XX. *On the Chinese Method of propagating Fruit-trees by Abscission.* By Dr. JAMES HOWISON, London*.

THE Chinese, in place of raising fruit-trees from seeds or from grafts, as is the custom in Europe, have adopted the following method of increasing them.

They select a tree of that species which they wish to propagate, and fix upon such a branch as will least hurt or disfigure the tree by its removal.

Round this branch, and as near as they can conveniently to its junction with the trunk, they wind a rope, made of straw, besmeared with cow dung, until a ball is formed, five or six times the diameter of the branch. This is intended as a bed into which the young roots may shoot. Having performed this part of the operation, they immediately under the ball divide the bark down to the wood, for nearly two-thirds of the circumference of the branch. A cocoa-nut shell or small pot is then hung over the ball, with a hole in its bottom, so small that water put therein will only fall in drops; by this the rope is constantly kept moist, a circumstance necessary to the easy admission of the young roots, and to the supply of nourishment to the branch from this new channel.

During three succeeding weeks, nothing further is required, except supplying the vessels with water. At the expiration of that period one-third of the remaining bark is cut, and the former incision is carried considerably deeper into the wood, as by this time it is expected that some roots have struck into the rope, and are giving their assistance in support of the branch.

After a similar period the same operation is repeated, and in about two months from the commencement of the process, the roots may generally be seen intersecting each other on the surface of the ball; which is a sign that they are sufficiently advanced to admit of the separation of the branch from the tree. This is best done by sawing it off at the in-

* From Transactions of the Society for the Encouragement of Arts, Manufactures, and Commerce, for 1807.

vision, care being taken that the rope, which by this time is nearly rotten, is not shaken off by the motion. The branch is then planted as a young tree.

It appears probable, that to succeed with this operation in Europe, a longer period would be necessary, vegetation being much slower in Europe than in India, the chief field of my experiments. I am, however, of opinion, from some trials which I have lately made on cherry-trees, that an additional month would be adequate to make up for the deficiency of climate.

The advantages to be derived from this method are, that a further growth of three or four years is sufficient, when the branches are of any considerable size, to bring them to their full bearing state; whereas, even in India, eight or ten years are necessary with most kinds of fruit-trees, if raised from the seed.

When at Prince of Wales's Island, I had an opportunity of seeing this proved by experiment. Some orange trees had been raised by a gentleman, from seeds sown in 1786, which had not borne fruit in 1795, while branches taken off by the Chinese mode in 1791, had produced two plentiful crops.

Whether forest trees might be propagated in Europe in the same manner, I have not had experience sufficient to form a judgment: if it should be found practicable, the advantages from it would be great, as the infancy of trees would, by this means, be done away, a period which, from the slowness of their growth, and the accidents to which they are liable, is the most discouraging to planters.

The adoption of this method will, at all events, be of great use in multiplying such plants as are natives of warmer climates, the seeds of which do not arrive here, at sufficient maturity to render them prolific.

I have frequently remarked that such branches of fruit-trees as were under the operation of abscission, during the time of bearing, were more laden with fruit than any other part of the tree. It appeared to me probable, that this arose from a plethora or fulness, occasioned by the communication between the trunk and branches, through the descend-

ing vessels being cut off by the division of the back, while that by the ligneous circles or ascending vessels, being deeper seated, remains*. The same reasoning accounts for fruit-trees producing a greater crop than usual, on being stripped of their leaves, most of the ascending juices being thrown off by them in perspiration, or expended in their nourishment, for we find that bleeding trees cease to give out their juices after they have put forth their leaves †.

I have observed that the roots from a branch under the operation of abscission were uniformly much longer in shooting into the rope when the tree was in leaf, than the contrary: hence, the spring season appears most proper for performing that operation.

It will seem singular that the Chinese entertain the same opinion that Linnæus did, respecting the pith of trees being essential to the formation of the seed. By cutting into the trunk of the guava tree before it has produced, and making a division in the pith, they have obtained fruit without seed.

Reference to the Engraving, Plate III., Fig. 1, of the Chinese Method of propagating Fruit-trees by Abscission.

- A. The tree on which the operation is performed.
- B. The straw rope wound in a ball round a branch of the tree.
- C. The cocoa-nut shell or vessel, containing the water, which gradually drops from thence on the ball below it.
- D. Another branch of the same tree from which the part E roosted in the straw rope or ball, and now ready for planting out, has been separated.
- F. The vessel suspended from a branch above, and from which the ball had been supplied with water.

* The circumstances attending the Chinese method of propagating fruit-trees, appear a strong confirmation of Mr. Bonnet's opinion, that plants as well as animals have a regular circulation of their fluids.

† Marsden, in his History of Sumatra, page 119, says, "The natives, when they would force a tree that is backward to produce fruit, strip it of its leaves; by which means the nutritive juices are reserved for that important use, and the blossoms soon show themselves in abundance."