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Fascinating *Fullonum*

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Summary

*A review is given of aspects of the origins, cultivation and use in textile working of fullers' teasel (*Dipsacus sativus *(L.) Honckeny).*

Introduction

Congratulations to Allan Hall (1992) for describing the first archaeological remains of the fullers' teasel, a cultivated plant that has been of immense importance during the history of textile manufacture in the raising of a 'nap' or pile on wool cloth. As indicated by him, no artificial substitute has been found for its gentle action on the finest cloths. Despite its importance it is a neglected plant and the aspects that have long interested me are (a) botanical—its cultivation (domestication) and the extent to which selective breeding might have taken place; (b) agricultural—the way in which teasels were grown as a crop; and (c) textile-historical—the way in which it was used historically during the hand processing of wool (Ryder 1969).

Botanical aspects

The teasel (sometimes spelt *teasle, teazel* or *teazle*) is a tall, prickly plant belonging to the family Dipsacaceae and native to Europe and western Asia. It is a biennial, which means that the flower heads, the part used, do not form until the second year. The small, tubular, purplish flowers are separated by stiff bracts, which provide a censer mechanism for seed dispersal, and in cloth finishing it is the bracts that tease fibre ends from the cloth (hence the name) to raise a nap. The use of the teasel in this way therefore depends on the persistence of the bracts in the dead, dry heads. A key feature of the teasel is the existence of wild and cultivated forms, the important difference being that the bracts in the cultivated plant are spiny, stiff and downward-curving (often referred to in the literature as 'hooked'). It is the elasticity of the bracts, and in particular of the points, which makes them superior to substitutes such as wire brushes. The distinction is shown quite clearly in figure 8 of Hall (1992) (although—as pointed out by the Editors in their Editorial on p. 49 of *Circaea*, vol. 9—the captions have been inadvertently transposed) and it is this difference that I wish to pursue—was what we now regard as the cultivated form always a different species or does this imply 'domestication' and selective breeding for downward-curved bracts? In my 1969 note I regarded the curved bracts as indicating selective breeding, which I thought implied that the plant had been cultivated for a long time. Grieve (1932) suggested that the curve is maintained by cultivation and that the bracts revert to the wild form through neglect. There appears to be no evidence supporting such a reversion.

Gerard (1597) distinguished the garden 'teasell' (*Dipsacus sativus*) from the 'wilde teasell' (*D. sylvestris*). He wrote that 'the tame teasell is grown in gardens to serve the use of fullers and clothworkers' and said that the tame variety had hooked spines and the wilde variety straight spines, which were of no use in dressing cloth. His illustrations clearly show the difference in the bracts. Culpepper (1653) stated that the fullers' teasel (the 'manured' form, as he quaintly put it), for which he gave the Latin name *Dipsacus fullonum*, had 'prickly hooks', while the larger, wild teasel (*D. Silvestris* [*sic*]) had erect prickles, that were not hooked. The very knowledgeable wool stapler Luccock (1805) regarded the fullers' teasel as the cultivated variety of *D. sylvestris*, 'which does not have hooked spines'. Loudon (1844, 198), however, was not convinced that the cultivated variety was different.

Confusion has been caused by the recent changes in nomenclature in which the name for the wild plant became *D. fullonum* L. (the name formerly used for the cultivated form by

Figure 8. Eighteenth-century Yorkshire teasel field.

Miller, but not Linnaeus) and the new name for the cultivated form *D. fullonum* ssp. *sativus*, with a further revision to *D. fullonum* L. and *D. sativus* (L.) Honckeny and fully distinct species in *Flora Europaea* (Tutin *et al.* 1976, 59). Keble-Martin (1974) uses the old names for the two forms, but gives no distinction or use. Although concerned with wild rather than cultivated plants, some authors (e.g. Moore 1983) give only *D. fullonum* and make no mention of *D. sativus*. Moore, (1978), however, illustrates *D. fullonum*, and lists *D. sativus*, which he states is used on a limited scale to raise the nap on cloth (without saying why or how). Others state, after describing the wild form, that the 'hooked bracts' of the cultivated 'fullers' teasel' were once used to raise a nap on cloth, not realising that the teasel is still so used.

Blamey and Blamey (1984), and Blamey and Grey-Wilson, (1989) regard the wild form as 'naturalized' in Britain i.e. introduced, but say that the origin of the cultivated form is unknown. They mention the continued cultivation in Somerset, and state that occasional escapes are found in the South. It is interesting that escapes are not more common. There is no mention of the teasel in three books I have on cultivated plants: Hvass (1960), Simmonds, (1976) and de Rougemont (1989).

Peter Mason, Director of the Petersfield (Hampshire, U.K.) Physic Garden, where the teasel is grown, suggested to me that the wild form was native to Britain and that the cultivated form was introduced. This would mean either that the cultivated form was a different species (with curved bracts), or that any selective breeding for curved bracts had already taken place before introduction, which might not accord with the new designation of the cultivated form as a species. The apparent lack of hybridisation of escapes with the wild form supports the conclusion that the two forms are distinct species.

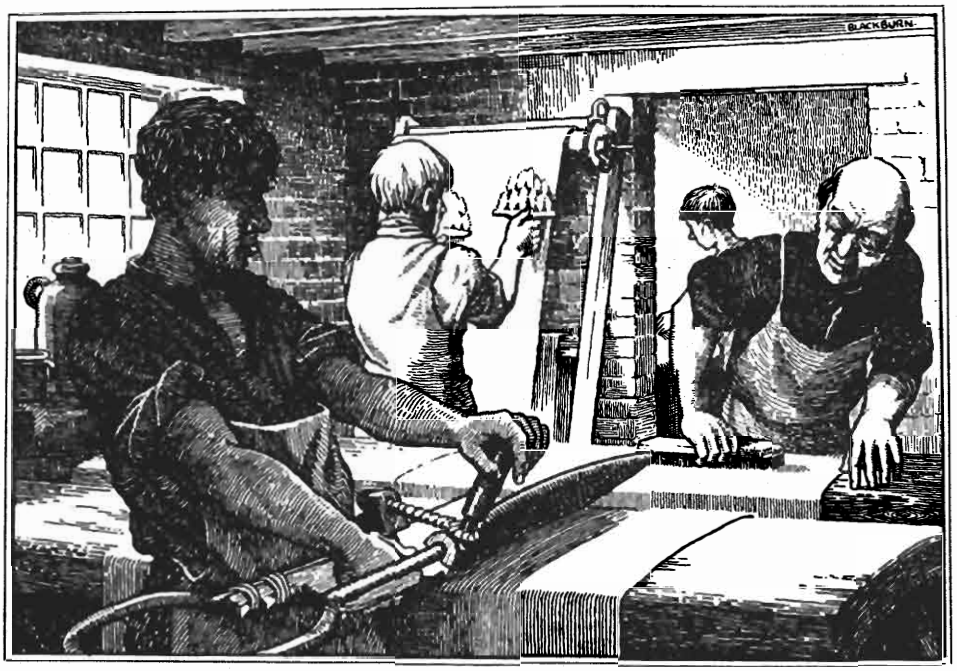

Figure 9. Using teasels to raise a nap on cloth (back); cropping the nap to a constant height with hand shears (front) (from Ryder 1983 after Bentley 1947).

The curved bracts almost certainly pre-date the Middle Ages, and their antiquity is further supported by the cultivation of the teasel also on the continent of Europe. The port books of Southampton record the import of teasels from France and Spain during the fifteenth century. According to the *Encyclopaedia Britannica* (15th ed., 1991) the teasel is (or was) also grown in North America (as the 'clothiers thistle'), but no evidence is given to support the statement that its use in Europe goes back to Roman times (see below). It will be only through archaeological work like that of Hall (1992) that answers will emerge to the questions: where and when was the teasel first cultivated and how was it selectively bred, if at all?

Agricultural aspects

The significance of the present restriction of teasel growing to a small area of Somerset south and east of Taunton lies in the importance of raised cloths in the West of England woollen industry (Ponting 1967). According to Humphreys (1972) teasel growing in Somerset goes back at least as far as the sixteenth century. By the 1960s only about 250 acres were planted on no more than 50 farms around the villages of North Curry, Curry Rivel and Fivehead (Jones 1964). Teasels are traditionally associated with particular farms and form part of a crop rotation, being followed by wheat. They used also to be grown around Blagdon in the Mendip country and John Billingsley writing on Somerset agriculture in 1795 stated that 'teasels are much cultivated' in that county (Mullins 1952).

But they were formerly grown also in Gloucester and Wiltshire, and Arthur Young (1794) wrote of teasels being grown in Essex in rotation with medicinal herbs. According to Loudon (1844) the two main centres were the West of England and Essex. Before World War I, teasels were grown around Sherburn-in-Elmet, east of Leeds i.e. not far from the woollen (as opposed to worsted) area of the West Riding wool textile industry, which extended south and west of Leeds to Wakefield and Huddersfield. The Yorkshire expression 'a crowd like bees round a teasel field' indicates that their growth was once more widespread (and incidently recognises the attraction of the flowers to bees).

The method of cultivation was summarised by Ryder (1969). The following account gives more detail. The 'seeds' (they are actually fruits) are sown in March or April, and the statement of Mullins (1952) that only seed saved from the 'better' heads are used

indicates the way in which selective breeding could have been carried out. As indicated by Hall (1992) the last merchant now controls the seed and therefore any selection. According to Hanley (*c.*1905), who wrote that teasel cultivation had declined considerably, the seeds were sown broadcast and the seedlings were thinned to give plants 1 ft (30 cm) apart. This process was known as 'slinging' (possibly a corruption of 'singling') and was carried out using a special spade having a narrow blade 18 in (46 cm) long and 4 to 5 in (11 cm) wide with a handle curved to be clear of the plants when in use.

Hanley stated that the plants flowered in May or June (of the second year) and that the heads were harvested in September. More recent accounts give the flowering month as July and the harvesting month as August, although Mullins (1952) states that the 'burrs' are harvested 'when sufficiently mature' i.e. when the seeds have dispersed [Editor's note: fullers' teasels observed by ARH in Somerset in 1992 were ready for harvest in early July]. By that time each plant is 5 to 6 ft (1.65 m) high and has 8 to 12 heads (Humphreys 1972). Each head is cut separately 8 in (20 cm) from the top with a short curved knife, which Hanley (*c.*1905) described as having 'a blade 2 to 3 in (6 cm) long, slightly tapering and somewhat turned up at the point' and to have been looped to the cutters wrist. Jones (1964) said that the knife was made from the blade of an old scythe.

Leather protective gloves are worn because of the prickly stalks, and Hanley described the wearing of a waterproof smock to guard clothing from the sap that exudes from the cut stalks and from the water that collects at the base of the leaves. As much as a pint (0.57 l) of water can collect in this cup, and it was often drunk by the cutters, being thought to have medicinal properties. Hanley stated that an experienced worker could cut 20,000 heads of 'tazzle' in a day, which is the same as Mullins' (1952) ten days to cut 200,000, 'the average crop to the acre' (0.4 ha).

Hanley named the largest heads from the top of the plant 'kings', medium sized ones 'maidens', and the smallest ones 'buttons'. Any heads still flowering at the time of cutting were named 'widows' and these were left to be cut down with the stubble, which was burnt. Large heads were bundled into batches of forty and smaller ones into batches of fifty. The bundles were first hung to dry for two or three days on old plant stems. Mullins (1952), as well as Hanley, described the main drying, which takes several weeks to complete, as being carried out on long poles, to each of which was attached about 20 bundles. Mullins said that these were stacked in the open, whereas Hanley said that the drying was formerly carried out in open sheds known as 'helms'. These were built from teasel stalks tied in 'faggots' and according to Hanley could still be seen about the country.

Woods (1963) included 'teasel towers' among miscellaneous structures to look out for, without giving any details. Hanley stated that the teasels were fastened round staves about three feet (90 cm) long with willow saplings for dispatch to the mills, and Mullins stated that they were dispatched in packs of 20,000, with a protective sheet. Although the caption of the eighteenth-century print in Figure 8 states that the teasels are being fitted into rollers for use, from the accounts in the text above and below it would appear more likely that they are being prepared for drying.

More recent accounts, starting with that of Mullins (1952), agree on a slightly different procedure: the seeds are sown in drills, the plants are hand-hoed as with a root crop, and subsequently 'singled' to 4 in (10 cm) apart. The plants are transplanted in October, but since the parsnip-like tap-roots make the plants difficult to lift, only the upper part or 'knot' is removed. This is taken with a short chisel-like tool known as a 'teasel-splitter'. The transplanted knots are 'dibbed' 24 in (61 cm) apart into rows 30 in (76 cm) apart at a rate of 12,000 to 14,000 plants to the acre (0.4 ha). The plants have become established by the following spring (Jones 1964).

Marketing and preparation

Just as wool is handled by merchants who buy it from the farmer and sell it to textile manufacturers, so teasels are prepared by cutting off the calyx and sorting for size and quality by merchants before being sold for textile use. The last teasel merchant in Britain, Edmund Taylor, visited by Hall (1992), used to have a regular advertisement in textile magazines indicating that the firm was established in 1849. In 1973, Mr Cyril George, the managing director, appealed in the *Farmers Weekly* (14th December, p. 85) for more British farmers to grow teasels. By then, the number of British growers had declined to about six (compared with 25 in 1949) and Mr George said that he could use one million more

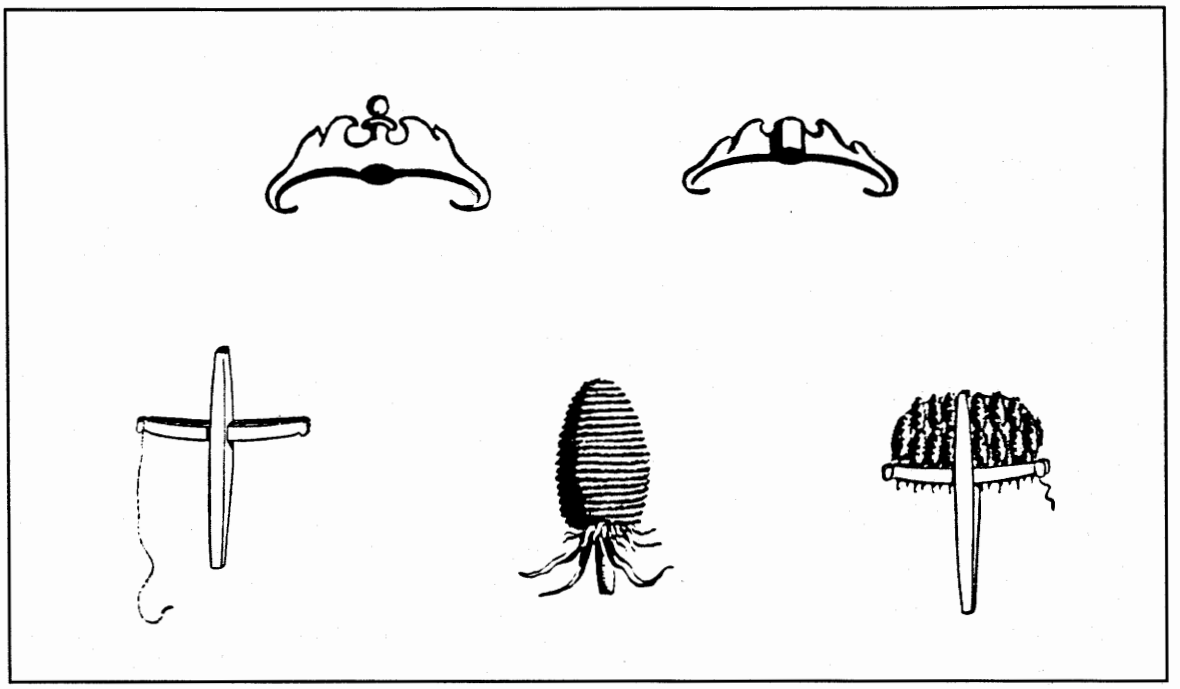

Figure 10. Habicks used to tighten the cloth over the shearing board for cropping (top); a teasel head flanked by an empty hand frame (lower left) and a frame containing teasels (lower right) (Clothworkers' Company).

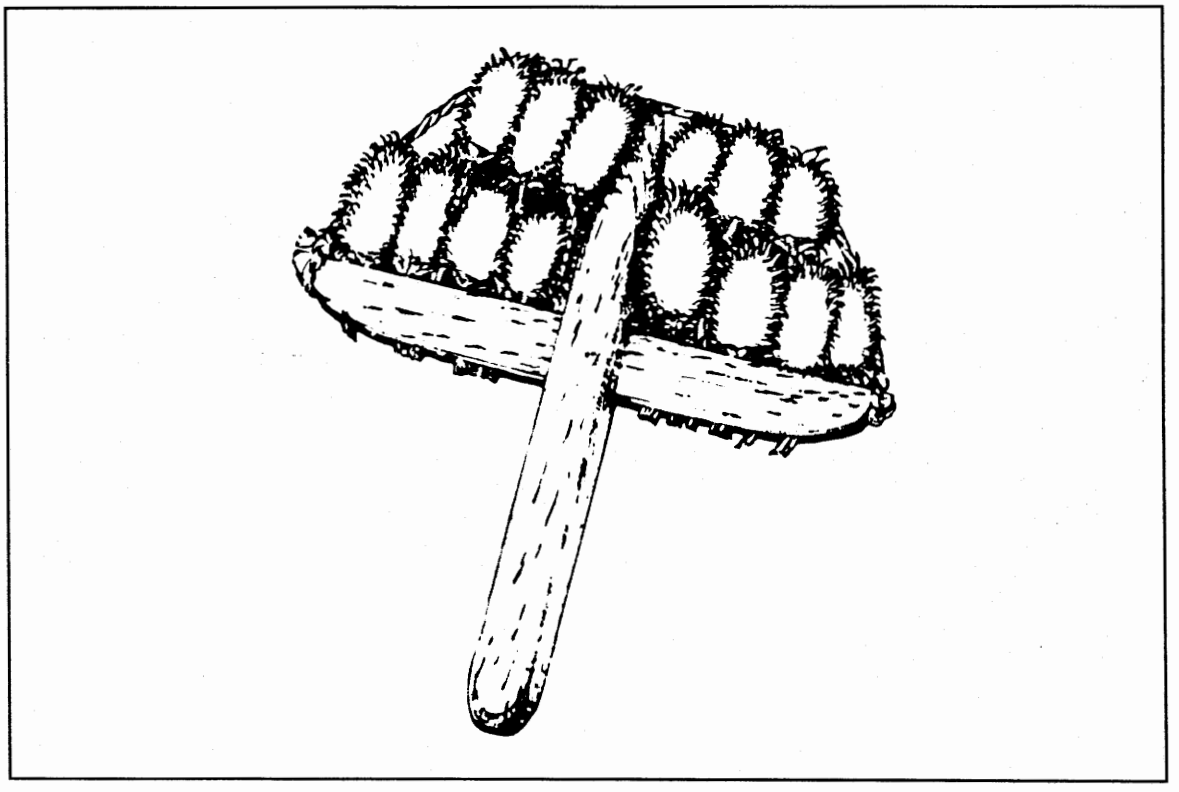

Figure 11. Teasels in a hand frame showing the stalks protruding through the cross-piece and the string around the edge to keep them in place (from Satchell 1984).

British teasels a year. According to Humphreys (1972) the annual British production was then only one million teasels compared with ten million in about 1920. Teasels could be grown more cheaply abroad and the production from Spain and southern France was then 500 times the Somerset production. Whereas larger teasels came from Provence, smaller and better-quality heads were grown in England. In 1980 Mr George reported in the *Yorkshire Evening Post* (Diary of a Yorkshireman, 16th October) that he had received a new order for 5000 teasels from Iceland, but of the six million handled by the firm annually for 200 customers, 95% came from abroad. This compared with only 5% from abroad in about 1950. In articles in *Farmers Weekly* of 17th December 1982 and *The Sunday Times* of 6th February 1983, more farmers were still being exhorted to grow teasels, although the number of growers in Somerset had decreased to four, the supply from France having begun to decrease. A report in *The Times* of 5th August 1986 stated that 80% of the Somerset crop had been destroyed by eelworm, but on 9th September 1988 yet another article appeared in *Farmers Weekly* describing a named farmer as growing teasels as a novelty crop in Somerset.

A report in *Wool Record* (October 1993, p. 5), when this contribution was revised, stated that Edmund Taylor, the last teasel supplier, faced closure because more and more textile manufacturers were raising cloth with a wire brush.

Textile history

Hall described the way in which at the mill the teasels are fitted into long, narrow frames known as rods, which are as wide as the length of the teasels. The frames are then clamped into the cylindrical drums of the 'teasel gig' machine. The gig 'mill' revolves in one direction at 120 r.p.m. and the cloth in contact with the teasels revolves more slowly in the opposite direction. The teasel bracts pull out fibres from the (woollen, not worsted) cloth and so raise a nap. It is possible to vary the process by having the cloth either wet or dry (when the teasel gig is replaced by a 'moser'). The raising and cropping are often repeated several times. The teasels are replaced in the frame at random in order to make the effects of the change on the cloth less severe.

In the Lakeland Museum, Kendal (Cumbria, U.K.) is a simple raising machine in which the teasels are apparently threaded on rods, which form the surface of a drum about one metre long. This was rotated by belting linked to a mechanical power source, but could earlier have been rotated by hand. One wonders whether this threading of the teasels is shown in error, because such an orientation would mean that the teasel bracts would touch the cloth laterally to the hooks and so be less effective.

The nap raised by teasels is subsequently trimmed to a constant height to give the cloth a velvety surface. This is done with a cropping/shearing machine, which resembles a spiral-bladed lawn mower, and indeed the design of the lawnmower was based on that of the cropping machine. The first crude 'cropping frame' that replaced hand shearing was the cause of the Luddite riots against such mechanisation in 1812 (Lipson 1952). Attempts to mechanise raising as well as shearing go back to the Middle Ages (Lipson *op. cit.*), but are out of the scope of the present account.

How long have teasels been used in raising (another name for which was rowing)? The process was certainly well-established by the Middle Ages. Raising was associated with fulling, the process of shrinking and thickening the cloth after weaving, and it was the fullers who raised a nap by brushing the surface with teasels. In Piers the Plowman, Langland (1377) quoted by Davies-Shiel (1975) wrote that 'Cloth that cometh from the weaving is nought comely to wear till it is fulled . . . and with teasels scratched' (spelling modernised). The cloth was hung over a support to give vertical orientation during the process and then passed to the shearmen who cropped the surface with heavy shears to give an even nap (Fig. 9). A fifteenth century illustration given by Davies-Shiel (1975) shows that the nineteenth century process depicted in Figure 9 had changed little since the Middle Ages. Note in Figure 9 that between the teaseling and cropping processes a man is shown working on the cloth with a scrubbing brush. The same brush is shown in use in a fifteenth-century carving on a wooden bench-end in Spraxton church, Somerset, reproduced by Aspin (1982), which also shows a hand teasel frame and cropping shears. Aspin also reproduces several nineteenth-century prints of the process.

Although each guild was much older, the Fullers' Guild was given a charter in 1480 and the Shearmen received one in 1507. The two

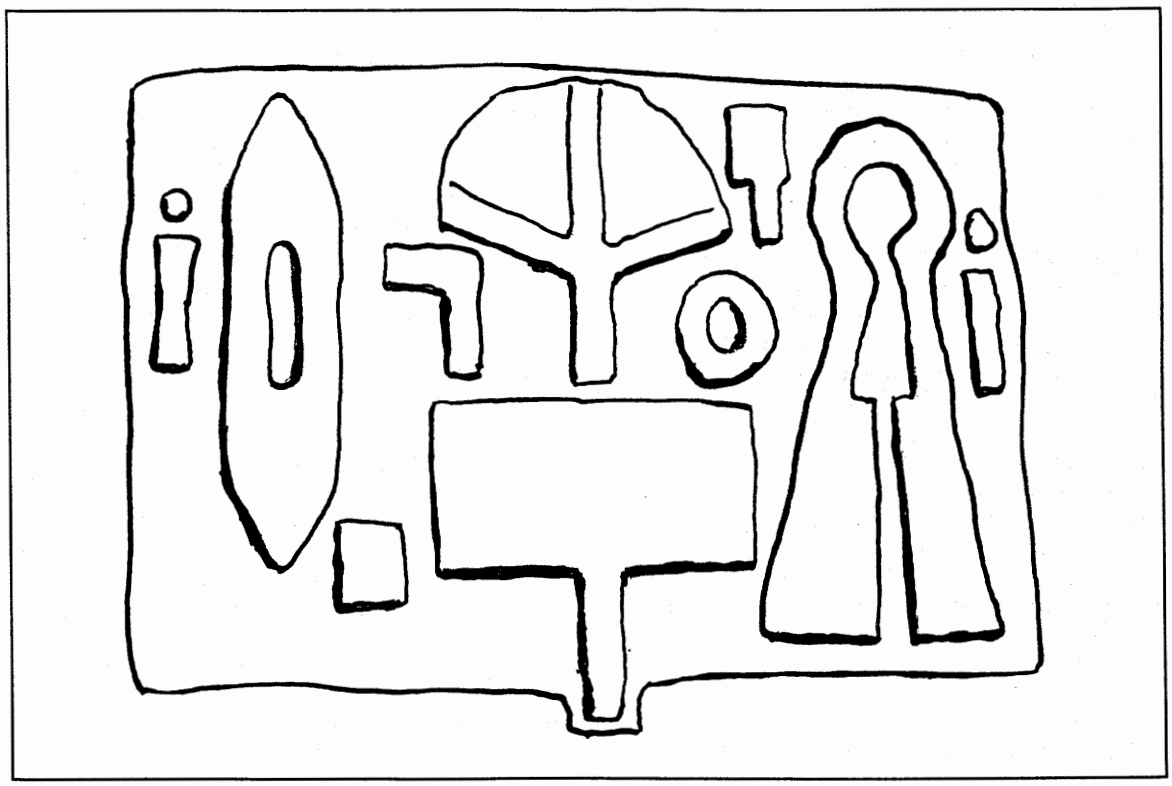

Figure 12. French stone dated 1701 with hand textile implements in relief: hand teasel-frame (top), hand card (bottom) and cropping shears (right) (from Ryder 1983).

amalgamated to form a cloth-finishers guild known as the 'Cloth-Workers' in 1528, but by the end of the sixteenth century 'teaseler' was a distinct occupation. Teasels and 'habicks', the claws used to stretch cloth over the curved board for cropping, appear in the arms of the Clothworkers Company (Fig. 10). Medieval examples of these hooks were excavated in Winchester (Ian Goodall, pers. comm.). Teasels also appear on the coat of arms of Kendal, which can be traced back to the early seventeenth century (Satchell 1984). I am indebted to Heinz Edgar Kiewe of Art Needlework Industries, Oxford, for drawing my attention to what appears to be a teasel on a relief in the Norman, St Peter's Church, Northampton, another medieval cloth town.

When raising was done by hand, the teasels were held in a small wooden hand frame in the shape of a cross, the long arm of which provided the handle (Fig. 10). The teasels were set by their stalks through holes in the cross-piece, and by making the stalks alternately long and short it was possible to obtain two rows, which were then held in place by a string around the edge (Figs. 10 and 4). Such hand teasel frames are depicted as being of different shape from hand cards (Fig. 12). Other names for the hand frame are teasel-bat and friezing-bat, 'frieze' being the name of a raised cloth first made in the Netherlands in the thirteenth century.

One is impressed by the similarity between raising and carding, which is the teasing out of the fibres in raw wool in preparation for woollen (as opposed to worsted) spinning. The verb *to card* is apparently derived from the Latin *carduus* (a thistle) because thistle heads were used in the first hand

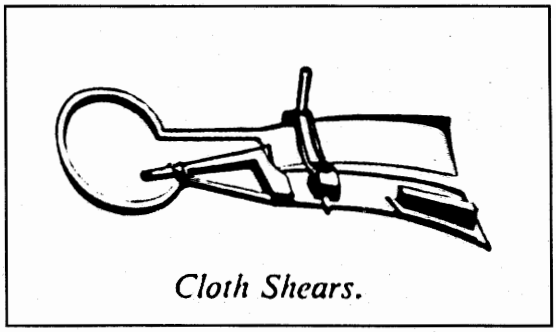

Figure 13. Hand cropping shears (Clothworkers' Company).

cards (which were later set with wires). In Iceland, however, the word for teasel is used for card. But hand cards were a medieval invention, and Wild (1970) considers that the Roman term *carminare* for the teasing-out of wool cannot refer to the process we know as 'carding'.

On the other hand there are references to 'shearers' in Roman Egypt which Wild (*op. cit.*) thinks must refer to cloth- and not to sheep-shearers. This is confirmed by the huge pair of Roman cropping shears found at Great Chesterford, near Cambridge, which are now in the Archaeology Museum, Cambridge. These Roman cropping shears are flat, but the upper blade was later set at an angle, which was gradually increased over the centuries to a maximum of 85 degrees. Cropping shears can therefore be dated from the angle of the upper blade. They weigh up to 40 lb (18 kg) and have blades up to 6 ft (nearly 2 m) long (Fig. 13).

The cropping/shearing of cloth implies the prior raising of a nap—the problem is how was this done? In my first note (Ryder 1969) I suggested the possibility that carding and raising had a common origin because the instruments used were so similar. I gained support for this suggestion from the fact that the teasel is referred to as the 'fullers thistle' and that the French name is *Chardon à foullon* and the German name *Kardendistel*.

Further support was gained from the description by Lucas (1968) of the hand raising of cloth in Ireland using the standard wire-toothed hand cards. Blanket cloth is a good example of a modern woollen that is raised by the wires of a carding machine and then not cropped. According to Wild (1968; 1970) the Romans raised cloth with an *aena fullonia*, which is mentioned by Pliny (*Natural History* XXIV, 111; XXVII, 92) and illustrated on wall paintings at Pompeii. This was a board about 20 cm (8 in) square covered with thorns or thistle heads. Wild (1968) gave the ancient Greek term used for both the raising tool and the plant providing the spines (see below). He stated (Wild 1970, 83) That the teasel was not used until late antiquity, the plant being absent from Godwin's (1975) list of Romano-British plants. I summarised the above (Ryder 1983, 754) by saying that raising was originally carried out with thistle heads fixed to a board and that the thistle heads were later replaced by teasels fixed in a frame to give an instrument similar to a hand card.

Pickering (1879) considered that the English word 'teasel' derives from the Saxon word *taesan*, to tease, which implies raising with the cultivated variety. He regarded the mention by the Roman writer Serenus Sammonicus of the *carduus nondum fullonibus, aptus* as indicating the cultivated teasel. More recently in a very detailed coverage of prehistoric textiles Barber (1991) gives only two references to raising. One (p. 274) refers to the teasing of cloth surface in ancient Greece to raise a nap, with no indication of how it was done. Pickering (1879), however, saw evidence of the cultivation of the teasel to raise cloth in various Greek references to an instrument used for the purpose (e.g. Herodotus i, 92). The other reference of Barber (1991, 287) was an Assyrian instruction of the second millenium BC stating that one side of a cloth should be combed, but not shorn. This makes shearing as well as raising very ancient, but unfortunately there is no association with teasels. Instead, a new instrument, the comb, appears. Could raising a nap be another possible use of the European Iron Age bone 'weaving combs', the true function of which has long been debated (Ryder 1991)? But that topic is out of the scope of the present account.

Summary and conclusions

The curved bracts of the cultivated teasel have long been important in the raising of a nap on wool cloth as part of a textile finishing process. Botanical evidence suggests that the plant has been cultivated for this purpose for a long time. Agricultural evidence from the recent past indicates a well-organised and widespread system of cultivation, but no indication of its antiquity. The most detailed evidence comes from textile-historical sources, which show well-established usage during the Middle Ages. There are indications that during the Roman period cloth was shorn after being raised with thistles. Despite vague hints of even earlier usage of teasels there is no conclusive evidence of when teasels were first used. Further archaeological remains need to be sought.

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