

TEXTILE WORK IN LINEN

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The line of work described in the following article is a problem which was given to the pupils of the sixth grade of the Yale Practice School, Chicago, under the supervision of the principal of the school. Enough flax was grown to permit the spinning of hundreds of yards of thread and the weaving of many yards of cloth. All the apparatus necessary was made by the pupils in the shop.

One of the most interesting features of the textile work is the preparation, so far as possible, of the raw materials for weaving. Flax is perhaps one of the most simple illustrations we have. The fact that it will grow in almost any kind of soil and in almost any part of the United States makes the various processes necessary for its preparation for the spinning-wheel, and finally for the loom, easy problems which may be worked out in any grammar school.

Flax is sown at any time from the first to the middle of May, and is harvested about the last of July or the first of August. After the seed is sown, it requires no care whatever. The plant is from two to three feet in height, with small, pointed leaves and blue flowers. A field of it in bloom presents a most beautiful appearance. The stems are very peculiar, being hollow and covered with fibrous material. The flowers grow in clusters at the top of the stalks, and, when they fall off, are succeeded by round seed-vessels, the size of a pea. When the harvest-time comes, it is not cut like wheat and oats, but is pulled. As fast as the stalks are pulled, they are made up into sheaves, with all the stalks laid parallel and all the root-ends even. It is then left for a few days to dry in the sun. The seed is then separated from the stem, as illustrated in Fig. 1.



FIG. 1.— Removing the Seed.



FIG. 2.— Pounding, Breaking, and Hackling.

This apparatus is easily made by the pupils in manual training, and consists of only a bench and a comb made of quarter-inch iron rods, the ends being ground to a point on the emery wheel or grinding-stone, and set in a piece of hard wood 12" \times 2" \times 1". The comb is held to the bench by means of small clamps, or is screwed down. The process of removing the seed is rather a particular one, as great care must be taken not to injure nor break the upper stems.

After the seed has been separated from the stalk, the stalks are tied up in small bundles and placed in water to soak. Care should be taken that it is completely immersed. Standing water, a pond or slough, is preferable. It must be remembered that a wagon-load of flax is not needed with which to experiment. The quantity which it is possible to grow in a flower-bed or even a window-box, if properly cared for, will answer for experimental purposes. A small amount may be soaked in almost any kind of receptacle. The time for soaking varies according to the temperature of the water. Usually three or four days is sufficient in the vicinity of Chicago. When the fibers begin to separate from the stem, and the woody core of the stalk snaps readily, it should be removed from the water. If allowed to remain there too long, the fibers as well as the stem rot. This process is called retting the flax. After it is removed from the water, it is spread upon the grass to dry and bleach.

The retting process may be carried on without placing the flax in water. It is accomplished by spreading the flax on the grass, allowing it to remain until the dew and rain have done the retting. This method requires a longer time. With the inexperienced person the results might be more satisfactory if the two methods were combined. Soak in water for about two days, and then spread upon the grass, allowing the dew and rain to complete the process.

We are now ready to begin the breaking. Before this process is begun, the stalks are thoroughly dried. With us the sheaves of flax were placed upon the register. This causes them to become very brittle. Before the flax is placed in the brake, it is put on a block of wood and thoroughly pounded, as shown in the right of

Fig. 2. This really begins the breaking. It is then placed in the regular brake, as shown in the center of Fig. 2. This brake is a simple piece of apparatus, also made by the boys. We have three brakes, of varying sizes, the smallest being made in such a way as to break such parts of the woody core as are not broken by the largest. This breaking is done to get the fibers free from the woody cores of the stalk and thus make them ready for use.

After the breaking has been thoroughly done, what remains is hackled. The hackling consists in passing the flax through a series of combs, as represented in the left of Fig. 2. The hackle is not a difficult piece of apparatus to make. It consists of wire nails ground into long, sharp points. These are driven through a circular or rectangular piece of wood, banded with an iron strip, and glued and screwed to a support, as shown to the left of Fig. 2. The process of hackling removes many of the pieces of stalk not removed by the brake, and it also splits the fibers. Even after this process is completed, there are still bits of the stalk left. To remove the last of it, the flax is brushed, as is shown in Fig. 3.

The flax is now ready for the distaff, and is spun into thread, as shown in Fig. 4. If linen cloth of the natural color is desired, it is woven into cloth at once; but if the white effect is wanted, the thread is sometimes boiled and bleached before weaving. Oftener, however, the thread is woven and the cloth bleached. The quickest way to accomplish this is to use chloride of lime. The part of the thread to be used as woof is taken from the spool of the spinning-wheel and placed on the bobbins of the shuttles to be used in weaving. That part of the thread to be used as warp is measured off on a large reel. From the warping-mill it is taken to the warp-beam of the loom. The ends of the thread are threaded through the harnesses and reed, and fastened to the cloth-beam just beneath the harnesses. The loom is now ready for the woof.

This line of work might readily be carried out in schools where space for planting purposes is not so valuable as in Chicago and



FIG. 3.— Brushing the Flax.



FIG. 4.— Spinning.

vicinity. It is especially adapted to the sixth grade, because of its close relation to the history work of that grade and the linen industries of Ireland. So far as possible, all the hand-work in the Yale School is related to other lines of school work as outlined in the course of study.