

Palum
Nelumbo nucifera, Gaertn.

ON THE NYMPHAEACEAE OF THAILAND

By

*Kasin Suvatabandhu*¹

Nymphaeaceae is a group or, according to botanists, a family of plants which are commonly known as water lily and lotus. Both the water lily and lotus have been familiar to the people of the Orient from time immemorial. They are aquatic plants with bright beautiful well-formed flowers—virgin flowers that rise up from the depths of muddy sediment and bloom above the surface of the water in ponds, ditches and lakes.

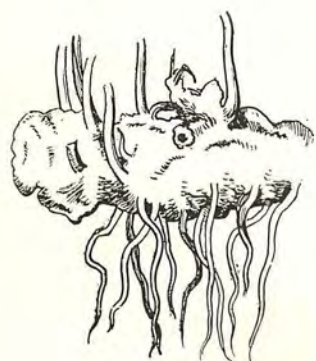
In Thailand the people call the plants “Bua”. The word “Bua” in fact has a wide range of usage. It may refer to other plants having parts similar to those of the water lily or lotus, to things having the shape, form or parts similar to those of the water lily or lotus, or sometimes to some confections which are molded into shapes resembling parts of the water lily or lotus. The word is also used poetically to refer sentimentally to the fine shapely breast of a lovely maiden. Besides the word “Bua” which refers to the water lily or lotus, there are also many other words derived from Sanskrit and Bali, which refer to various kinds of water lily and lotus that people differentiated in the olden days. This is because most of the knowledge including the knowledge of classification particularly of water lily and lotus ever known in the Thai kingdom originate historically from Sanskrit and Bali. In former days the water lily and lotus were classified into two groups: Pathum-Charth that conforms to lotus and Ubol-Charth to water lily; various kinds of water lily and lotus were differentiated and named according to colour, shape or form, size of the plants, etc. Such names can be seen in Thai literature both in prose and poetry, and in the ancient pharmacopoeia.

1. Dept. of Agriculture, Thailand. 1956.

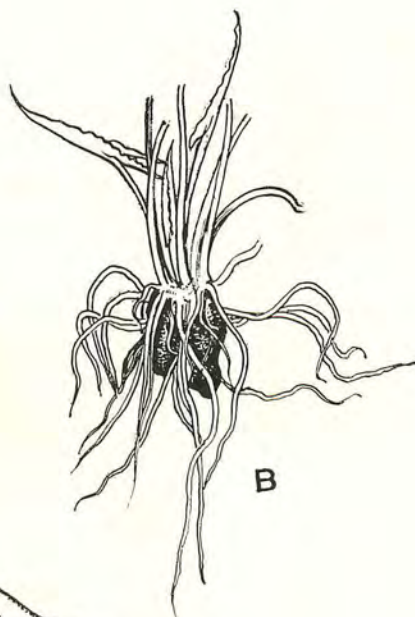
Nowadays more investigations have been made. New plants related to the water lily and lotus have already been found, and a new system of classification has been adopted; therefore the old classification is left only as a historical remnant. Because of its loveliness and its special characteristics, the Thai people consider the lotus flower as sacred, and they accord recognition to the flower as an appropriate offering in Buddhist religious rituals. They also know how to make use of these well-known plants in various ways. They use the leaves for wrapping instead of wrapping-paper and bags; the tubers or rootstocks, flower stalks, young leaves and seeds, for eating; tuber or rootstock, part of flower as well as the young embryo, for medicine; petals for cigar wrappers; husks of the seeds for mushroom media and flowers for decorative purposes.

Various kinds of water lilies and lotus either natural species or man-made hybrids are attracting much interest and are cultivated for their lovely flowers.

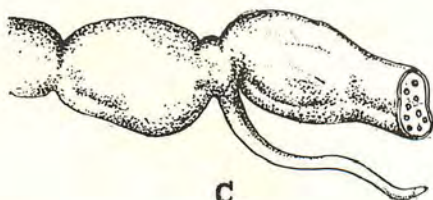
This article is to draw the attention of those interested in nature to all the plants belonging to the group of water lilies or lotus that have ever appeared in the kingdom of Thailand through botanical channels.



A



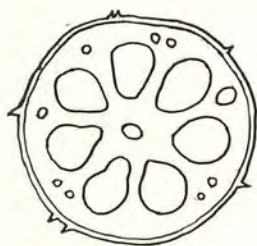
B



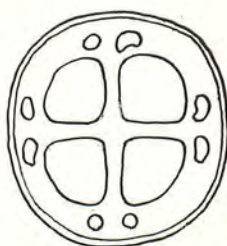
C

TUBERS

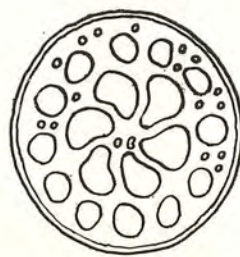
B. *Nymphaea* spp. (Lotus groups) A. *Nymphaea* spp.
(Castalia group) C. Rootstock of *Nelumbo nucifera*.



A



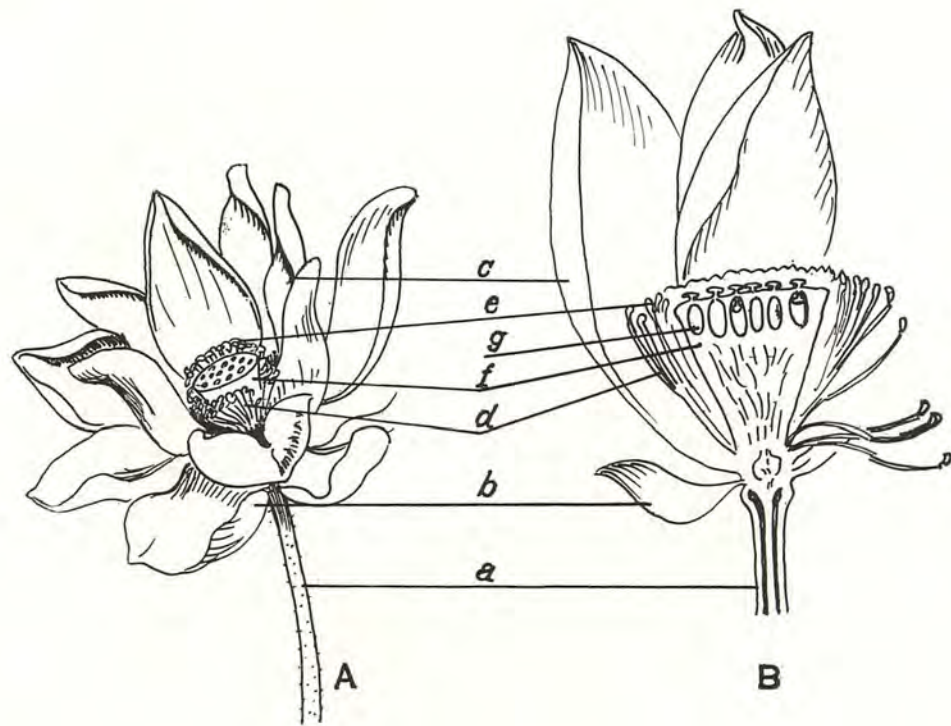
B



C

X-SECTIONS OF SCAPE

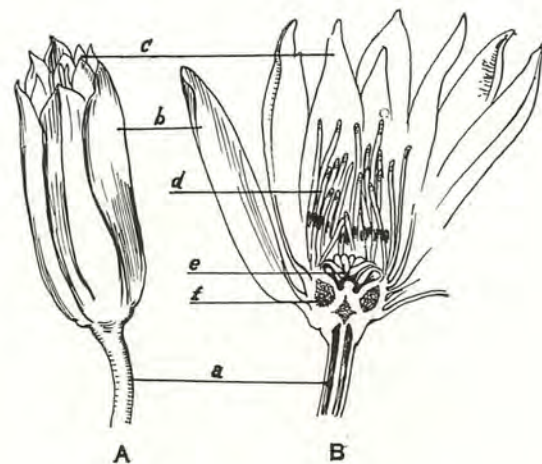
A. *Nelumbo nucifera* B. *Nymphaea* spp. (Castalia group)
C. *Nymphaea* spp. (Lotus group)



THE LOTUS

A. The flower

B. Vertical section of flower: a. scape, b. sepal, c. petal,
d. stamen, e. apical appendage, f. torus, g. ovary.



THE WATER LILY

A. The flower. B. Vertical section of

flower: a. scape, b. sepal, c. petal,
d. stamen, e. carpellary style, f. ovary.

NYMPHAEACEAE

Aquatic herb with large horizontal rootstock producing stolon, or round elongated tuber, sometimes short and globular; milky juice or watery juice present, turning dark when exposed; the particles become sticky and coherent forming a fine staple called in Siamese or Thai "Yai Bua". Leaves peltate orbicular, cordate or lanceolate often floating, petiole long rising from the rootstock or tuber, erect or partly bending. Flowers solitary perfect, blooming above the surface of water, sometimes floating, often sweet-scented. Scape or flower stalk similar to the petiole and as long as the petiole; sepals 4-6 petaloid; petals indefinite numerous hypogynous or perigynous, imbricate in buds, many coloured; stamens indefinite numerous with or without apical appendage, sometimes petaloid or with coloured filaments and appendage; anther adnate to the filament, intorsed split lengthwise; ovary superior or partly inferior, many carpels, free or united, the free one sunk in the enlarged torus, ovule 1 to many. Fruit a nut or berry, dehiscent or indehiscent; seed large or small, with aril.

Key to genera

- A Carpels free and sunk in the enlarged torus Nelumbo
- AA Carpels many united
 - B Carpels 20-30
 - C Scape, torus and sepals glabrous or slightly pubescent whole leaves floating flat, ovary half superior Nymphaea
 - CC Upper part of scape torus and sepals thorny leaves large floating flat with margin erect and vertically upward ovary inferior Victoria
- BB Carpels 8-10 Barclaya

Nelumbo

Herb with horizontal rootstock producing stolon in mud under water, having many air canals, milky juice present. Leaves large obicular, peltate long stout erect and prickled. Flowers large on long prickled scape, rising over surface of water; day blooming sweet-scented, white, rosy pink, and yellow. sepals 4-6 often petaloid; petals indefinite: stamens indefinite numerous yellow with white appendage, sometimes petaloid; carpels free sunk in the enlarge torus; stigma yellow waxy. Nut hard shell, endosperm starchy, embryo bitter.

Species 2; both present in Thailand, one indigenous and distributed all over the country, the other introduced. This is equivalent to Pathum-Charth in Thai.

Key to species

- | | |
|------------------------------------|-------------|
| A Flowers rosy pink or white | N. nucifera |
| AA Flowers yellow | N. lutea |

N. nucifera, Gaertn. (*Nelumbium speciosum* Willd.).
 Lotus, Sacred lotus; large perennial water plant with horizontal rhizome. Leaves peltate orbicular 1-3 ft. in diameter, upper surface glaucous petiole and flower stalk long erect and prickled. Flowers large solitary, rosy pink or white, slightly scented; sepals 4-5 petaloid; petals large ovate or lanceolate ovate or elliptic ovate 10-18; Stamens petaloid in double form variety.

In Thailand, many varieties bearing different names are classified according to their shapes, form, and colour of the flowers i.e.

- var. 1 Flowers large lanceolate ovate, rosy pink: Pathum,
Kokranotha, Patma.
- var. 2 Flowers small lanceolate ovate, rosy pink, dwarf variety
 and introduced found only in cultivation, introduced
 probably from China. Bua Pekin or Bua Luang Cheen,
 this may be var. *pekinensis*,



Buntharik
Nelumbo nucifera, Gaertn.



Satabankacha
Nelumbo nucifera, Gaertn.

var. 3 Flowers large, lanceolate ovate, white: Buntharik.

var. 4 Flowers large, ovate, double form, rosy pink: Satabankacha.

This variety is the sterile form of *N. nucifera*, to which the most of the stamen becoming sterile and petaloid, making the real petal more concave, and broader than larger, and the flower more or less densely compact.

Habitat: Every where in pools, ponds and lakes all over the Thai kingdom for var. 2 and 4 usually found in cultivated.

N. nucifera is well known for its most beautiful flowers used as offerings in Buddhist religious ritual, and for decorative purposes. The plant is also of economic value. Tubers are edible and used as food stuff. Leaves for wrapping, young leaves as edible green or salad or are grilled and used to make a kind of infusion to drink. Petals as cigar wrappers. Stamens and embryo are medicinally used. Nut edible, nut shell used as medium for mushroom growing.

N. lutea, Pers. (*Nelumbium luteum*, Willd.). American lotus, water chinkapine, the plant is similar to *N. nucifera* but leaves smaller, and flowers yellow. It is native to North America; introduced into Thailand many years ago but there is no record of flowering in Thailand.

Nymphaea

Large gregarious aquatic herb with globular or elongated tuber without stolon, more or less solid, water juice present. Leaves large or medium, deeply cordate, entire or undulate, or sharply toothed margin, upper surface shiny, green or glabrous dull purple or with purple motlings, lower surface, dull or pubescens, petiole long slender or stout glabrous. Flowers on the long scape which is usually pubescens when young, floating or rising above surface of water; day or night blooming, often sweet-scented, many coloured: sepals more or less green outside, coloured inside; petals many indefinite; stamens many, filament

flat or slightly thread-like, with or without appendage, sometimes coloured; ovary half superior, carpels many united with carpellery style; stigma rayed; ovule numerous. Fruit berry, matured under water; seed arillate. This is equivalent to Ubol-Charth of Thai and Komudhini or Chandravikasi of Indian. In Thailand species 4 and many introduced hybrids.

The genus *Nymphaea* divided into 2 groups namely :

1. Lotus group; comprising of the species having deeply cordate, leaves with undulate or sharply toothed margin. Air canals inside the flower scape usually 6; most of them are tropical.

2. Castalia; comprising of the species having cordate or round leaves with entire margin. Air canals in the scape usually 4 and most of them are temperate or subtropical.

Key to species of *Nymphaea*

1. Lotus group:

A Margin of leaves sharply toothed

B Stamens without appendage filament flat,
night blooming

C Leaves glabrous underneath..... *N. lotus*

CC Leaves pubescens underneath..... *N. lotus* var.
pubescens

BB Stamens with appendage, filament flat

at base or not. day blooming..... *N. capensis* var.
zanzibariensis

AA Margin of leaves undulate

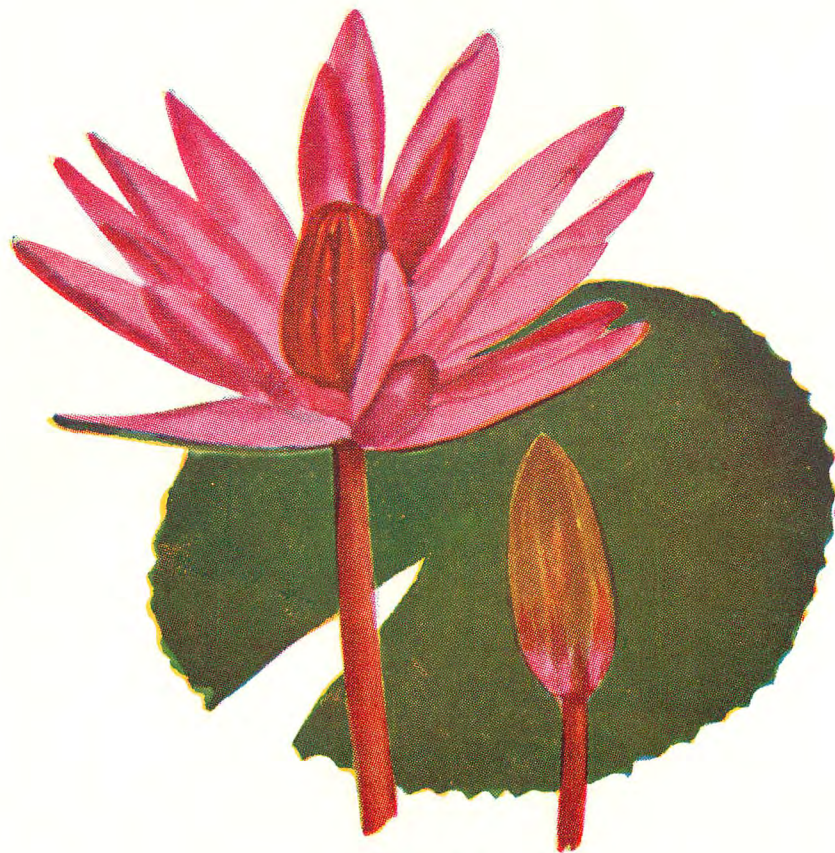
B Flowers white or pale mauve..... *N. stellata*

BB Flowers blue or purplish blue..... *N. cyanea*

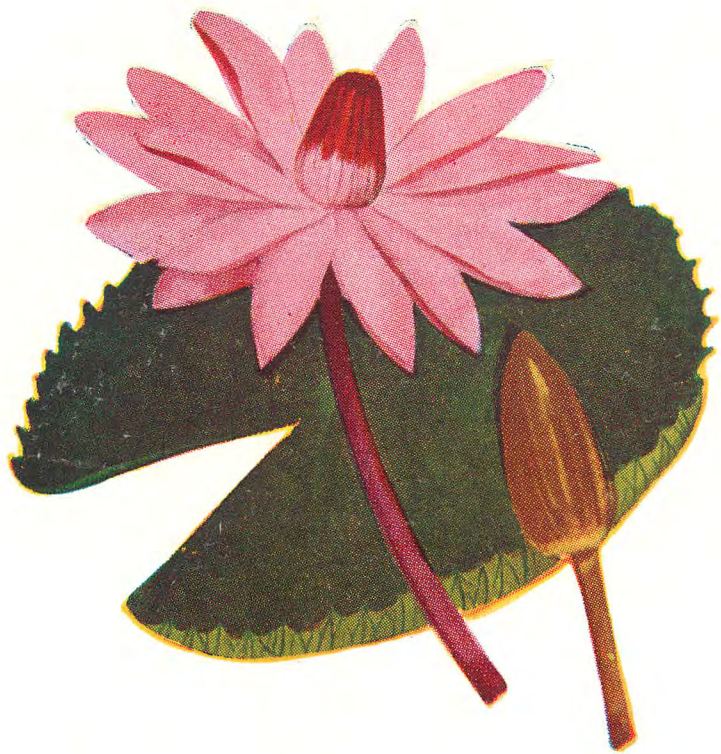
***N. lotus*, Linn.** Aquatic herb with large solid tuber, leaves large deeply cordated and deeply sinuate or toothed margin, floating, petiole very long. Flowers on long scape,



Komudh
Nymphaea lotus, Linn.



Sattabandhna
Nymphaea lotus, Linn.



Nymphaea lotus, Linn.



Bua Phuan
Nymphaea stellata, Roxb.



floating, night blooming, white, pink or dark vivid crimson red; stamens numerous filament flat and tapering towards the apex yellow pink or dark red, without appendage; pollen powdery white.

N. lotus is not of Thai origin, but introduced, and nationalized; now spread all over the country.

According to shape, form and colour various names are applied in many literal scripts, poetry, and Thai pharmacopoeia. A few could be mentioned as follows:

Komudh or Savaetra-Ubol or Bua Kao for the white.

Ratta-Ubol or Sattabandhna or Bua Daeng for the red.

Jongkolnee for the pink. (As for this form, Phya Winich Vanandorn says in his book "Ornamental Plants of Thailand" it is a very rare hybrid plant having double flowers, and petals are much wrinkled). But the author has never seen this variety and inclined to believe that it is the creation of poets' imagination.

N. lotus Linn. var. *pubescens*. This variety is similar to N. lotus but leaves pubescens underneath; scape more or less slender; sepals green with clear long white bands; petals white or pink.

The plant is widely distributed, locally known as Bua Kin Sai, Bua Khom and Palik in Khmer.

Flower stalk is edible as a raw or cooked vegetable.

N. stellata, Roxb. Annual aquatic herb, sometimes perennial, tuber small. Leaves smaller than that of N. lotus, 5-8 in. diameter, margin entire or undulated, floating. Flowers small on scape a little longer than the depth of water, white or pale mauve, day blooming, mildly odorous; sepals 4 pale green outside and white or pale mauve inside; petals lanceolate 10-20; stamens yellow with white or pale mauve appendage; Stigma rays stellate.

This water lily is indigenous and commonly found in flooded paddy fields, pools or ditches. It is generally called Bua Phuan.

N. cyanea, Roxb. The species is closely similar and related to *N. stellata*, but flower larger, colour blue or purplish blue, strong fragrance, and colour fades after blooming for 2 to 3 days.

The plant is native to this country occasionally found in stagnant pools and ditches of certain localities.

Many names are applied to this water lily i.e. Bua Phan, Bua Kharb, Nilubol, Nilobol, Nilotabol and Nil-Ubol.

N. capensis, Thunb. var. zanzibariensis. Aquatic herb with large tuber. Leaves vivid green and shiny deeply cordate and sharply sinuate toothed margin, floating sometimes curved upwards. Flowers on long erect and stout scape, large or small due to growth of plant, rising above the surface of water, day blooming, sweet-scented; sepals 4 thick dark green outside, margenta inside, triangular in shape; petals smaller margenta 20-35 in number; stamens many, filament yellow with margenta or purple appendage, style and stigma yellow.

This is native of Zanzibar, and introduced into Thailand for nearly 70 years by a member of the royal family in the reign of King Rama V, Phra Vimardather Khrom Khun Sutdhasininart. The plant is only found cultivated and well established.

As there is still no Thai name for it, the author begs to propose the name "Sutdhasinobol" for this charming water lily.

2. Castalia group:

All *Castalia* in Thailand are introduced hybrids.

Victoria

Perennial aquatic herb with large standing erect tuber, and anchored by numerous spongy roots. Leaves large, floating with margin turned up at right angle to the water surface, close network of prickly veins underneath; petiole long terete stout and prickled. Flowers large on scape which is similar to



Nilubol
Nymphaea cyanea, Roxb.



Suthasinobol
Nymphaea capensis, Thunb. var. *zanzibariensis*.



Nymphaea Hybrid
(*Castalia group*)

the petiole, night blooming, strong fragrance; sepals prickly; petals numerous white turning red; stamens indefinite numerous, filament linear lanceolate; ovary inferior, paracarpels forming cup between stamen and style, true carpels 30-40; stigma in the bottom, broad; fruit large berry like, crowned by torus.

The largest of all water lilies, south American origin, generic name dedicated to Queen Victoria. This is also a member of Ubol-Charth in Thai, Genera 2, in Thailand 1, introduced.

V. regia, *Lindl.* Large erect tuber; leaves large 3-6 ft. in diameter with margin vertically turned up 2-4 in. at edge, glabrous and shiny above, closely network of prickly veins, scarcely pubescent and reddish underneath; petiole, and peduncle long, 1-2 in. diameter covered with prickles. Flowers large 6-10 in. across, floating, blooming at early night, white turning pink in the early morning and later deep red in the second days, much fragrant; sepals 4 pale green, covered with prickles near the tip; petals 30-50 oblong or obtuse; ovary with prickles.

The species was introduced into this country over 50 years ago; found only in cultivation for ornamental purposes, well established. In Thailand local name Bua Kradong or Bua Victoria.

Barclaya

Small submerged aquatic herb with long rootstock. Leaves erect or floating, petiole long. Flowers floating hardly expanding, pink; sepals long imbricate narrow and apiculate; petals shorter numerous into series connate below; stamens indefinite numerous, filament short; ovary superior 6-8 carpels, style triangular. Fruit berry globose or sub-globose.

In Thailand species 3 indigenous to the southern part,

Key to species

- A Plant tomentose, leaves round cordate
 sepals narrow *B. motleyi*
- AA Plant glabrous
- B Leaves thin oblong ovate or lanceolate cordate
 sepals narrow shortly apiculate fruit globose *B. kunthleri*
- BB Leaves thin oblong lanceolate with deeply
 cordate base petiole and peduncle very long
 sepals broader *B. longifolia*

B. motleyi, *Hook.* Plant on sandy bed, tuber or root-stock villous. Leaves thick round, cordate, blunt, the blade glabrous above except on nerve tomentose, tomentose beneath 2-3 in. long, 3-5 in. wide; petiole and peduncle tomentose 3-8 in. long. Flowers floating; sepals narrow keeled 1-2 in. long apiculate; petals linear inner series smaller and tense colour; stamens yellow, pistil pink; fruit globose; seed small elliptic spiny.

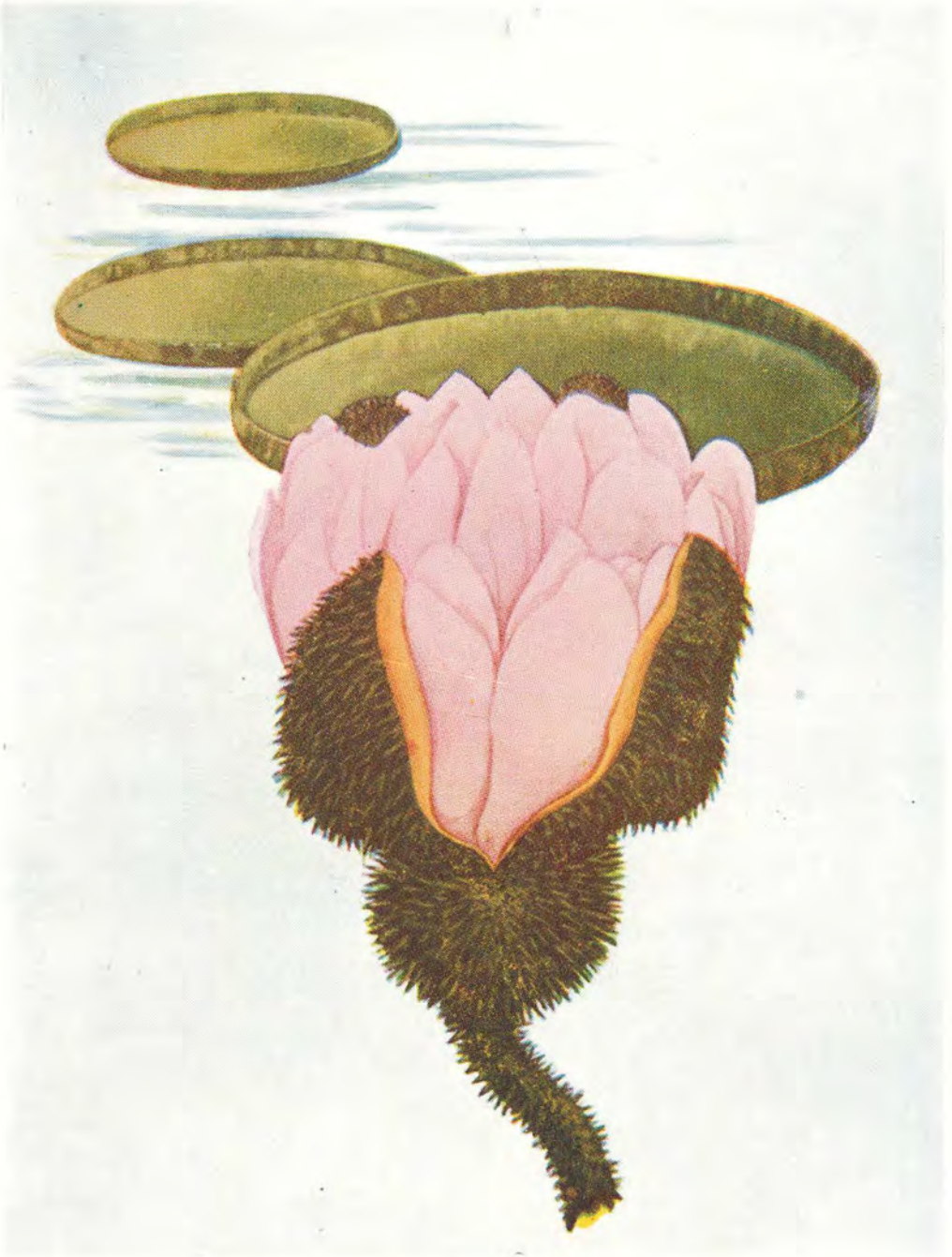
The plant is found in area of Narativas.

B. longifolia, *Ridl.* (*B. motleyana* var. *kunthleri* King.). The species is the closed affinity to *B. Motleyi* but all parts of the plant glabrous and leaves oblong ovate or lanceolate cordate sometimes with retuse base; sepals linear acuminate and shortly apiculate. Fruit smaller globose, seed globose spiny.

The plant is found in Satul and Chumpawn area.

B. kunthleri, *Wall.* Submerged plant. Leaves thin glabrous lanceolate cordate 6-9 in. long, 1.5 in. wide, petiole long slender 6-8 in. long. Flowers on glabrous, peduncle 10-12 long; sepals lanceolate broader about .6 in. apiculate; petals shorter oblong linear blunt. Fruit globose, seed globose not spiny.

This species is found in Satul and Koh Chang,



Bua Victoria
Victoria regia, Willd.



Barclaya motleyi, Hook.



Barclaya kunsthleri, Ridl.



Barclaya longifolia, Wall.

Literature cited**English:—**

Bailey, L.H.

The Standard Cyclopedia of Horticulture

Vol. 1,2,3, new edition 1925

The Macmillan and Company, New York.

Burkill, I.H.

A Dictionary of the Economic Product of the Malay

Peninsula. Vol. 1,2, 1935

The University Press Oxford.

Craib, W.G.

Florae Siamensis Enumeratio

Vol. 1, 1931

The Siam Society, Bangkok.

Hooker, J.D.

Flora of the British India

Vol. 1, 1875

L. Reeve & Co., London.

Hooker, J.D. & Jackson, B.D.

Index Kewensis

Tomus 1,2, 1893

The Clarendon Press, Oxford.

Innes, W.T.

Gold Fish Varieties and Water Gardens

First edition, 1947

Innes Publishing Company, Philadelphia.

Le Comte, M.H.

Florae Generale de L' Indochine

Tome Premier, 1907-1912

Nymphaeaceae (par Gagnepain) pages 158-163

Masson et C Editeure, Paris.

Le Mout and Decaisne,
Descriptive and Analytical Botany
Second edition, 1876
Longman Green & Co., London.

Nadkani, K.M.
Indian Plants and Drugs
Norton & Co., Madras, 1908.

Ridley, H.N.
Flora of the Malay Peninsula
Vol. 1, 1922
L. Reeve & Co., London.

Thai :—

Dhamnides Tuey Harn, Phra
The interpretation of plant name mentioned in the
article Bua Benjaban in the periodical of the
literature society of Thailand, Vajirayarn library
issue no. 1 B.E. 2479 pp. 34-39.

Royal Forestry Department
Siamese Plant Names
Royal Forestry Department, 1st. edition, B.E.
2491.

Sai-Bua --- Yai Bua
Ornament Plant of Thai Origin
Samat-parb, B.E. 2493.

Winit Vanandorn, Phraya
Suvatabandhu, Kasin
The Thai Science Bulletin Special Issue
December B.E. 2499, pp. 6-7,