
Manila Hemp in British North Borneo. (*Musa textilis*, Nees.)

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SUMMARY.

The result of experience so far gained in the experimental cultivation of the Ceara rubber plant may be summarised as follows :—

1. The plant is readily propagated both from seeds and cuttings. Seeds are abundantly produced in almost every part of the world where the plant has been introduced. They may be gathered from plants when only three to five years old. There is therefore the great advantage that a large area could be planted within a comparatively short period. Sowing the seeds in the position where they are to grow permanently is universally adopted in Brazil. It is possible, if adopted elsewhere, this plan would greatly reduce the cost of establishing plantations.

2. The Ceara rubber plant is very hardy, a fast grower, free from insect and fungoid attacks, requires little or no attention when once established and thrives in poor, dry and rocky soils unsuited to almost any other crop. It is evident, however, that the yield of a few trees cannot be remunerative and only large areas can hope to make the industry a paying one.

3. It produces a good class of rubber, second only when well prepared to the best Para rubber. For this there is a steady and continuous demand. The yield per tree is apparently small, but a return is obtained earlier than from any other rubber plant. With thick planting and judicious thinning as the trees grow up, it may be possible to increase the yield hitherto recorded; while with skilful treatment the permanent trees may be tapped twice yearly and last in a productive state for 15 to 20 years.

4. In spite therefore of the apparent want of success which so far has attended experiments with Ceara rubber plants in Ceylon and other countries, the increasing importance of rubber as an article in large demand in all civilized countries at good prices, suggests a reconsideration of the merits of this interesting plant. In many of our colonies possessing a dry climate and a poor stony soil, it is possible that large areas could be profitably occupied with Ceara rubber trees so grown as to provide annual crops for tapping.

DXCIII.—MANILA HEMP IN BRITISH NORTH BORNEO.

(*Musa textilis*, Nees.)

Information respecting the important cordage fibre obtained from *Musa textilis*, the whole supply of which comes from the Philippine Islands, was given in the *Kew Bulletin* for April, 1887 (pp. 1–3). More recent information was published on the same subject in the number of the *Kew Bulletin*, devoted to an account of the “Species and Principal Varieties of *Musa*,” for August 1894 (pp. 248 and 289, 290, with a figure). A further brief note appeared in the following year (*Kew Bulletin*, 1895, p. 208).

At the request of Kew, Mr. W. B. Pryer, who is engaged in agricultural enterprise in British North Borneo, has been good

enough to prepare the following notes respecting the experiments now being carried on in that part of the world in cultivating Manila hemp :—

The stems of all the *Musaceæ* yield fibre of more or less strength, but that obtained from *Musa textilis* is the best. From the indigenous or wild *Musa textilis*, however, the percentage of fibre of proper strength is so small that it does not pay to extract. It is from a cultivated variety that marketable Manila hemp is obtained.

The wild plant of *Musa textilis* is known by the natives as *Saying Grotei* or *Gerotei*, and the fibre-yielding variety as *Saying Lanut*; *Saying* being their name for all bananas and plantains. Of *Saying Lanut* there are several sub-varieties, such as *Lanut pula* (red lanut), *Lanut batang*, and others. In general appearance *Musa textilis* varies very little from *M. paradisiaca*, the ordinary banana, but a sharp eye will soon notice that the leaves are narrower and more pointed, and of a paler or more sea-green colour, while the stems are of a dark pickled-cabbage colour with broad irregular streaks of a dirty green.

Musa textilis requires a more equable climate than *M. paradisiaca*, and does not thrive in any country in which there is a distinct dry season; it also demands a good soil and a warm temperature. Its present cultivation is restricted almost entirely to certain parts of the Philippine Islands and to the adjacent coast of Borneo. In fact, the requisite conditions of climate and soil are found in that part of the world only. It does not die absolutely if exposed to a drought of two or three weeks, but if spells of dry weather occur at too frequent intervals its growth is stunted very materially; but again, although it prefers rain every two or three days, it does not like a continuously wet season. Even in the Philippines its range is restricted. It is chiefly found on the eastern side, and there only it thrives really well.

In districts where it does well it requires little attention. The cheapest way of planting it is to get natives to fell and clear the forest and plant hill rice under an agreement that when (or before) they have taken their crop they are to put in Manila hemp suckers. These suckers are planted some 10 or 11 feet distant from each other, and it is well to give them two or three rough weedings during the first few months to give them a start. After this they can be left almost to take care of themselves; in fact, a few of the coarser large-leaved weeds may be left, as they tend to keep the ground cool and draw the plants up into larger stems than would otherwise be the case. When the plants are well up, however, it is best to cut down all other large plants, and the plantation will then take care of itself with only one day's going over every three months or so.

Almost any lay of land will do for Manila hemp as long as it is not too swampy or too steep, but it thrives best on rich flat land, and does not much mind a flood as long as the water does not stop too long on the land or leave it swampy afterwards.

Manila hemp suckers take longer to sprout than the ordinary banana, and send up fewer shoots, but in three weeks or so from the time the sucker is put in, if the weather is fairly favourable, the first shoot will be seen, which will be succeeded by one or

two more. It will at least be sixteen months before the main shoot is fully matured and ready to throw out its fruit spathe. This is the best time to cut it down for fibre. If so desired, however, it can be utilised at an earlier age, but the percentage of hemp obtained is very small. This is to some extent compensated for by the better quality of the hemp obtained.

Within three or four months of the first shoot showing, a careful man should go over the entire place to destroy any plants that have come up *Gerotei* instead of *Lanut*. The same process should be repeated later on, as several which looked like true *Lanut* at first will ultimately be found to have developed into *Gerotei*. Once a stool is well established as *Lanut* it always remains so.

At the age of twelve months when the main stem will be nearly fully grown, though not fully matured, two or three others will be of considerable size and some four or five small suckers will be coming on. In time the ground will be pretty well covered. As the older stems are cut down the young suckers grow up and take their place. When it has arrived at this state a Manila hemp plantation requires scarcely any attention as long as the workers do not open it up too freely by cutting over many stems, or allow the jungle plants to encroach too much. As an instance of the longevity of *Musa textilis*, I may mention one stool twenty years old that has not cost a cent, but has yielded stem after stem for treatment at frequent intervals during that period.

The above remarks are based upon Manila hemp in North Borneo. In the Philippines it would seem to take (if there is not some mistake in the observation) nearly double the time to mature.

The "stem" of the plant is composed of overlapping layers of the leaf stalks, somewhat similar to a stick of celery, but firmly bound together. The fibre is found just below the surface on the outer side of these stalks. A stem weighs from 50 to 80 lbs. No machine that I am acquainted with has yet been discovered that will extract it to pay. The native method is simple and cheap. The stem is cut down and each leaf stalk detached from the others. After this the operator sits down with the end of a stalk in his lap, he then makes a slight incision just beneath the fibre at the end, and giving a smart twitch, brings away a strip or ribbon of the cuticle with the fibre in it, from the whole length of the stalk, much in the same way that the fibrous part of a rhubarb stalk is taken off when preparing it for cooking. This operation is best performed on the plantation itself, as the discarded portions of the stem remain as manure. When a sufficient number of ribbons are obtained they are carried to a hut for treatment. The appliances used for the actual extraction of the fibre are of the most primitive and inexpensive character. A blunt knife is obtained and a hole is made in the front end of it, through which a string is passed and to which a couple of bricks or stones are tied. The knife is then attached to a block of softish wood, the blade of it pressing on the wood against which it is held by the weight of the tied-on stones. Another piece of thin rope or string is tied through the same hole in the knife, running over a bit of wood above it, to a treadle worked by the foot. All is now complete. The operator twists the end of one of the ribbons round a small piece of wood so as to get a firmer hold, and

slipping it under the knife allows the blade to descend upon it; a steady pull drags the fibre underneath the knife, which holds back all the pith, weak fibre, and other useless matter. As the strain is heavy it constitutes a guarantee that all the fibre that is not broken is of proper strength, and the result is pure strong fibre. A boy can clean in a similar way the few inches of the end which was wrapped round the piece of wood, and the fibre is then hung over a pole to dry. This is soon done if it is a fine day, and the hemp is then ready for market.

These operations are quite simple and can be performed by anyone; but some force is required to pull the fibre under the knife, and the particular muscles brought into play soon tire if the operator is new to the work. Men who have been brought up to hemp pulling can go on for hours without any discomfort.

Some men claim to be able to make half a picul (66 lbs.) of hemp in a day; but the most I have ever seen produced by one man in a day was 37 catties (a shade less than 50 lbs.). With the fibre at \$6 a picul this quantity would sell for \$2.24, a high rate of pay in a country where wages are normally 30 cents a day.

It is needless to add that it would not be advisable to employ men on day wages to prepare Manila hemp, as so much depends upon the amount of force put into the work and consequently the quantity of hemp produced.

W. B. PRYER.

DXCIV.—CAPE SUMACH.

(*Colpoon compressum*, Berg.)

The "Bark Bosch" is a bush of about six feet, confined to Cape Colony and Natal, belonging to the Sandal-wood family (*Santalaceæ*). It is locally used for tanning leather. It has also been described as *Thesium Colpoon*, Linn., *Fusanus compressus*, Murr., and *Osyris compressa*, A. D. C.

It has been investigated by Mr. Arthur George Perkin, F.R.S.E., in the Clothworkers' Research Laboratory, Dyeing Department of the Yorkshire College, Leeds. He has published the following account in the *Journal of the Chemical Society* for 1897 (pp. 1132-5):—

"My attention was drawn to this material by Professor Procter during its examination as a tanning material in the Leather Industries department of this College, and to him I am also indebted for the subjoined description of its general properties.

"The leaf is much used in South Africa under the Dutch name of 'Pruim-bast,' as a substitute for sumach for tanning; only the younger leaves are gathered.

"According to analyses made in the Leather Industries laboratory, and also by Mr. A. N. Palmer, it contains about 23 per cent. of a catechol-tannin giving green-blacks with ferric salts, a precipitate with bromine water, and with ammoniacal cupric solutions a precipitate which is soluble in excess of ammonia. It is quite as strong as the average Sicilian sumach (*Rhus Coriaria*) and although its tannin is very different chemically from that in