1. The fullers' teazle and its uses

The fullers' teazle (*Dipsacus fullonum*)[1] is a Mediterranean biennial. During its second year of growth, the plant sends up a tall, branching stem with a large seed head or teazle at the top and other proportionally smaller teazles at the ends of the lateral and sub-lateral stalks, diminishing in size towards the bottom. These teazles, unlike those of the common teazle (*Dipsacus sylvestris*), which grows wild in places in this country, are covered in stiff, but flexible curved hooks. Since at least later classical times,[2] because of the unique nature of this hook structure, teazles have been used for raising the nap or pile on woollen cloths and on knitwear such as stockings,[3] and at one time on some worsteds. In the system of handworking evolved by the Roman fullers and followed, with modifications, in Europe down to the eighteenth and nineteenth centuries, the teazles were set in a small hand-held wooden frame called a 'handle' in England, and in Flanders, because of its shape, a *croix* or *cruce*.[4] The handles, of which a number were set, were drawn across the surface of the usually wetted cloth, to pull out the fibre ends from the body of the cloth, chiefly from the weft.[5] The more times this was done, starting with old worn teazles, and only using new ones at the very end, the better the results. There was, however, a proportionally greater cost involved, not only in teazles, which were expensive, but also in labour. It was for this reason that the use of teazles was connected mainly with the production of the better qualities of cloth, especially the 'ancestral' broadcloth and its derivatives, with their characteristic laid pile, which set the standard of quality in the woollen industry down to the nineteenth century. During the medieval and early modern periods, the teazle or the handle appeared in a number of surviving contemporary representations, often as a symbol of quality and skill. These included church and cathedral carving in wood and stone; stained glass; memorial brass; embroidery; on the arms of guilds and of towns where cloth was made; and in other secular settings.[6] Cheaper cloths were sometimes dressed mainly with cards set with wire teeth, the alternative to teazles, despite repeated prohibitions down the ages because of the damage they could do.[7]

It is sometimes suggested that fullers' teazles were used for carding wool before it was spun by hand, with a spindle or on the wheel. It is true that teazles can be made to card wool in an experimental way, whilst terms such as 'Cardthistle' used in one sixteenth century source quoted in an article by Alan S. Raistrick in *The Journal of Weavers, Spinners and Dyers* in September 2001, seems to lend some support. However, any kind of direct historical confirmation seems to be lacking, whilst also to the contrary, medieval pictorial and documentary sources show that cards were used. What seems to matter is that whilst teazles were an expensive item with a limited life, cards did the job better, and lasted indefinitely.

Increasingly, during the eighteenth and earlier nineteenth centuries, the process of dressing or raising the cloth with teazles was mechanised through the use of the teazle gig or raising machine, which made possible a far greater number of raisings, with a resulting increase in final quality, accompanied by an immense saving on labour costs. By at least 1860, a different kind of machine using rotary or spindle teazles was also introduced, this producing a finish more suitable to knitwear, hosiery and to certain other fabrics.[8] However, through the same period sustained efforts were also made to devise cheaper substitutes for the teazle, usually in the form of machines using wire teeth, sometimes of brass,[9] so as to avoid the problem of rusting, necessary because much raising was carried out as part of a wet finishing process. The chief drawback of these machines was that whereas the flexible hooks of the teazles overrode any knots or other faults left in the cloth, or broke off, the wire teeth tore them out, damaging the cloth. In 1875, however, Edward Moser, a refugee from Alsace, approached Tomlinsons of Rochdale to make the

first planetary card wire raising machine. This gave for the first time a wire raising machine capable of overcoming some of the earlier problems, and it became the basis for many subsequent machines, replacing the teazle gig for a variety of uses, especially in dry raising.[10] Even so, no machine was able to reproduce the characteristic pile produced by the teazle gig through wet raising, and it was the progressive decline in the fashion for the traditional cloths during the nineteenth century, rather than the direct challenge from wire alone, that was responsible for the diminishing demand for teazles.[11]

It was in the same period, however, that the fullers' teazle, which was given public prominence as a symbol of quality in the woollen industry in a variety of contexts in the medieval and earlier modern periods, mostly in the older manufacturing districts across the south and west of the country, received recognition in the northern industrial towns where much of the production of cloth was undertaken in the mid-Victorian decades. In Rochdale, where wool was still of importance in a town increasingly turning to cotton, the fullers' teazle formed a conspicuous feature of the decoration of the original council chamber of the town hall by W. H. Crossland of Leeds, opened in 1871, being shown in four different contexts. A motif of stylised teazles, alternating with the cotton boll, was painted round the walls, whilst formalised teazle plants were repeated in the sequence of paintings between the main panels of the frieze, one of which depicted a highly simplified version of a teazle raising gig. Teazle plants were also superimposed on the sheep's fleece design used across the ceiling compartments. At the end of the same decade, in Leeds in 1879, fullers' teazles carved in stone were set high in the exterior wall of the Textile Industries Department funded by The Clothworkers' Company of London, the first purpose built buildings of the Yorkshire College which later became the University of Leeds, the department itself becoming an internationally-renowned centre for textile studies. Fullers' teazles also appeared in the gables overlooking the adjacent Clothworkers' Court, as well as in the coat of arms of The Clothworkers' Company in stone on the wall of the department and above the arch leading into the court, and in stained glass in the department. The architect was Alfred Waterhouse, who coincidentally designed the new tower for the Rochdale Town Hall when the first one burned down. In addition, in 1885, Edward Hailstone used a 'glen' of fullers' teazles as an impressed device on the cover of his edition of George Walker's *The Costume of Yorkshire*, published in Leeds.

Since the later nineteenth century, though, both the spindle and the stem teazle have been replicated in wood and wire,[12] rubber and wire, or in the form of plastic. In the twentieth century, the introduction of man-made fibres was a further serious cause of declining demand for the natural teazle. Nevertheless, well into the second half of the twentieth century the real teazle was still considered indispensable for the manufacturing of high quality cloths for uniforms, fine quality knitwear, fabric made from cashmere, llama, vicuna and mohair; speciality cloths such as billiard cloths and tennis ball cloths; and materials such as paper-makers' felt, an industrial speciality. In the second decade of the twenty-first century, the same is still true for some of these cloths.