

Palms of China

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While gathering information on the role of palms in the economies of Southeast Asia and the Neotropics (Griffiths 1989a, b), I was struck by the paucity of information on palms from mainland China; what little material was available had the added disadvantage to general readers that the information was written in Chinese script! Realizing that China might be a source of useful information I embarked on a project to investigate the role of palms in China, both from the standpoint of their cultural role in the history of that country and their economic usefulness. I am fortunate to be in the somewhat privileged position of being on the doorstep of China and having at my disposal a number of colleagues who could help in the work of translation; the result of this effort is summarized in this short communication.

Palms are a feature of the Chinese indigenous flora and have been exploited since early recorded history as a source of food, shelter, timber, and pharmaceutical products. In searching early Chinese literature for information, one encounters the basic problems of nomenclatural identity and the correctness of assigning data written in Chinese ideograms to the corresponding Latin equivalent. This problem has been encountered by numerous sinologists in the past and in particular has been commented upon by Bretschneider (1882), a physician to the Russian Legation in Peking and an expert sinologist interested in botanical aspects of *Materia Medica* of the ancient Chinese kingdoms. He reports as follows:

“The first difficulty that arises is to find out where to look for the plant about which information is required. Chinese botanical works note from 5000 to 6000 names of plants, the synonyms of each plant

being for the most part numerous. The Chinese have nothing similar to the alphabetical indexes of our comprehensive works.

It cannot be said that the style of Chinese writers on botanical matters presents difficulties to European readers acquainted in some degree with the language. In describing plants the authors use for the most part always the same terms. The chief obstacles encountered by European inquiries studying these writings will be found to consist in the right interpretation of geographical names which occur, and in ascertaining the time when the quoted works were composed.

The only exact method of ascertaining the botanical names corresponding to Chinese denominations of plants is to obtain the plants *in natura* and to determine them. I may however observe that, although the common cultivated plants are known under the same Chinese names all over the Empire, many other plants, especially drugs, go under different local names in different provinces.

The first difficulty we encounter in identifying Chinese names of plants with the scientific appellations, is to secure trustworthy and competent natives to procure authentic specimens of the plants desired.”

Although palms were used locally to provide the everyday necessities for living in primitive conditions, i.e., timber, shelter and food, etc., ancient Chinese communities were seemingly obsessed by the identification of plant extracts as a cure for ills, as stimulants and as balms for bodily abrasions. A great folklore developed in various regions of China where voluminous works were produced extolling the virtues of various drugs to alleviate pain and suffering and to help the patient to lead a full and fruitful life!

Again, in trying to ascertain the exact botanical identity of many of these drugs one runs into the ever-present problem of nomenclature. For example, Bretschneider (1882) states:

“The majority of drugs dealt with in Chinese treatises on *Materia medica* are yielded by wild growing

mountain plants. The mountains of Chihli, Shantung, Shansi, Honan and Sz' ch'uan are especially famed for the medicinal herbs they produce. These drugs (roots, leaves, flowers, fruits, etc.) for the most part reach the apothecary's shop cut in little pieces or pulverized. The apothecary knows nothing about the plants from which they are derived, nor concerning the place whence they have been gathered. Our specialists in Europe are also seldom able to determine these fragments."

The first attempt by Europeans to describe Chinese drugs was made by Gauger (1848) in his "Repertorium für Pharmacie und praktische Chemie in Russland" who described 54 drugs with their Chinese names but gives no accurate botanical descriptions.

In describing the pharmaceutical uses of palms *per se* ancient writers are somewhat scant in their descriptions and one is left with a tantalizing statement that extracts of the plants are "efficacious in childbirth" or "good for colds" etc.

In this paper I will attempt firstly, to give a historical background to Chinese writings on botanical subjects with special reference to the palms.

Palms in the Ancient Texts

Among the earliest Chinese treatises giving a systematic account of plants is the Nan-Fang Ts'ao-Mu Chuang written in the 4th century by Chi Han and now available in an English translation by Li (1979). The book deals with the tree flora of southern China and lists, among others, the Sugar palm (*Arenga pinnata*); the date palm (*Phoenix dactylifera* L.); the Betelnut palm (*Areca catechu*), and the coconut palm (*Cocos nucifera*).

For example, the author Chi Han names the sugar palm (*Arenga pinnata* (Wurmb.) Merr. syn. *A. saccharifera* Labill.) as Kuanglang but only refers to its usefulness in making ropes from the bark and for the extraction of a flour from a region just under the bark. He does not mention the formation of the inflorescence from which natives in Burma and Malaysia obtain sugar-yielding sap.

This palm was previously mentioned in the 3rd century treatises "Kwang Zhi" and "Buo Wu Zhi" and also mentioned as being of economic value in the 4th century text, "Ben Cao Shi Yi Hua Yang Guo Zhi" and also in the 16th century treatise, "Pen Ts'ao Kang Wu." This latter treatise on Materia Medica and Natural History was written by Li Shi Chen in 1552 and took twenty six years to complete. It is probably the treatise on Materia Medica most widely quoted by European sinologists.

The date palm (*Phoenix dactylifera* L.) is referred to as Hai-tsao-shu or the jujube tree. The author states that the taste is very sweet and agreeable. The date palm has probably existed since prehistoric times in Northern Africa and Asia Minor and some of the Chinese names refer to its foreign (e.g., Persian) origin.

The Betel-nut Palm (*Areca catechu* L.), known in Chinese as Pin-lang-shu, gets a more extensive treatment from Chi Han presumably because of its obvious pharmacological attributes. The description given below is that derived from the translation of the original description by Li (1979):

"The Pin-lang-shu are over one hundred feet in height. The bark resembles the Ch'ing'tung and the joints, the Kuei-chu. The trunk is not enlarged at the bottom nor narrowed at the top. It is straight and ascending, and tens of thousands of this tree look exactly the same, green and stately and without branching. From the top grow the leaves which resemble the leaves of the banana, broken into strips along the veins. Gazed up at from a distance, they appear like numerous banana leaves stuck on top of bamboo sticks, swaying in the wind like numerous feathered fans sweeping the sky. Below the leaves are attached several spathes . . . , each with clusters of several tens of fruits. The fruits are as big as peaches and plums with naturally formed spines densely covering the base; these protect the fruits. Cut open the skin and peel off the flesh; the taste is acrid and astringent. When hung and dried, the fruit becomes hard like dried jujube. By taking it together with betel-leaf and oyster-shell lime . . . , it is slippery and tasty, and it dissolves gases and promotes digestion. It grows in Lin-i, where the people consider it valuable. . . . Another name is Pin-men-yao-chien (guest door medicinal sweet-meat).

Chi Han was obviously aware of the prevalence of this nut as a masticatory and presumably was aware of the intoxication produced in subjects following prolonged chewing. He is also aware of the use of the nut as a socializing factor and "distinctly emphasizes that inadvertent omission of presenting betel-nut to a guest would be a mark of enmity" (Li 1979). We know from many betel-eating societies that its effects are anthelmintic in animals and a decoction of the nut is recommended in cardiac conditions and as an astringent lotion for eyes. The decoction is also applied to ulcers, bleeding gums and for urinary discharges. Essential oils from the leaves are said to be effective in bronchitis, laryngitis and throat inflammations; it is also used to induce labor. The active ingredients are the alkaloids, arecoline, arecaine, guvacine and guvacoline. It is listed in America as a narcotic stimulant and the deleterious effects of the alkaloids have been listed; large doses, e.g., 8-10 seeds can be fatal. Subcutaneous atropine is suggested as an antidote.

The value of *Areca* palm in the Chinese pharmacopoeia is evident when one considers that authors such as Lu Ho, in his *Shih-wu pen-ts'ao* (Materia medica of Nutrition), written in the 16th century describes the value of this palm in a virtually identical manner and describes the active principle, Ping-Lang as follows:

"Ping lang. Taste: acrid; [thermo-influence:] warm; no distinct medicinal strength. [The drug promotes] the digestion of grains and eliminates water. It removes mucous congestions. It relieves sensations of repletion, breaks through [obstructions in the flow of] the body's influences and drains obstructions in the body's depots and palaces. It is added to all medications meant to descend [in the body]. It kills the Three Worms and the tapeworm. If [this drug] is consumed in large amounts, it damages one's original influences. The people in Fukien and Kanton wrap the ping-lang in the leaves of the chu-chiang [plant]. The resulting taste is acrid-aromatic, and a pleasant feeling in the area of the diaphragm is produced. If lime prepared from shells is added, the effect should be even better. However, [after the use of this preparation], a red

substance must be spit out, which is not particularly aesthetic." [Quotation after Unschuld 1986]

The coconut palm (*Cocos nucifera* L.) receives scant treatment and mention is made only of the taste of the flesh (endosperm) though drinking the juice is said to induce intoxication presumably after it has fermented. Mention is also made of the legend referring to the shape of the fruit:

"It is colloquially called Yueh-wang-t'ou (head of the king of Yueh). It is said that once upon a time there was a feud between the king of Lin-i and the king of Yueh. The former sent a knight-errant to assassinate the latter and cut off his head and hung it on a tree. It suddenly changed into a coconut. The king of Lin-i was angered and had it cut open and made into a drinking vessel. This custom is still followed by the people of the South. It is said that when the king of Yueh was being killed, he was very intoxicated and thus the juice of the coconut was just like wine." (Li 1979).

Later writers have referred to the beneficial effects of eating the flesh in that it promotes a healthy plumpness of figure and face! The flesh is variously described as being "heating" or "cooling" to the body and useful in the treatment of haematemesis and dropsy. The bark of the coconut palm can be used as an astringent and styptic remedy in haemorrhages and fluxes and the incinerated shell when mixed with wine may be used as a treatment for secondary and tertiary syphilis (Smith 1871). The only other palms mentioned in the *Nan-Fang Ts'ao*-Mu Chuang are *Livistona chinensis* R. Br. and *Trachycarpus*.

In his important work, *Botanicon Sinicum*, Bretschneider (1895) refers to an obscure Chinese text, the *Shan hai king*, which I have been unable to trace, and in it is described a palm *Trachycarpus fortunei* called either "Tsung" or "ping lu." Confirmation for the identity is provided by the 11th century author Su Sung who refers to the same palm under the epithet "Tsung lu." Both descriptions refer to terminal leaves atop a stalk forming a circle resembling a wheel with spokes. Some con-

fusion remains as Bretschneider considers the palm *Chamaerops fortunei* to be identical to *C. excelsa* described by Kaempfer in 1712 in his *Amoenitates Exoticae* along with other palms (and this is the quite different *Rhapis excelsa*).

In searching the Chinese botanical literature readers frequently note major omissions, due presumably either to a genuine lack of knowledge or else a total lack of interest in a particular group of plants. One such omission is the complete absence of a mention of palm or palm trees in the 12th century text, Kiu Huang Pen Ts'ao—"a treatise on plant fit for supporting life in time of scarcity" (Bretschneider 1882). The author (probably Chou ting Wang—an Imperial Prince but possibly his son Chou hien Wang) made a detailed study of plants suitable for use as food and derived a greater part of his information from peasants and farmers.

The next major work to identify palms was the 16th century treatise. Ben Ts'ao Kang Wu—written by Li Shi Chen (who also wrote under a number of pseudonyms). As was stated previously this is probably the most widely quoted ancient Chinese work on *Materia Medica* by European scholars and is an impressive compilation of facts and illustrations in some 52 chapters (referred to as 52 books in Chinese). The first few chapters were devoted to the bibliographic details of previous writers; the natures and properties of medicines, and a list of diseases and the prescriptions available as remedies. The remaining 46 chapters represent the main body of the text being an account of the various drugs and the classification of natural objects. Palms are discussed under the general heading "Fruits" and more specifically under "Foreign Fruits." The following palms are mentioned:

Areca catechu
Cocos nucifera
Borassus flabellifer

Persian dates (*Phoenix*)
Caryota

Under the heading "Aromatic Trees" is mentioned "Dragons blood" which might possibly refer to the palm *Daemonorops draco* Bl. while the section on "Stately Trees" contains a reference to *Trachycarpus fortunei*.

While the Ben Ts'ao Kang Wu is recognised as an important work of reference some authorities have questioned the accuracy of the botanical identifications within the text. For example Sampson (1869) makes the following pertinent point:

"Other names are however given, with less certainty of correct identification, some of them probably referring to other Palms of which the writers have heard, and in their ignorance have "lumped" with the Cocoa nut, a process to which the Pen Ts'ao in particular is very prone."

This writer also gives an excellent account of the etymology concerned with the various Chinese names used to describe the Persian date (*Phoenix*).

The next important treatise to mention Palms is the 17th century work, Nung Cheng Ts'uan Shu written by Su Kuang R'i but incomplete on his death in 1633. The manuscript was completed by Tsz'lung in 1640. The title may be translated as "Complete Treatise on Agriculture" and the two palms *Trachycarpus fortunei* and Cocoa-nut (*sic*) tree are mentioned in Books 37-38 "On Planting Trees."

Trachycarpus fortunei is also mentioned in the 17th century text Shou Shi T'ung K-ao—a compilation of various economically important plants but the work provides little attendant discussion or critical examination of the plants.

The Modern Texts

Many of the earliest Chinese texts on matters relating to science and agriculture were known and available only to a comparatively small European audience and restricted to those scholars who had a

knowledge of the written Chinese script and a background of ancient Chinese literature. However, with the advent of widespread exploration of distant lands, particularly countries of Asia, by European voyagers in the eighteenth and nineteenth centuries there resulted in Europe a dramatic increase in the awareness of exotic plants and for example, an expansion of Botanic gardens in many European cities where unusual plants were seen for the first time by an incredulous audience. Along with a general interest in plants came a reevaluation of Chinese botanical and agricultural literature and the availability, often for the first time, of translations relating to these fields of study.

Mention has already been made of the 17th century treatise Nung Cheng Ts'uan Shu (a treatise on agriculture completed in 1640) and the *Amoenitates Exoticae* of Kaempfer in 1712 which, although describing the flora of Japan gave the names of many plants in Chinese characters and gave European scholars botanical descriptions coupled with the correct Chinese ideograms. The nineteenth century saw a proliferation of works devoted to Chinese Botany and agriculture among which was the "English and Chinese Dictionary" of Morrison, published in 1822 and containing the Latin names and Chinese equivalents of 148 plants native to Southern China. Brigeman's "Chinese Chrestomathy" contains the Chinese and English names of 445 plants and in 1863 Williams published his "Chinese Commercial Guide" which contained a list of commercially important plants. In China too 19th century works such as the *Zhi Wu Min Shi Tu Kao Chong Pien* described economic plants including palms.

A somewhat curious publication to yield information specifically on the palms of China is the "Notes and Queries on China and Japan" published in the last century by Charles A. Saint. In Vol. 3 of this work are found two most useful papers describing both the botanical description, eco-

nomic importance, and correct Chinese etymology of a number of palms by Sampson (1869) and Bretschneider (1869). Sampson's notes in particular, are most valuable to anyone wishing to study the origin of orthography in relation to the names given to palms.

One of the most important contributions to bring details of the studies of Chinese Botany to the attention of Europeans was by Bretschneider (mentioned above) who summarized all of the previous European studies on Chinese studies in his "Early European Researches into the Flora of China" published in 1880. In this work the author gives accurate botanical descriptions in Latin of the following palms found in and described from China with their correct Chinese ideograms; *Areca catechu*; *Caryota*; *Phoenix pusilla* and *Cocos nucifera*.

Bretschneider, in Vol. I of his *Botanicum sinicum*, refers somewhat scathingly to work published some 10 years before his own (i.e., in 1871) by Dr. Fr. Porter Smith under the title "Contributions towards the *Materia Medica* and Natural History of China" in the following terms:

"[The book] which has often been quoted as a standard work in his department by people who cannot discern its real value, and who rely upon the assurance with which the author's information is presented. Dr. P. Smith's book indeed contains notices of a great number of Chinese drugs: Chinese and scientific names are always given and identified without any hesitation. One might believe that Chinese Pharmacology is as well known to Europeans as our own drugs are to us, and that Dr. P. Smith has left nothing to be done in this department. But if anyone attempts to examine the matter thoroughly, he will soon be aware of the arbitrary character of his identifications and of the insufficiency of the knowledge we really possess with regard to Chinese drugs and economic plants. Thus, P. Smith's scientific denominations of Chinese plants, being drawn without any critical discernment from trustworthy and untrustworthy sources, have little value and render his book unreliable for any scientific purpose. It cannot however, be denied that there are in it many interesting accounts, translated from Chinese works, relating to the medical virtues ascribed by the Chinese to their drugs."

Smith refers to the palms *Areca* and

Cocos and provides notes on their use in medicine.

The only work known to me which has a section devoted specifically to palms is the book, "Forest Botany of China" by Lee (1935). In it the author gives both a key to the family Palmae as well as descriptions of the following genera and their representative species: *Phoenix*, *Trachycarpus*, *Rhapis*, *Licuala*, *Livistona*, *Calamus*, *Caryota*, *Arenga* and *Areca*. The author also gives notes on the distribution of each palm within China.

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LITERATURE

- BRETSCHNEIDER, E. 1869. B. K. 1978. Cytogenetics of *Areca-cathechu* *Areca-triandra* and their F-1 hybrids (Palmae). *Genetica* (The Hague) 49(1): 1-8.
- . 1869. Les Palmiers de la Chine. Notes and queries on China and Japan. 3: 139-142 and 150-152.
- . 1880. Early European researches into the flora of China. *Journ. N. China Branch, Royal Asiatic Soc. (N.S.)* 15: 1-194.
- . 1882. *Botanicon Sinicum; Notes on Chinese Botany from Native and Western Sources*. Vol. I. Truber & Co., London.
- . 1895. *Botanicon Sinicum: notes on Chinese botany from native and Western sources*, Vol. III. Botanical Investigations into the Materia Medica of the Ancient Chinese. Kelly and Walsh, Shanghai etc., 1895.
- CHANG, M. C. 1982. *Tsung lu* (Palm Trees). (Auhui k'o hsueh chi shu ch'u pan she. Ho-fei Shih (ed.), p. 31.
- CHEN, C. P., C. C. LIN, AND T. NAMBA. 1987. Development of natural crude drug resources from Taiwan: VI. In vitro studies of the inhibitory effect of 12 microorganisms. *Sjppualigali Zassjo*. 41(3), p. 215-225.
- CHING, Y. C. AND Y. C. HSU. 1954. A new species of *Trachycarpus* from Yunnan. *Acta Phytotaxonomica Sinica* 15(2): 111-112.
- CHUNG, W. C. AND B. C. F. KO. 1976. Treatment of *Taenia saginata* infection with mixture of areca nuts and pumpkin seeds. *Chinese Journal of Microbiology* 9(1/2): 31-35.
- ESSIG, F. B. AND Y. F. DONG. 1987. The many uses of *Trachycarpus fortunei* (Arecaceae) in China. *Economic Botany* 41(3): 411-417.
- GAUGER, G. 1848. *Chinesische Roharzneivaaren* (quoted in Bretschneider, 1882 above).
- GRIFFITHS, D. A. 1989a. Palms: underexploited tree crops. I. Palms of Asia. *West Australian Tree and Nut Crop Association Yearbook*, 1989 (in press).
- . 1989b. Palms: underexploited tree crops. II. Palms of the Neotropics. *West Australian Tree and Nut Crop Association Yearbook*, 1989 (in press).
- LEE, S. C. 1935. *Forest botany of China*. Commercial Press Ltd., Shanghai, 1935.
- LI, H. L. ET AL. (EDS.). 1978. *Palmae of Taiwan*. In: *Flora of Taiwan*, Vol. 5. Epoch Publishing Co. Ltd., Taipei, Taiwan, p. 1166.
- LI, HUI-LIN. 1979. Nan-fang ts'ao-mu Chung: a Fourth Century flora of Southeast Asia. The Chinese University Press, Shatin, New Territories, Hong Kong, p. 168.
- LIN, K. C. 1981. Resistance of ten tree species to sulfur dioxide. *Bulletin, Taiwan Forestry Research Institute*. No. 349, 14 pp.
- LIN, Z. Z. 1987. Observation on effectiveness of *Areca* and fruit skin of Pomegranate mixture against cestode of breeding geese. *Poultry Husbandry and Avian Disease Control*, No. 1, p. 12-13.
- LIU, L. H. AND Y. D. Y. 1980. The shorea forest and its phytocenological characters in Western Yunnan China. *Acta Bot. Yunnanica* 2(4): 451-458.
- LIU, TANG-SHUI. 1962. Illustrations of native and introduced ligenous plants of Taiwan. *Moraceae-Bambusaceae* Vol. II. *Taiwan National University*, Taiwan, pp. 703-1388.
- MABBERLEY, D. J. 1987. *The plant book*. Cambridge University Press, Cambridge, U.K., p. 706.
- MATSUMURA, JINZO. *Nippon Shokubutsu mei-i*; or, Nomenclature of Japanese plants in Latin, Japanese and Chinese. Tokyo. (9th ed. Shokubutsu mei-i. Revised and Enlarged. Part I. Chinese names of plants. Tokyo, 1915.)
- MCCONNELL, D. B., J. N. JOINER, AND C. R. JOHNSON. 1978. Influence of salinity levels of growth and chemical composition of *Livistona-Chinensis*. *Hortscience* 13 (6 Section 1): 706-707.
- PEI, SHENG-JI. 1989. New materials of palmae from China. *Acta Phytotaxonomica Sinica* 17(2): 132-146.

- SAMPSON, T. 1869. Palm trees. *In*: Notes and queries on China and Japan. Vol. 3. Charles A. Saint, Hong Kong, pp. 148-150.
- SMITH, F. P. 1871. Contributions towards the *Materia Medica* and natural history of China. American Presbyterian Mission Pres, Shanghai, p. 237.
- TANG, C. T. AND T. L. WU. 1977. A new species of *Chuniophoenix* (Palmae) from Hainan [*Chuniophoenix humilis*]. *Acta Phytotaxonom. Sinica*. 15(2): 111-112.
- UNSCHULD, P. U. 1986. *Medicine in China: a history of pharmaceuticals*. University of California press, Berkley, Los Angeles and London, p. 367.
- WEI, CHAO-FEN. 1986. A study on the genus *Calamus* of China. *Guihaia* 6(1-2): 17-40.
- . 1988. A new species of *Arenga* from China. *Acta Phytotaxonomica Sinica* 26(5): 404-405.
- . 1989. A new species of *Arenga* from China. *Acta Botanica Austro Sinica* 4: 7-9.
- WU, C. ET AL. 1985. Treatment of a heavily infected case of *Hymenolepis nana* with Areca nut and pumpkin seed. *Journal of Parasitology and Parasitic Diseases* 3(1): 75.
- ZHANG, J. T. AND B. I. LIU. 1983. Studies on the pollen morphology of the Chinese Palmae. *Acta Bot. Sin.* 25(4): 318-323.

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