

they throw away the inner or superior surface, together with the other half of the large bundles of fibres. The cellular tissue, already broken up by tearing it away from the rest of the leaf, is easily got rid of, and thus the fibre is both finer and cleaner than that prepared by the machines. Of course the system is very wasteful, and it would never do for us to follow it, but I would suggest that it might be very advantageous to split the leaf longitudinally, so as to divide the inner and outer surfaces before putting it through the machine, as by this means the bundles of fibres would be split into two, and a finer, as well as a cleaner, article obtained.

Gum.—The gum of the flax plant, when first exuded, is a thickish, sticky, colourless fluid, that runs down the leaf when it is cut. It gradually hardens into a semi-solid, jelly-like, viscid substance, and ultimately into a thin tough pellicle, which can be easily peeled off the leaf, and which generally retains the markings of the cell-walls of the superior epidermis. When pure it is colourless, or pale yellow. It shows no microscopical structure, but generally contains small pieces of vegetable tissue, &c., and sometimes several animals, which live in it. On exposure to the sun, it shrinks greatly, and after a few days hardens into a tough solid substance, not easily broken.

In its first or fluid state, in which alone it exists in the interior of the plant, it readily mixes with water. Both in its usual semi-solid state, and after hardening in the sun, it softens and intumesces in cold water, but only partially dissolves. In boiling water, it dissolves readily, when in the semi-solid state, but with difficulty after having been dried. Alcohol fails to dissolve it, but turns it white. It is unaffected by the caustic alkalies, but dissolves easily in acids. Iodine colours a solution of it yellow, without any trace of blue.

Neither alcohol nor neutral acetate of lead produces any effect upon a solution in water; but it is precipitated, of a yellowish white colour, by tribasic acetate of lead, by protochloride of tin, and by nitrate of mercury.

These reactions show that it differs from all the gums, by not being precipitated by alcohol, and further, from the gum-arabic group by its insolubility in cold water; from the cherry-tree gum group, by its being precipitated by nitrate of mercury; and from the gum-tragacanth group by its insolubility in caustic alkali, while it is allied to this latter by its intumescent and partly dissolving in water. On the other hand, on all these points except the solubility in cold water, it agrees with carrageen and linseed mucilage; and the latter, after having been dried, intumesces in water, and only partially redissolves. From all the mucilages, however, our flax gum differs in its behaviour with neutral acetate of lead, which proves that it contains little or no pectin, and in this respect it is like the true gums. It appears, therefore, that flax gum is intermediate between the gum-tragacanth, or Barsorin group of true gums, and the mucilages, and ought, strictly speaking, to be called a gum mucilage.

We are thus led to the following conclusions:—

1. That the object to be aimed at, in manufacturing the fibre, is the separation of the fibro-vascular bundles from the cellular tissue and epidermis of the leaf, and not, by any means, the breaking up of the bundles into their ultimate fibres, which would entirely destroy their strength.

2. That the bundles of fibres in the leaf are of different sizes.

3. That no woody fibre exists in the leaf, but the liber-cells have thin walls of delicate construction, which probably accounts for the quick deterioration of the fibre by over-bleaching, or by the use of chemicals.

4. That the gum appears to offer no peculiar obstacle to the manufacturer, provided the leaves are above the butt; for in the state in which it alone exists in the interior of the plant, it readily mixes with cold water.

No. IX.

PHORMIUM TENAX.

(To the Editor of the *Press*.)

SIR,—Having in a recent letter (that on the burning of the “Blue Jacket,”) stated my intention of offering a few more remarks on the utilization of the above plant, I now ask for space to do so.

Many of your readers will remember something of my former letter on this subject, published in your paper recently, wherein I strongly condemned the state in which nearly all the fibre produced here, up to that period, had been prepared, and some of it shipped, and I then gave some simple directions for improving future supplies, which suggestions were so easy to understand that none but the thoroughly careless, prejudiced, or stupid, need fail in carrying out; yet my hints have mainly passed unheeded, and much equally inferior material has continually been prepared, tending, according to my thinking, seriously to keep the character of the Canterbury production in the background, and by making intending investors dubious, has been keeping back this new industry, to the loss of all.

Some of our flax-dressers have evidently relied more upon weight than quality or price, and have not been over scrupulous about condition; and we all know that flax, when only half-cleaned and put away wet, will rot. Also, that rope made of imperfectly dressed fibre will, when subjected to moisture, soon decay and break, and probably, when in sufficient bulk, may be liable to spontaneous ignition, for the substance generally termed gum is more of a resinous character.

The Auckland merchants are, most properly, very particular about condition, and during land transit the fibre is always most carefully protected by good tarpaulins or other safe covering and if perchance a parcel gets wet, it is opened out, fully dried, and repacked, at the risk and expense of the producer or carrier.

Now, in contrariety to such care, half-cleaned flax is here often delivered while very imperfectly dried, and even at this moist season of the year, heavy loads are to be seen on our roads without any protection against the weather; while if Colonial buyers receive loose flax in so unfit a state, they are bound to experience a considerable diminution in weight when pressing their fibre into bales, as much moisture will evaporate during lightly-packed storage, while fibre so stored is liable to mildew, and our present flax-dressers must be intensely stupid if they do not perceive that such action cannot fail to speedily recoil against themselves.