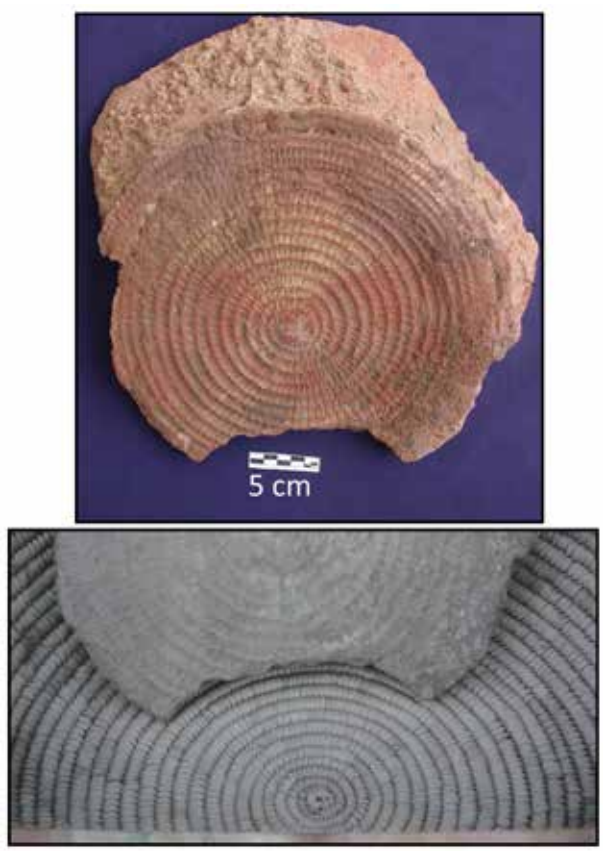

Figure 13. Coiled basket or mat impressions on the base of a large piece of pottery from the site of Sheri Khan Tarakai (upper image) and photographed on a modern coiled basket from the bazaar in Bannu City (lower image). After Khan *et al.* (2010: figs. 5.9, 8.8).

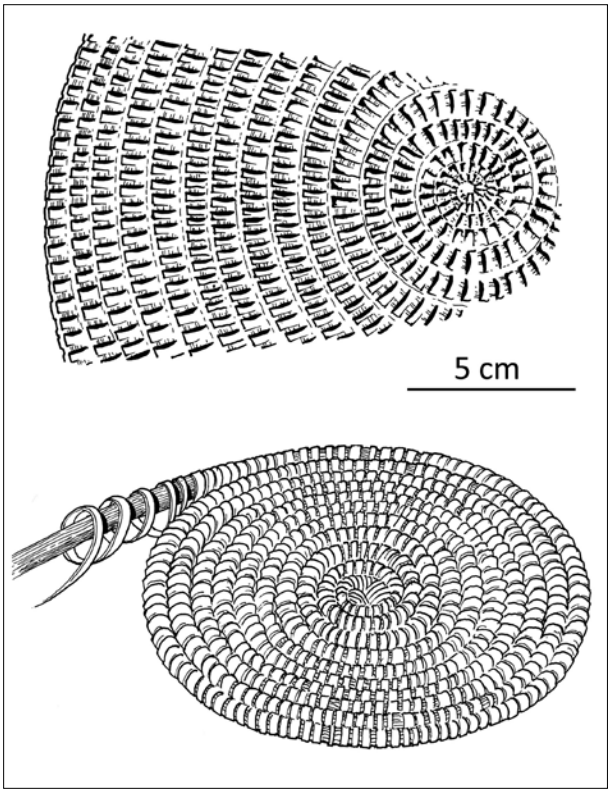

Figure 14. Reconstructions of the coiled basket and of the technique of basket production, based upon the impressions of basketry in a pot from Sheri Khan Tarakai (see Fig. 13). After Khan *et al.* (2010: fig. 5.70). Compare this with the modern basketry in Fig. 15.

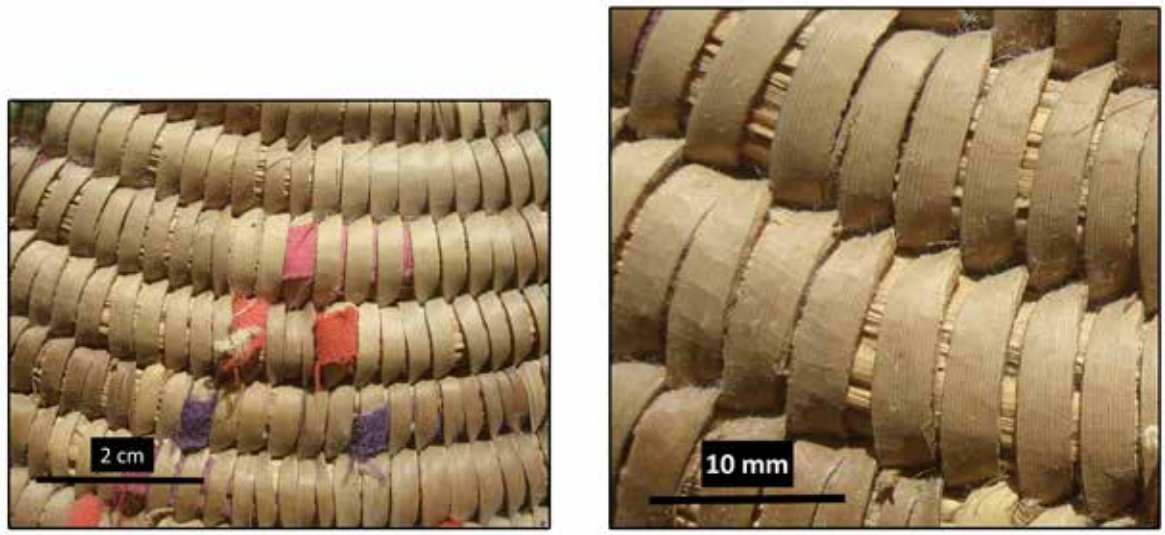

Figure 15. Mode of manufacture of a modern coiled basket from the bazaar in Bannu City. Upper: close-up of the successive coils in the basket (pieces of coloured cloth had been woven in to add a decorative effect). Lower: magnified image of the coils of the same basket, showing how they are made from bundles of fine stems which are bound together by strips cut from long leaves (compare with the reconstruction in Fig. 14, based upon a detailed examination of the basket impressions in a pot from the site of Sheri Khan Tarakai)

rare, and in Bannu District we have evidence only from the site of Lewan. Impressions of cloth or fabric on the surface of a fired clay sealing (Fig. 16) from the Kot Dijian period of occupation at the site have been described by Wright (1986: 178-9 and fig. 4.9.2). On one surface, the sealing bears two impressions of the same seal and impressions of a coarse fabric. It is impossible to determine if the fibres in the cloth were of plant or animal origin. Wright makes the reasonable suggestion that the cloth had been used to produce a 'smooth' uniform finish to the surface of the clay for the seal impressions to stand out with greater clarity. As also noted by Wright (1986:179-180), the other side of the clay sealing is interesting because it retains impressions of twine and a matting, or fabric, covering over which the clay appears to have been applied. The clay had probably been pressed against a cylindrical form, possibly a pole, suggesting the sealing had been used on a door to ensure its closure and security.

Discussion

The foregoing considerations of the present and past uses of plant fibres and fibrous tissues cover a rich diversity of 'traditional' cultural heritage. Pakistan is, of course, richly endowed with a wonderfully impressive cultural heritage, represented by a great number and wide diversity of important ancient sites, six of which are fully recognised and protected as World Heritage Sites. These range from individual sites (Rohtas Fort and Moenjodaro), to site complexes (Takht-i-Bahi with Sahr-i-Bahlol, the Fort and Shalamar Gardens, and the Thatta monumental complex), to the cultural landscape of the Taxila Valley with its great diversity of ancient sites. In addition to these, there are 26 sites in Pakistan on the UNESCO 'Tentative List', pending their recognition and designation as being of World Heritage status (UNESCO 2016a). All these outstanding sites are part of the rich 'Tangible Cultural Heritage' of Pakistan.

While historic buildings, monuments, and diverse other categories of things (including single artefacts), can readily be perceived to be part of humanity's cultural heritage, other forms of heritage, 'Intangible Cultural Heritage' (ICH), consist of nonphysical elements or traditions, such as folklore, beliefs, systems of knowledge, customs and practices. As a parallel to its listings of protected World Heritage sites, UNESCO (2003) also produced a 'Convention for the Safeguarding of Intangible Cultural Heritage'; see Kurin (2004) for a useful overview and appraisal of this scheme. The Convention has been ratified by most countries, including Pakistan in 2005. Pakistan has endorsed the addition of the festival of 'Nawrouz' to the List of the Intangible Cultural Heritage of Humanity (UNESCO 2016b) and of 'Falconry' to the Representative List of Intangible Cultural Heritage (UNESCO 2016c).

The local traditional crafts, past and present, discussed here have both tangible and intangible elements. Tangible aspects include the materials used and selected for use, the technology of their use, and the resulting products (ropes, mats, baskets, etc.). Where the original physical nature of such heritage items has not been preserved, which is commonly so with the archaeological record, casts, impressions, and other traces can provide tangible evidence of such craft practices in the past. Intangible aspects of such cultural practices are, as implicit in the term, less obvious

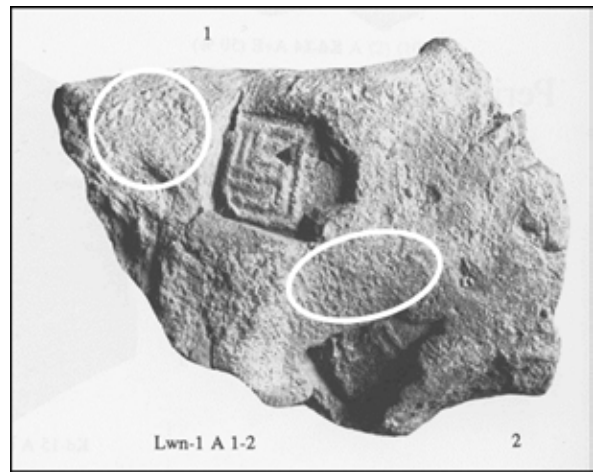

Figure 16. Impressions of cloth or fabric on the surface of a clay sealing from the site of Lewan, which also bears two clear impressions that have been stamped using the same seal. There are faint impressions of a fabric of some kind over the surface, two such areas being high-lighted here within a circle and an ellipse. Sealing 'Lwn-1' of Shah and Parpola (1991: 400). Based on a photograph in Wright (1986: fig. 4.9.2). Photograph reproduced by courtesy of Asko Parpola.

and highly subtle. For example, the karkare is a simple device used in village Bharat to make ropes (Fig. 6), but the choice of 'karkare' as a name has deeper cultural associations relating to the local passion (verging on a 'cultural obsession') for the catching and keeping of cranes (Khan 1991). Traditional knowledge is an important element of the intangible cultural heritage of a region and its people. It was noted above that the term '*Deelai*' could be used for the leaves and stems of both *Typha latifolia* and *Saccharum munja*. Such a 'folk' classification cuts across the 'scientific' botanical one. The former is based upon traditional knowledge, material considerations, and practical usage, while the latter is a system based on an understanding of phylogenetic relationships. Neither system is 'better' than the other; both are fit for their very different purposes. Interestingly, and perhaps paradoxically, classifications of living things based on traditional knowledge tend to be more stable over time than formal biological classifications, because the latter are subject to change as the scientific understanding of phylogenetic relationships changes.

Traditional ways of knowing, classifying, and naming are all forms of Intangible Cultural Heritage (ICH). While practices or actions/ performances that typically constitute ICH are not usually visible as physical entities in the archaeological record, the results or products of such practices or actions may be. The distinction between tangible and intangible cultural heritage therefore becomes blurred when certain 'performance' aspects of the intangible are made tangible. Choices are made at various stages during the process of producing craft objects, including selecting suitable raw materials, preparing those materials, and using them in particular ways to form the required product. This production sequence or *chaîne opératoire* (Leroi–Gourhan 1964), takes place within a specific social, economic, and ideological setting, which provides both a context for the individual actions and a range of potential constraints on those actions (Lemonnier 1993). Of particular interest is how the knowledge embedded within such production sequences, in our case knowledge of plant materials, their products and ways in which they can be used, is conserved and transmitted. For many craft skills, gender-specific transmission is likely to be especially important. Khan and Thomas (2020) found that transmission of the knowledge and skills required to produce wheel-thrown pottery was from father to son. For understandable reasons of *pardah*, we were unable to observe women demonstrating their knowledge and skills regarding the use of plant fibres, but it is the case that such knowledge is transmitted from mother to daughter. What is so interesting about the archaeological evidence for the uses of plant fibres is that such generation-to-generation transmission appears to have persisted over millennia. Such deep time persistence relates not only to the concepts of using plant fibres in various ways, but to the transmission of specific modes of production and handicraft skills, as shown in the finished products (for example, modern baskets and basket-impressions in ancient pottery) and the *chaînes opératoire* that can be inferred from them. But what of the future? The pace of change in all aspects of peoples' lives is such that there must be great uncertainty for how much longer such crafts will continue to be practiced and transmitted as 'living heritage'.

Conclusion

Consideration has been given to the 'traditional' craft uses of plant materials as attested in the ethnographic present and in the archaeological record of Bannu District. In terms of a nation's cultural heritage, they seem to be very small things, fading into insignificance when set against massive monuments to human endeavour, creativity, organization, and power such as Moenjodaro or Takht-i-Bahi. Despite this, they represent craft traditions and ways of knowing and doing that have highly impressive deep-time persistence in the archaeological and ethnographic records. From this perspective, they are a precious heritage indeed.

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