



FIG. 48.—CYCAS MICHOLITZII, Dyer: ENTIRE PLANT.

Male plant with cone, showing also subterranean caudex and a leaf. (Much reduced.)

NEW OR NOTEWORTHY PLANTS.

CYCAS MICHOLITZII, DYER.*

I am afraid the pressure of other work has compelled me to defer too long the formal de-

* *Cycas Micholitzii*, sp. n. Caudex subterraneus, $1\frac{1}{2}$ ped. longus $1\frac{1}{2}$ poll. crassus. Folia pauca, ad 10 ped. longa, basi ad 4 ped. aculeis armata, pinnulis 8 poll. longis, fere 2-dichotomis, segmentis $\frac{3}{4}$ poll. latis.

scription of a new and very remarkable species of *Cycas* which Mr. F. Sander has placed in my hands.

We owe this interesting discovery to Mr. W. Micholitz, Messrs. Sander & Sons' collector, who had the good fortune to find the plant in Annam.

Strobilus mas (juvenilis) ad 6 poll. longus, squamis antheriferis brevissime acuminatis. Carpophylli lamina terminalis obovato-rhombea superne profunde pectinatalacera. Annam. Legit cl. Micholitz. W. T. Thibellon-Dyer.

Complete material for its study came last year into the possession of my friend Mr. Ridley, the accomplished and enthusiastic Director of the Botanic Gardens, Singapore. The new species is so unlike any other *Cycas* in its foliage that it is scarcely a matter of surprise that Mr. Ridley proposed to make it the type of a new genus. In this however, for reasons to be presently explained, I found myself unable to concur; and Mr. Ridley, learning that I was interested in it



FIG. 49.—CYCAS MICHOLITZII, *Dyer*: DETAILS OF FOLIAGE AND MALE CONE.

A—Male cone (probably immature).

B—Lower surface of scale of male cone, showing anthers.

C—Upper surface of scale of male cone, showing anthers.

D—Carpophyll with immature fruits.

E—Pinnules half natural size.

very kindly placed all his material at my disposal. I am rather indebted to him for the drawings by the artist attached to his staff, which are here reproduced.

A glance at these will show that the striking and remarkable feature of the new species is the

repeated dichotomy of the leaf-pinnules. If we except the Australian *Bowenia*, which in its "loosely bipinnate" foliage stands alone in the order, we might have affirmed till within the last quarter of a century that pinnate or pinnatifid leaves were uniformly characteristic of the

Cycadeæ. This conclusion was, however, rudely dissipated when the late Charles Moore published, in 1833, his description of *Macrozamia heteromera*, which has, unlike the rest of the genus, the pinnules once or even twice dichotomous.

One was scarcely, however, prepared for any-

thing of the same kind in the genus *Cycas*, which is widely distributed from Africa to Polynesia, with numerous species, more or less well defined, but all having simply pinnate leaves. The first exception was a plant from Kwangsi, collected by Mr. H. B. Morse, which I described in the *Index Floræ Sinensis* (*Journal of the Linnean Society*, vol. xxvi., pp. 559, 560) as *Cycas Rumphii* var. *bifida*. In this the pinnules were simply bifid to the base. In the absence of any material of the reproductive organs, I regarded it, and I think most probably wrongly, as a mere variety of *C. Rumphii*. I was encouraged in this view by Miquel's figure of *Cycas inermis* (*Annal. Bot. Ind.*, ii., t. iii.), in which the lower pinnules of the leaf are represented as bifid. As Kwangsi and Annam are contiguous, it is by no means improbable that Morse's and Micholitz's plants may turn out to be the same. In that case the affinity of the former would be wholly remote from *C. Rumphii*, to which I referred it.

Cycas Micholitzii, as I propose to name the new species, belongs to the small group which is confined to an area extending from Nepal to Cochin China, in which the margins of the carpophylls are pectinate or comb-like. It differs from both other species, *C. pectinata* and *C. siamensis*, in having a very short or obsolete acumen to the antheriferous scales, instead of the long and slender one which they possess.

According to the description of Micholitz, *C. Micholitzii* has a subterranean caudex or stem. Both *C. pectinata* and *C. siamensis* develop a trunk which may be 6 feet or more. *W. T. Thiselton-Dyer*.

FRUIT-TREE BUDDING.

BUDDING is more generally practised than grafting when propagating new varieties of fruit-trees because it entails less labour and produces equally good results, and furthermore enables more trees to be raised from a given shoot; for to be successful with grafting two or more eyes are necessary to form a graft.

Budding is generally practised during the months of July and August, the proper condition of the stock being the first consideration. This state obtains when the stock is growing freely, and when the bark is in such a condition that it is easily separated to allow of the insertion of the bud. If the stock is in a stunted condition and has already finished growing, it will be of little use to try and insert a bud under such conditions, so tightly does the bark adhere to the wood. Where this is found to be the case it is best to give the stock a good soaking of water. This operation can easily be performed with a

are not plump and prominent must likewise be rejected as unsuitable. Buds for the purpose are much better cut from trees growing in the open rather than from those growing against walls or under glass. This particularly applies to Peaches and Nectarines.

In commencing the operation of budding it is very necessary that the shoots should be freshly cut, and it is a bad practice to immerse them in water for too long a period, for by so doing the inner bark becomes discoloured, and the buds are consequently rendered useless. Buds that have travelled some distance and have become shrivelled may have their plumpness restored by laying them in damp moss. Young stocks varying from a $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter are the best for budding purposes; old and aged shoots should be grafted. The scion from which the buds are to be taken should approach as near to the size of the stock as possible, and as the sizes of the latter will vary when a quantity have to be operated on, the diameter of the bud can easily be varied to suit the individual case by the manner in which it is removed from the scion. When the stock is made ready by removing any side growths that are in the way of the operator, a cross cut should be made one-third round the stock, and then a longitudinal cut $1\frac{1}{2}$ inch in length at right angles to the first, the two forming a letter T. The flat end of the budding-knife should be inserted between these cuts, and the rind lightly and carefully raised ready for receiving the bud. The leaves should be removed from the shoot containing the buds to be inserted, with the exception of about $\frac{2}{3}$ inch of the leaf-stalk. The shoot should be held with the growing point downwards, and the bud carefully removed with a sharp knife, severing the wood and bark with the included bud for about 2 inches. The wood should next be removed, a proceeding that requires great care. To do this expeditiously the bud should be held by the shield between the finger and thumb of the left hand, and the wood extracted with the forefinger and thumb of the right hand. When the wood is removed the bud is ready for inserting into the stock.

The process of tying-in the bud is an important item, and should be commenced at the lower part of the incision, leaving a sufficient piece of raffia to fasten at the top. It is important that the bud be securely bound below the shield, and again close down to the bud, so that the eye may be lightly pressed on to the wood of the stock. In from ten days to a fortnight it will be seen if the budding has been successful. Much depends upon the nature of the stock used as to what height from the ground-level the budding should be performed.

CHERRIES can be successfully budded on the

APPLES.—Various stocks are used and various results are obtained in working the Apple. It is a matter of vital importance that the grower should have some knowledge as to the kind of stock his trees are growing upon. There are but two kinds of stocks on which the Apple can be said to do well, one being the Crab stock, which is suitable for all forms of trees where quick growth is needed, and the other is the paradise stock, of which two or three forms are now in commerce, including the English broad-leaved variety, which is the best. This stock should be budded low down, so that the union of the stock and the scion, often an ugly formation, may be hidden below the surface of the soil, where it often develops roots, to the additional benefit of the tree.

PEAR trees are budded on the common Pear, its most natural stock, and upon the Quince stock, for dwarfing and early fruiting purposes. There are a few kinds of Pears which will not grow successfully when budded directly on the Quince, but require budding on to another variety, which will succeed on the Quince. The Quince stock is more adapted for budding than for grafting, and in common with all the dwarfing stocks should be worked low down the stem. Weak-growing kinds required as standards are obtained by budding a strong-growing variety such as Pitmaston Duchess on to the Pear stock, and when the necessary height of stem has been attained, the required variety is budded at the desired place.

PLUMS.—For budding the Plum several kinds of stocks are used, but to be successful an intimate knowledge must be gained of the different varieties that are suited to the various stocks. Many stocks are obtained from suckers. The stock suiting most varieties is the common Mussel, which produces few suckers, and is propagated chiefly from root cuttings, as also is the Brussels-stock. The Myrobalan Plum is used with good results by some nurserymen as stock for Damsons, but it should be worked late in the season when the sap is not excessive.

PEACHES AND NECTARINES.—To be successful in budding the Peach and the Nectarine much attention and study are needed. Stocks as nearly allied in constitution to the variety to be worked must be used. Feeble growth, unfruitfulness, and premature death are some of the failures attributable to unsuitable stocks. Up to the present time no universal stock for these fruits has been discovered, but nurserymen of repute test for themselves the suitability of the stock which they use, zealously guarding the secret of their success. The character of the trees and of the fruits are somewhat changed by the use of various stocks. Up to the