

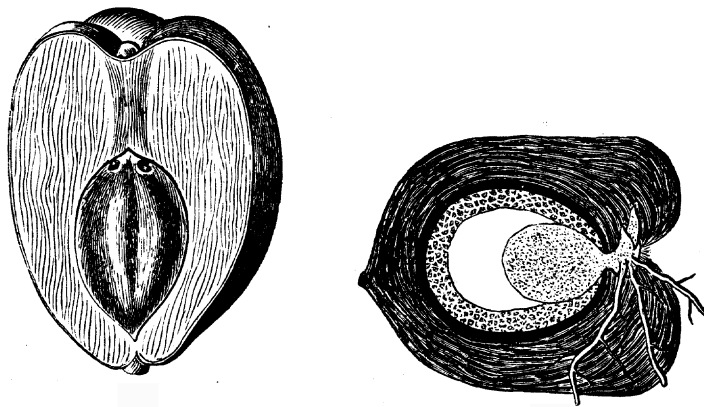
A start for archaeological Nutters: some edible nuts for archaeologists.

By Dorian Q Fuller 24.10.2007

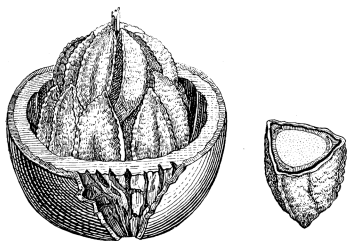
Institute of Archaeology, University College London

A “nut” is an edible hard seed, which occurs as a single seed contained in a tough or fibrous pericarp or endocarp. But there are numerous kinds of “nuts” to do not behave according to this anatomical definition (see “nut-alikes” below). Only some major categories of nuts will be treated here, by taxonomic family, selected due to there ethnographic importance or archaeological visibility. Species lists below are not comprehensive but representative of the continental distribution of useful taxa.

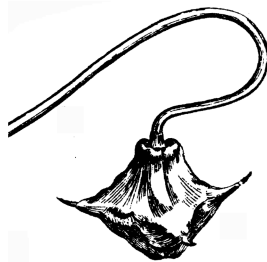
Nuts are seasonally abundant (autumn/post-monsoon) and readily storable.
Some good starting points: E. A. Menninger (1977) *Edible Nuts of the World*. Horticultural Books, Stuart, FL.; F. Reosengarten, Jr. (1984) *The Book of Edible Nuts*. Walker New York)



Cocos nucifera fruit cross-section, and cross section of sprouting fruit (from Engler 1936)



Brazil nut (*Bertholletia excelsa*)
fruit structure (from Engler 1936)



European waterchestnuts
(*Trapa natans*) (from Engler 1936)

Trapaceae (water chestnuts)

Note on terminological confusion with “Chinese waterchestnuts” which are actually sedge rhizome tubers (*Eleocharis dulcis*)

Trapa natans European water chestnut

Trapa bispinosa East Asia, Neolithic China (Hemudu)

Trapa bicornis Southeast Asia and South Asia

Trapa japonica Japan, jomon sites

Anacardiaceae

Includes Pistachios, also mangos (South & Southeast Asia), cashews (South America), and numerous poisonous tropical nuts.

Pistacia vera true pistachio of commerce

Pistacia atlantica

Euphorbiaceae

This family includes castor oil plant (*Ricinus communis*), rubber (*Hevea*), cassava (*Manihot esculenta*), the emblic myrobalan fruit (of India & SE Asia), *Phyllanthus emblica*, and at least important nut groups:

Aleurites spp. Candlenuts, food and candlenut oil (SE Asia, Pacific)

Archaeological record: Late Pleistocene Timor, Early Holocene reports from New Guinea, New Ireland, Bismarcks; Spirit Cave, Thailand (Early Holocene) (Yen 1979; Latinis 2000)

Ricinodendron rautanenii the mongongo nut, a Dobe !Kung staple (S. Africa: Kalahari)

Good ethnographic data of nut-use

Rosaceae

The prunoid fruits, include edible seeds (if roasted to remove cyanide compounds). In domesticated almonds this has been selected during “domestication”. But seeds in others species (apricots, peaches) can be detoxified.

Left two peach stones, right three almond stones (from C. Darwin 1869)





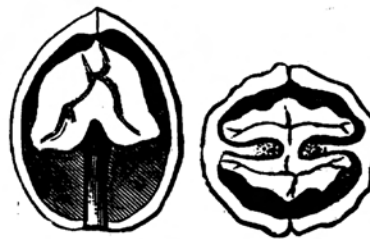
White hickory (*Carya tomentosa*) fruit (left), and "de-husked" endocarop (right)
 image from: http://www.clemson.edu/extfor/publications/bul117/Carya_tomentosa.htm



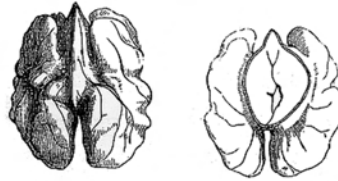
Walnut fruit (left) and peeled to endocarop/ stone (right)
 (from La Maout & De Caisne 1873)



Carya cathayensis fruit, from *Flora of China Vol. 4. Illustrations* (1999), via www.efloras.org



Juglans regia endocarop cross sections (Engler 1936)



Walnut seed, whole (left) and split vertically (from La Maout & De Caisne 1873)

Juglandaceae (walnuts and hickories)

Pretty much a global family (except Australia/Pacific)

Two heavily dimpled nutmeat (seed) cotyledons, nearly divided by septum. Nut (endocarop) contained within a fibrous fruit. "Shell" a single layer. *Carya* shell tends towards smooth, *Juglans* grooved and dimpled. *Carya* spp. are a major component of Eastern North American archaeobotanical record and the most methodological work on identification & quantification has been done there.

Americas	W. Eurasia	E. Eurasia	Other
Hickories <i>Carya ovata</i> shagbark hickory		<i>Carya cathayensis</i> Chinese Mountain walnut	
<i>Carya lacinoso</i> Kingnut hickory		山核桃 <i>shan he tao</i>	
<i>Carya tomentosa</i>			

White hickory, mocknut		
<i>Carya glabra</i> Redheart hickory, pignut		
<i>Carya illinoensis</i> Pecan 美国山核桃 <i>mei guo shan he tao</i>		
		walnuts
<i>Juglans cinerea</i> butternut	<i>Juglans regia</i> English/ Persian walnut 胡桃 <i>hu tao</i>	<i>Juglans mandshurica</i> (syn. <i>J. cathayensis</i>) Chinese walnut 胡桃楸 <i>hu tao qiu</i>
<i>Juglans nigra</i> black walnut		<i>Juglans ailanthifolia</i> Japanese walnut
<i>Juglans neotropica</i> South America		<i>Pterocarya caucasica</i> Central to NE Asia

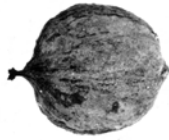
Old World record:

Europe: *J. regia*, Late Iron Age & Roman era spread throughout Europe & Britain. North African & Egyptian finds (Roman trade?); wild in SE Europe, Turkey, Caucasus through Central Asia to Tian Shan (Zohary & Hopf 2000; www.archaeobotany.de)

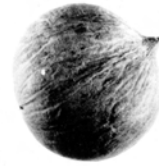
South Asia: *J. regia*, Late Harappan (early second Millennium BC) spread to NW (Kashmir & Eastern Harappan zone) (Fuller & Madella 2001)

East Asia:

Southeast Asia: LGM (19,000-16,000 bp) shell fragments of *Juglans* sp. type at Xom Trai cave, Vietnam (N. Viet 2001. Further studies of Hoabinhian in Vietnam, *J. Southeast Asian Archaeology* 21: 16-28)



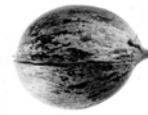
C. aquatica
water hickory



C. cordiformis
bitternut hickory



C. glabra
pignut hickory



C. myristicaeformis
nutmeg hickory



C. illinoensis
pecan



C. laciniosa
shellbark hickory



C. ovata
shagbark hickory



C. tomentosa
mockernut hickory

***Carya* spp. (hickories)** from America, photos from USDA-NRCS PLANTS Database.
USDA, NRCS. 2007. The PLANTS Database (<http://plants.usda.gov>, 24 October 2007).
National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

For more images & descriptions, see Vanderbilt University BioImages
<http://www.cas.vanderbilt.edu/bioimages/pages/carya-fruits.htm>

Other “walnuts” [not actually related]

		Olacaceae	
		<i>Anacolosa luzoniensis</i> Galo (Philippines)	<i>Coula edulis</i> African walnut (central Africa)
		<i>Scorodocarpus borneensis</i> woodland onion (Sumatra, Borneo, Malaya)	<i>Heisteria, Ongokea, Strombosia</i> (also W/C Africa)
Lauraceae <i>Cryptocarya moschata</i> Brazilian nutmeg		<i>Endiandra palmerstonii</i> Queensland Walnut (Australia, Malaysia, Polynesia)	
		<i>Beilschmiedia bancroftii</i> Yellow walnut, Wanga (Australia, New Zealand)	<i>Tylostemon mannii</i> spicy cedar, tola (West Africa)

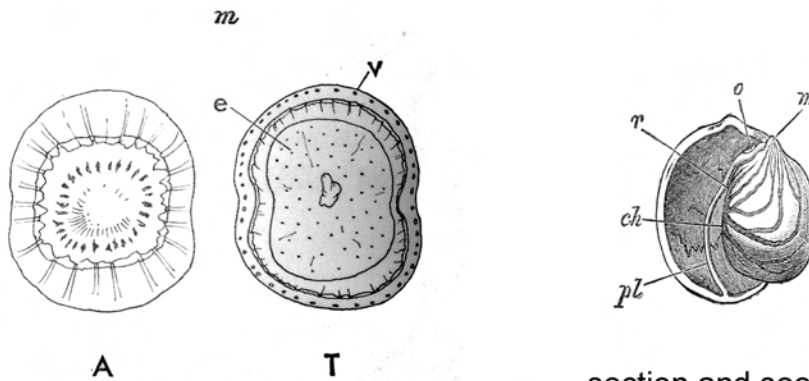
Betulaceae (birch family)

Hazelnuts (*Corylus*)

Nuts fairly symmetrical & spherical, thick shells have round veins in cross-section



Corylus avellana (fruit and nut from Engler 1936),



axial view and transverse section (from J. Renfrew 1973). v=longitudinal vesicles in shell.

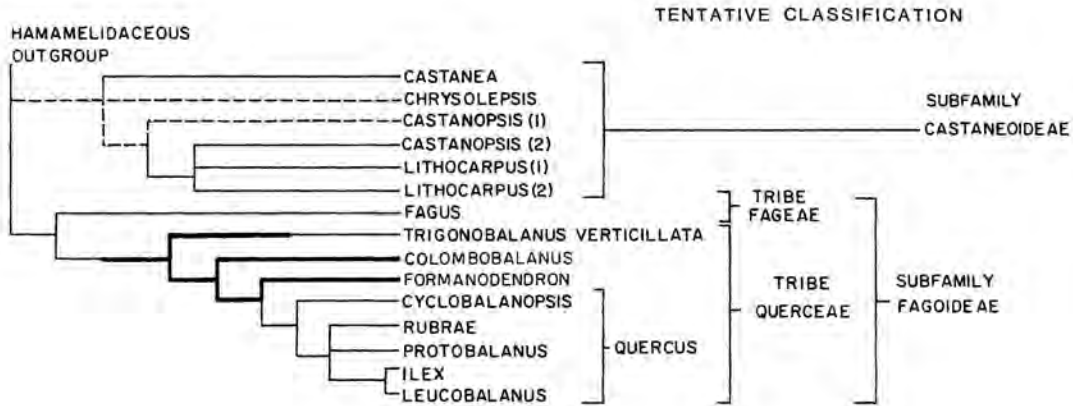
section and seed (from Lubbock 1898)

Americas	W. Eurasia	E. Eurasia	Other
<i>Corylus Americana</i> Eastern U.S. “filberts”	<i>Corylus avellana</i> Common hazel nut, Cobnut, cult.	<i>Corylus heterophylla</i> Siberia, Korea, N. China, S. to Yangzte. Main cultivated hazelnut of east. 榛 <i>zhen</i>	
<i>Corylus rostrata</i> Eastern U.S. “filberts”	<i>C. maxima</i> Hazel nut, “Kentish Cob”, Southern Europe, cult.	<i>Corylus mandshurica</i> N. China, NE Asia, Japan 毛榛 <i>mao zhen</i>	
<i>C. rostrata</i> var. <i>californica</i> west coast	<i>Corylus columa</i> Turkish hazel, cult.	<i>Corylus yunnanensis</i> SW China 滇榛 <i>dian zhen</i>	
		<i>Corylus ferox</i> S. China, SE Asia, NE India in mountains 刺榛 <i>ci zhen</i>	

Fagaceae (beech family)

chestnuts (*Castanea*), beechnuts (*Fagus*), acorns (other genera)

Simple two subfamily classification (from Crepet & Nixon 1989. Earliest megafossil evidence of Fagaceae: phylogenetic and biogeographic implications, *American Journal of Botany* 76: 842-855)



Note: *Lithocarpus*, the tanoaks (mainly East Asia, 1 species in California), are actually closer to chestnuts than to true oaks

Cyclobalanopsis (the evergreen Qinggang oaks of Eastern Asia & SE Asia) are often considered a distinct subgenus or *Quercus* or sometime separated in their own genus.

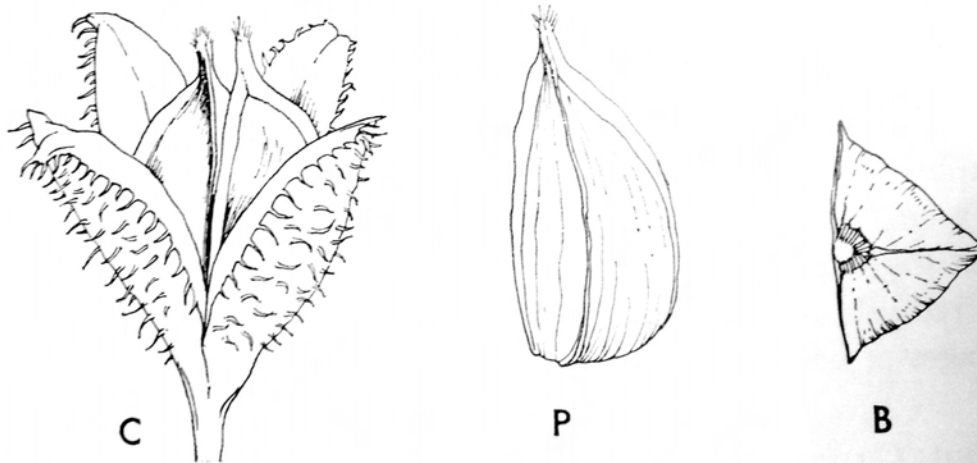
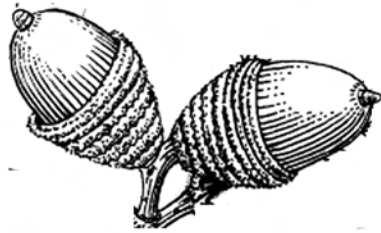
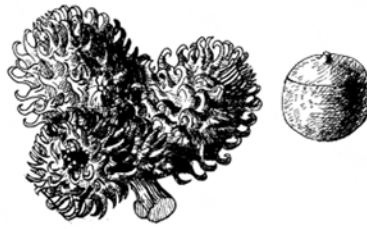


Fig. 106 Beech *Fagus sylvatica* L. (C) cupule, splitting into four valves exposing the two fruits (beech-nuts) within, (P) trigonal nut in perspective view, (B) in basal view showing attachment scar. All $\times 2\frac{1}{2}$.



Cyclobalanopsis delicatula
(from Flora of China)



Lithocarpus xylocarpus
(from Flora of China)



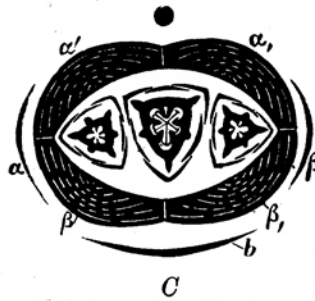
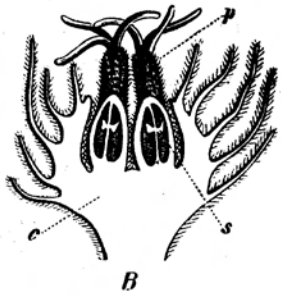
Cross section of acorn
(from Lubbock 1898)



Quercus acitussima
(from Flora of China)



Castanopsis longzhouica

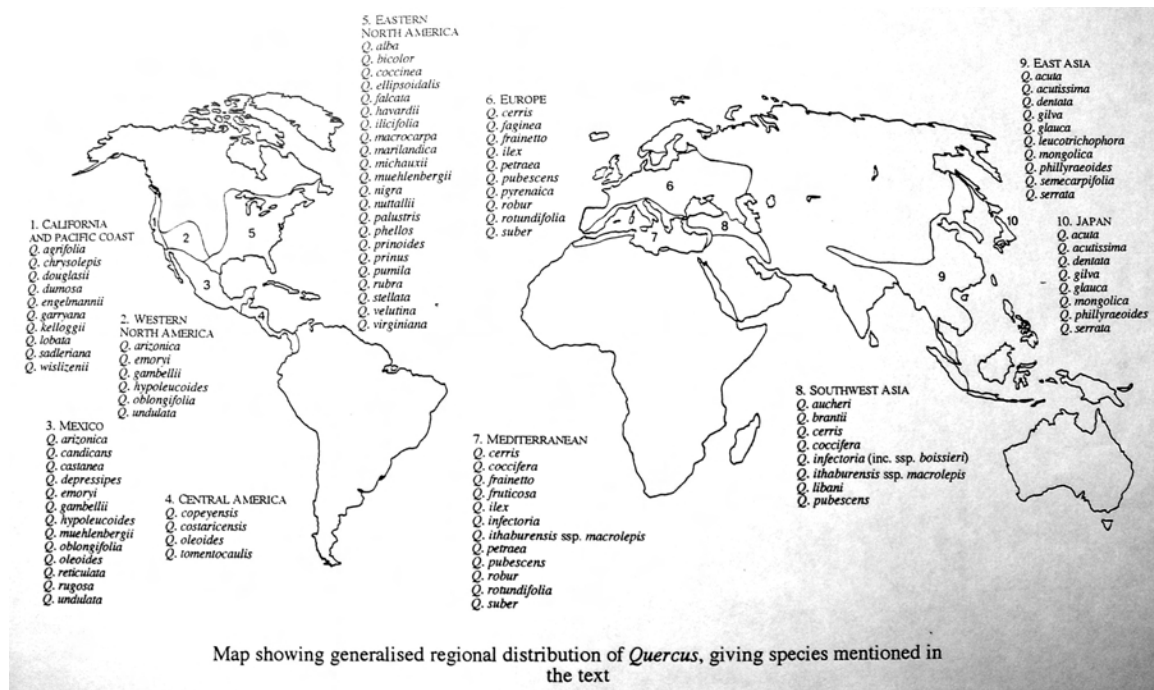


Fagus and Castanea flowers from Engler

Americas	W. Eurasia	E. Eurasia	Other
<i>Quercus</i> spp. (sensu stricto)	<i>Quercus</i> spp. (sensu stricto)	<i>Quercus</i> spp. (sensu stricto) 栎属 <i>li shu</i> 35 spp. in China	
<i>Lithocarpus</i> (California)		<i>Lithocarpus</i> spp. Tanoaks 柯属 <i>ke shu</i> 118 spp. in China !	
		<i>Cyclobalanopsis</i> spp.	

		Qinggang oaks 青冈属 <i>qing gang shu</i> 69 spp. in China	
		<i>Castanopsis</i> spp. “gon chestnut”, “kat” <i>Castanopsis</i> <i>chinesis</i> 锥 <i>zhui</i> Genus has 58 spp. In China, mainly southern through SE Asia.	
<i>Castanea dentata</i> American chestnut	<i>Castanea sativa</i> Spanish chestnut (S. Europe through Caucasus)	<i>Castanea mollissima</i> Chinese chestnut 栗 <i>li</i> Throughout China & Korea	
<i>Castanea pumila</i> Chinquapins American northwest		<i>Castanea seguinii</i> 茅栗 <i>mao li</i> South China, also cult.	
		<i>Castanea crenata</i> (syn. <i>C. japonica</i>) Japanese chestnut 日本栗 <i>ri ben li</i> Cult. In Japan, recently in Korea & NE China	

General distribution of acorns (with documented ethnographic/historical use), map from Sarah Mason (1992) *Acorns in Human Subsistence*. PhD Dissertation, UCL.



Acorns (*Quercus* spp., and *Cyclobalanopsis* & *Lithocarpus* in East Asia, were widely used in the past as gathered human food. Common on Neolithic & Mesolithic sites in Europe, some epipalaeolithic sites in Near East (e.g. Ohalo 2), in Yangzte valley (e.g. Hemudu, Kuahuqiao, Bashidang, Jiahu)—Lower Yangzte Neolithic probably mainly *Lithocarpus* and *Cyclobalanopsis*, and in Jomon tradition Japan. Also very widespread in North American archaeobotany and in early/pre-agricultural Mesoamerica (e.g. Guilá Naquitz cave). Acorns are normally tanniniferous, requiring processing by leaching, which is made easier by hot water (boiling) and by grinding.

Europe: *C. sativa*, cultivated in North Italy by Romans, spread throughout Europe in Roman period, but systematic management for fruits is mainly post-Roman (Condera et al. 2004. The cultivation of *Castanea sativa* (Mill.) in Europe, from its origin to its diffusion on a continental scale Source: *Vegetation history and archaeobotany* 13 (3): 161-179)

East Asia: Japan, abundant chestnuts from Jomon, possible management or cultivation in Middle Jomon (Sanna Maruyama site).

Mainland SE Asia: Terminal Pleistocene (from 12,000 bp)/Early Holocene “*Castanopsis*-like” shell at Con Moong cave, Vietnam (N. Viet 2001. Further studies of Hoabinhian in Vietnam, *J. Southeast Asian Archaeology* 21: 16-28); *Castanopsis* from Sprit Cave Thailand (Yen 1979)

Horse chestnuts (Family Hippocastanaceae)

***Aesculus* spp. (American buckeyes).** They only superficially resemble true chestnuts.

These nuts are widespread across northern Hemisphere. They are highly toxic and need to be detoxified by extensive leeching. Nevertheless they were used by native Californians and widely used by Jomon and epi-Jomon cultures on Hokkaido island.

Burseraceae

This family is related to Anacardiaceae (below). The subfamily Bursereae includes the important incense plants of the Old World (East Africa, Yemen, S. India), *Boswellia* spp. (frankincense, olibanum), *Commiphora* spp. (myrrh, bdellium)

The sub-family Canarieae, includes important nuts.

Dacryodes edulis, bush butter tree, West Africa, oily seeds

Canarium spp., numerous species focused on SE Asia (extending to S. Asia & China). Complex taxonomy within the genus. These include two major cultivars:

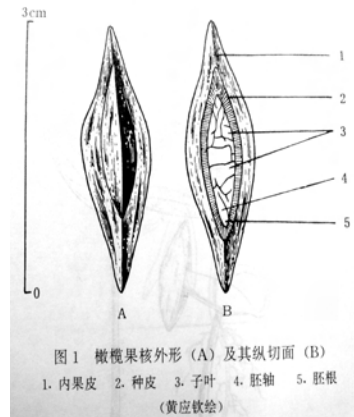
Canarium luzonicum, the pili nut of the Philippines, Java almond

Canarium album white Chinese olives, 橄榄 *gan lan*, native to South China & Vietnam

Canarium pimela black Chinese olives, 乌榄 *wu lan*, native to far S. of China through Cambodia

[note: no relationship to European olives in taxonomy or taste, these are more like dried dates or dried apricots in use!]

seeds basically triangular in cross-section with 3 seed cavities.



Old World records

East Asia: ? no reports?

South Asia: Terminal Pleistocene (from 12,500 bp)/Early Holocene *Canarium. zeylanicum* at Beli-Lana cave, Sri Lanka (Kajale 1989)

Mainland SE Asia: Terminal Pleistocene (from 12,000 bp)/Early Holocene *Canarium* sp. at Con Moong cave, Vietnam (N. Viet 2001. Further studies of Hoabinhian in Vietnam, *J. Southeast Asian Archaeology* 21: 16-28); Spirit Cave, Thailand (Early Holocene) (Yen 1979)

Island SE Asia/ Oceania: *Canarium* sp., Niah Cave (Sarawak), ca. 10,000 bp; Leang Burung (Sulawesi) ca. 5500 bp ; Sepik-Ramu, New Guinea ca. 14,000bp, Admiralty Islands ca. 12,000 bp, numerous early-mid Holocene reports from New Guinea. Solomons, Bismarcks. (D. K. Latinis 2000. The development of subsistence system models for Island Southeast Asia and Near Oceania: the nature and role of arboriculture and arboreal-based economies. *World Archaeology* 32(1): 41-67

V. J. Paz 2005. Rock Shelters, Caves, and Archaeobotany in Island Southeast Asia, *Asian Perspectives* 44: 107-118)