

large number of fungi, many known to be of great economic importance. In view of all of these facts I believe that the plainest common sense will dictate the necessity of the most rigid sanitation in and near rubber plantations.

This is all a look forward. The few plant pathologists who have been privileged to work in the Peninsula have accomplished results of value which should be in no wise discounted. But the "field is so great and the hands so few" that there is no present promise of our being able to compete with nature in this matter. The natural state of the forest is not only one of superabundant life but also one of wholesale and all-pervading death. The successful upsetting of the normal plan of nature, and maintenance of health and vigor in every individual of an extensive plantation, can only come out of comprehensive, intensive, and adequately supported scientific investigation.

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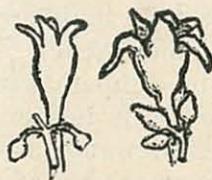
### THE GARDENS' HEVEA TREE No. 1844, — *H. CONFUSA*, HEMSL.

Planted in the exact centre of a small rectangular bit of ground close to the office in the Economic Garden stood a rather small rubber tree which bore the number 1844. Its dark grey bark attracted attention to it; and when it was more closely examined the foliage was seen to differ from that of the neighbouring trees of *Hevea brasiliensis*. Its history was unrecorded: but by the way in which it stood, it suggested that it came by no accident, but was set in its position as something apart from the other rubber trees.

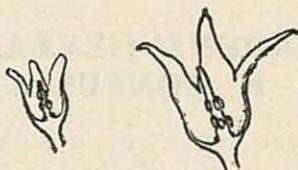
When it flowered in 1917 it was seen that the flowers removed it far from *H. brasiliensis*. The seeds also were found small, though not outside the extraordinarily wide limits in which *H. brasiliensis* varies: when it was tapped the latex was found to be yellow, meagre in amount and to remain tacky, with little elasticity. It appeared to be an undesirable type: but it was determined not to destroy it without enquiry. Flowering specimens were therefore dried and sent to the Royal Botanic Gardens, Kew, where Sir David Prain has been so good as to have it determined as *Hevea confusa*, Hemsl. The tree has now been destroyed on account of its proximity to the seed bearing trees, lest it should bring about cross-pollination; but seedlings have been raised in order that if any purpose is found for it, the species may be available.

*Hevea confusa* originates from British Guiana. It differs in so little from *H. pauciflora*, Muell. Arg., of the same region that to unite the two on botanical eye characters is quite justified; and if united, it takes the second name. Seeds of the tree 1844 had been sent to Dr. P. S. Cramer before flowers could be sent to Kew; and with no more material than this he had suggested *H. pauciflora*

as the species. It belongs to the section of the genus which has the male flower-buds blunt, as the annexed figure shows, whereas in *H. brasiliensis* they are acute. The female flowers of *H. confusa* are further a little smaller and the male flowers considerably smaller than in *H. brasiliensis*.\* But a still more striking difference is in the pose of the male flowers.



On the left a female flower of *H. confusa* with buds of two male flowers (a third has been broken off). On the right a female flower of *H. brasiliensis* and three male buds. Note the smaller flowers of the first and that the male buds bend earthwards.



On the left a male flower of *H. confusa* in section and on the right a large one of *H. brasiliensis* which is very variable in regard to size of its male flowers. Note the blunt perianth lobes of the first.

The panicle in *H. brasiliensis* carries up to 300 flowers of which, always if well developed, the terminal flower is female; and the better developed the more female flowers are there, terminating the stronger lower branches, up to about 7 in number. Thus a panicle that is weak may be wholly male, and the stronger and larger it is, the more in number are the female flowers on it. All these female flowers take their position as regards the earth from the axis that they terminate, and that position is generally in some measure such that they are directed upwards or obliquely upwards: but the divergence of this angle from the vertical is determined by the angle at which the branch takes off from its parent axis and again this by the angle at which the parent axis stands. The panicles produced by tree No. 1844—*H. confusa*—are narrower than those of *H. brasiliensis*, as much because the angle at which the side axes take off is smaller, as because, at least in tree 1844, they are of lesser size. The weakest panicles are wholly male as in *H. brasiliensis*, and the stronger carry more and more female flowers upon the lower side-branches up to 5 or 6.

\* J. Huber, *Novas contribuicoes para o genero Hevea* in *Boletim do Museu Goeldi*, vii, 1910, pp. 200-216, has discussed at some length the size of the flower, as a character by which species and groups of species may be distinguished from each other.

The perianth of the female flower in *H. brasiliensis* is of a dull mustard yellow, and if normal consists of five ovate acuminate sepals coherent in their lower third into a cup, which is of a greener tint inside than the lobes. This cup is almost filled by the ovary, around the base of which is a slight circular swelling being the disc which may be just damp with honey; five slight thickenings extend up the cup as the midribs of each part of it. In *H. confusa*, the perianth lobes are ovate and blunt, and the cup extends to half their length; they and the cup are straw-coloured with a magenta line down the middle from the tip or near it to the very base inside. Outside they are covered with short hair. The top of the ovary is conspicuously blunt with sessile stigmas.

Often in *H. brasiliensis* the first flower of a panicle to open is a male flower; but after all the female flowers are over, there are males that follow in considerable numbers. The male of *H. brasiliensis* is like the female in perianth, but smaller and hardly pale green within the cup. The staminal column carries two rings of five anthers. The pose of the flower depends upon the axis which bears it, and it may face in any direction. The male flowers of *H. confusa*, like its female flowers, are smaller than those of *H. brasiliensis*, blunter, different in colour, being straw-coloured: they have fewer anthers, and by the bending of their pedicels they face more or less earthwards. Outside they are hairy. This bending of the pedicels gives a very good distinguishing mark which the herbarium student cannot note so well as the field student.

The seeds are as figured by Hemsley in *Hooker's Icones Plantarum*, plate 2575: but tree No. 1844 gave flowers with blunter perianth-lobes than the figures on plate 2574.

*Hevea pauciflora* is known to produce hybrids with *H. brasiliensis*, and so far it seems that these hybrids have no value.

A sample of rubber from the tree was submitted to Dr. Frankland Dent, Government Analyst, Straits Settlements, and another to the Director of Agriculture, F. M. S., for kind submission to Mr. B. J. Eaton, Agricultural Chemist in the Department of Agriculture. These two samples on analysis scarcely differed: they contained about 95 per cent of a substance chemically rubber but lacking the physical properties required in commercial rubber, probably as Mr. Eaton suggested a polymer of caoutchouc; and they contained also rather under 2 per cent of resins. The samples were too small for a vulcanization test. They were small because the tree yielded so grudgingly.

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## MANGO PESTS IN SINGAPORE.

In no other part of the tropics are mangoes more badly pest-ridden than in Singapore. Locally produced fruit is therefore neither abundant nor of good quality. There is nothing in Singapore to compare with the great quantities of fine "carabao" man-