

A Census of Palms Cultivated in the Indian Botanic Garden, Howrah

S. K. BASU

Indian Botanic Garden, Botanical Survey of India, Howrah-711103, India

The Indian Botanic Garden, Howrah, is situated near sea level (4.5 m alt.) in West Bengal. It comprises an area of 109.29 hectares, the approximate annual rainfall is 1536 mm, and temperatures range from 21° to 31° C. A population of more than 12,000 plants is spread over the landscape. Among others, palms play a dominant part in enhancing the beauty and scientific aspects of the garden.

The main object of bringing out this list of palms cultivated in the Indian Botanic Garden is to give an idea of the palm wealth after nearly two centuries of the garden's existence. References to the palm collection of the garden appear in the works of Griffith (1844-45), Gage (1912), Blatter (1926), Benthall (1946), Sen and Naskar (1965), and Basu (1969). Blatter includes, among others, the history of the introduction of *Lodoicea maldivica*, the giant coco-de-mer palm, into the garden.

Many species recorded earlier have died, many were replaced, and at the same time many have been introduced and established in the garden. With this continuous process, many species are not found in the localities mentioned for them earlier, and in many cases their previous names are no longer in use. An up-to-date census providing recent botanical names and synonyms, country of origin, location in the garden, and habit, was therefore felt necessary. *Nypa fruticans*, mentioned in earlier records, is no longer found in the garden but grows luxuriantly at the Governor's residence garden in Calcutta, only a

few miles from the garden on the other side of the Hooghly River.

The accompanying map of the Indian Botanic Garden (Fig. 1) shows 25 working divisions corresponding to the numbers mentioned with each species as a guide to its location. The abbreviations used herein are as follows: C, clustering; DN, division; F, flowering and fruiting; LPH, Large Palm House; N, Nursery No. 1; NF, not yet flowering; OH, Orchid House; P, pinnate-leaved; PA, palmate-leaved; PT, potted plant; RB, river bank; S, single-stemmed; SPH, Small Palm House. In a few instances—*Daemonorops jenkinsiana*, *Desmoncus horridus*, *Rhopalostylis sapida*, *Salacca edulis*—plants are flowering but have not fruited. Nomenclature largely follows Moore (1963).

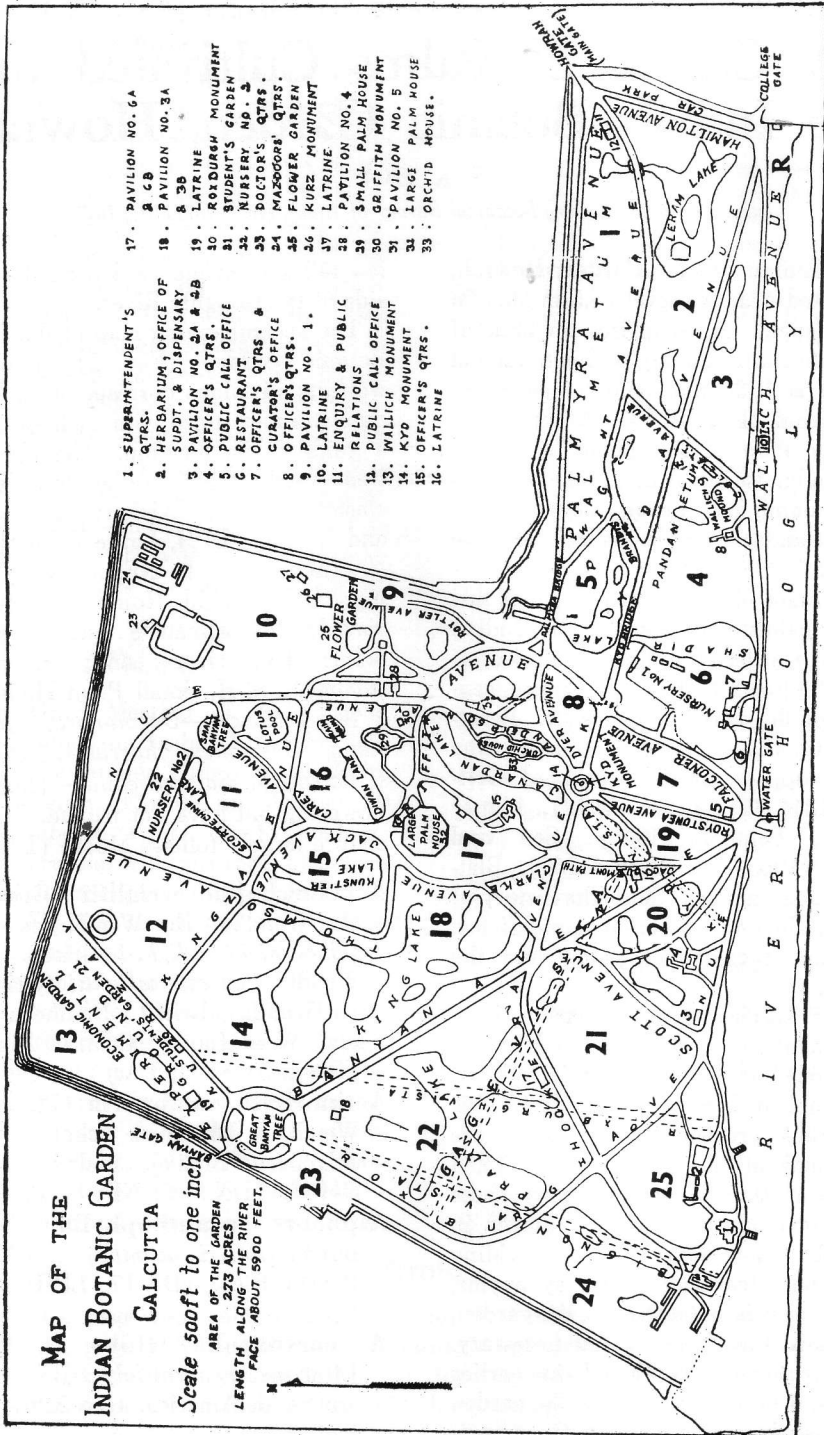
Acoclorrhapha wrightii (Griseb. & H. Wendl.) H. Wendl. ex Becc. [*Copernicia wrightii* Griseb. & H. Wendl., *Paurotis wrightii* (Griseb. & H. Wendl.) Britt.]. Southern Florida, West Indies, Central America. (DN-4, 5; F; C; PA.)

Actinorhysis calapparia (Blume) H. Wendl. & Drude ex Scheff. [*Areca calapparia* Blume]. Malaya to New Guinea. (DN-5, 6; NF; S; P.)

Aiphanes acanthophylla (Mart.) Burret [*Bactris acanthophylla* Mart.]. Puerto Rico. (DN-17, LPH; F; S; P.)

A. caryotifolia (HBK) H. Wendl. [*Martinezia caryotifolia* HBK]. Northern South America. (DN-5, 6; F; S; P.)

Archontophoenix alexandrae (F.



1. A map of the Indian Botanic Garden, Howrah, with divisions numbered.

- Muell.) H. Wendl. & Drude [*Ptychosperma alexandrae* F. Muell.]. Eastern Australia. (DN-5, 17, N; NF; S; P.)
- A. cunninghamiana** (H. Wendl.) H. Wendl. & Drude [*Ptychosperma cunninghamianum* H. Wendl., *Seaforthia elegans* Hook. not R. Br.]. Eastern Australia. (DN-8, N; S; P.)
- Areca catechu** L. Tropical Asia. (DN-1, 4-7, 17, 22, 24, 25; F; S; P.)
- A. macrocalyx** Zipp. ex Blume. New Guinea. (DN-6, N; NF; PT.)
- A. triandra** Roxb. India, Malaya. (DN-2, 4, 5-7, 9, 17, LPH; F; C; P.)
- Arenga engleri** Becc. [*Didymosperma engleri* (Becc.) Warb.]. Formosa, Ryukyu Islands. (DN-6, 22, LPH; F; C; P.)
- A. obtusifolia** Mart. Malaya, Java. (DN-8; F; C; P.)
- A. pinnata** (Wurmb) Merrill [*A. sacharifera* Labill.]. Malaya to Philippine Islands. (DN-1, 2-4, 6-8, 10, 13, 17, LPH, SPH, N, RB; F; S; P.)
- A. undulatifolia** Becc. Borneo, Celebes. (DN-17; F; S; P.)
- A. wightii** Griff. India. (DN-1, 8; F; C; P.)
- Bactris gasipaes** HBK [*Guilielma gasipaes* (HBK) L. H. Bailey]. Central America to Peru. (DN-6, N; NF; S; P.)
- B. major** Jacq. Central America to northern South America. (DN-1, 2, 3, 5, 6, 9, 17, 22; F; C; P.)
- Bentinckia nicobarica** (Kurz) Becc. [*Orania nicobarica* Kurz]. Nicobar Islands. (DN-5, 17; F; S; P.)
- Borassus flabellifer** L. India, Malaya. (DN-1, 2, 3, 7-13, 22, 24; F; S; PA.)
- Calamus arborescens** Griff. Burma. (DN-4, 5, 20; F; C; P.)
- C. ciliaris** Blume. Malaya. (DN-6, PT; NF; C; P.)
- C. erectus** Roxb. [*C. erectus* var. *schizospathus* (Griff.) Becc., *C. schizospathus* Griff.]. India. (DN-1; C; P; NF.)
- C. guruba** Buch.-Ham. ex Mart. Malaya. (DN-1, 2; F; C; P.)
- C. leptospadix** Griff. India, Burma. (DN-1, 2; F; C; P.)
- C. longisetus** Griff. India, Malaya. (DN-5; F; C; P.)
- C. rotang** L. [*C. roxburghii* Griff.]. Sri Lanka. (DN-6; F; C; P.)
- C. viminalis** Willd. Malaya. (DN-1, 2; NF; C; P.)
- Calyptrocalyx spicatus** (Lam.) Blume [*Areca spicata* Lam.]. Amboina. (LPH; F; S; P.)
- Caryota mitis** Lour. [*C. furfuracea* Blume ex Mart., *C. griffithii* Becc., *C. sobolifera* Wallich ex Mart.]. India to Java. (DN-1, 2, 3, 5, 6, 9, 11-13, 15, 17, 18, 22, 23; F; C; P.)
- C. rumphiana** Mart. Australia, New Guinea, Solomon Islands. (DN-1, 17; F; S; P.)
- C. urens** L. India. (DN-1, 2-5, 9-12, 22, 24, 25; F; S; P.)
- Chamaedorea elegans** Mart. [*Colinia elegans* (Mart.) Liebm. ex Oerst.]. Mexico, Guatemala. (N; NF; S; P.)
- Chrysalidocarpus lutescens** H. Wendl. [*Areca madagascariensis* Mart.]. Madagascar. (DN-1, 2, 5-8, LPH, SPH; F; C; P.)
- C. madagascariensis** Becc. [*Areca madagascariensis* Hort. not Mart., *Dypsis madagascariensis* Hort.]. Madagascar. (DN-5, 6, 8, 12, 25; F; C; P.)
- C. madagascariensis** var. **lucubensis** (Becc.) Jumelle. Madagascar. (DN-17; F; S; P.)
- Coccothrinax argentata** (Jacq.) L. H. Bailey. Florida, Bahama Islands. (DN-5; F; S; PA.)
- C. crinita** Becc. Cuba. (DN-23, PT; S; PA. NF.)
- C. dussiana** L. H. Bailey [*Coccothrinax barbadensis* Becc., *Thrinax barbadensis* Lodd. ex Mart.?]. Guadeloupe. (DN-6, N, PT; NF; PA.)

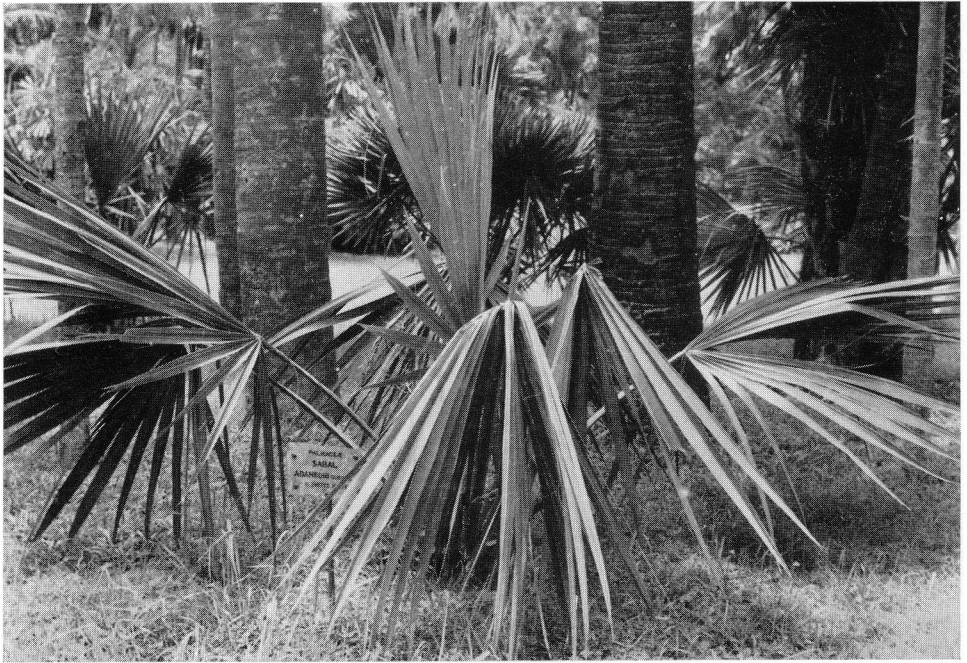


2. *Caryota rumphiana* with two stems.

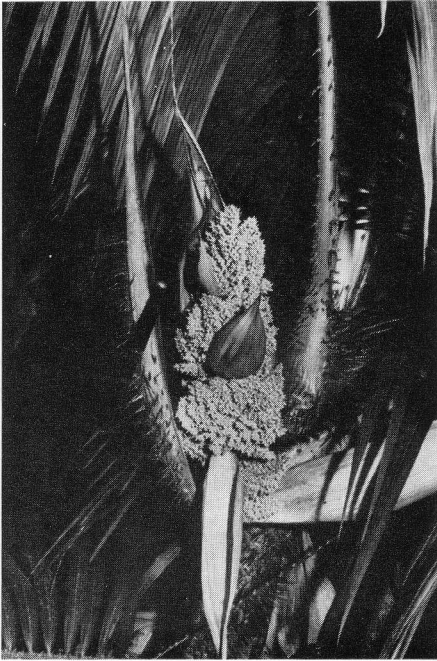
C. inaguensis Read. Bahama Islands.
(DN-6, N, PT; NF; PA.)

Cocos nucifera L. Pantropic. (DN-12,
5, 25; F; S; P.)

Corypha elata Roxb. [*C. gebanga*
(Blume) Blume, *Taliera gebanga*
Blume]. India and Burma. (DN-9,
12, 18, 24, RB; F; S; PA.)

3. *Sabal minor*.

- C. taliera** Roxb. India. (DN-6; F; S; PA.)
- C. umbraculifera** L. Sri Lanka. (DN-6; F; S; PA.)
- Daemonorops didymophylla** Becc. India and Burma. (DN-2; NF; C; P.)
- D. jenkinsiana** (Griff.) Mart. [*Calamus jenkinsianus* Griff.]. Burma, India, Malaya. (DN-8; C; P.)
- Desmoncus horridus** Splitg. ex Mart. Surinam. (DN-5; C; P.)
- Dictyosperma album** (Bory) H. Wendl. & Drude ex Scheff. Mascarene Islands. (DN-2, 5, 8; F; S; P.)
- Elaeis guineensis** Jacq. [*E. melanococca* Gaertn.]. Tropical Africa. (DN-2, 5-9, 11, 22, LPH; F; S; P.)
- Heterospathe elata** Scheff. Amboina. (DN-1, 2, 5, 7, 22; F; S; P.)
- Howea belmoreana** (C. Moore & F. Muell.) Becc. [*Kentia belmoreana* C. Moore & F. Muell.]. Lord Howe Island. (DN-6, N; NF; S; P.)
- Hyophorbe lagenicaulis** (L. H. Bailey) H. E. Moore [*Mascarena lagenicaulis* L. H. Bailey]. Mascarene Islands. (DN-6, N; NF; S; P.)
- H. verschaffeltii** H. Wendl. Mascarene Islands. (DN-6, SPH, N, PT; S; P.)
- Hyphaene bussei** Dammer ex Busse. Kenya. (DN-5; F; S; PA.)
- H. natalensis** Kuntze. East Africa. (DN-5; F; C; PA.)
- H. indica** Becc. India. (DN-5; F; S; PA.)
- H. schatan** Bojer ex Dammer. Madagascar. (DN-5; F; C; PA.)
- H. thebaica** (L.) Mart. North Africa. (DN-5; F; S; PA.)
- Latania loddigesii** Mart. [*L. glaucophylla* Hort.]. Mascarene Islands. (DN-5; F; S; PA.)



4. A staminate plant of *Daemonorops jenkinsiana* in flower.

- L. lontaroides** (Gaertn.) H. E. Moore
[*Cleophora lontaroides* Gaertn., *L. commersonii* J. F. Gmel., *L. rubra* Jacq.]. Mascarene Islands. (DN-8; F; S; PA; staminate.)
- Licuala grandis** H. Wendl. New Hebrides. (DN-6, 17, LPH; F; S; PA.)
- L. peltata** Roxb. ex Buch.-Ham. India. (DN-5, LPH; F; S; PA.)
- L. spinosa** Thunb. [*L. horrida* Blume]. Southeast Asia. (DN-1, 2, 4-9, 14, 15, 17, 18, 22; F; C. PA.)
- Livistona australis** (R. Br.) Mart. [*Corypha australis* R. Br.]. Australia. (DN-1, 2, 5; F; S; PA.)
- L. chinensis** (Jacq.) R. Br. ex Mart. [*Latania chinensis* Jacq., *Livistona oliviformis* (Hassk.) Mart.]. China. (DN-1, 2, 4-7, 9-11, 15, 17, 22; F; S. PA.)
- L. decipiens** Becc. Australia. (DN-5; F; S; PA.)
- L. humilis** R. Br. Australia. (LPH; NF; S; PA.)
- L. jenkinsiana** Griff. India. (DN-5; F; S; PA.)
- L. rotundifolia** (Lam.) Mart. [*Corypha rotundifolia* Lam.]. East Indies. (DN-1, 2, 5, 7, 8, 11, 15-17; F; S; PA.)
- L. saribus** (Lour.) Merrill ex A. Cheval. [*Corypha saribus* Lour., *Livistona cochinchinensis* (Blume) Mart.]. East Indies, Southeast Asia. (DN-16, 18; F; S; PA.)
- Lodoicea maldivica** (J. F. Gmel.) Pers. [*Cocos maldivica* J. F. Gmel., *Borassus sonneratii* Giseke, *L. sechellarum* Labill., *L. callipyge* Comm. ex St.-Hil.]. Seychelles. (LPH; NF; PA.)
- Normanbya normanbyi** (W. Hill) L. H. Bailey [*Cocos normanbyi* W. Hill, *Normanbya muelleri* Becc.]. Australia. (DN-6, 25, N, PT; NF; S; P.)
- Orbignya cohune** (Mart.) Dahlg. ex Standl. [*Attalea cohune* Mart.]. Belize to Honduras. (DN-1, 6, 8, 17, LPH; F; S; P.)
- Phoenicophorium borsigianum** (C. Koch) Stuntz [*Astrocaryum borsigianum* C. Koch, *Stevensonia borsigiana* (C. Koch) L. H. Bailey]. Seychelles. (N, PT; NF; S; P.)
- Phoenix acaulis** Buch.-Ham. ex Roxb. India and Burma. (DN-5; F; P; C.)
- P. loureirii** Kunth [*P. hanceana* Naud., *P. humilis* var. *hanceana* (Naud.) Becc., *P. ousleyana* Griff.]. India to Hong Kong. (DN-1, 15, 22; F; S; P.)
- P. paludosa** Roxb. India. (DN-2, 4; F; C; P.)
- P. reclinata** Jacq. Tropical Africa. (DN-4, 9; F; C; P.)
- P. roebelenii** O'Brien. Laos. (DN-5, staminate; NF; S; P.)
- P. rupicola** T. Anderson. India. (DN-1, 2, 5-8, 11, 17, 18, 20; F; S; P.)
- P. sylvestris** (L.) Roxb. [*Elate syl-*

5. A clump of *Arenga wightii*

- vestris* L.]. India. (DN-1, 2-4, 7, 9-12, 17, 18, 20, 23-25; F; S; P.)
- P. zeylanica** Trimen. Sri Lanka. (DN-5; F; S; P.)
- Plectocomia assamica** Griff. Assam. (DN-4, LPH; NF; C; P.)
- Pritchardia pacifica** Seem. & H. Wendl. Fiji Islands. (DN-5, N, LPH, SPH; NF; PA.)
- Ptychosperma elegans** (R. Br.) Blume. Australia. (DN-1, 2-5, 9-14, 17, 18, 20, 21, 25; F; S; P.)
- P. macarthurii** (H. Wendl.) Nichols. [*Actinophloeus macarthurii* (H. Wendl.) Becc., *Kentia macarthurii* H. Wendl.]. Australia, New Guinea. (DN-1, 2-5, 9-15, 17, 18, 20, 21, 25; F; C; P.)
- Rhapis excelsa** (Thunb.) Henry ex Rehd. [*Chamaerops excelsa* Thunb., *R. flabelliformis* L'Hér. ex Ait.]. China? (DN-2, 5, 7, 9, 17, 20, 23, 25; NF; C; PA.)
- R. humilis** Blume. China? (DN-9, 17; NF; C; PA.)
- Rhopaloblaste augusta** (Kurz) H. E. Moore [*Areca augusta* Kurz, *Ptychoraphis augusta* (Kurz) Becc.]. Nicobar Islands. (DN-5, 12, LPH; F; S; P.)
- R. singaporensis** (Becc.) Hook. f. [*Ptychosperma singaporensis* Becc., *Ptychoraphis singaporensis* (Becc.) Becc.]. Malaya. (DN-5, LPH; F; C; P.)
- Rhopalostylis sapida** H. Wendl. & Drude [*Areca sapida* Soland. ex Hook. f.]. New Zealand. (SPH; S; P.)
- Roystonea borinquena** O. F. Cook. Puerto Rico. (DN-5, N; NF; S; P.)
- R. oleracea** (Jacq.) O. F. Cook [*Areca oleracea* Jacq., *Oreodoxa oleracea* (Jacq.) Mart.]. West Indies. (DN-4, 5, SPH; F; S; P.)
- R. regia** (HBK) O. F. Cook [*Oreodoxa regia* HBK]. Cuba. (DN-1, 5, 11, 13, 15-17, 19; F; S; P.)
- Sabal domingensis** Becc. [*S. um-*



6 Emergence of the terminal inflorescence in *Arenga undulatifolia*.

braculifera Hort. not Mart.]. Dominican Republic. (DN-5; F; S; PA.)

S. mauritiiformis (Karst.) Griseb. & H. Wendl. [*S. glaucescens* Lodd. ex H. E. Moore, *S. nematoclada* Burret]. Belize to northern South America. (DN-4, 5; F; S; PA.)

S. mexicana Mart. [*S. guatemalensis* Becc., *S. texana* (O. F. Cook) Becc.]. Texas to Guatemala. (DN-4, 5, 6; F; S; PA.)

S. minor (Jacq.) Pers. [*S. adansonii* Guersent]. Southeastern United States. (DN-4, 5, 6; F; S; PA.)

S. palmetto (Walt.) Lodd. ex Schult. & Schult. f. [*S. viatoris* L. H. Bailey]. Southeastern United States. (DN-5; F; S; PA.)

Salacca edulis Reinw. [*Calamus zalac-*

ca Gaertn., *S. blumeana* Mart.]. Java. (DN-1, 8; F; C; P.)

Scheelea insignis (Mart.) Karst. [*Maximiliana insignis* Mart.]. Northern South America. (DN-20; F; S; P.)

Serenoa repens (Bartr.) Small [*Corypha repens* Bartr.]. Southeastern United States. (N, PT; NF; PA.)

Syagrus romanzoffiana (Cham.) Glassman [*Cocos romanzoffiana* Cham., *Arecastrum romanzoffianum* (Cham.) Becc.]. Brazil. (DN-4, 5, N, LPH; F; S; P.)

S. schizophylla (Mart.) Glassman [*Cocos schizophylla* Mart., *Arikuryroba schizophylla* (Mart.) L. H. Bailey]. Brazil. (DN-4, 5, LPH; F; S; P.)

- Thrinax parviflora** Swartz. Jamaica. (DN-2, 4-6, 17, 22; F; S; P.)
- Trachycarpus fortunei** (Hook.) H. Wendl. [*Chamaerops fortunei* Hook., *T. excelsa* Hort.]. China. (DN-6, PT; NF; S; PA.)
- T. martianus** (Wallich) H. Wendl. [*Chamaerops martiana* Wallich]. India. (N, PT; S; PA.)
- Veitchia merrillii** (Becc.) H. E. Moore [*Normanbya merrillii* Becc., *Adonidia merrillii* (Becc.) Becc.]. Philippine Islands. (N; NF; S; P.)
- Wallichia densiflora** (Mart.) Mart. [*Harina densiflora* Mart., *Wallichia oblongifolia* Griff.]. India. (DN-5; F; S; P.)
- Washingtonia filifera** (L. Linden) H. Wendl. [*Pritchardia filifera* L. Linden]. Southwestern United States, northern Baja California, Mexico. (DN-6; NF; S; PA.)

- W. robusta** H. Wendl. Baja California, Mexico. (DN-4; NF; S; PA.)

LITERATURE CITED

- BASU, S. K. 1969. The Indian Botanic Garden, Calcutta. *Principes* 13: 115-119.
- BENTHAL, A. P. 1946. The trees of Calcutta and its Neighborhood. Thaker Spink, Calcutta.
- BLATTER, E. J. 1926. Palms of British India and Ceylon. Oxford University Press, Bombay.
- GAGE, A. T. 1912. Catalogue of Non-herbaceous Phanerogams Cultivated in the Royal Botanic Garden, Calcutta. *Rec. Bot. Surv. India* 5: 1-367.
- GRIFFITH, W. 1844-45. Palms of British East India. *Calcutta J. Nat. Hist.* 5: 1-103, 311-355, 445-491.
- MOORE, H. E., JR. 1963. An annotated checklist of cultivated palms. *Principes* 7: 118-184.
- SEN, J. AND J. N. NASKAR. 1965. Non-herbaceous Phanerogams of Indian Botanic Garden, Calcutta. *Bull. Bot. Surv. India* 7(1-7): 31-61.

PALM LITERATURE

FAMILTON, A. K., A. J. McQUIRE, J. A. KININMONT, AND A. M. L. BOWLES (eds.). 1977. Coconut stem utilisation seminar: held at Nuku'alofa, Kingdom of Tonga, 25-29 October 1976 under the New Zealand aid programme for the South Pacific region. Ministry of Foreign Affairs, Wellington, New Zealand. 521 pp.

About 400,000 people (about 10%) of the population of the scattered South Pacific nations are more or less completely dependent on the coconut for their livelihood. The economy of these islands is often linked closely to this palm—Copra provides from up to 80% of export income in Tonga and Tuvalu, to as little as 10% in Fiji. In the nearby Philippines 25% of all export earnings comes from coconuts, an obvious major industry to a nation of 44 million people.

Thirteen million people are said to be directly involved in the coconut industry.

And yet, only a small proportion of the total biomass produced by a coconut palm enters into commerce—its fruit, via copra, supplies edible oil, and to some extent the husk and endocarp may be used. At the end of the productive life of a coconut the trunk remains, normally to be left to rot (where, unfortunately, it may serve as a breeding ground for rhinoceros beetle).

The question was asked recently—"What is the potential value of the stem of overmature, i.e., unproductive coconut palms?" This is an appropriate question to ask in the South Pacific where natural resources are limited and where it is estimated that out of almost half a million hectares of coconuts, nearly one-third may be considered overmature and require a vigorous replacement program.

(Continued on page 148)