In April, Mrs. Alvin R. Jennings has graciously offered her famous estate for a "ramble" and picnic. Plans are being made for trips to Dr. Lawrence M. Simonson's garden at Lantana, to Key West and Naples, Florida, on future dates.

A letter enclosed with this number tells you some exciting news about the California group's plans.

LUCITA H. WAIT

Measuring Growth Rates in Palms*

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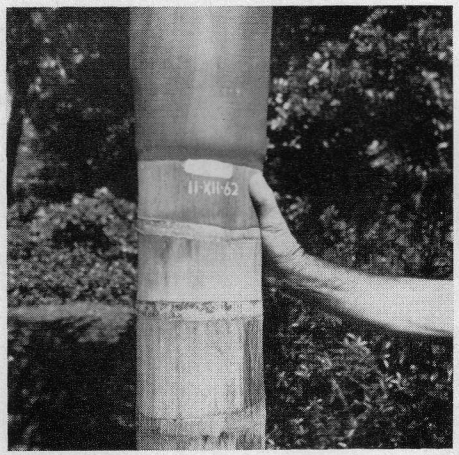
The growth rate of a palm can be measured by estimating the number of leaves it produces in a given period. Each palm stem ends in a leafy crown within which leaves are produced singly in succession. The early stages of leaf development are not visible because the youngest leaves are enclosed and concealed by enveloping older leaves. Each leaf becomes visible as a slender spike growing from the center of the crown with the various parts of the future blade closely folded together. The spike elongates and the blade then expands quite quickly and the leaf is mature. The length of time each leaf persists in the leafy crown varies for different palms and for many it is rather indefinite. As a leaf becomes older it is displaced from the center of the crown by younger leaves. It may gradually dry and decay and its shrivelled remains may persist. On the other hand many palms lose their leaves in a precise way, the whole leaf falling as a single unit. These palms are said to have self-cleaning trunks and probably the most familiar example is the royal palm (*Roystonea*). Other common examples are *Areca*, *Ptychosperma*, *Veitchia* and other members of the arecoid group.

The rate at which new leaves are produced can be determined by tagging plants and keeping them under observation for long periods. Marking can be done without injuring the palm in any way. It can be done inconspicuously so that a palm, for example in a botanic garden, is not made an unsightly object. Also if done inconspicuously it does not attract the attention of curious and destructive animals, like monkeys and small boys.

Two methods have been used at Fairchild Garden for tagging palms, but no doubt others could be devised.

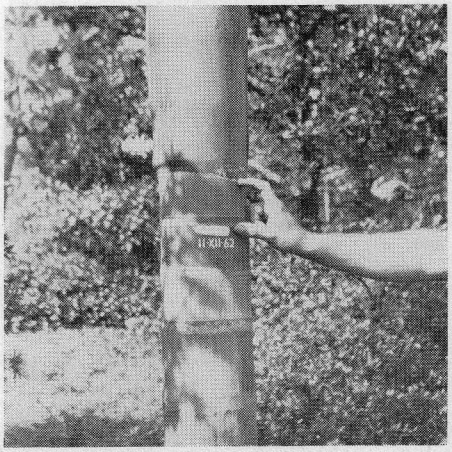
Methods for Self-Cleaning Palms

These are easily marked with paint, on the stem just below the tubular base of the oldest leaf (Fig. 32). It may be necessary to rub off a little wax or scurf from the stem before the paint can be applied. Subsequently as successive leaves fall, their original position is indicated by the circular scars they leave on the stem. Thus after a period it is easy to count the number of leaves lost since the original mark was made (Figs. 33,



32. Palm with self-cleaning trunk, marked December 11, 1962.

*These notes are intended for the guidance of participants in a proposed International Palm Year.



33. Same palm as in Figure 32, March 11, 1963.

34). The paint mark may have to be retouched from time to time.

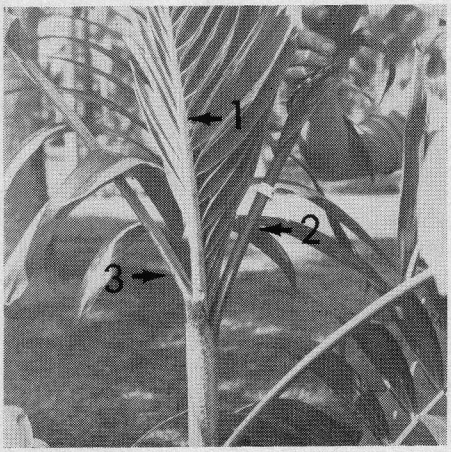
Of course this method actually measures the number of old leaves lost rather than the number of new leaves produced. This does not matter if new leaves are produced at the same rate that they are lost, which must be true over a long period, but is certainly not true over a short period. In a recent cold spell at Fairchild Garden some small arecoid palms lost several leaves in rapid succession. Leaf loss was accelerated, the

34. Another palm marked December 11, 1962, and photographed March 11, 1963.

palms certainly were not growing faster. This is one reason why records must be kept on such palms for at least a season.

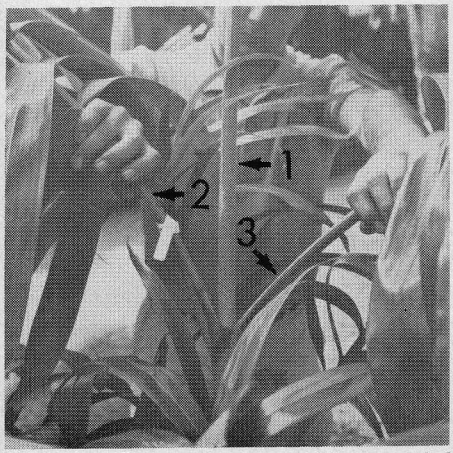
Methods for Other Palms

Careful examination of the leafy crown will reveal the youngest leaf with a fully expanded blade. There may be one or more younger, unexpanded leaves which may be partly visible, but these can be ignored. Tagging is done by firmly tying a piece of colored plastic tape to the petiole, just below the blade, of the youngest leaf with a fully expanded blade (Figs. 35-37). The date of tagging may be written on the tape, although this

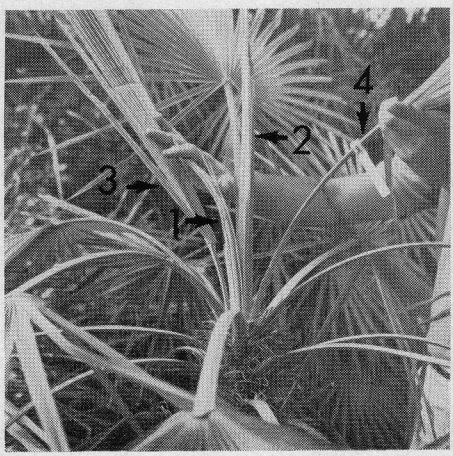


35. Leafy crown with youngest fully expanded leaf tagged.

is not essential. As the tagged leaf is displaced from the center of the crown by younger leaves a count can be kept of the number of new leaves produced. This may be rather more difficult than the description implies, since it is often not easy to recognize the age sequence in a group of congested leaves. A casual glance is not enough, the leafy crown must be examined very carefully. If great difficulty is experienced in distinguishing leaves of successive ages, the one certain method is to tag each new leaf as it becomes fully expanded. Rather more effort than is expected of the ob-



36. Leafy crown with youngest fully expanded leaf tagged.



37. Leafy crown with youngest fully expanded leaf tagged.

server is needed to do this, since a constant watch on the palm must be kept, but the results cannot be in doubt.

Records

After initial tagging, little effort is needed to make and keep records. Observations are best made regularly and three-monthly intervals are recommended. For the palms marked at Fairchild Garden, records for each palm under observation have been kept on a single 3 x 5 inch filing card. Information about the palm appears on one side, the actual measurements on the other (Figs. 38, 39). Most of this information is incidental to the direct measurements and in case of doubt should be omitted, rather than guessed at. Some detailed notes explain the kind of facts needed to be included on the cards.

Scientific name. If this is not known for certain an attempt can be made by me to do this from a good photograph.

Date of planting and age. The age of the palm from seed is required, if possible, and not the period that the palm has been planted out.

Locality. Whether in cultivation as an exotic or a wild palm in a natural habitat.

Soil type. Only very general notes are required, such as whether the soil is well-drained or not; clay, sand, muck or rock; acid or alkaline, although detailed and accurate information if it is known would be very valuable.

Total height. An approximate estimate is sufficient.

Length of visible trunk. Measured as accurately as possible, although for palms without self-cleaning trunks only an approximation is possible.

Diameter at breast height. This can only be given for well-grown palms with at least 3 ft. 6 in. of visible trunk.

Flowering conditions. If the palm has achieved a flowering condition, evidence for this will be found in the presence of young unexpanded inflorescences, or the remains of old ones even though there may be no open flowers at the time of tagging.

Presentation of Information

A suggested layout is shown in Fig. 39. Counts should be made at intervals of exactly three months from the time of first tagging. Otherwise the recording date should be noted. Measurements should continue for at least a year, but by taking records at shorter intervals an

estimate will be gained of periodicity of leaf production. Thus it will be possible to decide if leaves appear more abundantly in one season than in another. Cumulative totals only should be taken. Also in Fig. 39, space is left for records of flowering (open flowers) and fruiting (ripe fruits) which may be added if desired. Little extra effort is needed to make these records on palms which are regularly surveyed. In the cards for palms at Fairchild Garden these records are taken at the same intervals as leaf records, but a more accurate estimate of the periodicity in flowering may be obtained from palms which are con-

SCIENTIFIC NAME: *Mascarena vershaffeltii (Wendl.) Bailey*

DATE OF PLANTING: *1942*

AGE: *from seed : 28 yrs.*

LOCALITY: *F. T. G. Coral Gables, Florida*

SOIL TYPE: *Limestone rock ; well-drained*

TOTAL HEIGHT: *16'*

LENGTH OF VISIBLE TRUNK: *11'*

DIAMETER AT BREAST HEIGHT /D.B.H./: *11"*

FLOWERING CONDITION ACHIEVED: *Yes*

38. Data card.

DATE OF FIRST MARKING: *11 · XII · 62*

/YOUNGEST FULLY EXPANDED LEAF
OR OLDEST MATURE LEAF/

11 · III · 63

MONTHS	3	6	9	12	15	18	21
LEAVES EXPANDED OR LEAF SCARS EXPOSED	/						
OPEN FLOWERS	+						
RIPE FRUITS	O						

39. Data card, reverse side.

stantly observed by inserting the date of flowering and fruiting in the space available.

It must be emphasized, however, that the method of keeping notes is not important. It is the records themselves and their accuracy which are significant.

Period of Observation

Records should be kept for at least a year. This might be timed to correspond to the proposed International Palm Year. But the longer records are kept, the more useful they become, since a much better average estimate becomes possible. At the end of a year's observation and possibly at yearly intervals thereafter a copy of the records should be sent to me on 3 x 5 inch filing cards. Members of the Society will be kept in touch with the progress of this scheme through the pages of PRINCIPES.

Selection of Palms for Study

Unlimited observations are required on all species of palms. The only restriction is that palms under study should have occupied their existing site for at least a year. Palms take a considerable time to recover after transplanting. For similar obvious reasons palms under study should not be moved during the course of the observations. It is, however, quite legitimate to keep records of growth rates in small palms grown in pots, provided these are well established, are not re-potted during the period of study and do not have the environment of the pot drastically changed.

An observer need not feel that records can only be kept by people with large and varied collections. Records are needed of the commonest, as well as the rarest palms. Records are needed of many different individuals of a single species; if these individuals are growing close together we can learn something about individual variation in growth rate, if the palms occupy different localities we can learn something about the effect of soil and climate on growth rates. Thus an individual with only one species available for study might keep just as many records as an observer with dozens of different species available.

Also observations are needed on palms, whether of the same species or not, which are of different ages. Obviously most records are going to come from small palms since these can be tagged at ground level with little effort. But a conscious effort must be made to tag older and taller palms. Information is needed to decide if old palms grow as fast as young ones. As a suggestion a tall palm growing near a building may be easily observed from an upper story. Otherwise a ladder can be used.

One final note should be added. This is not a competition and no prize goes to the observer who sends in the most records or measures the fastest rate of growth. The only reward is the satisfaction of doing something fundamentally useful and perhaps, by watching closely the growth of a palm, of learning to understand it a little more.

A Visit to the Seychelles

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Knuthenborg, Bandholm, Denmark

Among the many travellers who visit India are undoubtedly a considerable number of nature lovers, many of whom are not aware that the remote Seychelles islands are easily reached from Bombay and that a round trip, with a week's sojourn in the islands, can be made in three weeks by the steamers of the Brit-