Is the Fullers' Teasel (*Dipsacus sativus*) really a distinct species?

The Fullers' Teasel (*Dipsacus sativus* (L.) Honck.) is 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; no man-made 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). I returned to the subject recently (Ryder, 1994) after the first archaeological remains of the Fullers' teasel had been described by Hall (1992). These came from an early-medieval Dominican Priory in Beverley, North Humberside.

(a) Botany

The Teasel (sometimes spelt *teasle*, *teazel* or *teazle*) is a tall prickly, plant belonging to the family Dipsacaceae and is 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, spiny bracts, which provide a censer mechanism for seed dispersal, and in cloth finishing it is the bracts that *tease* fibre ends from the cloth to raise a nap (hence the name). The use of the teasel in this way therefore depends on the persistence of the bracts in the dead, dry heads. It also depends on the downward-curving nature of the bracts in the cultivated form. In the wild form the bracts are straight (Fig. 1). The elasticity of the bracts and their curved points (usually described as being hooked) make them superior to substitutes such as wire brushes. 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 curved bracts? Ryder (1969) regarded the curved bracts as indicating selective breeding, which he thought implied that the plant had been cultivated for a long time.

Gerard (1597) distinguished the "garden teasell" from the "wilde teasell". He wrote that "the 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*) 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".

Confusion has been caused by changes in nomenclature. First, the new specific name became *D. fullonum* (the name formerly used for the cultivated form) and the two forms were regarded as two subspecies of a single species: *D. fullonum* L. subsp. *fullonum* (wild form) and *D. fullonum* L. subsp. *sativus*. (L.) Thell. (cultivated form) e.g. Clapham *et al.* (1962). A later revision made them into distinct species *D. fullonum*

L. (wild teasel) and *D. sativus* (L.) Honck. (Fullers' teasel) (Tutin *et al.* 1976, p59; Stace 1991). 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 books, e.g. Moore (1983), give only *fullonum* and make no mention of *sativus*. Moore, (1978), however, illustrates *fullonum*, and lists *sativus*, which he states is used on a limited scale to raise the nap on cloth (without saying how or why). 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.

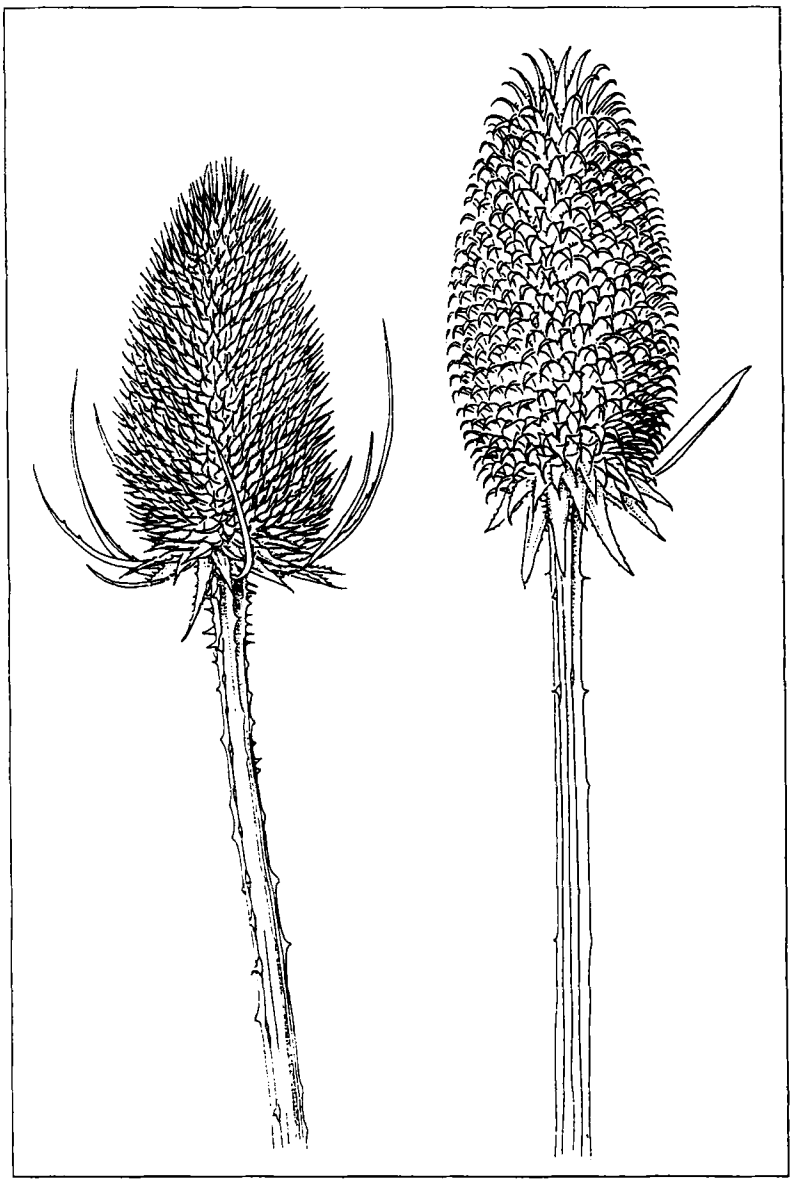

Figure 1. Drawings of modern reference specimens of mature flower heads of the wild teasel (*Dipsacus fullonum* L.) left and the cultivated form (*D. sativus* (L.) Honck.) right. (From Hall, 1992).

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), Simonds, (1976) and de Rougemont (1989).

Peter Mason, Director of the Petersfield (Hampshire) 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. There are therefore two possibilities: (1) that any selective breeding for curved bracts had already taken place before introduction; or (2) that the cultivated form was a different species, which already had curved bracts. This accords with the new designation of the cultivated form as a species, and the apparent lack of hybridisation of escapes of the cultivated plant with the wild form supports the conclusion that the two forms are distinct species. According to Grieve (1932) the curve of the bracts is maintained by cultivation and they revert to the wild shape through neglect. There appears to be no evidence supporting such a reversion.

The curved bracts almost certainly pre-date the Middle Ages, and their antiquity is further supported by the growth of the teasel also on the continent of Europe. Teasels were imported from France and Spain during the fifteenth century. The teasel was also grown in North America as the "Clothiers Thistle". 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?

(b) Agricultural Production and Marketing

Teasel growing in Somerset goes back at least as far as the sixteenth century and its present restriction to a few farms in that county is linked to the importance of raised cloths in the West of England woollen industry. But teasels were formerly grown also in Gloucestershire, Wiltshire, Essex and Yorkshire, where they supplied the West Riding woollen textile industry. The Yorkshire expression: "A crowd like bees round a teasel field" indicates that their growth was once more widespread (and incidentally recognises the attraction of the flowers to bees).

The method of cultivation was detailed by Ryder (1994) and is only summarised below. The seeds are sown in March or April, and the statement that only seeds 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 seeds and therefore any selection. The seeds used to be sown broadcast and the seedlings were thinned using a special spade to give plants 30cm apart. More recently, the seeds have been sown in drills, the plants hand-hoed, and subsequently "singled" to 10cm apart. The plants are transplanted in October, but since the parsnip-like tap-roots make the plants difficult to lift, only the upper parts is removed. These are taken with a short chisel-like tool and "dibbed" 61cm apart into rows 76cm apart at a rate of 13,000 plants to 0.4ha. The plants have become established by the following spring and flower from May to July. The heads are harvested in August or September when the "burrs" are sufficiently mature i.e. when the seeds have dispersed. By that time each plant is 1.65m high and has 8 to 12 heads. Each head is cut off separately 20cm from the top

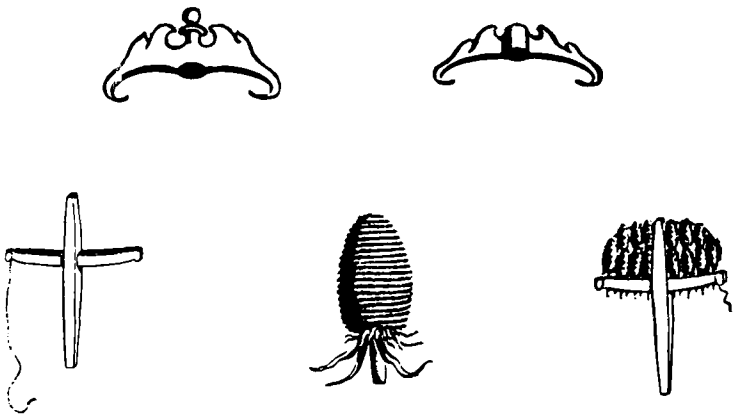

Figure 2. Habicks used to tighten the cloth over the shearing board for cropping (top); a teasel head flanked by an empty hand frame (left) and a frame containing teasels (right) (Clothworkers' Company).

with a short curved knife.

Leather protective gloves are worn because of the prickly stalks, and also waterproof clothing against the sap that exudes from the cut stalks and the 0.5 litre of water that can collect at the base of each leaf. An experienced worker could cut 20,000 heads in a day, 200,000 heads being the average crop to the acre (0.4ha). Heads of similar size were bundled into batches and hung to dry for three days on old plant stems. The main drying, which takes several weeks to complete, was carried out later in open sheds. Merchants prepare the teasels for sale by cutting off the calyx and sorting them for size and quality. The last teasel merchant in Britain, Edmund Taylor, of Huddersfield has been appealing for 20 years for more British farmers to grow teasels. There are now only a handful of British growers and the production has declined from ten million teasels in 1920 to only one million, yet there is a demand for one million more British teasels a year. Teasels are grown more cheaply in southern France and Spain, but smaller and better-quality heads are grown in England. Of the six million teasels handled by the firm annually 95% come from abroad, whereas in 1950 only 5% came from abroad.

(c) The Textile History of Cloth Raising

At the wool mill, the teasels are fitted into long, narrow frames, 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 the fibre ends from the (woollen not worsted) cloth and so raise a nap. The nap so raised is then trimmed to a constant height to give the cloth a velvety surface. This is done by a cropping machine, which resembles a spiral-bladed lawn mower. Not all raised cloth is cropped, however; blanket cloth is an example of a modern woollen that is raised by the wires of a carding machine and then not cropped.

Knowledge of the length of historical time that teasels have been used in raising wool cloth could give us clues on the length of time teasels have been cultivated. 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. 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. 4). Although each was much older, the Fullers Guild was given a charter in 1480 and the Shearmen received one in 1507. The two 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 metal hooks used to stretch cloth over a curved board for cropping, appear in the arms of the Clothworkers Company (Fig.2). 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. 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. 2 & 3).

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. He also 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). 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 in Pompeii. This was a board about 20cm 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. He stated (Wild, 1970 p.83) that the teasel was not used until late antiquity, the plant being absent from Godwin's (1975) list of Romano-British plants. Ryder (1983 p.754)

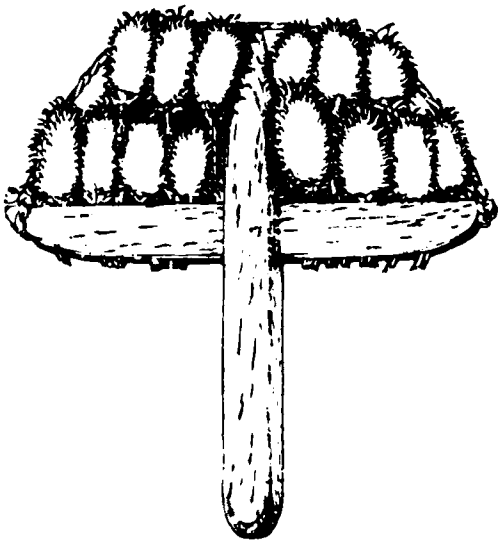

Figure 3. Teasels in a hand frame showing the stalks protruding through the cross-piece and the string around the edge to keep them in place (from Ryder, 1994).

summarised the above 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 (Fig. 4). That the raised cloth was subsequently cropped is shown by Roman references to cloth shearers, and the process is confirmed by remains of cropping shears.

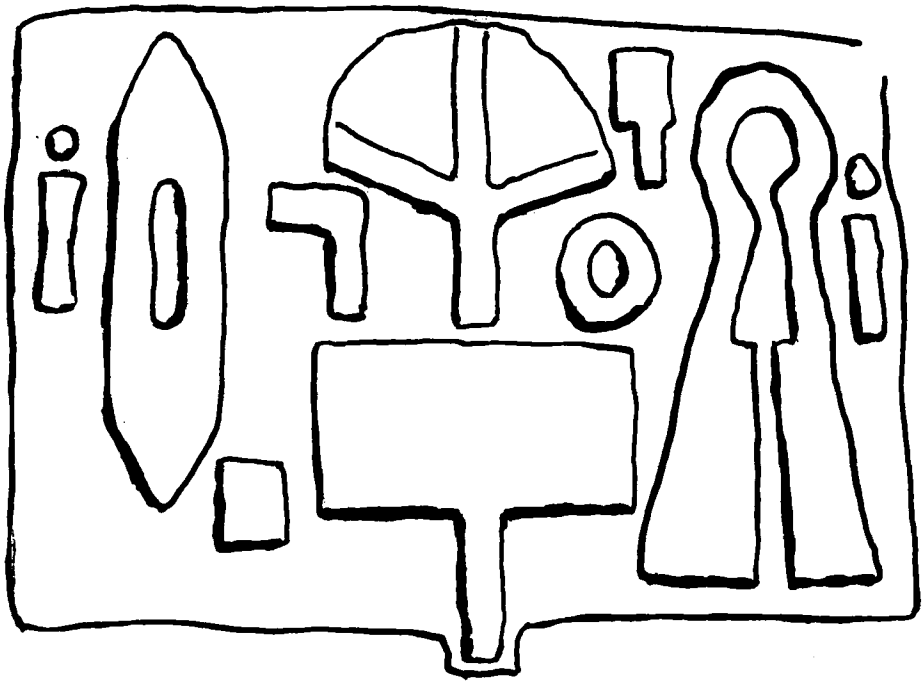

Figure 4. French stone dated 1701 with hand textile implements in relief: hand teasel-frame (top), hand card (bottom) and cropping shears (right) (from Ryder, 1983).

The teasing out of the fibres in raw wool in preparation for woollen (as opposed to worsted) spinning is known as carding. The similarity between raising and carding suggests a common origin (Ryder, 1969). The verb: "to card", is apparently derived from the Latin: *carduus* (a thistle) because thistle heads were used in the first hand 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 it is not clear how wool was prepared for spinning during the Roman period. Support for a link between the two processes can be gained from the fact that the teasel is referred to as the "fullers thistle" and that the French name is "Chardon a 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.

More recently in a very detailed coverage of prehistoric textiles Barber (1991) gives only two references to raising. One referred to the teasing of cloth surface in ancient Greece to raise a nap with no indication of how it was done. The other reference 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.

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. The plant appears to have been cultivated for this purpose for a long time, which suggests that the curved bracts are the result of human selective breeding and that the cultivated form is a "domestic" variety. Botanical research (possibly DNA study) is required on whether or not the cultivated form is a distinct species. 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 of teasels during the Middle Ages. Cloth was shorn during the Roman period, after a nap had been raised with thistle heads. There are vague hints of earlier raising and shearing of cloth, but no indication of which plant was used. Archaeological remains need to be sought for botanical study.

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