



NOTE

ON

CAOUTCHOUC

OBTAINED FROM

THE CHAVANNESIA ESCULENTA:

BY

G. W. STRETTELL.



RANGOON:

PRINTED AT THE GOVERNMENT PRESS.

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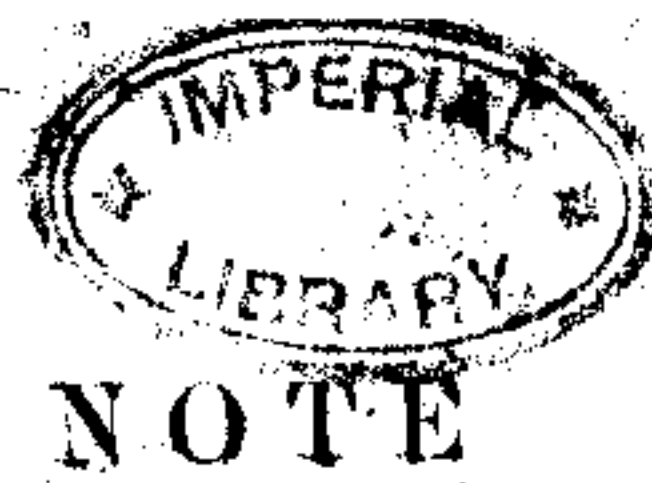
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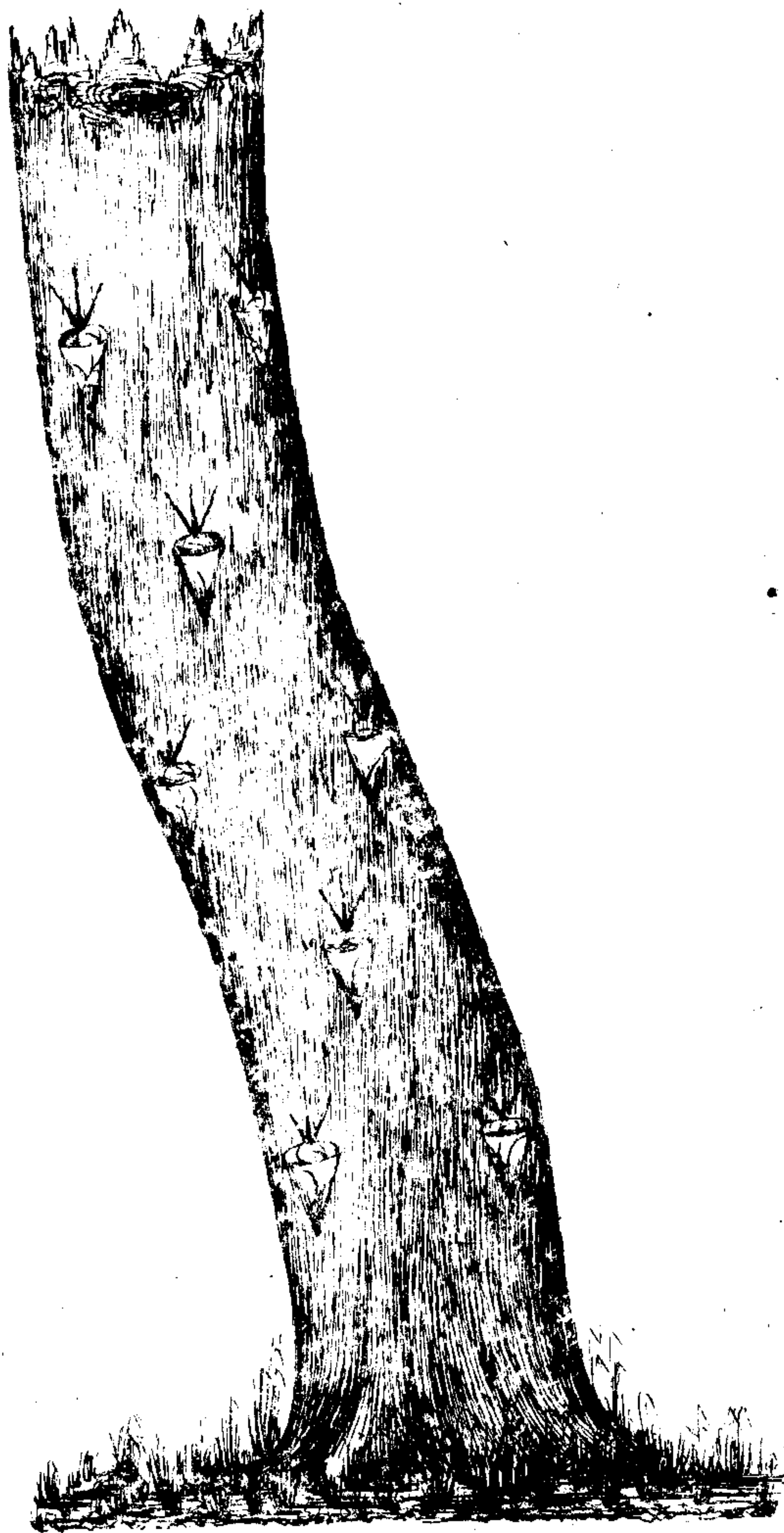
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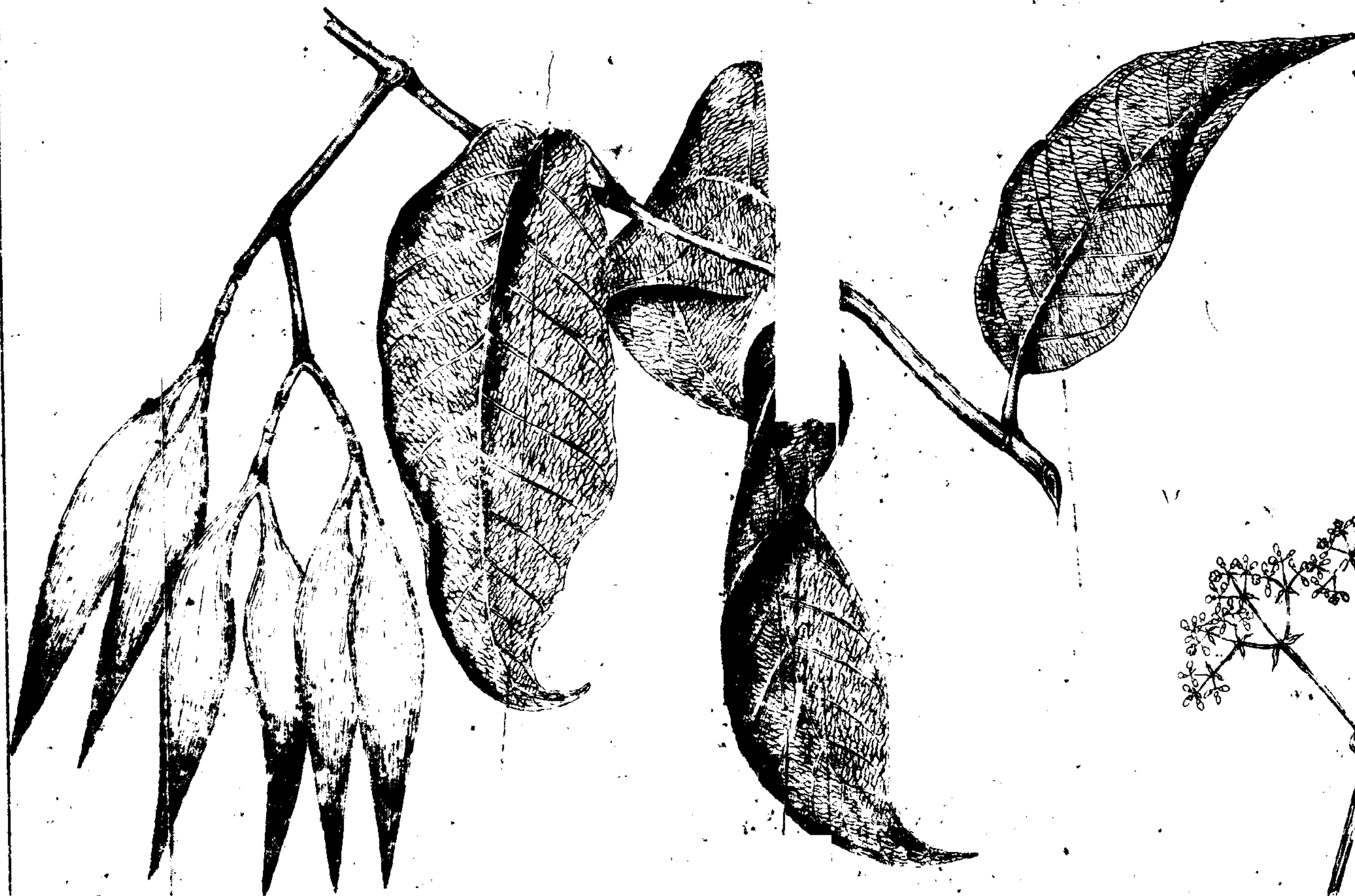
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Tapping Operation referred to at Page 5



Fruit.

CHAVANNESIA ESCULENTA

Flower

NOTE ON CAOUTCHOUC,

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NATURAL ORDER, APOCYNACEÆ—(Lind.)

DOGBANE TRIBE.

Chavannesia esculenta. Vernacular, ကျက်ပေါင်ဖို, "Kyet-poung-hpb."

DESCRIPTION.—Trees or shrubs, usually milky, allied to the *Asclepiadaceæ*, and differing from them in the contorted aestivation of the corolla, distinct filaments, granular pollen, and a peculiar hour-glass-like stigma.

DISTRIBUTION.—Natives of the tropics of Asia, America, and Africa. Known species, 570. *Ill. Gen.*,—Allamanda, Carissa, Cerbera, Tanghinia, Urceola, Vinca, Plumiera, Balfouria, Strophanthus, Nerium, Aocynum, Echites, Cleghornia, Mandevilla.

PROPERTIES.—Many of the plants are poisonous, some are drastic purgatives. The bark is sometimes tonic and febrifugal. The milk of several species supplies caoutchouc.—*V. K.*, p. 599.

AS FAR back as 1860 we find in Mason's *Burma* the following mention of a gum-elastic-yielding creeper, whose caoutchouc is scarcely inferior to that of the *Ficus elastica*, and which as recently as last August was valued by a European firm in Rangoon at Rs. 200 per 100 viss :—

AN INDIGENOUS creeper; yields caoutchouc not at all inferior to that which is obtained from the elastic fig-tree. The Agricultural and Horticultural Society, in reporting on a specimen sent them by Major Macfarquhar, of Tavoy, observed, with care in preparing, it would be equal to the best South American. I have never seen the plant in flower, but, to judge from the fruit, it belongs to the dogbane tribe, and *echites* group, for its seeds are comose above. It was stated in the *Friend of India* a few months ago that Captain Power had forwarded specimens of India-rubber from Rangoon, the exudation of a plant supposed to be the *Urceola elastica*. In the absence of any description of the plant, we may suppose it identical with the one in the Tenasserim Provinces. Mr. Parish writes me,—“I think you are right, and I believe the plant to be *Echites macrophylla* (Wight). It is a splendid creeper, and yields apparently excellent caoutchouc. I find it on Beluguen.”

2. My attention was first drawn to this creeper when crossing the hills east of Talo last January, lat. 25° 33', long. 97° 40', elevation 2,300 feet. Halting at the Kachyen hamlet of Nansing to give my people a half hour's rest preparatory to making our next ascent and encamping for the night, my attention was drawn to a Kachyen girl busily engaged dyeing some homespun thread, with what appeared

indigo, before arranging it for the loom. This turned out to be a mere decoction obtained from equal parts of the leaves of the *Ruellia indigofera* and *Chavannesia esculenta*.* So good was the imitation to what I mistook it for, that it would require some little experience in the two dyes to distinguish the difference, and I would strongly urge its introduction into the jail as a substitute for indigo.

3. The next morning, shortly after leaving Nansing, we came on this creeper growing in prolific abundance all over the forest, a large proportion of the trees being entwined by it. I collected specimens of the leaves and milk, which latter I found had partially consolidated within a few hours of tapping. Now, for the first time I learnt from my interpreter that this creeper was not only common to our own forests, but even cultivated by the people, on account of its fruit, which has an agreeable acid taste, and, being in season when tamarinds are not procurable, is readily purchased by the Burmans for culinary purposes, and sells in Rangoon at an anna per bunch of ten pods.

4. On my return to Rangoon, I found Mr. Nepean had been writing on the subject of different milk-producing shrubs, one of which he reported to be *Landolphia owariensis*; but this was a mistake, and as he seemed quite to have lost the art of producing caoutchouc similar to the sample forwarded with his letter, I did not interest myself more in his writings, but worked out results for myself. I prepared specimens of India-rubber obtained from the *Chavannesia esculenta* growing within a few miles of Magayee, and solicited the favor of Mr. Hervey, late Assistant Superintendent of Telegraphs, kindly submitting it to an electric test: his report I here quote verbatim:—

I HAVE carefully tested this piece (A) of rubber with the only apparatus we have for the purpose. It is not, I am sorry to say, as sensitive as it might be, but with a battery of 16 cells, not the slightest current passed through it;—for insulation it may be said to be perfect, but to what degree I cannot say, as we have nothing to measure it by. The rubber was soaking in water all Saturday afternoon and yesterday, and has stood that test apparently without any change whatever.”

5. I next addressed Messrs. Galbraith, Dalziel, & Co. on the subject of its marketable value, and their reply I also quote *ipsissimis verbis*:—

IN REPLY to your favor of yesterday's date, No. 534, accompanied by specimens of caoutchouc, the quantity sent is scarcely sufficient to give

* Mr. S. Kurz, in reply to a reference I made, kindly wrote as follows:—“The drawing and plant of *Chavannesia esculenta* is chiefly found in Tenasserim and Martaban, and was not known to occur also in Pegu. I myself did not meet with the plant, or more probably overlooked it. A very similar plant, of which I enclose a leaf, is common on the Pegu

(a) Note.—I have also specimens of this creeper, but the rubber is far inferior, and less elastic than *C. esculenta*.—G. W. S.
not know.”

Yomah, and is *Anodendron paniculatum* (a). It is easily distinguished by the nerves and transverse venation beneath being very obsolete, while in your plant they are very prominent. It produces also caoutchouc, but of what quality I do

a proper opinion of the quality : judging, however, from what you have sent, we consider the quality to be very fair, and at the present market value of about Rs. 200 per 100 viss. We will thank you if you will procure and send us a good parcel,—say about 100 viss,—which we will pay for at the foregoing rate if of equal quality to the specimens herewith referred.

6. I then subjected my manufacture to a few chemical tests, which gave the following results, and will be found to nearly correspond with those obtained from *Siphonia cahuchu*. It is insoluble in water, acids, or alcohol, but dissolves in æther, bi-sulphuret of carbon, oil of sassafrass, and turpentine. When formed into solution by æther, its properties remain unchanged on evaporation of the menstruum. Specific gravity of consolidated caoutchouc, 0.975.

7. More recently, Mr. Galbraith very kindly also had the specimens submitted to chemical analysis, which showed that “rubber tried by all the usual solvents gave the same results as ordinary rubber; it also produced oil-rubber by distillation.”

8. The foregoing data, then, I think is sufficiently encouraging to warrant the cultivation of this creeper being introduced as a branch of forest administration on an extensive and systematic plan; and it is only astonishing that so valuable a product in which our forests abound should have remained thus long unutilized or thought of.*

9. I will now deal with the system under which I would suggest this creeper be cultivated by the Forest Department; but before this can be successfully accomplished, we must have some more definite control over the areas within forest limits than what at present exists.

10. This creeper may be propagated either from seeds or cuttings. The former I would recommend, as natural reproduction is abundant wherever the creeper grows, and we can make certain of results if the plant lives; but not so with cuttings, which do not in every instance equal the parent tree—a phenomenon in vegetable physiology yet to be accounted for. Regarding the mode of planting, we must for the present follow the natural habit of the plant, which is to entwine itself round its more stalwart companions of the forest, reaching from one to another in the most fantastic forms and shapes, until its trunk has gained sufficient strength to make it independent of its original support, which may long since have fallen a victim to its suffocating embrace.

11. There is no necessity to preserve any fixed distance at which to plant this creeper, nor to go to any great expense in starting the system. Let seedlings be established at the base of every tree unsuited for other purposes, within a given area, which for the present need not exceed 400 acres. There are plenty of such sites to be found near the Magayee plantation, but it will be necessary at once to put

* *Chavannesia esculenta* is one of the several creepers for whose extermination in teak tracts an annual budget provision is made.

a stop to the felling of all descriptions of trees, and to guard against fires and cattle-trespass.

12. Planting should commence immediately the rains have set in, and vegetable life has taken a fresh start; natural reproduction then being plentiful, seedlings may be collected and planted at a reasonable cost; but, to guard against blanks from any unforeseen causes, nurseries of half an acre each should also be established in localities where artificial irrigation may be conducted at a reasonable rate. This will admit of the nursery operations being commenced about April, so that by the middle of the monsoon the seedlings will have made sufficient growth to admit of their establishing themselves in their new homes before the cold season comes on.

13. In respect to soil, the difficulty would be to name a class unsuited to this creeper, for I have seen it growing in luxuriant profusion in localities where the soil was antipodal, both as regards the organic and inorganic components. In the quasi-evergreen, mixed *Dipterocarpus* belt which intersects the vegetation of the plains and that of the more hilly tracts adjoining the Magayee plantation, the soil is all that could be desired; but care of course must be taken not to select marshy land, nor land where water is stagnant.

14. No indisputable information being obtainable as regards the rate of growth of this creeper, the following figures must be received with caution, though every effort has been made to secure the most reliable data by a comparison of statements made by the different parties who have propagated the creeper for the benefit of its fruit. The following measurements were obtained from creepers growing near Rangoon and Thamine:—

No. I.—Growing on *Accacia concinna* of 18 feet high, with trunk 5 feet from the ground, 18 inches circumference. Thickest stem of *C. esculenta*, 9 inches circumference. Space covered by crown branches, 300 square feet. Age said to be five years; growing on laterite soil.

No. II.—Originally started on *Malicocca trijuga*, but now entwines three trees. Thickest portion of stem 11 inches. Soil, sandy loam. Said to be seven years old.

No. III.—Originally entwined on Mango, now extends over four trees. Thickest portion of stem, 10½ inches. Soil, sandy loam. Said to be seven years old.

15. Now, allowing the foregoing data to be approximately correct, and assuming the trees to be 30 feet apart, the following details will enable us to form a fair idea of the probable financial results. Area to be cultivated 400 acres. Trees at 30 feet by 30 feet, equal per acre 48, or 19,200 creepers in 400 acres. Minimum yield of caoutchouc per annum, estimated at one viss per creeper, equals 19,200 viss, or, at Rs. 200 per 100 viss, Rs. 38,400 per annum.

16. The cost of starting this project will be trifling in the extreme. All that will be necessary ought not to exceed, on an average of seven years, Rs. 4 per acre per annum. After the first year the creepers will have attained a sufficient height to require little or no

further attention, beyond, of course, protection from fire, &c. Thus, at the end of seven years the cost on 400 acres would represent Rs. 11,200; and even this expenditure might be reduced if Shans or others were induced to sell their labour for the privilege of cultivating within the area free of taxes; while a still further reduction might be brought about by intermediate sowing, tapping each alternate creeper to death immediately it commenced to interfere with its neighbour.

17. At the expiration of seven years the expenses will embrace tapping, pressing, and preparing the caoutchouc, which I estimate at $12\frac{1}{2}$ per cent. of the profits. According to these figures and the present market value of the India-rubber of this creeper, the net assets of this scheme may be approximated at Rs. 33,600 per annum.

18. The milk of this creeper apparently more readily coagulates than that of the *Ficus elastica*, for I have known it resolved into a coagulum floating in an aqueous solution within a few hours after collecting, and without exposure to the direct rays of the sun, or artificial heat of any sort. This consolidated mass should be collected at once, and all moisture expelled by means of graduated pressure, to be accomplished either by a sort of mangle, or press something on the principle of a catch-press, the sides being perforated, so as to admit of thorough drainage. The aqueous portion, however, should not be thrown away, for it still holds in suspension particles of caoutchouc which will solidify and coalesce if subjected to artificial heat; and a final system of pressing will produce rubber equally valuable to that in which the coagulum had formed unassisted.

19. The lactiferous vessels are those that yield the inspissated milk *sui generis*, and flows most abundantly from the *mesophloeum*. When tapping, care should be taken not to cut into the sap-wood. To those unacquainted with this subject, the most practical way of understanding what is implied by the *Cinenchyma* vessels and *mesophloeum*, is to cut a deep V into the wood and watch whence the inspissated secretions flow. This is the method I adopted to tutor a couple of my men, both of whom can now make the incisions and tap with unfailing accuracy.

20. The cut I adopt is in the form of an arrow, and the incisions are made on three sides of the stem. The tiers of arrows should be three feet apart, and so regulated that the cuts do not come in a perpendicular line with those below. At the point of the arrow I attach a funnel, formed out of the leaves of the *Butea frondosa*, which readily attaches itself to the tree, from the glutinous nature of the milk. Any other leaves will answer equally well if sufficiently large, and proof against cracking. I have named the *Butea frondosa* as the one I used and found to answer the purpose.

21. Burmans, like most other eastern races, are an improvident lot, and always ready to kill the goose for the golden egg: they will cut down a tree rather than climb it for the fruit, as I have often observed: and so with the tapping of trees,—if they are not looked after, to save

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trouble, they lop off the branches and collect the milk from the amputated extremities.

22. The season for tapping these trees is about the end of April. Between October and March circulation is slow, and milk scarce; but during the rains the milk is more aqueous, and flows more readily. To give the system a start, and stimulate others to bring the caoutchouc into the market, I have arranged with a Burman to purchase any quantity of the milky emulsion at a fixed rate, to be delivered either at Rangoon or Magayee. The art of manufacturing caoutchouc not being known to the people about here, I have been in a measure obliged to agree to terms that under other circumstances I should have declined—I refer to delivering the milk in a liquid state, and also to its delivery at the former station; but under other conditions, I found the plan was likely to fall through, and, as the system can be re-organized at any moment, we must not be too particular at the start off.

23. Since completing this paper, Mr. Galbraith, the senior partner of Messrs. Galbraith, Dalziel, & Co., informs me that his chemical tests prove the rubber of *C. esculenta* to be purer, and better suited to their purposes, than that obtained from the *Ficus elastica*.

