Technical Notes: The Technicalities of Twist

Sonya Hammond, Dorset and Online Guilds

Figure 1 - Constructing the twist angle gauge, step 1

Figure 2 - Constructing the twist angle gauge, step 2

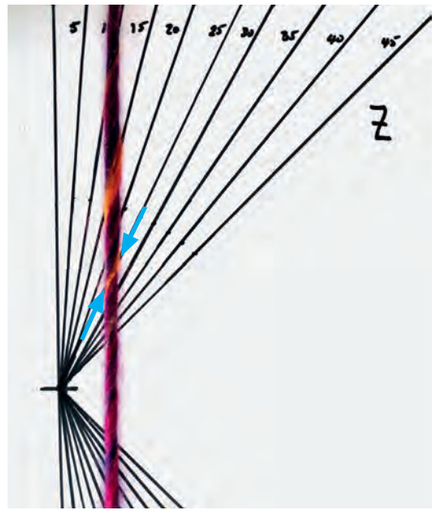


Figure 3 - Measuring twist angle (this yarn has a twist angle of approx 25°)

Twist is central to handspinning, as without it a yarn doesn't exist. This Note will show you one system for measuring your twist, to make it easier to record the details of your yarn in your spinning record book and to recreate it in the future, should you wish. There are two main twist quantities to measure.

Twist angle

This is the easier measurement to make on a singles yarn, but you will need a protractor and an A5 piece of card to make a twist angle gauge. Draw a line down the left-hand half of the card and mark the centre of this line with a small cross. Align 0° on the protractor with the vertical line, with the small cross at the centre point of the protractor (Fig. 1).

Mark 5° angles from both the top and the bottom of the protractor, up to 45°. You shouldn't need angles greater than 45° unless you are spinning high twist yarns, but you can mark them in if you wish.

Then draw a line between the central small cross and each of these angle markings, labelling each one with its angle (Fig. 2). The angles at the top of the card measure Z twist, while those at the bottom measure S twist.

If you are left-handed, mirror these instructions by drawing the vertical line towards the right-hand side of the card and measuring the angles to the left of this line. For this gauge, the angles at the top will measure S twist and those at the bottom Z twist.

To measure the twist angle, lay your yarn parallel to the vertical line, without over-stretching. Find the angle that is closest to the alignment of the fibres within the single – you may need a magnifying glass for very fine yarns (Fig. 3).

Twist per inch (or per centimetre)

Twist per inch (TPI) is more easily measured on plied yarns. You can measure twist per centimetre (TPC) instead – the technique is exactly the same – so do remember to quote the units used with each measurement to avoid future confusion.

To measure TPI or TPC, lay your yarn alongside a ruler and count the number of 'ply bumps' within an inch (Fig. 4). If there are only a few ply bumps per inch (or centimetre), do count over a longer distance (2in in this figure) and divide to find the average value.

Then, for both measurements, divide the number of ply bumps by the number of plies to get the TPI or TPC.

This is just one system for documenting twist: there are others, which will be covered in future Notes.

About the author: *Sonya is Spinning Editor for the Journal*

Technical Notes: An occasional series of short articles on our core skills.

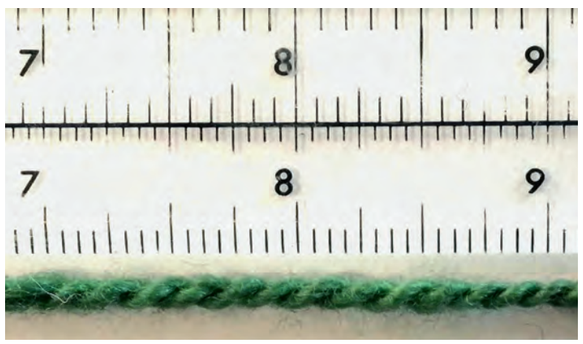


Figure 4 - Counting ply bumps (this two-ply yarn has 12.5 ply bumps between 7in & 9in; therefore, as it is a two-ply yarn, it has a TPI of approx 3.125)

Photos: Sonya Hammond

Exploring Primitive Breeds

Judith Edwards, Eden Valley and Online Guilds, and Alice Underwood

Group of some of the sheep in the project
L-R, starting with the black face: North Ronaldsay, Shetland, North Ronaldsay, Shetland, Castlemilk x2. There are several Cheviots in the background.

Photo: Ruth Dalton

In late 2018, the Cumbria Support Group of the Rare Breeds Survival Trust[1] (RBST) launched their Primitive Produce Project. Two newly weaned wethers (castrated males) from each of the seven British primitive breeds, also known as Northern European or North Atlantic short-tailed sheep, were gathered and raised under identical conditions. The fleece and meat of each would then be compared, having removed influential variable factors such as feed, housing and weather.

The seven British primitive breeds are Boreray, Castlemilk Moorit, Hebridean, Manx Loaghtan, North Ronaldsay, Shetland and Soay. All but Castlemilk Moorit originate from small and/or remote islands and remain 'unimproved' by the introduction of more commercial breeds, as has happened to many mainland breeds. All are small coloured sheep, many with additional kemp and guard hairs in their fleece. On the RBST's 2019-20 Watchlist, Boreray and North Ronaldsay are 'Vulnerable' and Castlemilk Moorit, Manx Loaghtan and Soay are 'At risk', with Manx Loaghtan numbers steadily declining.

The wethers were reared on grass and overwintered on a farm near Coniston, in the Lake District National Park, alongside hill breeds such as Cheviot and Herdwick. These primitive breeds are too small to kill as lamb meat, so were brought on until November 2019 to give hogget meat, with the added advantage that the first clip fleeces could be collected. With a longer growing time, the locks are longer than from more mature sheep and as lambswool are generally of better quality. Apart from dipping 6-7 months before clipping, no chemicals were used on or required for these sheep.

All were sheared with electric clippers in April 2019, apart from the Soay that naturally lost its fleece. The fleeces were skirted and staples collected from the base of neck and shoulders for each breed. These were soaked in rainwater overnight then briefly washed in hot water with soap, rinsed, spun at low speed (400rpm) and air dried. Weight loss during washing varied from 21% (Shetland) to 45% (Castlemilk Moorit), suggesting relatively low dirt and lanolin in several. 100g samples were passed to Judith for processing.

Fibre preparation is the key to spinning! The clean fleeces were picked through to remove vegetable matter and second cuts.[2] Initially the North Ronaldsay was drum carded for speed, but as it was partially cotted[3] on the skin side and contained second cuts, even with only two passes through the drum carder, nepps[4] formed. These were probably from the second cuts and the coarse (72 point) drum carder. For this reason only two other fleeces, Boreray and Hebridean, were drum carded, again with two passes. The double-coated Boreray, with coarse hairy outer and fine inner layers, had a 10-15cm staple. Combing might have removed most of the hair, but with just 100g of fibre, blending

was more appropriate. The Hebridean's 5-15cm staple, poor lock structure and some second cuts would also have made combing very wasteful. However, both fleeces carded and spun up well.

Three of the fleeces were carded on mini hand carders (112 point), as the drum carder would have created a lot of nepps. The Castlemilk Moorit and Manx Loaghtan had a staple length of 10cm, while the Soay was only 4cm. All were very fine. Mini carders were more comfortable than standard ones, although smaller rolags result.

The Shetland had a surprisingly long staple of 18 to 25cm but no hair, i.e. it was not double-coated. Flick carding the tip and butt of each lock, then hand carding, produced nepps, so it was combed on two-row small wool combs with three passes. The fibres were dizzed[5] off into tops with aligned fibres. Over 50% of this fleece was wasted, whereas the carded fleeces lost around 20% of their weight during preparation and spinning.

The fleeces were spun on a Schacht Sidekick wheel at a ratio of 9:1, then plied at 10:1, except for the Soay which was spun and plied on a Haldane Shetland at 8:1. After plying, the yarns were soaked in warm water, spin-dried and air dried with no weight attached. As intended, all were a DK weight.

The three drum-carded fleeces were all spun from the length of the batt, short forward draw in a semi-worsted style. The North Ronaldsay was fine and wanted to be spun thin so it was three-plied, making a slightly heavier yarn. The Hebridean was an easy spin, the variable staple length and second cuts resulting in a rather uneven two-ply yarn. All the hair in the Boreray made for a quick, easy spin, two-plied. The combed Shetland was spun from the butt end of the locks with a short forward draw to produce a true worsted yarn. It was very fine, so was three-plied. Despite the worsted method, the fibre's natural crimp kept the yarn fluffy.

The Castlemilk Moorit and Manx Loaghtan were spun English longdraw; this was quick and such fun. They were two-plied and produced a typically airy woollen yarn. It was interesting to see how even the final yarn colour was – the carding and woollen spinning distributed the sun-bleached tips randomly throughout the fibre.

The Soay had a lot of nepps, probably because its fragile sun-bleached tips broke off in the carding. A smooth draw was therefore difficult so a supported longdraw was used, where nepps could be removed during spinning. The result was a fairly airy but rather lumpy two-plied yarn.

The range of colours and processing and spinning methods demonstrated the variety of fleeces from the seven breeds, making for a most interesting project. All produced a very useable yarn, except perhaps for the hairy Boreray. The most traditional processing methods were time-consuming but

Bags of raw unwashed fleece *Photo: Sally Seed*

Manx Loaghtan locks showing sun-bleached tips *All photos: Alice Underwood, unless otherwise stated*

produced the best fibre to spin. Spinning a good rolag with English longdraw (Manx Loaghtan and Castlemilk Moorit) was fast and produced a lovely woollen yarn. The Manx Loaghtan was slightly better, probably because of the greater crimp. Spinning a true worsted yarn from a roving (Shetland) was also a delight and gave a beautiful soft and surprisingly fluffy worsted yarn. Because of the waste with the Shetland, the overall 'best' yarn was the Manx Loaghtan.

Samples were woven on a vintage Weave-it pin loom in plain weave, fulled lightly by hand in warm water and dried flat. DK weight yarn on these looms gives an open weave, but all the samples fulled well to close up the weave. As expected, the woollen-spun samples shrank more than the worsted-spun samples. All the yarns would work as weft; there was insufficient to try a warp but possibly only the true worsted Shetland yarn would be suitable.

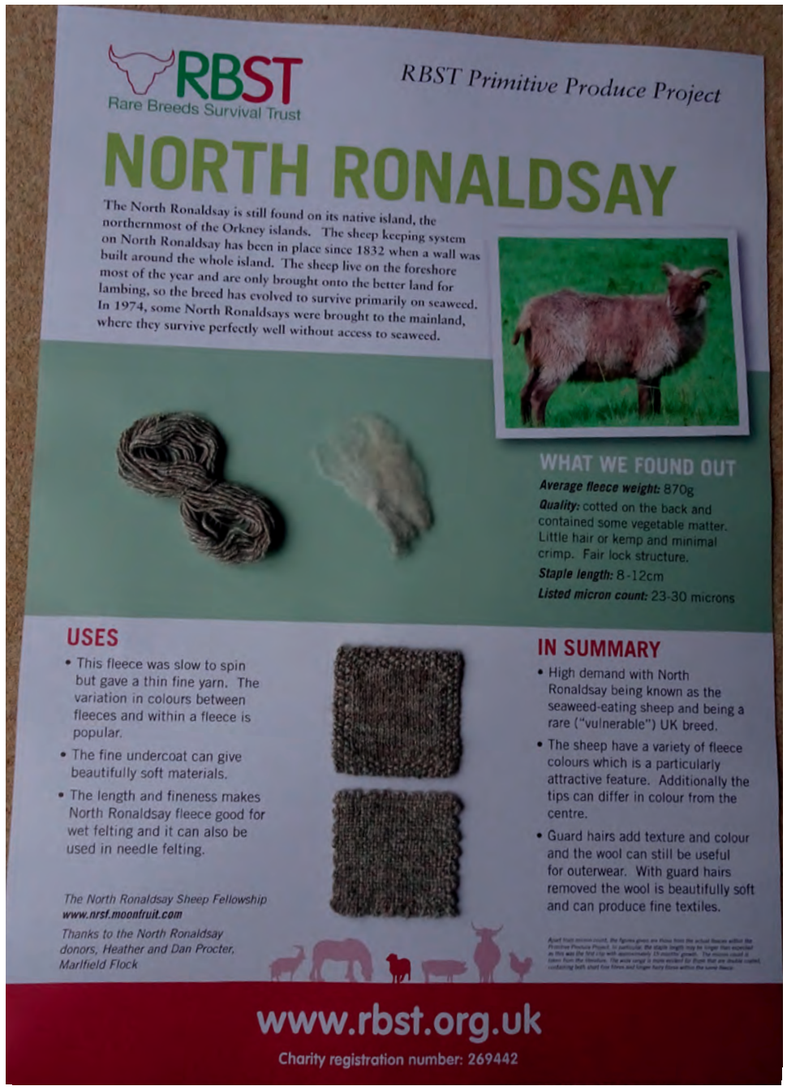
Square samples were knitted in stocking stitch with a moss stitch border, matching the fulled woven samples for size. The size of needles and number of stitches needed did not vary much; typically, samples were knitted on 3mm needles, with 25 stitches and 32 rows.

In November 2019, RBST held an event promoting the seven breeds in the study. Sheep breeders, breed societies, chefs and restaurateurs were invited and presentations and demonstrations given on the rearing, butchery and this fleece comparison. It was noted that prices paid by craft workers for fleeces from these breeds at events such as Woolfest[6] far exceed those paid by British Wool[7] and so increase the potential value of the fleece. Information boards were produced and displayed for each breed containing samples of the locks, spun yarn, knitted and woven samples.

The event concluded with a 'blind' meat tasting of all seven breeds and each invitee described each meat. Word clouds have since been created to compare the meats. Most importantly, an assessment of the financial viability of these breeds was given, showing that not only can primitive breeds be profitable, but that demand for the coloured fleece is a noticeable contribution to this.

Skeins of yarn from the seven breeds — L-R: Boreray, Castlemilk Moorit, Hebridean, Manx Loaghtan, North Ronaldsay, Shetland x2, Soay

Woven and knitted squares — Clockwise from top left: Hebridean, Boreray, North Ronaldsay, Castlemilk Moorit



Display board (North Ronaldsay)

Footnotes and references

1 https://www.rbst.org.uk
2 Second cuts are caused when the shearer cuts the same area twice, leaving short pieces of fleece.
3 The wool on a cotted fleece has been naturally felted on the sheep.
4 Nepps are little lumps of wool which, unless removed by hand during spinning, will remain in the yarn.
5 Dizzing is the process of drawing fibre off a comb or carder through a tool with a small hole in it (a diz) to form either tops or roving respectively.
6 *https://www.woolfest.co.uk*
7 *https://www.britishwool.org.uk*

About the authors: *Alice Underwood is a smallholder with Manx Loaghtan sheep and an active member of RBST. She is also a member of both the Woolfest and Wool Clip co-operatives. She has been a keen knitter and designer since childhood and runs a small wool business concentrating on specific sheep breeds (Sheepfold). Judith Edwards has been spinning for about 13 years and is a member of the Eden Valley and Online Guilds. She obtained a Certificate of Achievement in Spinning in 2015 and loves a fleece-to-finished item project.*

From Sheep to Sugar — Wales and the Slave Trade

Liz Millman, Gwynedd Guild, and Prof Chris Evans

In 2019 the National Lottery Heritage Fund provided a grant for the From Sheep to Sugar – Welsh Wool and Slavery *project which brings together community research volunteers from Mid and North Wales who are interested in the history of spinning and weaving, with families from farming communities interested in local history and heritage, to explore and tell the history of the production of a woollen fabric called 'Welsh Plains' between 1650 and 1850 and its markets, using archival records and exploring Welsh place names.*

Launch of the project at the Drapers Hall, Shrewsbury. *Photos: Learning Links International/Liz Millman*

It seems extraordinary to think that many of the enslaved workers who were toiling in sugar cane fields or picking cotton in the 1700s and 1800s were provided with woollen cloth called Welsh Plains to make their clothes. Spun and woven by poor rural families in Mid Wales, this fabric, along with cloth from Kendal in Cumbria and Penistone in Yorkshire, was produced specifically for the Plantation Trade. The cloth would have had the hard-wearing qualities associated with the fleece of Welsh Mountain sheep.

Since the focus on the bicentenary of the abolition of the slave trade in 2007, historians have become more aware of the profound impact that the Atlantic slave system had on places like rural Wales, places that seemed far away from the plantations in the Caribbean and cotton fields of the Southern States.

In the eighteenth century, Wales was notable for producing a coarse woollen fabric from which clothes for enslaved workers in the New World were fashioned. This was 'Negro Cloth', a drab material that is little remembered today. Yet it was important. 'Who would believe', asked one eighteenth-century commentator, 'that woollens constitute an article of great consumption in the torrid zone? Such, however, is the fact. Of the coarser kinds especially, for the use of the negroes, the export is prodigious.'

So it was. Weavers of Negro Cloth served a market that underwent an astonishing expansion across the eighteenth century. Between the Glorious Revolution of 1688 and the War of 1812, the enslaved population of the British sugar islands underwent a more than eight-fold increase, from 87,000 to 743,000. The rate of growth in British North America was even greater, from about 10,000 individuals to 1.19 million. It was a market that could never be satisfied. Slave workers usually required a new set of clothes every autumn, it being taken for granted that a year's labour would reduce the previous year's ration to rags. By assuming a standard allowance per slave, we can make a rough-and-ready calculation of how much Negro Cloth was consumed every year. However,

A consultation at the Sailors Institute in Barmouth between Liz Millman (right) and Janet Griffiths, Secretary of the Sailors Institute. Barmouth exported wool across the Atlantic for a short time.