

A Remarkable New Nenga From Sumatra

JOHN DRANSFIELD

Herbarium Bogoriense, Bogor, Indonesia

Specimens in the Herbarium Bogoriense collected by H. A. B. Bunnemeijer on Gunung Talakmau in West Sumatra in 1917 had been assigned by Furtado on his visit to the Herbarium in 1936 to the genus *Nenga*. On a preliminary examination of the palms in the herbarium in 1970, I could not agree with Furtado's identification, but even so could not assign the specimens to any genus. Then, in February 1971, I visited Kepahiang in the hills of the Bukit Barisan range of Sumatra near Bengkulu, an area extremely rich in beautiful and interesting palms. It was with great excitement that I discovered a squat palm of rather massive proportions growing in great abundance at an altitude of 800 m. in steep river valleys and on slopes; the inflorescences of the palm proved to be identical to those of the Bunnemeijer collections, and on examination of the living plants and fresh and spirit-preserved material of flowers and fruits, I now agree with Furtado's original generic identification. The most striking feature of the whole palm is the infructescence, which is borne interfoliarly, and resembles in its nodding, club-shaped form, a fruiting head of *Nypa fruticans* Wurm.

I propose to call this spectacular palm *Nenga gajah* after its local Indonesian name "pinang gajah" ("pinang" = *Areca*, *Pinanga*, *Nenga* and other arecoid palms, "gajah" = elephant).

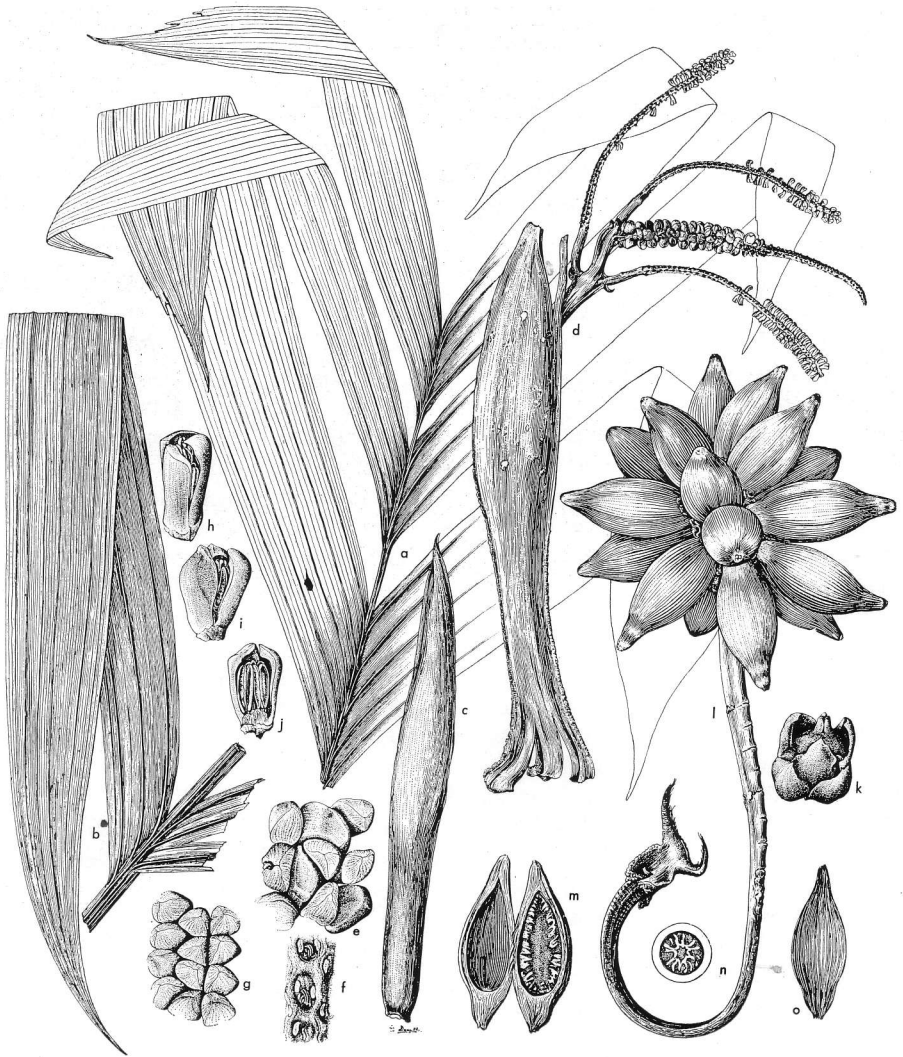
Nenga gajah Dransfield, *sp. nov.*

Diagnosis. Differt a ceteris speciebus *Nengarum* inflorescentia interfoliacea

spatham coriaceam persistentem ferente, paribus florum masculorum in 5-7 seriebus verticalibus, et capitulo fructuum.

Descriptio. Palma solitaria humilis, inermis, monoecia. Caulis crassus, ad 2 m. altus, 15 cm. diametro infra folia, radicibus gralliformibus praeditus, horizontaliter arcte cicatricosus. Cicatrices foliorum delapsorum ad 1 cm. distantes, fibris vaginarum foliorum tectae. Internodia verticaliter rugosa, cortice aliquantum suberoso. Radices corticiformes ad 1.5 cm. diametro, atrobrunneae, radicibus conicis lateralibus spongiosis, pallidis pneumaticis, ad 1 mm. longis, serialibus. Folia 8-9 in corona, patentia, (cum vagina) ad 3 m. longa, vagina ad 50 cm. longa, pallide luteo-viridi, a caule non munde dehiscente, marcescente et vestigium fibrosum formante, indumento atrobrunneo juventute sparsim tecta. Petiolus ad 75 cm. longus, 2.5 cm. diametro, in sectione circularis, indumento atrobrunneo sparsim tectus. Rhachis triquetra, ad 8 mm. diametro in medio longitudinis, ad 3 mm. diametro prope apicem, squamis brunneis sparsim tecta. Foliola leviter sigmoidea, regularia, utrinque 8-10, paribus 1-2 inferioribus unicostatis, superioribus 3-5-costatis subopposita, horizontalia, 3-6 cm. distantia, in medio folii ad 60 cm. longa, ad 8 cm. lata, apice acuminata, infra leviter pallidiora et squamis indumentoque pallide brunneis secus costas tecta, supra glabra. Foliola terminalia sub angulo 70° inter se divergentia, acuminata aut bifida aut leviter dentata.

Inflorescentia interfoliacea erecta, 30-



1. *Nenga gajah*. a, leaf apex $\times \frac{1}{4}$; b, mid-portion of leaf $\times \frac{1}{4}$; c, inflorescence enclosed within the almost woody spathe $\times \frac{1}{4}$; d, inflorescence at anthesis of male flowers: note female flowers still in bud, and the acropetal sequence of opening and falling of the male flowers $\times \frac{1}{4}$; e, closeup of flower triads $\times 2\frac{1}{2}$; f, scars left on rachilla by flower triads $\times 2\frac{1}{2}$; g, grouping of male flowers on distal portions of the rachillae $\times 2\frac{1}{2}$; h, i, male flowers $\times 2\frac{1}{2}$; j, dissected male flower $\times 2\frac{1}{2}$; k, female flower at anthesis $\times 1\frac{1}{4}$; l, whole infructescence of mature fruit $\times \frac{1}{4}$; m, vertical section of fruit $\times \frac{1}{4}$; n, transverse section of fruit $\times \frac{1}{4}$; o, fruit with mesocarp removed $\times \frac{1}{4}$.

40 cm. longa. Spatha solitaria, atrobrunnea vel violacea, dura, coriacea aut paene lignosa, ad 25 cm. longa, ad 4 cm. lata parte latissima, 2.5 cm. lata parte angustissima 10 cm. super basim, indumento

furfuraceo brunneo praecipue marginibus tecta. Spatha pro parte quarta vel tertia longitudinis uno margine laterali dissiliens et inflorescentia per fissuram lateraliter emergens, spatha per anthesin



2. Palm-rich Hill Dipterocarp Forest near Kepahiang; in the centre, flowering *Areca latiloba* Ridley with *Nenga gajah* on each side; also in the photograph are *Daemonorops hystrix* Blume, *Daemonorops* sp. nov., and *Pinanga densiflora* Beccari.

longe persistens, dein in vestigiis fibrosis marcescens. Rami inflorescentiae 3–5, omnes ordinis primi. Pedunculus ad 25 cm. longus, in sectione ovalis, 20×8 mm., atroviolaceo-brunneus, pilis ramosis sparsim tectus. Rachillae quaeque bracta rigida triangulari crassa 5 mm. longa, basi 5 mm. lata subtentae.

Rachillae 2–4 inferiores masculae ad 10–12 cm. longae, 5 mm. latae sine floribus; rachilla terminalis ad 10 cm. longa et basi 8 mm. diametro, mascula femineaque aut raro tantum mascula; rachillae 1–3 inferiores ca. 1–3 cm. distantes, eis terminalibus et penultimis approximatis. Rachillae masculae 1–2 cm. super basim sine floribus, rachilla terminalis floribus masculis femineisque pro 3–4 cm. infimis et floribus tantum masculis prope apicem praedita. Dimensiones inflorescentiae maturitate crescentes. Flores masculi ante flores femineos aperientes,

binati, quoque pare bracta minuta in rachilla subtento, quoque flore bracteola minuta subtento. Paria florum masculorum in 5–7 seriebus verticalibus aut arcte spiraliter disposita, si spiraliter tum flores contiguissimi; numerus serie-rum superne decrescens. Ubi rachillae in spatha contiguissimae sunt, flores masculi singuli abortantes, aspectu vestigiorum otrorum remanentes.

Flores masculi cremei, angulosi, oblongi, alabastris ad 5 mm. longis, 3 mm. latis. Sepala 3, ut videtur libera, disjuncta, minuta, triangularia, ad 0.5 mm. alta. Petala 3, libera, tenuiter coriacea, oblonga, plana aut cucullata, si cucullata tum leviter acuta, forma variantes, impressione staminum intra notata. Stamina 6; filamenta ad 1 mm. longa; antherae medifixae, ad 2.5 mm. longae, 0.5 mm. latae, dehiscentia latrorsa; vestigium ovarii non videtur. Grana pollinis lutea, sphaerica, uniporata. Sub anthesin



3. *Nenga gajah* by a small stream at 850 m. altitude.



4. *Nenga gajah*. Inflorescence with female flowers at anthesis; note the bare axes which once bore the protandrous male flowers.

flores masculi inter alabastros propinquos exserti dein cito caduci, rachillis nudis relictis; evolutio florum masculorum acropeta.

Flores feminei violacei, singuli cum 2 floribus masculis lateralibus aggregati, greges florum in 5–8 seriebus verticalibus dispositi, aut series verticales propter distortionem non prominentes. Quisque grex florum bractea membranosa minuta subtentus; flos unusquisque bracteolo subtentus. Flores feminei rotundati ca. 7 mm. longi sub anthesin. Sepala 3 libera, valvata, leviter cucullata, ad 7 mm. longa, basi 6 mm. lata, coriacea, persistentia, amplitudine post anthesin crescentia. Petala 3, libera, valvata, coriacea, longe persistentia, ad 6 mm. longa, post anthesin ad 1 cm. crescentia. Staminodia 6, triangularia, minuta, ad 0.5 mm. alta.

Ovarium rotundatum, ad 4 mm. diametro, stigmatate rostrato, conico, apice obscure trilobato. Loculo 1, ovulo 1, laterifixo, micropyle ad receptaculum spectante.

Infructescentia capitulum pendulum claviforme fructum fusiformium. Fructus ad 8 cm. longus, 2.5 cm. latus, fusiformis vestigio stigmatatis terminatus; epicarpium laeve, glabrum, atroviolaceo-brunneum; mesocarpium ad 4 mm. latum, fibris verticalibus perductum; endocarpium laeve, intra nitidum. Semen fusiforme, 4.5 cm. longum, 1.8 cm. latum, secus longitudinem ad endocarpium raphe basi 4 mm., apice 1 mm. lata affixum. Testa ca. 0.2 mm. crassa. Endospermium valde ruminatum, ruminationibus ad ca. 5 mm. penetrantibus,



5. *Nenga gajah*. Pendulous infructescence with almost ripe fruit. The stocky stem with a few stilt roots and the untidy crown can also be seen.



6. *Nenga gajah* Kepahiang, August, 1973.

parte centrali endospermii non ruminata. Embryo conicus, basalis, 4 mm. longus, 3 mm. latus. Folium plantulae binatum.

Habitat in clivis et secus fluvios, 800 m., Hill Dipterocarp Forest, Kepahiang, Bengkulu, Sumatra.

Holotypus: *Dransfield 1234*, 12.2.71. BO (Isotypi BH, K, L).

Diagnosis. Differing from all other species of *Nenga* in the interfoliar inflorescence bearing one persistent coriaceous spathe, pairs of male flowers in 5–7 rows, and in the head of fruit.

Description. Solitary, squat, unarmed, monoecious, undergrowth, forest palm. Stem stout, stilt-rooted, to 2 m. high and 15 cm. in diameter below the leaves, grey-

brown and marked with close horizontal leaf scars. Leaf scars more or less 1 cm. distant, to 4 mm. broad, with persistent leaf sheath fibres. Internodes with vertical wrinkles, bark somewhat corky. Stilt roots to 1.5 cm. in diameter, dark brown with rows of paler, conical, spongy, short, lateral, pneumatophore roots to 1 mm. long. Leaves 8–10 in crown, spreading, to 3 m. long including sheath; leaf sheath to 50 cm., long pale yellowish-green, not cleanly dehiscent from the stem, but rotting to form a fibrous vestige of the leaf sheath base; sheaths covered in sparse dark brown indumentum when young. Petiole to 75 cm. long by 2.5 cm. in diameter, circular in cross-section, with sparse dark brown indumentum. Rhachis about halfway along



7. *Nenga gajah* Kepahiang, August, 1973.
Note stilt roots.

lamina about 8 mm. in diameter, triangular in cross-section, dwindling to 3 mm. near apex, with sparse brown scales. Leaflets regular, 8–10 pairs, the lower 1 or 2 pairs uncostate, the upper 3–5-cos-tate, subopposite, held horizontally, separated by 3–6 cm.; leaflets slightly sigmoid, to 60 cm. long, to 8 cm. broad in the middle part of the leaf, long-acuminate, slightly paler beneath than above, with scattered pale brown hairs and scales along the main ribs beneath, glabrous above; terminal leaflets diverging from each other at an angle of 70° , acuminate, or bifid, or slightly dentate.

Inflorescence interfoliar, erect, 30–40 cm. long. Spathe single, dark brown or purplish, hard, coriaceous or almost woody, to 25 cm. long by 4 cm. wide at the widest point, 2.5 cm. wide at the

narrowest point, 10 cm. from the base, covered in scurfy brown indumentum, especially at the margins. Spathe splitting down one lateral edge for $\frac{3}{4}$ – $\frac{1}{3}$ of its length, and the inflorescence emerging laterally through the split, spathe long-persisting through anthesis and then rotting to leave fibrous vestiges at fruiting. Inflorescence with 3–5 branches all of the first order. Peduncle to 25 cm., elliptic in cross-section, 20×8 mm. when fresh, dark purplish-brown, covered in sporadic, brown, branched hairs. Rachillae each subtended by a short, thick, stiff, triangular bract to 5 mm. long and 5 mm. broad at the base.

The lower 2–4 rachillae male, 10–12 cm. long by 5 mm. in diameter without the flowers, the terminal rachilla to 10 cm. long by 8 mm. in diameter at the base, male and female, or rarely male only, and then the entire inflorescence male; lower 1–3 rachillae ca. 1–3 cm. distant, the penultimate and terminal rachillae close; male rachillae bare of flowers in the lowermost 1–2 cm., the apical rachilla with male and female in the lower 3–4 cm., and above this with male flowers only. Inflorescence dimensions increasing markedly with age. Male flowers reaching anthesis before the females, grouped in pairs, each pair being subtended by a minute bract on the rachilla, and each flower with a minute subtending bracteole; male flower groups in 5–7 vertical rows, or tight spirals, if the latter, close-packing so tight as to give the impression of vertical rows; number of vertical rows decreasing above; where close-packing with neighbouring rachillae tight, single male flowers from pairs aborting and remaining as blackened vestiges.

Male flowers cream, angular, oblong, to 5 mm. long by 3 mm. wide in bud. Sepals 3, apparently free, separated, minute, triangular, to 0.5 mm. high. Petals

3, free, thinly coriaceous, oblong, plane or cucullate, if cucullate, then slightly acute, petals variable in shape, marked with impression of the stamens within. Stamens 6, filaments to 1 mm. long, anthers medifixed, to 2.5 mm. long by 0.5 mm. wide, dehiscence latrorse, ovary vestige absent. Pollen grains yellow, sphaerical, uniporate. At anthesis, male flowers opening, pushing out between neighbouring buds, and then quickly falling, leaving the bare rachillae, male flower development being apparently acropetal.

Female flowers purplish, in triads, two lateral male flowers accompanying a central female, triads in 5–8 vertical rows or vertical rows not prominent owing to distortion. Flower groups subtended by minute membranous bracts, each flower subtended by a bracteole. Female flowers rounded, ca. 7 mm. long at anthesis. Sepals 3, free, valvate, somewhat cucullate, to 7 mm. long by 6 mm. wide at the base, coriaceous, persistent, increasing in size after anthesis. Petals 3, free, valvate, coriaceous, long-persisting, to 6 mm. long, increasing to 1 cm. long after anthesis. Staminodes 6, minute, triangular, to 0.5 mm. high. Ovary sphaerical, to 4 mm. in diameter, with a beaklike, conical stigma, obscurely 3-lobed at the apex; locule 1, ovule laterally fixed, micropyle facing the receptacle.

Infructescence a clublike, pendulous head of fruit. Fruit to 8 cm. long by 2.5 cm. wide, fusiform, tipped with remains of the stigmas; epicarp smooth, glabrous, dark purplish-brown; mesocarp to 4 mm. thick, traversed by longitudinal fibres; endocarp smooth, shiny within. Seed fusiform 4.5 cm. long by 1.8 cm. wide, attached along its length to the endocarp by a raphe 4 mm. wide at the base and 1 mm. wide at the apex; testa ca. 0.2 mm. thick; endosperm strongly ruminant, ruminations penetrating ca. 5

mm. inwards leaving a central column of more or less nonruminant endosperm; embryo conical, basal, to 4 mm. long by 3 mm. wide. Seedling leaf bifid.

Habitat: hillslopes and streamsides in Hill Dipterocarp Forest at 800 m. altitude, Kepahiang, Bengkulu, Sumatra.

Holotype: *Dransfield 1234*, 12.2.71. BO. (Isotypes in BH, K, L).

Other specimens examined: *Bünne-meijer 295, 296, 417, 1013^a*, April–June 1971, N.E. slopes of G. Talakmau, Bukittinggi, West Sumatra (BO). *Dransfield 3625*, 27.8.73., from the type locality (BH, BO, K, L, SING).

Seedlings from *Dransfield 1234*, and *Dransfield 3267* cultivated in Hortus Botanicus Bogoriensis.

The two most aberrant features of this palm are the interfoliar inflorescence and the structure of the male flowers. Interfoliar inflorescences are unknown elsewhere in the small genus *Nenga*. In previous accounts of genera of the Arecoideae (cf. Scheffer (1873), Wendland and Drude (1875), Beccari and Pichi-Sermolli (1955) *inter allis*), this character has been given considerable prominence in the separation of genera; for example, *Gigliolia* is separated from *Areca* by a few characters, one of which is the position of the inflorescence. However, interfoliar and infrafoliar inflorescences are sometimes found within the same genus, as in *Pinanga* (most species with infrafoliar inflorescences, a few acaulescent species such as *P. latisecta* Blume with interfoliar inflorescences) and interfoliar inflorescences are usually associated with tardily dehiscent or non-dehiscent leaf sheaths (and hence with no well-defined crownshaft) and/or the acaulescent habit. Furthermore, a *Gigliolia* species from Bako National Park, Sarawak, reported by Moore (1965), has infrafoliar inflorescences, otherwise being very similar to *G. insignis* with the

interfoliar inflorescences more usual in the genus, and an as yet undescribed *Areca* from Sumatra shows tendencies to the interfoliar state. In this last species, collected by me in North Sumatra in 1973 and by W. Meijer (*Meijer 6888*) in West Sumatra, the leaves are tardily dehiscent and tend to mummify on the plant before dropping off, and the inflorescences burst through the rotting leaf sheaths at anthesis. As yet, material of this species is incomplete so cannot be described.

In *Nenga gajah* leaf sheaths do not dehisce but rot on the stem, and therefore, by necessity, the inflorescences are interfoliar and erect at anthesis. Associated with the interfoliar state is the anomalous, almost woody spathe which apparently serves as a longer-lasting protection to the inflorescence than do the thin spathes of other *Nenga* species; in such species, up till leaf abscission, the inflorescence is protected by the leaf sheath, which, when it falls, releases the inflorescence, the latter normally quickly entering the state of anthesis.

In the male flowers of *Nenga gajah*, the calyx is much shorter than the corolla. In *N. pumila* and its allies (*N. intermedia*, *N. schefferana*) the calyx lobes are long-acuminate and longer than the corolla lobes. In *N. macrocarpa* the sepals are slightly shorter than or equal to the petals and are obtuse and rounded. This series may only represent a grade in calyx lengths despite the apparent anomaly of *N. gajah*.

Why then should the Sumatran palm be included in the genus *Nenga*? The inflorescence with probably spirally arranged flower groups, the proximal portions bearing triads, and the distal portions being entirely male agrees well with *Nenga*; similarly the parietal placentation of the ovule would rule out *Areca* and strongly suggests its being

Nenga. In the ripe fruit of *Nenga pumila* and its allies, the fibres of the endocarp are free at both ends when the mesocarp has eroded away; it is not known whether the fruit of *N. macrocarpa* behaves similarly, but certainly *N. gajah* is dissimilar in this respect. If interfoliar and infrafoliar inflorescences can be found in one closely related genus (*Pinanga*) then it should not theoretically be unacceptable for the same state to occur in *Nenga*.

The aberrant nature of *Nenga gajah* does draw attention to unresolved intergeneric taxonomic problems in the *Areca* alliance of the Arecoideae (Moore 1973). It requires much more research to clarify such problems; I consider it worthwhile to draw attention to these fascinating problems by publishing the description of this species.

Little is known of the natural history of this palm. In the Bengkulu area it is locally abundant above 800 m. altitude on hillslopes and in valley bottoms—I know nothing of the upper altitudinal limit of the palm as the hills near Kepahiang where it grows do not exceed 950 m. It is apparently absent from large areas of the Bukit Barisan where I have hunted palms. The collections from near Bukittinggi suggest it has a very disjunct distribution. Inflorescences at male and female anthesis smell similarly—a penetrating, musty, sickly-sweet smell reminiscent of the smell of the flowers of *Pinanga kuhlii*—and are visited by small nitidulid beetles and trigonid bees. Immature fruit were often found chewed, and fruits in which the mesocarp had been entirely removed, were found scattered on the forest floor at some distance from the mature plants. What animal is responsible for such dispersal is not known, but it is suspected that squirrels or other rodents may be the vectors.

In August, 1973, I had the opportunity to return to the Bengkulu area and was

able to recollect "pinang gajah" and to distribute a limited number of ripe seeds to the Seed Bank of The Palm Society under the collector's number *Dransfield* 3627. It is hoped that this weird, aberrant, but hardly beautiful *Nenga* can be introduced into palm collections.

Acknowledgments

I should like to thank Pak Matsa'a of the Department of Nature Conservation, Kepahiang, Bengkulu for assistance in the field. Sdr. Damhuri, artist of the Herbarium Bogoriense, prepared the analytical drawings.

LITERATURE CITED

- BECCARI, O. AND R. E. G. PICH-SERMOLLI. 1955. Subfamiliae Arecoidearum Palmae Gerontogaeae. *Webbia* 11: 1-187.
- FURTADO, C. X. 1933. The limits of the genus *Areca* L. and its sections. *Repert. Spec. Nov. Regni Veg.* 33: 217-239.
- MOORE, H. E., JR. 1965. Palm hunting around the world, II. Malaya and Sarawak. *Principes* 9: 103-117.
- . 1973. The major groups of palms and their distribution. *Gentes Herb.* 11 (2): 27-140.
- SCHEFFER, R. H. C. C. 1873. Sur quelques palmiers du groupe des Arécinées. *Natuurk. Tijdschr. Ned-Indië* 32: 149-193.
- WENDLAND, H. AND O. DRUDE. 1875. Palmae Australasicae. *Linnaea* 39(5): 155-238.

NEWS OF THE SOCIETY

Back Issues of Principes

The Board of Directors voted at the Biennial Meeting to charge \$1.50 per issue for back numbers of *Principes* still in stock (Vol. 3, No. 3 onward).

The 11 issues of Vol. 1, No. 1 through Vol. 3, No. 2 (Vol. 1 has five issues) are to be reprinted if enough orders are received. Each issue will cost \$2.50 or a total of \$27.50 for all 11 issues, including postage and handling.

Orders for these early issues must be accompanied by full payment. If all 11 issues are ordered by March 31, 1975, a prepublication discount of 10% may be deducted from the order. The discount does not apply on less than the 11 issues, or if the reprints are ordered after the above date.

Chapter Notes

A Special Meeting of the Western Chapter of the Palm Society was held September 21, 1974 at 10:30 a.m. to 3:30 p.m. at the Huntington Botanical Gardens in San Marino, California. It turned out to be a beautiful day and approximately 90 members attended the meeting. Before partaking of a catered

lunch, three tours of the palm gardens were conducted by Myron Kinnach, newly elected Vice-President of the society, Fred Boutin and Bud Hallberg. They showed the many old specimen palms along with some of the new ones planted within the last few years.

After lunch in one of the meeting rooms, Fred Boutin and Myron Kinnach took turns telling about and showing slides of a recent trip they had taken to Mexico to hunt the native braheas and collect seeds. Following this was a plant auction to which the Huntington Garden and some of the members had donated plants. The interest of the members is evinced by the fact that a 2-in. pot of *Wallichia disticha* with two tiny leaves went for \$25 and a purple crown-shafted *Pinanga* in a 3-in. pot sold for \$10. Everyone evidently came with money and was ready to bid, so it turned out to be a very successful money-raising event.

During the business meeting chairman Lee Phelps resigned and Ralph Velez, a schoolteacher from Westminster, was elected new Chairman. He is a long-time member and in his small yard has one of the best collections of palms in California for so small an area. The group is