

## 2) An introduction to the Welsh woollen industry - Ysbyty Ifan to Penmachno

Frequently in this area of North Wales, another type of water-powered mill was to be found close to the manorial corn-mill, in locations where a sufficient volume of water was available. This was the "Pandy" or Fulling Mill, which represented the earliest application of mechanical power to the preparation of woollen fabrics, at a time when weaving was still very much a cottage industry performed on hand looms. It was thus found predominantly in upland areas such as this, which were well suited to the rearing of hardy sheep but of little use for other agricultural purposes.

The fulling process itself consisted of closing together and "felting" the short woollen fibres to form a strong web after weaving, by pressing or kneading the cloth. Simultaneously, washing was carried out to remove residual grease and dirt which accumulated in the fleece whilst on the animal, and the oils which had been applied to aid the spinning and weaving operations. Cleaning materials used were Fuller's Earth (a type of clay), stale human urine, and latterly (much more effectively, one might think) soft soap. After fulling, the cloth was stretched by hooking it upon "tenter-frames" to dry, the resultant shrinkage imparting stability to the material.

The kneading or "tucking" operation of the fulling process formerly carried out by walking the cloth underfoot (and which is incidentally the origin of the surnames Walker, Tucker and Fuller), was mechanised by the use of specially shaped wooden hammers. These were driven from the waterwheel, and pounded and gathered the damp fabric in the washing-box. The hammers are known as fulling-stocks and were usually operated in pairs off a tappet wheel. Two types of mechanical arrangement were common; the falling stocks having vertical shafts similar in principle to the later "stamps" used for mineral-ore crushing, and driving stocks with pivoted horizontal arms as used in the old type of forge trip hammer.

Fulling stocks are nowadays very rarely to be found in situ, and to observe a set in action it is at present necessary to visit the reconstructed Esgair Moel Mill at the Welsh Folk Museum, St. Fagans, near Cardiff. It must, however, be emphasised that these as now seen, along with other derelict stocks mentioned later in this book, comprise just one small part of the machinery of a typical nineteenth century woollen mill. For a long period before this the fulling mill was a separate entity found on most hill farms at a time when all the other stages in the manufacture of woollen goods were carried out by hand. The sale of these goods at the local market provided an additional source of income for the farming family during the slack winter season; the work, comprising the making of rugs, shawls, blankets and underclothes, was generally the province of the women of the community.

Nowadays the location of many of the farm mills is recalled only by the survival of the name "Pandy". Two such remained in operation at Ysbyty Ifan until the 1920's, but the characteristic small stone buildings are now used as general farm buildings, at Pandy (841487) and Pandy Uchaf (840482). Despite the late survival of these, here and in other areas remote from the giant northern city mills of the industrial revolution, there is no longer any machinery to be found.

Mechanisation of the processes in the embryo woollen industry was to occur by the inventions of several workers during the years from 1750 to about 1840. The complete fabrication process which resulted may be briefly summarised as follows: -

- a) Dyeing, usually in vats of unwashed wool (occasionally the finished cloth was dyed). Dye vats were heated by means of wood (alder) fires. The wool was then soaked with vegetable oil to aid steps b) and c).
- b) Willying or Teasing. Disentanglement by means of a large drum with iron spikes affixed. This loosens and opens the matted wool, and allows different qualities to be mixed together. The machinery was fed by rollers, and the teased wool collected by comb at the rear.
- c) Carding, or "the breaking up of all previous artificial or natural arrangements of the fibres - every fibre is disengaged from the others and free". Originally carried out by hand using teazles, combs and "hand-cards". Mechanisation was in two stages; the Scribbler-Carder (from 1820) produced "piecenings" for hand joining; this was superseded by the "Slubbing Billy", in use until c1930, whereas the whole operation could be combined in the condenser-carder (from about 1850). The wool was now in the form of slivers, thick and weak.
- d) Spinning, to make slivers strong and elastic, in a suitable form to withstand the strain and friction of weaving. The yarn was spun and twisted onto bobbins. Wool which was required for heavy-

duty use in blankets and "Carthenni" was taken to the twister which provided the necessary strong 3-ply yarn.

e) Warping - the longitudinal laying-out of variously coloured fibres from the bobbins, in the required running pattern of the finished weave.

f) Fulling, as already described. Prickly heads from the teasle plant were used in the "gig-mill" to raise the nap of the cloth after fulling, to give a fluffy texture where required, on products such as blankets. Some lightweight products such as shawls were not fullled; these were instead "scoured" as the final cleaning stage.

h) Shearing (after the nap had been raised). Carried out on a cropping machine, whose operation was not unlike a lawn mower in principle.

i) Drying and shrinking on the tenter frames. Edges were then stitched where required, on heavy-duty sewing machines.

j) Pressing and folding ready for dispatch or sale.

All the machinery required to carry out the above stages joined that of the fulling process in larger woollen mills, which are occasionally found intact and in operation in rural areas, still often powered by the ubiquitous waterwheel. Such factories were the immediate forerunners of the giant steam and then electrically-powered mills for which several northern English cities became world famous.

In recent times, enforcement of parliamentary powers during the Second World War effectively prevented rural mills from buying raw wool directly from the local farmers, and most of the ancillary processes described above have fallen into disuse: the wool nowadays usually arrives at all mills in the form of spun yarn fed directly onto the power looms after warping. It is unfortunate that of the mills still in operation in North Wales, none has been set up specifically as a museum, with examples of all the above processes and equipment clearly explained and demonstrated, for this would be so much more meaningful than any written account. Perhaps the nearest approach is those open to visitors in the summer months, though still operated primarily as commercial ventures. Rural water-powered factory mills of the type described are located at Penmachno (below) and at Bryncir (see section 27); the equipment may be seen in operation during normal hours and products purchased from the mill shop. There is one example of the larger modern mill more usually found in towns, at Trefriw, whereas another of the small type is being restored, perhaps more on the lines of the museum approach, at Blaenau Ffestiniog (section 29).

To reach the village of Penmachno from Ysbyty Ifan, it is necessary to return briefly to the A5, but this may be via the old road from Ysbyty to Llanrwst if a change from the incoming route is desired. Just before the junction with Telford's Highway (at 828524) the old road crosses the River Conwy on a magnificent and lofty single-arched stone bridge dating from 1780, which is known as Ponrhydlanfair; well worth an inspection.

Factory Isaf, nowadays known as the Machno Woollen Mills, is well signposted from the junction of the Machno Valley road just over one mile further west along the A5. The factory (806528) was established in the 1830's, and was in the hands of the Hannah Jones family for a long period. After some years of closure, the mill has reopened to cater for the increasing demands of the tourist industry, under the supervision of a veteran employee of the old family concern: products include blankets, bedspreads, tweeds and knitwear. The present machinery, some old and some new, is powered by a water turbine which replaced the old waterwheel sometime after the First World War.



## **Updates – November 2011**

The present status of the old fulling mill buildings at Pandy & Pandy Uchaf, Ysbyty Ifan is not known; both are on private residential properties.

Pontrhydylanfair is unchanged, though much hemmed in by vegetation

Penmachno Woollen Mills ceased to operate some years ago. The building survives, but appears largely unused at present.