

he breaks across in two places, about two inches apart. If he can readily pull away the central woody portion without tearing the filament of the layer which surrounds it, he considers that the flax has been sufficiently "watered."

The next stage in the management of the flax is the "grassing" of the steeped straw, by which the separation of the loosened fibres is greatly facilitated. For this purpose a newly mown meadow or a short pasture ground is selected, and the straw is spread thinly over it, and allowed to remain exposed to the air. In showery weather six days will usually be sufficient exposure; and if at the end of that time the stalks are perceived to present the appearance of a bow and string, produced by the fibre contracting and separating from the inelastic woody portion, the flax may be "lifted" and put up in small stacks, so built as to allow the air freely to circulate through them. Thus steeped and grassed, the straw is ready for the application of the mechanical operations by which the worthless, brittle, woody matters may be removed, and its textile filaments dressed and rendered suitable for their important uses.

The ordinary method of steeping in ponds or rivers, though apparently simple, requires very careful attention, and is attended with great risk. Like the fermentation of the brewer, the peculiar series of decompositions which facilitate the breaking up of the various organic structures which compose the stem of the flax plant, are liable to be affected by changes of temperature and other disturbing causes; it is not, therefore, surprising that in the open air, in a variable climate, it should progress irregularly, and that, notwithstanding the anxious attention of the farmer, one part of the straw should be oversteeped, while another part has not experienced the alterations required to facilitate the perfect separation of the fibre. Even in districts where the management is conducted by trained workmen the imperfections and uncertainty of the old system are found so much to interfere with the profits of the flax-grower, that numerous attempts have been made both on the continent and in Ireland to substitute for it some more certain and less hazardous method. In some places "dry scutching," that is, the separation of the fibre from unsteeped straw by mechanical means, has been attempted, but has failed to produce fibre of good quality or requisite fineness. In France, chemical solvents, dilute acids, alkalies, and solutions of soap, have also been tried; but though it is possible by the action of these solvents to break up the structures of the plant and to obtain fibre apparently of good quality, yet experience proved that it was inferior in tenacity and other essential properties to that procured by the ordinary methods.

The first attempt in advance of the traditional methods which offered any prospect of more favorable results, was made by an American named Schenck, who, in 1847, arrived in Belfast with specimens of fibre prepared by exposing the straw to the action of water heated by steam, and maintained at the temperature of 90 degrees for sixty hours. The introduction of Mr. Schenck's method seemed likely to produce a complete revolution in the system of flax management, and it was expected that the preparation of fibre for the spinner would be made entirely a factory operation, and thus be

rendered independent of the ignorance and unskillfulness of the farmers in those districts which it was most desirable that the cultivation of the plant should be extended, but in which the want of skilled labour opposed very great obstacles to its introduction. In Ireland, however, an establishment, erected under Mr. Schenck's patent, did not give satisfaction; spinners complained that the fibre was injured, and the expense of conducting was found so great, that it was found necessary to return to the old method of steeping. There is at present only one factory in Ireland in which the hot water system is followed; but in England and in Belgium, where it is known as the "*rouissage* manufacturier," it has given greater satisfaction. At Calne, in Wiltshire, certain modifications of the original method are employed, and from the reports of our spinners, we find that the fibre obtained there is regarded as of excellent quality.

We have had many opportunities of observing the application of Schenck's process both under the direction of Mr. Schenck and his intelligent successor, Mr. Bernard, and we have always regarded it as calculated, if judiciously applied, to prove of great value in the production of flax fibre. It is, in fact, merely the ordinary method of fermentation *accelerated* and *placed under control*, and, if managed by persons acquainted with the business, capable of preparing flax in the most satisfactory manner. In many of the works conducted on Schenck's method, the temperature of the water was raised too high, and the soluble constituents of the plant hardened and made obstinately to adhere to the fibre. Uniform temperature, not exceeding 70 degrees, which can be obtained at but trifling expense, and the application to the steeped straw of the pressure of a pair of smooth cylinders of cast iron, while, at the same time, a stream of water is made to flow upon the rollers as proposed, first, we believe, by Mr. Pownall, of London, so as to wash away the softened organic impurities, will enable the steeper to accelerate the process of steeping, and yield the fibre in the best condition.

In Belgium much interest has lately been excited by the application of a new process proposed by M. Julien Léfébure, at the London Exhibition of 1862, who obtained a gold medal for flax and hemp prepared by his system. Through the kindness of his Excellency Lord Wodehouse, Lord Lieutenant of Ireland, who has obtained a report from Belgium for the Chemico-agricultural Society of Ulster on this method, we are enabled to give some account of its chief features.

Léfébure's method is described as being based "upon a combination of chemical and mechanical elements." An alkaline solution is used as the solvent, and three successive operations are required. In an establishment in which 1000 kilogrammes of undressed flax are daily treated, producing 175 kilogrammes of prepared flax ready for spinning, the first operation is *crushing* the flax (*broyer*) so as to remove the woody matters: 1000 kilogrammes of green flax when crushed give 320 kilogrammes of filaments. The second operation is *washing* in water and alkali; the expense of the quantity of water required for the above quantity of flax is 16 francs. The third operation is *drying*. A "*séchoir*" machine for drying 320 kilogrammes of crushed and washed flax should measure 20 me-