Principes, 41(4), 1997, pp. 184–189, 208–210

Vegetable Ivory and Other Palm Nuts/Seeds as an Art/Craft Medium

EUGENE T. DOREN
HC-33 Box 3208-L, Wasilla, Alaska 99654

The purpose of this article is to describe the use of some palm nuts or seeds as a medium for arts and crafts, instead of their normal roles in reproduction, as a food source, etc. I will attempt to keep this article at a low technical level, but will refer to more technical papers, when I am aware of them.

For many years people have been using vegetable ivory to make a variety of items. According to Schabillion (1989), the tagua nut from South America was brought to England in small quantities during the 1820s and 1830s. Toys, umbrella handles, and carvings were made from the nuts. A few tons made it to Germany in the late 1850s. By 1862 button factories were being established in France and England, in Leeds, Massachusetts in 1864, in Canada in 1870, and by the German-American Button Company Rochester, New York in the early 1880s. By 1887, it was recorded that two or three million nuts were used each year by the factories in London and Birmingham, England. During the Victorian age many items were crafted by hand-carving or turning on an ornamental or conventional lathe; included were thimbles and thimble cases with threaded lids, needle cases with threaded lids, tape measures with spindles, ear rings, dice, and rings. Most of these were highly ornamented. The greatest utilization and consumption of vegetable ivory were in the production of buttons, between the end of the 19th century and the beginning of World War II (Barfod 1989). The tagua nut, the seed of *Phytelephas* (Phytelephantoideae, Uhl and Dransfield 1987), was probably the source of most of the vegetable ivory of that period. The other two genera in subfamily Phytelephantoideae (*Ammandra* and *Aphandra*, Barfod 1991) were a contributing source. The genera *Hyphaene* from Africa and *Metroxylon* from Asia were also used in the button-making industry.

My approach will be more from a woodturner's view, than as a palm expert. Numerous articles have been written on the tagua nut as an art/craft medium, but there are very few, if any, reports on *Metroxylon, Hyphaene, Actinorhytis, Veitchia, Bismarckia, Mauritia,* and *Areca,* to name only a few of the many more out there that I have not had an opportunity to try yet! I will relate my experiences with many of the genera that I have tried, and provide details of the turning process on seeds of Phytelephantoideae and *Metroxylon.*

Actinorhytis

There are two species in the genus *Actinorhytis* (Uhl and Dransfield 1987), *A. calapparia* native to New Guinea and the Solomon Islands and *A. poamau* in the Solomon Islands. I have not seen information or fruits from the latter.

A. calapparia. The fruit is very large, about 2.5″ long × 1.5″ wide (6.35 × 3.8 cm), ovoid ±/− beaked, green turning orange-red at maturity, epicarp smooth, mesocarp with thin flesh and fibers, adhering to the endocarp, endocarp thin, hard, stony, adhering closely to what appears to be a thick seed coat, which in turn adheres closely to a deeply ruminate endosperm, with a central irregular hollow. The embryo is basal, and the seed about 2.0″ × 1.25″ (5.0 × 3.2 cm), globose, with a lateral, longitudinal hilum. The adhesion of the endocarp, seed coat, and endosperm is so great, that I have been unable to dry the fruits without the seed cracking. To overcome this problem, I turn the wet nuts on the lathe, removing everything down to the endosperm, then allow it to dry. *A. calapparia* is a very attractive nut, and can be used to make a vase or box. The ruminate pattern, viewed externally, resembles many equally spaced pin holes (Fig. 2).

Areca

There are about 60 species, distributed from India and South China through Malaysia to New

Guinea and the Solomon Islands. The fruit is globose, ovoid, or spindle shaped, often brightly colored, rarely dull brown or green; the epicarp is smooth, shiny, or dull, the mesocarp thin to moderately thick, fleshy, or fibrous, and the endocarp composed of robust longitudinal fibers, usually closely adhering to the seed, possibly becoming free at the basal end. Seed conform to the fruit shape or are slightly hollow at the base; the hilum is basal, the endosperm deeply ruminate, and the embryo basal (Uhl and Dransfield 1987).

A. catechu. The common name is betel nut palm. The fruit is yellow when mature and about 1.8″ long × 1.1″: wide (4.5 × 2.8 cm); the endocarp is thin, hard, and brittle; it adheres tightly to the seed coat, sometimes even when dry. The seed size is about 1.0″ long × ¾″ wide (2.5 × 2.0 cm). The ruminate endosperm is very attractive in a vase.

A. ipot. The seed is similar to *A. catechu,* except for being slightly oval in horizontal section.

Bismarckia

B. nobilis. The single species in the genus *Bismarckia,* common name Bismarck palm, is from the drier parts of Madagascar (Uhl and Dransfield 1987). The fruit has a smooth, shiny, rich brown epicarp, somewhat speckled with lighter brown, the mesocarp is fibrous, +/− aromatic, and the endocarp about 1.7″ long × 1.1″ wide (4.3 × 2.8 cm), thick, irregularly flanged and pitted, and with a conspicuous central intrusion at the base. Seed are basally attached with homogeneous endosperm, but grooved to match the endocarp intrusions, and have apical embryos. This nut makes an attractive vase (Fig. 1).

Hyphaene

The genus *Hyphaene* probably consists of about ten species (Uhl and Dransfield 1987). One common name is Doum palm. The species are distributed in the drier parts of Africa, Natal, Madagascar, Red Sea Gulf of Eilat coasts, coastal Arabia, and the west coast of India.

H. thebaica. The fruit is somewhat variable in shape, but tends to be between ovoid and spherical and taller than wide. The epicarp is smooth, generally shiny, and from light brown to almost black. The mesocarp is fibrous, often aromatic, and referred to as the gingerbread palm, apparently because of its similar taste. I have received some that have the aroma of wine. The endocarp is a hard fibrous material. The seed is basally attached, and taller than wide, about 1.25″ long × 1.0″ wide (3.2 × 2.5 cm). It is larger at the base, has a brown seed coat, and homogeneous endosperm (vegetable ivory) with a central hollow and an apical embryo. My experience with the light brown fruits is that many times the seed is small, with the seed coat not or only partially attached to the endosperm. The embryo appears to be developed, but I have not tried germination. The very dark brown fruits seem consistently to have large well-developed seeds, with the seed coat tightly attached to the endosperm, and work well for making vases.

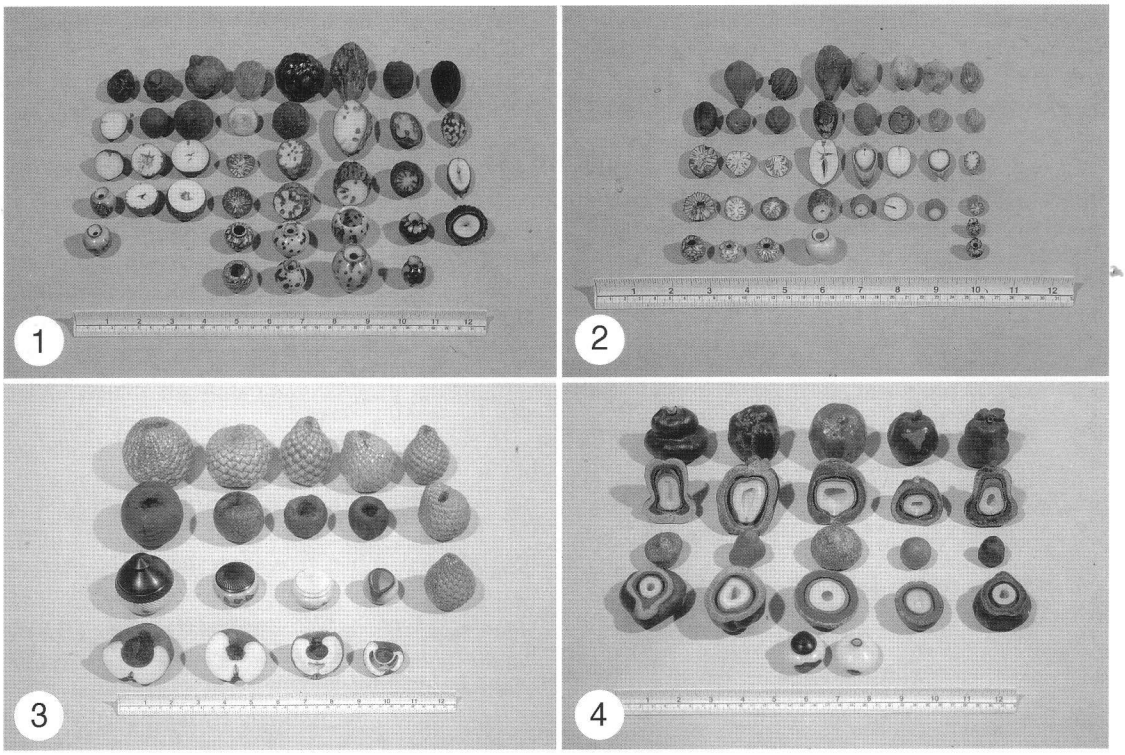
H. petersiana. The fruit is similar to *H. thebaica,* but is more spherical, although at times approaching pear shape. The endocarp is the thickest of the species I have worked with, and I have made box lids and goblet tops from them. The seed is flat at the base, nearly round in horizontal section, about 1.1″ long × 1.25″ wide (2.9 × 3.2 cm) with the apex slightly peaked at the embryo. The basic shape is ideal for making boxes.

H. coriacea. The fruit and seed are pear shaped to spherical, the seed is about 1.0″ in diameter (2.5 cm), with a central hollow. The species has the same basic fruit characteristics as *H. thebaica* and is suitable for making vases (Fig. 4).

Mauritia

There are two species distributed in the wetter parts of Trinidad, Colombia, Ecuador, Peru, Venezuela, Guyana, Surinam, French Guiana, and Brazil. The common name is Mauritia palm. Fruit is +/− rounded, very large, usually one seeded, with apical stigmatic remains. The epicarp is covered in many neat vertical rows of reddish-brown reflexed scales, the mesocarp is rather thick and fleshy, and the endocarp not differentiated. The seed is rounded, attached near the base, with a blunt apical beak, thin seed coat, homogeneous endosperm, and basal embryo (Uhl and Dransfield 1987).

M. flexuosa. The seeds I received were cleaned down to the seed coat; the embryo is subbasallateral, the endosperm homogeneous, and solid, without central cracks like the tagua. The seed is about 1.4 × ⅞″ (3.5 × 2.2 cm). The disadvantage is the position of the embryo, but that can be designed around. This nut can be used to make vases and small lidded boxes (Fig. 1).



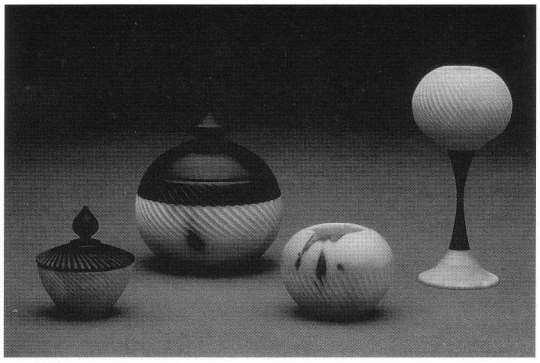
1. Vertical rows from left to right: *Mauritia flexuosa, Orania* spp., *Orania trispatha, Areca catechu, Raphia farinifera, R. australis, Bismarckia nobilis, Wodyetia bifurcata.* 2. Vertical rows from left to right: *Actinorhytis calapparia, Normanbya normanbyi, Verschaffeltia splendida,* Phytelephantoideae (tagua), *Veitchia joannis, V. montgomeryana, V. arecina, V. merrillii.* 3. Vertical rows from left to right: *Metroxylon amicarum. M. warburgii, M. vitiense, M.* spp. (*M. upolense*?). 4. Vertical rows from left to right: *Hyphaene* spp., *H. thebaica, H. petersiana, H. coriacea, Hyphaene* spp.

Metroxylon

Metroxylon is composed of five species, according to Rauwerdink (1986). *M. sagu* has the widest distribution, including Malaysia, Indonesia, Mindanao, and New Guinea. The remaining four species are endemic to the following areas: *M. vitiense* in Fiji, *M. salomonense* in the Solomon Islands, Santa Cruz Islands, and Papua New Guinea, *M. warburgii* in Western Samoa and New Hebrides, and *M. amicarum* in Guam and Micronesia. The fruits of *Metroxylon* are covered with longitudinal rows of scales, and contain a single seed. The seed is composed of a dark-brown seed coat, and the endosperm is a hard ivorylike, homogeneous mass (vegetable ivory); it is horseshoe shaped in vertical section, with a large cavity at the apex, and a small cavity containing the embryo at the base. *M. sagu* and *M. salomonense* are exploited for their sago, which is a starchy substance that forms in the pith, at the base of the tree, and is used as food. The fruit of *M. amicarum* (one common name is ivory nut palm) is reported to have been used in the button-making industry. *M. amicarum* is the only species of the five that is pleonanthic (does not die after fruiting); the remaining four species are hapaxanthic (die after fruiting) (Fig. 3).

M. sagu. Unable to acquire fruit or seed to date.

M. vitiense. The fruit is turbinate to pear shaped, yellowish-tan, about 2.75″ long × 2.25″ wide (7 × 5.7 cm), with 27(28) longitudinal rows of scales. The seed is variable in size, but averages about 1.5″ long × 1.75″ wide (3.8 × 4.4 cm). It is also variable in shape, mainly in the area around the opening or lip of the large apical cavity; sometimes a portion of the lip is receding or much lower than the remainder of the lip. This seed germinates very rapidly; on seeds that have started germination there tends to be an extension of the embryo cavity, radiating out in a horseshoe shape, surrounded externally by the outside wall of the endosperm, and internally by the inside wall of the large apical cavity. This embryo cavity



5. Palm nut turnings. The largest is from *Metroxylon amicarum* and African Blackwood. The others are *M. salomonense* and African Blackwood. Photo by Gregg Krogstad.

extension is filled with a soft, pithy substance, apparently caused by endosperm breakdown during the germination process. On the trees that I observed, the germination process seemed almost instantaneous with dropping to the ground. In both *M. vitiense* and *M. warburgii*, the presence of the cavity limits the amount of useful vegetable ivory.

M. warburgii. The fruit is pear shaped, about 3.5″ long × 3.25″ wide (9.0 × 8.3 cm), covered with 24 longitudinal rows of tan-brown scales. The seed is slightly larger than that of *M. vitiense*, about 1.75″ long × 2.0″ wide, less variable in shape, but with the same embryo cavity extension on seeds starting to germinate; see above for *M. vitiense*.

M. salomonense. The fruit is globose, depressed at apex and base, about 2.5″ long × 3.5″ wide (6.5 × 9.0 cm), and covered with 24–27 longitudinal rows of straw-colored scales. The seed is about 1.75″ long × 2.0″ wide (4.4 × 5.0 cm), and is consistently the most symmetrical of the five species. It also has the smallest opening to the large apical cavity, in proportion to seed size, thus allowing greater flexibility in design of items made from this nut (Fig. 5).

M. amicarum. The fruit is globose to apple shaped, about 4.25″ long × 4.0″ wide (10.8 × 10.2 cm), covered with 24–28 longitudinal rows of chestnut-brown scales. The seed is about 2.25″ long × 2.5″ wide (5.8 × 6.4 cm), but tends to be less symmetrical at the opening or lip of the apical cavity than *M. salomonense.* However, it is the largest of the genus, and an excellent nut (Fig. 5).

Woodturning

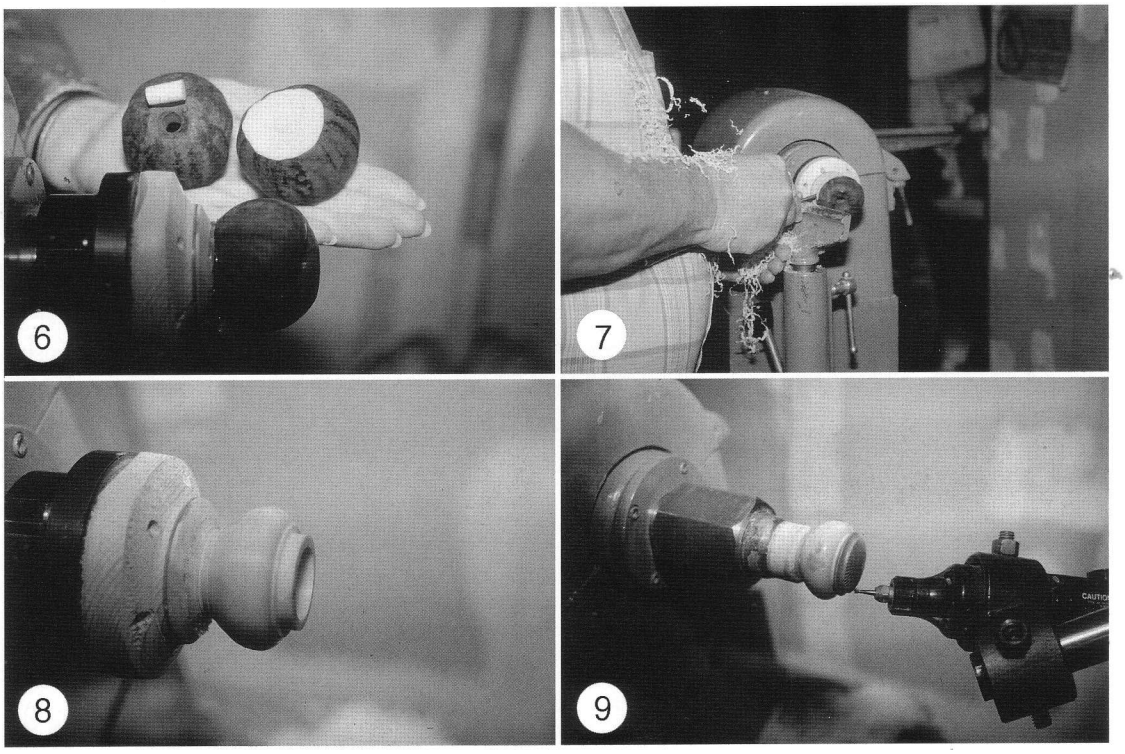
For those readers who are not familiar with woodturning, I will attempt to cover the basics briefly. Woodturning is done on a wood lathe, which has a headstock driven by an electric motor; there is normally some means to change the speed of the headstock. The material to be turned is mounted horizontally to the lathe's headstock, which usually has a threaded shaft, to accept a faceplate, on which the material to be turned is attached. The lathe also has a bed, running horizontally to the headstock shaft. The bed provides a means of adjustment and locking for the tailstock and tool rest. The tailstock may be used as needed to support the end of the material opposite the headstock. The tool rest is adjustable and provides support for the tools, which are handheld in woodturning.

Safety Precautions

A face shield or safety goggle is recommended; at a minimum safety glasses should be worn. Also loose clothing around the hands and arms is very dangerous, as well as long hair, which should be tucked in a hat or contained by other means.

Making a Round Box

After receiving my first *Metroxylon* seed (nut) in October 1993 (*M. amicarum*) I allowed it to dry in its scaly shell for two months at room temperature. The shell was then removed and the brown corklike material was removed from the outside and from inside the large cavity of the nut, leaving just the seed coat attached to the endosperm. The horseshoe shape in vertical section looked perfect for making a round box, a lid to be added from other material. The only problem was the void left by the embryo in the base of the nut. This problem was solved, by drilling a hole from the embryo cavity into the large void, then reaming the hole with a taper reamer and fitting the cavity with a tapered plug, made from a scrap *Metroxylon* nut. The base of the nut is sanded flat, then coated with medium thickness Super glue (Hot Stuff brand—yellow label). The wood waste block is sprayed with accelerator to decrease the curing time for the glue. Once the nut is centered on the waste block and firmly glued, the lathe is turned on. I use a ¼″ spindle gouge to shape the outside of the box as before, and dental picks and a small scraper to hollow the large cavity. The large cavity must be kept as small as possible, since this will be the lip of the box, to which the lid is fitted. When the outside, lip, and inside cavity are shaped, they are sanded starting with 240 grit,



6–9. Sequence for a *Metroxylon* box. 6. A tapered plug ready to glue, a plug glued and sanded flat, and a nut glued to a waste block. 7. Shaping the outside of the box. 8. The rough-shaped box. 9. Cutting flutes in the top of the lid.

then 320, 400, 600, and polished with a buffing compound (white). The lip is made to its final dimension, and then it's time to make a lid. My lids are usually made of exotic woods, but may be made of *Metroxylon* or other material. Presently the *Metroxylon* box lids have all been a threaded or screw-on type, which requires threading the inside of the lid and the outside of the lip of the box. The wood for the lid should be oriented, such that end grain is at the top and bottom of the lid. Lids made in this fashion are the most stable and least affected by humidity changes. Since this particular lid is to be threaded, the wood should be hard, dense, and tight grained, my favorite being African Blackwood (*Dalbergia melanoxylon*). The faceplate holding the box is removed from the lathe, and another installed with a waste block. The material for the lid is glued to the waste block as before. The lid is shaped inside with the gouge, scraper, and parting tool, leaving the inside wall of the lid parallel and 0.080″ (2.0 mm) smaller in diameter than the lip of the box. This dimension only corresponds to the 16 tpi (threads per inch) that I am using. The inside of the lid is sanded as before. The faceplate with the lid attached is removed, and a high-speed 60° v-shaped cutter is mounted on the headstock spindle. A threading attachment is mounted to the bed, and the faceplate with the box is mounted on the threading attachment spindle. The threading attachment (t.a.) depth of cut hand wheel is adjusted so the box just touches the cutter flutes, then the t.a. depth of cut (d.o.c.) scale is zeroed, the box is moved away from the cutter with the t.a. spindle handwheel, and the desired depth of cut is set, using the d.o.c. handwheel and scale. The box is advanced toward the cutter using the t.a. spindle handwheel, in turn cutting the thread to the depth setting on the d.o.c. dial, in this case 0.020″ (0.51 mm) to cut a full thread. I usually make three small passes to produce a smoother thread. The lid is threaded in the same manner, the only difference being an internal rather than external thread. When satisfied with the fit, the threading attachment and cutter can be removed and the faceplate with the lid installed. The lid is removed from the waste block with a parting tool, the faceplate with the box installed, the lid screwed on

securely, and the final form given to the top of the lid, with a gouge, sanding as before but not buffing. I then add some fluting to the top of the lid; usually 48 flutes are cut in the top, using a 1/8 cutter driven by a Dremel tool, held in a jig made for this purpose. The lathe I am using has 48 indexing holes. For those not familiar with headstock indexing, it is only used when the lathe is turned off and provides a means to divide one revolution of the headstock into, in this case, 48, 24, 16, 12, 6, 3, or 2 segments. If the pin is inserted in every hole, then the box lid will have 48 partial revolutions to complete one full revolution. With a flute being cut at each indexing hole the flutes total 48. The lid is given a coat of Watco oil finish, which is allowed to penetrate a few minutes and the excess removed with a clean rag. The box is parted off the waste block, and a groove is cut in the waste block to match the lip of the box. The lip is inserted in the groove, and nylon reinforced tape is used to bind the box and waste block together. The bottom of the box is thus exposed for finishing, with a gouge and scraper, and finally sanded, buffed, and signed (Fig. 5).

Normanbya

N. normanbyi. This genus has a single species from the rain forests of northern Queensland, Australia, whose common name is Australian black palm. The hard, dark wood was used by the Aborigines for making spears, and more recently for canes and walking sticks. Fruit is ovoid to obpyriform, pointed distally, dull salmon pink to purplish-brown at maturity, with the stigmatic remains (apical) forming a short beak. The epicarp is somewhat fleshy, drying wrinkled, and the mesocarp is rather thin, with longitudinal, branched, straw-colored fibers adherent to the smooth endocarp. Seed are about 1.2″ long × 1.0″ wide (2.9 × 2.5 cm), and laterally attached with a long unbranched raphe, lateral hilum, ruminate endosperm, and basal embryo (Uhl and Dransfield 1987).

Oenocarpus

This genus has a single species with two subspecies, distributed in Panama and South America.

O. bataua. The seed is ellipsoidal, with a basal hilum, narrow tapering raphe, and ruminate endosperm, with a hollow in the center; the basal embryo is very large, extending beyond the middle of the seed (Uhl and Dransfield 1987), about 1.1″ long × 7/8″ wide (2.8 × 2.2 cm) (Fig. 2).

Orania

The genus has three species in Madagascar, the rest occurring in SE Asia. I have received seed from one. The endocarp was still present, globose in shape with a rounded cap apically. The seed was globose with a brown seed coat, subapical embryo and homogeneous endosperm with a central cavity.

O. trispatha. The seed is about 1.25″ (3.2 cm) in diameter and can be used for making a box or vase (Fig. 1).

Subfamily Phytelephantoideae

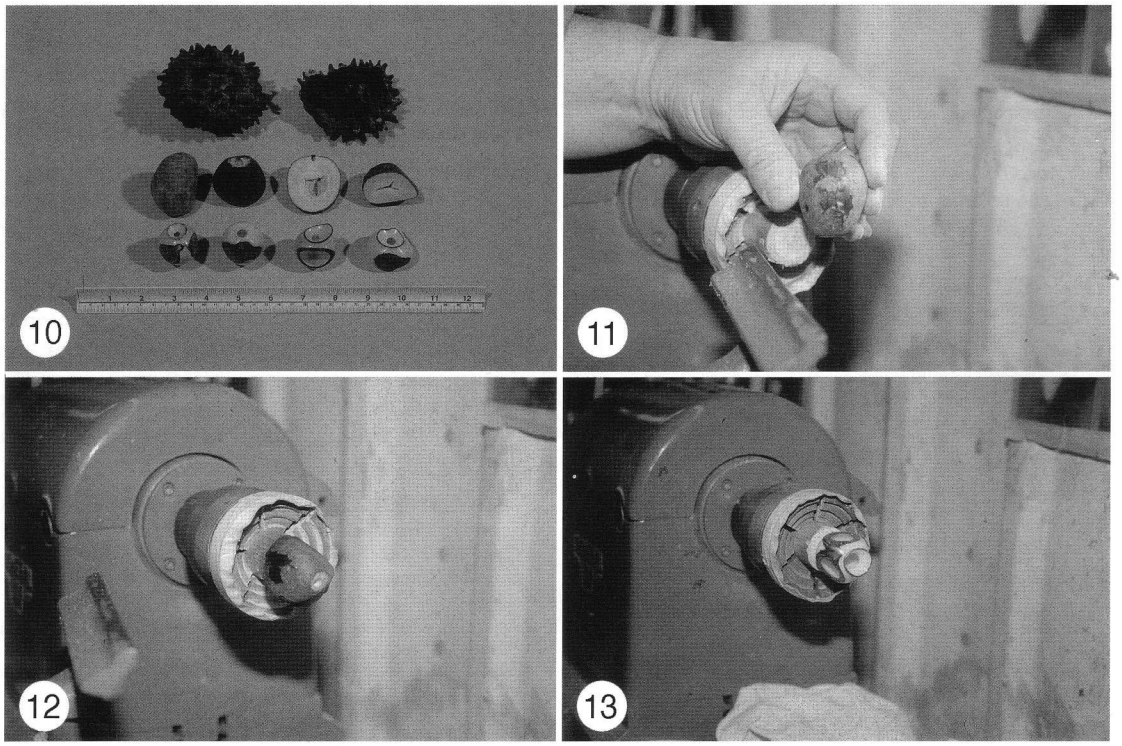
The genera, species, and subspecies within the subfamily Phytelephantoideae are distributed in northwestern South America and Central America, including the following countries: Peru, Ecuador, Columbia, Brazil, Bolivia, and Panama (see Barfod [1991] for detailed description of distribution).

The infructescences, fruits, and seeds of the phytelephantoid palms vary in both size and numbers, depending on the genus and individual tree. The numbers and sizes listed below are from Barfod (1991), and are the combined minimums and maximums of all the genera and not necessarily applicable to any one genus. The infructescences are somewhat spherical in shape and can number from 5 to 25 on a tree and can be as large as 45 cm. The infructescences have from 4 to 45 fruits and the fruits from 2 to 9 seeds (nuts). The seeds are surrounded by a fibrous mesocarp within the fruit, and further covered with a thin hard endocarp. Under the endocarp is the seed with a dark-brown seed coat; the endosperm is homogeneous. The embryo is usually located toward the smaller diameter end of the seed, but its location is variable (Fig. 10).

The tagua nuts that I use have the endocarp removed and are dry when purchased. The size varies from approximately 1.25″ to 2.5″ (3.2 to 6.4 cm) long, and 1.0″ to 2.0″ (2.5 to 5.0 cm) in diameter. The shape is also variable; most are longer than wide. Some tend to be rather flat in horizontal section, while others are pyramidal in horizontal section, with one side rounded and two sides flat. The endosperm varies in color from snow white to a deep amber; giving the appearance of old or fossilized ivory. Many exhibit a grain pattern similar to that of elephant ivory or the growth ring pattern

(*Continued on p. 208*)

(*Continued from p. 189*)



10–13. A tagua nut turning sequence. 10. Phytelephantoideae, left to right: outside of infructescence, inside of infructescence, nut with endocarp, nut with seed coat, nut in vertical section, in horizontal section, and finished vases. 11. A tagua nut before turning. 12. The nut mounted on the lathe. 13. The completed vase.

of a tree. All the tagua nuts I have seen and turned have a void, or cavity, originating in the center of the endosperm, usually running on the same axis as the void for the embryo. Cracks radiate from this central void toward the outer surface of the nut, and limit the amount of material that can be removed from the surface of the nut, without exposing a crack, and must be a design consideration. I am unaware of a method for identification of a genus or species from the tagua nut alone, so they are all tagua nuts to me at this point.

Turning a Tagua Nut Vase

The ideal tagua nut shape for making a vase is round in horizontal section, with the embryo centrally located at one end and vertically inserted. A flat area is sanded on the end opposite the embryo, approximately ¾″ (2.0 cm) in diameter. This flat area will become the base of the vase and will also be where the nut is attached to the lathe. A flat is sanded on the base of the nut for mounting to the lathe spindle as before, and glue is applied to the flat and accelerator to the waste block. The nut is pressed against the waste block and securely attached, keeping the embryo void as close to the center line of the lathe as possible (Fig. 12). The tool rest is adjusted to about ⅛″ from the farthest protrusion of the nut, determined by hand rotation of the lathe. Using a ¼″ spindle gouge, the outside of the vase is formed, stopping the lathe occasionally, to check the depth of cut and the pattern created by the remaining seed coat. A portion of the seed coat is retained to add contrast and interest to the vase. When the outside form is complete, the inside of the vase is hollowed out. A hole is made in the top of the vase using a drill bit or ⅛″ gouge, with the hole extending down through the center of the vase to within about ⅛″ of the base. At this point dental picks, which are formed and ground to various shapes, are used to complete the hollowing of the vase. This is all accomplished with the lathe running and the vase rotating. If all goes well, the void from the embryo becomes the inside neck of the vase and disappears. Because the opening in the neck is normally small, the inside is not sanded.

The inside flare of the neck and the complete outside is sanded and buffed as before. The vase is removed from the lathe using a small parting tool, cutting it off at the glue line. Normally the vase will be remounted using a friction chuck to hold it. A friction chuck is nothing more complicated than a waste block mounted to the lathe, with a tapered hole sized to grip the shoulder of the vase. The vase is inserted into the chuck, neck first, to expose the base for finishing. It may take several tries of adjusting the vase in the friction chuck to make it run true. Once accomplished the base is finished with a small scraper, by making very light cuts so as not to dislodge the vase from the chuck. The base is sanded, buffed, and signed. There is no finish applied to the vase. Liquids or creams should not be stored in the vase, as they may soften and ruin it. It takes me about two hours to complete a vase (Fig. 13).

Raphia

There are about 28 recognized species, mostly in Africa.

R. farinifera syn. (R. ruffia). The fruit is globose, covered with 12–13 longitudinal rows of dark-brown scales at maturity, about 2.0″ in diameter (5.0 cm), epicarp thin, mesocarp thick, mealy, endocarp not differentiated. Seed are obovoid, about 1.5″ long × 1.3″ wide (3.8 × 3.3 cm). The endosperm has large ruminations and a lateral embryo.

R. australis. The seed is elliptical, about 2.8″ long × 1.5″ wide (7.1 × 3.8 cm). See *R. farinifera* for remaining data.

Veitchia

The genus *Veitchia* has about 18 species; I will only discuss the species I have turned. The distribution is New Hebrides, Fiji, and the Philippine Islands (Uhl and Dransfield 1987). *V. joannis, V. montgomeryana,* and *V. arecina* exhibit the same drying problems as noted with *Actinorhytis calapparia*; they must have their seed coats removed, prior to drying. This genus is used to make vases.

V. joannis. This is the largest *Veitchia* seed I have turned, and possibly the largest of the genus. The common name is Joannis palm. The fruit is about 1.8″ long × 1.1″ wide (4.5 × 2.8 cm), ovoid, beaked, red to orange at maturity, with a thin epicarp, yellowish thin-fleshy mesocarp, with two to several fibrous layers, and a thin hard and brittle endocarp. The seed is ovoid to ellipsoidal, about 1.4″ long × ⅞″ wide (3.5 × 2.2 cm) and has a thick hard seed coat adhering to the homogeneous endosperm. The embryo is basal (Fig. 2).

V. montgomeryana. The common name for this species is Montgomery palm. The fruit is ellipsoid, about 1.5 × 1.0″ (3.8 × 2.5 cm). The seed is more ellipsoid than *V. joannis,* and its size is about 1.25″ long × ¾″ wide (3.2 × 2.0 cm). The remainder of the data for *V. joannis* applies.

V. arecina. The common name is Arecina palm. The fruit is ovoid, about 1.25″ long × 1.0″ wide (3.2 × 2.5 cm). The seed is also ovoid, the size about 1.0″ long × ¾″ wide (2.5 × 2.0 cm). For remaining data see *V. joannis.*

V. macdanielsii. The common name is sunshine palm. The fruit is ovoid, about 1.1 × ⅞″ (2.8 × 2.2 cm). The seed is ovoid, about ⅞″ long × ⅝″ wide (2.2 × 1.6 cm). I have been successful at drying these fruits without cracking. See *V. joannis* for remaining data.

V. merrillii. Common names are Christmas palm and Manila palm. The fruit is ovoid, about 1.0″ long × ¾″ wide (2.5 × 1.9 cm). The seed is also ovoid and about ¾″ long × ½″ wide (2.0 × 1.3 cm) with a thin, brown seed coat and ruminate endosperm. See *V. joannis.* for remaining data.

Verschaffeltia

V. splendida. A single species is confined to the islands of Mahe, Silhouette, and Praslin in the Seychelles. The fruit is moderate, spherical, brownish-green, the epicarp smooth, mesocarp thin, fleshy, and endocarp thin, ridged and flanged. The endosperm is about ¾″ in diameter (2.0 cm), conforming to endocarp shape, deeply ruminate, with a small central hollow, and basal embryo (Fig. 2).

Wodyetia

W. bifurcata. A single species, from northeastern Queensland, Australia, is confined to the southwest, south and southeast sides of the Melville Range. The common name is foxtail palm. The fruit is globose-ovoid, orange-red at maturity, with apical stigmatic remains forming a conical beak. The epicarp is thin with very short, stout fibers below the epidermal layers, the mesocarp is fleshy, orange-yellow when ripe, thin with longitudinal fibers, some forked. The endocarp is complex with outer distinctive thick, flat, branched fibers and an inner layer of horizontal fibers. Seed are about 1.2″ long × ⅞″ wide (2.9 × 2.2 cm),

ellipsoidal, beaked, and have medium, anastomosing, slightly impressed raphe branches, a homogeneous endosperm and, basal embryo (Uhl and Dransfield 1987) (Fig. 1).

The palm seeds discussed here are those I have tried. I am most interested in hearing from readers about other seed available, on a purchase or trade basis. I am searching for large, symmetrical, homogeneous, or ruminate seed, with an endosperm that is hard when dry.

Acknowledgments

The accompanying photographs are by the author, unless otherwise stated.

I wish to thank the following people for their help and support with this article, by supplying information, pictures, seeds, etc.: Inge Hoffmann (Seed service), Paul and Patty Craft (Cricket Creek Nursery), Eric, Eileen, and Faye (Seedco), Jeff Marcus (Floribunda Palms), Dr. Scott Zona and Dr. Larry Noblick (Fairchild Garden), Michelle and Janeen (Field Museum Library), Lloyd Sumner (IWCS 'World of Wood' Editor), Ray Baker and Liz Huppman (Lyon Arboretum), Craig Whitesell (Institute of pacific Island Forestry), and last but not least Dr. Natalie Uhl for her invitation to write this article, and her support.

LITERATURE CITED

BARFOD, A. S. 1989. The rise and fall of vegetable ivory. Principes 33: 181–190.

———. 1991. A monographic study of the subfamily Phytelephantoideae. Opera Botanica 105: 1–73.

RAUWERDINK, J. B. 1986. An essay on *Metroxylon*, the sago palm. Principes 30: 165–180.

SCHABILLION, S. 1989. All in a nutshell. Mississippi Petrified Forest: 1–42.

UHL, N. W. AND J. DRANSFIELD. 1987. Genera Palmarum: a classification of palms based on the work of Harold E. Moore, Jr. L. H. Bailey Hortorium and the International Palm Society. Allen Press, Lawrence, Kansas, USA.

CHAPTER NEWS AND EVENTS *(Continued from p. 207)*

Sydney Branch, P.A.C.S.O.A., Chapter of the IPS

The Sydney Branch of P.A.C.S.O.A. regularly meets on the third Tuesday of the month. Their venue has recently changed to the First Ashfield Scout Hall, Corner Orchard Crs. and Murrell Street, Ashfield, NSW. For more information on the Sydney Branch Chapter of the IPS, see the accompanying Membership Roster's section on chapters and affiliates or contact Paul Anderson at (61)-043 691422 by telephone or palmnut@msn.com by email.

The *Principes Minor* July 1997 issue (No. 87) featured the genus *Syagrus*, with a nice summary list of species, each with a brief description, by Ian Edwards, followed by discussions and comments on *Syagrus* culture experiences. Also featured in this issue was a rather comprehensive list of "Palms for the Sydney District—What will Grow?".

Palm & Cycad Society of Western Australia

The Palm & Cycad Society of Western Australia (P.A.C.S.O.W.A.) generally meets at 8:00 p.m. on the third Monday of each month at the Leederville Town Hall, Cambridge Street, Leederville. There are some exceptions, so for the latest information on upcoming meetings, write to P.A.C.S.O.W.A., P.O. Box 170, Como, W.A., 6152, Australia. Alternatively, you may wish to call Barry Shelton (66-9-458-3627) or contact Darryl Hardie at dhardie@agric.wa.gov.au by email.

In addition to local society news, the April issue of the Newsletter of P.A.C.S.O.W.A. carried "Palms of Gascoyne Park" by George Sevastos—a comprehensive list of the over 2000 palms (96 species in 38 genera) planted there. Each newsletter issue includes an interesting installment of "Palm Spotting in Perth" by Barry Shelton, of interest to both residents and visitors to the Perth area.

Hawaii Island Chapter

The June 1997 *Pritchardia*, newsletter of the Hawaii Island Chapter of the IPS, included an article on "High Elevation Palm Growing in Puna—Interview with Jon Hermsdorf" by Bo-Göran Lundkvist, which will be of interest to others growing palms in high tropical altitudes. John's garden in Hawaii is at 2600 feet (790 meters) elevation. For information on the Island of Hawaii Chapter, see the accompanying Membership Roster.

(Continued on p. 218)