

MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

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257	258	
Dated	16	4 1862.

Not to be folded or roughly handled

*Proceedings of the Madras Government, Revenue Department,
16th April 1862.*

No. 257. Read the following letter from Mr. W. G. McIVOR, to His Excellency the Honorable Sir WILLIAM DENISON, dated Ootacamund, 5th April 1862 :—

1. I have the pleasure to enclose you a drawing of our new method of propagation, also a Report of what we have observed to be the requirements of the plants so far as we have proceeded with our operations, and everything seems to argue that open cultivation will be the most successful and profitable, but your Excellency will be able to judge from the statement of facts given in the Report itself. I am happy to be able to give a good account of the parcel of seeds I received on the 4th of last month; the first sowing was made the same day, and yesterday this sowing had yielded 4,193 transplanted seedlings of the *Cinchona Condaminea*, and a small parcel of about 125 seeds (all that we had received) of *Cinchona Crespilla* sown on the same day, had yesterday yielded 82 transplanted seedlings of this sort, this is a success with imported *Cinchona* seeds, which has never been equalled in any country, and still many more seedlings are daily coming up. Our new propagating house is invaluable, both for rearing seeds and for propagation, and if we had another similar building at Neddivattam it would be of great use.

2. We have now over 25,000 plants in all, including the seedlings, and this number will be nearly doubled by the end of this month, so that we will have much over the number of plants we expected to have at the end of July. In my estimates for next year, I have only estimated for 150 acres of new land to be brought into cultivation; I now see we can have plants to do over 300 acres if your Excellency think it desirable, but I thought when sending in the estimates in December that we might not have plants to do more than the 150 acres; and perhaps we may be content with this quantity, until we see our way a little more clearly, with regard to a given system of cultivation best applicable to our soil and climate, as a year's more experience would be very desirable before we came to any definite conclusion on this subject, and perhaps the loss of time may be more than made up by what we will gain by experience. I will inform your Excellency as soon as Mr. Lyall arrives, of the condition of his plants; and as I expect to receive the opinions of some of the great authorities on our proposed method of cultivation, I will forward them at the same time.

Remarks on the cultivation of Cinchona on the Nilgherries.

1. *Rearing seeds.*—The first sowing of imported seeds took place in the beginning of February 1861. No certain data being given for the treatment of *Cinchona* seeds, our first operations were necessarily experimental, and a good number of seeds were lost by being sown in too retentive soil and supplied with what, to *Cinchona* seeds, proved to be an excess of moisture. The greatest success we obtained in our first attempts was with the use of a soil composed nearly entirely of burned earth, and of this sowing nearly sixty per cent. germinated. The temperature of the earth being about 70°, the period required before germination took place in the several sowings varied from 62 to 68 days. The seedlings made but little progress for the first six weeks, but after that time they sprang into rapid growth, averaging from 1½ inches to 2 inches per month.

2. A supply of seeds of the valuable *Cinchona Condaminea*, received on the 16th February 1862, were sown on the same day in a very light open soil composed of a beautifully open sort of sand, with a very small admixture of leaf mould. Our experience with the first seeds having established beyond all doubt that the *Cinchona*s are very impatient of any excess of moisture, particular care was taken in the preparation of the soil used in this sowing. The earth was in the first instance exposed to the sun for two or three days and thoroughly dried, it was then heated to about 212° in order to destroy all grubs or larva of insects; after being allowed to cool it was brought into the potting shed and watered sufficiently to make it moist, but only to that degree of moisture that the particles of soil would not adhere together on being pressed firmly with the hand, that is, the earth on being laid down was sufficiently dry to break and fall into its usual form. With the soil in this state the pots were filled, the surface lightly pressed down and the seeds sown thereon being lightly covered with a sprinkling of sand. The

pots were then placed on a slight bottom heat of about 72°. These were never watered in the strict sense of the word, when the surface got dry they were slightly sprinkled with a fine syringe just sufficient to damp the surface, but never to penetrate the soil. Under this treatment the seeds began to germinate very strong on the 16th day after sowing, and at this date, 17th March 1862, or twenty-nine days after sowing, upwards of 60 per cent. of the whole of the perfect seeds sown have germinated, and we may fairly hope to rear over 90 per cent. of this sowing. I may, however, observe that these seeds possessed the great advantage of being forwarded to India in a letter, and thus they were not subjected to the damaging effects produced on seeds sent out in air-tight parcels, the reason of this is the want of a circulation of air through the packets and the consequent deposit of moisture on the interior of the outer covering by every increase and decrease of temperature on the voyage. As soon as the seeds germinate they are carefully pricked out into fresh pots (the soil being prepared as before described for the seeds). This must of course be done with very great care. The radicle being carefully covered with soil while the seed and cotyledons are kept above the surface. In this way about 25 seedlings are transplanted into a four inch pot and treated in every respect the same as the seeds, that is, they are never watered, the soil being merely sprinkled, as before stated, to keep it in that medium state of moisture in which it was first put into the pots. This prevents the damping off of the seedlings, to which they are very liable when treated otherwise; it also greatly facilitates their growth and the formation of roots, the soil being so perfectly open that it is readily affected by the atmosphere and thus kept in the most favorable condition for promoting vegetation. When treated in this way our seedlings have made an average growth in ten months of over 18 inches, the growth being much more rapid towards the end of the ten months than in the earlier stages.

3. *Propagation.*—As soon as the seedlings and imported plants attained sufficient size, they were propagated by being layered, in this way it was found that they rooted readily in about six weeks or two months, and by being bent down caused them to break or throw out shoots from every bud; and not only this, but many latent buds were developed, and a fine growth of young wood produced for succeeding layers and cuttings. The principle of layering being so well known to English gardeners requires no detail, but in this species of plant it was found they were very liable to *bleed*, and this not only weakened the plants, but retarded the formation of roots, this we found to be remedied in a great degree by inserting in the cut a triangular piece of perfectly dry broken porous brick. An abundance of young wood being produced we proceeded to propagate by cuttings, the earth being prepared with great care, the same as for the seeds with the exception of not being heated, the ends of the cuttings are placed upon pieces of perfectly dry porous bricks, around the sides of the pots. They are then placed on a bottom heat of 75 or 80°, and treated in this way young and tender wood roots in about three weeks or one month. Older wood in from six weeks to two months. With cuttings of the young wood our loss has not exceeded two per cent., and with older wood about 10 per cent.

4. Our object being to produce the largest number of plants in the shortest possible space of time, it was found that cuttings and layers required more wood than could be conveniently spared, and it was resolved to try the propagation by buds; in this respect the success has been most satisfactory. The accompanying drawing illustrates the manner in which this is accomplished, the secret of success entirely lies in the amount of moisture given, if in excess they rot immediately, but if sufficient care is exercised in reference to moisture, the losses will not exceed 3 or 4 per cent. The pot on the left shows six *C. Calisaya* buds put in on the 30th January, which had all rooted in forty-one days after; being the date on which the drawing was made by Mr. Ratoock. This drawing represents the natural size of the pot and growth of the buds at the date given. It may be observed that it is not necessary that a leaf should be attached to the bud, this is no doubt an advantage, although we have struck many buds of the Red bark without leaves and also a few of the *Calisaya*s.

5. It ought to be explained that the reason why the earth is brought to a medium state of moisture before being put into the pots, is because it is never afterwards watered to such an extent as to render it really wet, being in fact just kept in that state of moisture in which it

was originally placed in the pots, and this uniform and medium state of moisture is rendered more easily kept by the pots being plunged in beds of earth. The reason why we found this system necessary was that when the soil was watered in the usual way after the seedlings or cuttings were placed in it, it was found from its expansion and adhesion by the action of the water that the particles of soil were forced far too close together to be beneficial to the growth of the plants, and in many instances it proved to be injurious, vastly retarding their growth.

6. In the Nurseries, in the open air, the same principle of cultivation and propagation as that described above has been adopted, and with reference to the condition of the plants and layers with nearly equal success. The period of rooting of the layers being from two months to ten weeks, while cuttings take from two to three months, the average loss being about 15 per cent.; this occurs from the impossibility in the open air of keeping a uniform state of the atmosphere around the cuttings. With layers this is not so important as they root quite as certain (though slower) as in the propagating houses, and flourish equally well.

7. *Formation of Plantations.*—The mode of cultivation of these plants likely to prove the most advantageous being uncertain, it was resolved in May and June of 1861 to place out a number of plants under different conditions of shade, exposure, &c., and the result has been that the plants placed without the protection of living shade have made the most satisfactory progress, and borne the dry season without the least injury. The plants placed under living shade were found to be damaged in some degree during the rains by the incessant drip, but on the weather clearing up they threw out new leaves and quickly recovered. Nine months after planting or at the end of our dry season these plants were found to be suffering considerably from the drought, on taking a few of these plants up, it was found that the holes in which the *Cinchona*s were planted had become entirely filled by the fibres of the roots of the living trees in their neighbourhood, which had drawn up the whole of the moisture and nourishment from the soil in which the *Cinchona* plants were placed. In putting the plants out which were placed in the open air, we of course saw from the first, that with the young plants we had to combat the bad effects of excessive evaporation during our dry season under a bright and scorching sun; we also saw the injury likely to be done to the plants by radiation during bright and cloudless nights. To obviate these disadvantages the plants were sheltered on the approach of the dry season by a rough enclosure of bamboo branches, with the leaves adhering to them (as illustrated in the drawing), so as to give them sufficient shelter both from the effects of evaporation and radiation. In addition to this shade of the branches of cut bamboos, the soil around the roots of the young *Cinchona* plants was covered with 1 or 2 inches in thickness of half decayed leaves, and the plants thus treated show a very great luxuriance which is not exceeded by any of the plants in our propagating houses. To ascertain the cause of this luxuriance a few of the plants were recently examined, and although at the end of the dry season, the soil about the roots was found to be perfectly moist, thousands of young rootlets of great strength were found to have been thrown into the covering of decayed leaves, so that it had become one matted mass of beautiful white roots many of them nearly the thickness of a crow quill.

8. From these observations we have resolved to place out this season 75 acres of *Cinchona* plants in cleared land, and exactly under the conditions and treatment last described. We also propose planting 75 acres under various degrees of living shade in which every attempt will be made to mitigate as much as possible the injurious effects of this system already described. The cultivation of these plants being experimental, it is necessary that we should give every method of cultivation which appears reasonable a fair trial; and that only developed facts should influence us in giving preference to one method of cultivation over another. The distances at which we have prepared to place the plants are for the larger growing species from 9 to 10 feet apart, for the sorts of medium size 8 feet, and for the shrubby sorts 7 feet, these distances are of course too close to admit of the plants attaining a full size, but we believe that it will be advantageous to plant them close in the first instance, and thin them out afterwards. In order to illustrate the extreme growth of our plants, it is worthy of note that one or two of them although not yet twelve months old have attained a height of about

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5 feet by $3\frac{1}{2}$ in diameter through the branches, we may therefore conclude that the plants will in about two years fairly cover the ground if placed at the distances given above. When they begin to crowd and impede the growth of each other they will of course be thinned out and pruned, and it is anticipated that a good supply of bark may be obtained by these means in from eight to twelve years, or perhaps earlier.

(Signed) W. G. McIVOR.

Government Gardens, Ootacamund,
22nd March 1862.

No. 258.

ORDER THEREON, 16th April 1862, No. 847.

Ordered to lie over.

(Signed) J. D. SIM,

Secretary to Government.

PROPAGATION OF CINCHONA PLANTS FROM BUDS.

(vide para 4 of Report.)

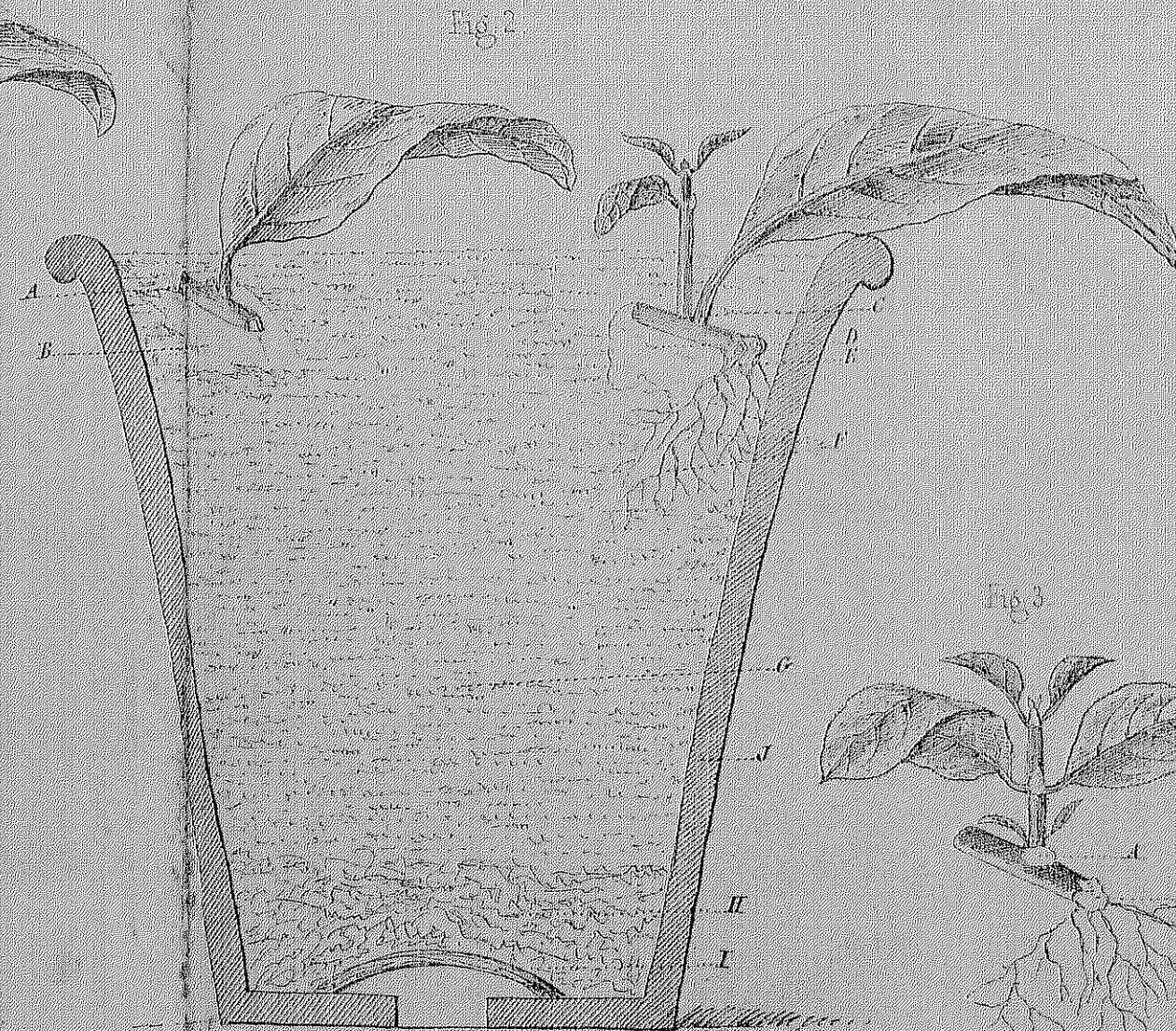
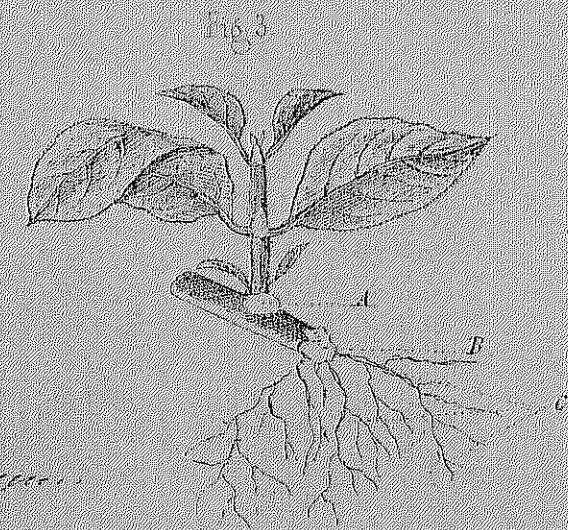


Fig 1 represents the entire pot of buds of *C. Calisaya* 41 days after planting

Fig 2 — a section of a pot to show the manner in which the buds are planted

A the bud with a leaf lying on the plane surface of a piece of dry brick. B.
C the rooted bud 41 days after planting. D a piece of brick. E callosity.
F rootlets. G the soil. H a portion of moss to secure drainage. I a piece of
potsherd placed over the hole in the pot. J the hole.

Fig 3 — a bud of *C. succiruba* rooted in the same way

A cicatrice of old leaf. B callosity. C rootlets.

J. McConchy Superintendent
San Francisco, Cal.

Wm. H. Harkness Lieut. Colonel
Chief Engineer D.P.W.

Copy of a Letter to England
of 10th Oct 1862

Rev 1862 Oct 10th
Prof of Hort & Gard.
No 1034.

X

From Mr. W. W. W.

Dated 10th 3rd 1862
Received 10th 1862

E-3. W.

Enclosed is
drawing of the new
method of propaga-
tion, and a Report
of what he has ob-
served to be the
requirements of
the Fuchsia Plant

1025/1862

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W. W. W.
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