



BISHOP MUSEUM
Art Conservation Handout

HISTORY AND TECHNOLOGY OF CALABASHES

Hawaiian carved wooden bowls, or calabashes are among the most beautiful in Polynesia. Originally inspired by the natural shapes of coconuts and gourds, calabashes are today prized works of art as much as unique ethnographic artifacts. Hawaiian royalty held individual calabashes in high esteem and calabashes were sometimes named in honor of chiefs or relatives, in which case the calabash took on the importance of a cherished heirloom.

"The most highly esteemed and favorite calabashes had chants composed for them as though they were human beings, and when they were placed on the table one would hear their owner with proud countenances, chanting of the celebrated deeds of those for whom they were named." William Brigham, 1908

Originally reserved for royalty, when the kapu system was in force common people were forbidden to own vessels made from kou and other trees and they mostly used gourds. After 1819, when Kamehameha II abolished the kapu system commoners could no longer be forbidden to own wooden calabashes. More and more, as Western utensils and pottery became available, traditional calabashes were not thrown away but rather, were kept and treated as valuable heirlooms.

The majority of calabashes were carved from kou, milo and kamani, but monkeypod, koa, rosewood, coconut, breadfruit and other woods were also used. When kou started dying out in the 1860's, due to the devastating effects of an accidentally introduced insect, koa which was usually used for canoes was used as a replacement wood because of its commercial availability and attractiveness.

Ancient Hawaiians shaped calabashes using stone and coral tools. After the calabashes had been shaped and hollowed they were finished using coral, lava then pumice stone and sometimes the skins of sting ray or shark. Kukui nut oil was applied to enhance the grain and polish the wood leaving it with a soft, matt oil finish. During the early 1800's, iron tools replaced the traditional stone and coral tools for fashioning calabashes. By the end of the 1800's, when calabashes became popular to collect, they were often refinished with shellac to give the surface a glossy finish, the calabash being treated as any piece of fine woodwork. Ancient methods of polishing calabashes fell into disuse.

Repairing calabashes during the crafting process or during the life of the calabash was also a skilled art and repairs were often looked upon as marks of beauty. Repairs consisted of filling holes and cracks with wooden plugs and using plugs to stop cracks from enlarging. The most commonly identified repair is the butterfly repair. Large wooden patches with pegs were also employed as repairs. In the 19th century, the non-traditional technique of using orange shellac to fill holes or depressions on the interior of calabashes came into use.

Lathes came to Hawaii in the 1830's, but it wasn't until the 1870's that lathe turned calabashes became common. This coincided with the increasing scarcity of kou trees as well as the Hawaiian calabash craftsman. Thereafter, a variety of non-traditional forms made their appearance, most notably calabashes with footed pedestals and knobbed covers. These were made more for display than functional use.

During this time, Hawaiian calabashes became increasingly valued as art objects rather than utilitarian ones and were prominently displayed in homes. The increasing rarity of traditional calabashes coincided with the increasing perception that Hawaiian culture was in decline. This inspired a renewed interest into the traditional Hawaiian crafts. Serious collections of calabashes began to be assembled by King Kalakaua (1874-1891), as well as others. The deaths of Princess Ruth (1883), Princess Bernice (1884), and Queen Emma (1885), made many calabashes available to the general public as parts of the royal households were sold at auction.

The opening of the Bernice Pauahi Bishop Museum, in 1891, housing the Hawaiian collection of the Kamehameha dynasty including numerous ancient calabashes, conferred greater prestige upon those calabashes held in private collections. Today, Hawaiian calabashes are tangible proof of the pride and unique skill of Hawaiian craftsmanship, symbols of Hawaiian history and models for contemporary craftsmen.

Causes of Deterioration

The purpose of this handout is to summarize steps which can be taken at home to ensure a longer life for your calabash. Because calabashes are made of wood, an organic material, they are susceptible to damage from insects, humidity, light and dust. The following is a summary of how these forces work to accelerate deterioration of calabashes and steps which can be taken to limit them.

Insects

Wood-boring insects such as termites are a major source of damage to calabashes. Cigarette beetles have also been known to attack wood. Your calabash should be examined periodically for the presence of holes and frass (fine pellet or sawdust droppings). If a calabash has any cracks, as many do, these are sites of exposed wood which are particularly vulnerable to insect infestation. If an infestation is discovered, the calabash should be placed into a heavy duty plastic bag immediately and PRCC called regarding the proper procedure for freeze sterilization.

We generally do not recommend the use of chemical fumigants.

Humidity

Relative humidity is a measure of how much moisture there is in the air. Wood can absorb and desorb moisture as the humidity rises and falls. Very low humidity will cause wood to dry out and crack. Rapid fluctuations in humidity are not good either because the expansion and contraction of the wood will result in a weakening of the wood, particularly if the wood has cracks or old repairs. When repairs such as butterfly repairs, patches or plugs were made to calabashes, a different wood than that which the calabash was made frequently was used. Because different woods expand and contract differently in response to changes and fluctuations in humidity, constant swings in humidity can over time result in a loosening of the old repairs in the calabash.

One of the biggest problems in Hawaii is the growth of mold due to the presence of excess moisture in the air. Some types of mold can grow with humidity as low as 65%. Since our humidity in Hawaii is often above this, steps should be taken at home to avoid mold growth.

Mold is a problem because it is visually disfiguring and can have a bad affect upon the surface finish of a calabash. Mold growth grows best given the following conditions: high humidity, lack of air circulation, and the presence of a food source such as dust or oils to grow on. Mold can be avoided by keeping your calabash away from areas of high humidity such as bathrooms and away from areas where leaks or mold have been a problem in the past. Air circulation in the room where your calabash is kept can be increased by running fans and routinely airing out closets if your calabash is stored there. Dehumidifiers can be used in rooms which do not have sufficient air circulation. Keeping your calabash free of dust (see section on DUST) will also aid in preventing the growth of mold.

If mold is found, it must be removed from the surface of the calabash. Take the calabash to a clean work surface. Using a dry, soft, natural bristle paint brush, lift the fluffy mold growths from the surface of the calabash. A vacuum nozzle should be carefully held above the area being brushed to collect the mold as it is lifted. The nozzle should not be allowed to come into contact with the surface of the calabash to avoid scratching the surface. When vacuuming mold, you should always wear a dust mask and disposable latex gloves. Because most vacuum cleaners throw a certain amount of collected materials back into the room during use, it is best to use a wet-dry vacuum(which will trap the mold in the water) or to vacuum the calabash outdoors. After removal of the mold from the calabash, it should be returned to a drier area than where it had been when mold growth began.

Light

Light is a form of energy. All light contains energy and can do damage . All visible materials absorb light. The amount of damage done to these materials depends upon the energies contained by the light, the amount of light falling on the object, otherwise known as intensity, and the length of time that the light is kept on the object. Unfortunately light damage is cumulative. Once the molecular structure of a material has been altered by light, it cannot heal itself. Sunlight and fluorescent light are the most damaging types of light because they contain high energy short wavelength ultraviolet (UV) radiation.

The energy in ultraviolet light is so great that it quickly causes the "activation energy" of materials to be reached. This results in the breaking of chemical bonds between atoms in the molecules that make up materials. Broken chemical bonds in materials result in visible changes in the condition of objects. In wooden objects such as calabashes, these changes will be seen as bleaching and fading of the wood. On calabashes that have been shellaced or have shellac fills, the effects of light damage can result in degradation of the shellac finish which will be seen as cracking and darkening of the shellac finish.

To lessen the damage caused by ultraviolet light, calabashes should never receive direct sunlight or be illuminated by bright spot lights. Direct sunlight can also cause the calabash to get hot. Elevated temperatures will have a drying effect upon the wood and

possibly damage the finish as well. The ultraviolet component in sunlight can be lessened by the use of clear or partially shaded acrylic films which can be applied to window glass. The ultraviolet light given off by fluorescent light can be diminished by the use of ultraviolet absorbing filters which can be placed over the fluorescent light tubes. If the calabash is in a display case, the case should be made of an ultraviolet light absorbing acrylic such as Lucite[®], Plexiglas[®] UF-3 and UF-4 grades or Lexan[®]. For more information on light, please refer to the PRCC handout entitled "Light: Basic Principles and Practices for the Preservation of Art and Artifacts."

Dust

Dust can damage calabashes by attracting insects and mold. Since dust is ever present, knowledge about what dust is composed of and how it affects objects will help to understand how it effects preservation. By knowing the procedures for proper removal of dust, damage to calabashes can be minimized.

Dust is fine organic or inorganic suspended particulate matter ranging in size and coarseness. It is the result of deterioration. Plants shrivel, dry and break apart, animals shed, factories give off by-products, automobile tires gradually erode and release fine rubber particles into the air. These all contribute to the formation of dust. Natural particulates in the air include, mold spores, pollen, proteinaceous particles from dead insects and inorganic, mineral based dirt.

The organic material in dust tends to be hygroscopic. This means that moisture in the air is retained and even attracted by the dust. The moisture collected in dust provides the necessary humidity for the growth of mold. Mold growth on the surface of a calabash can result in discoloration, staining and marring of the finish. The organic matter found in dust is also a good absorber of atmospheric pollutants such as sulphur dioxide and chlorides which provide the necessary conditions for mold growth. Chlorides are present in the air through evaporation of ocean water. Chloride salts are hygroscopic and can lead to staining and weakening of organic materials such as wood.

Another danger of dust is that concrete particles and other inorganic mineral components are crystalline. The sharp, hard spikes and edges of these particles can be abrasive and act as fine sand paper, marring polished and finished surfaces as dust is rubbed or dragged across the surface. Finally, the insect parts, pollen, plant particles and grease found in dust is an attractive food source for a range of insects. The warm, moist, food-rich environment formed by the dust provides an excellent nesting site for insects. Insects which begin by feeding and nesting in dust found on a calabash may eventually infest and damage the calabash.

Good housekeeping is the best means of combating dust. Weekly cleaning of exposed surfaces will prevent the build-up of dust and help keep your calabash from suffering chemical, fungal and mechanical damage. There are various methods of safely removing dust from the surfaces of a calabash. We do not recommend the use of commercial aerosol spray cleaners because the ingredients used are often not disclosed on the can. The finish on your calabash can be damaged by the solvents used in commercial spray cleaners. Commercial cleaners can also contain a variety of other unknown ingredients which have the potential for damaging your calabash. Any product containing silicones or oils should not be used, as these materials tend to build up, darken, and become sticky and difficult to remove over time.

When removing dust from your calabash the abrasive quality of dust must be kept in mind. A gentle stream of clean air blown over the surface can remove a large quantity of abrasive dust. Brushing the surface with a soft brush such as a white boar's hair Chinese pipe brush or Japanese hake brush rather than a dust cloth will further reduce abrasion. The soft bristles will pick up dust rather than drag it across the surface as would a dust cloth. Brushes are available from local art supply stores. When removing dust from a hard, textured surface, a stiffer brush may be needed to work the dust out of the cracks and crevasses frequently found on calabashes. The stiffer brush should be used only after as much dust as possible has been removed using air or soft brush.

Cleaning

Over a period of time, as a result of frequent handling and accumulations of dust and dirt calabashes can take on a dull, lifeless appearance which detracts from its natural beauty. It is understandable then, that the owner of a calabash might desire to clean and polish the calabash in an effort to restore some of its original lustre.

While this is an admirable sentiment on the part of the owner, there are still several factors to consider when contemplating the cleaning and polishing of calabashes. One critical fact is that commercial cleaning and polishing products are "proprietary". This means that the actual contents of the product are rarely fully disclosed. Consequently, the ingredients of the product may be harmful to the finish of the calabash and you would have no way of knowing until after the damage had been done. In addition, ingredients of products are frequently changed without warning or notification. As a result, a product which was previously harmless to wood may be less so after the contents have been changed. Therefore, proprietary products should be avoided whenever possible.

To clean a calabash, the simplest way is really the best and least damaging approach. The calabash should first be dusted carefully using a soft brush to remove the dust from the surface. Because dust can have a fine, abrasive quality, it is important not to use a dust cloth as this may grind dust into the surface and mar the finish. Smaller brushes may be used to remove dust from inside cracks. If possible, when brushing dust from the surface of the calabash, it should be directed into the nozzle of a small, low power vacuum cleaner to completely remove the dust, rather than merely redistribute it.

After the surfaces of the calabash have been dusted, surface accretions and other dirt can best and most safely be removed by using a clean, damp cloth. The use of "dusting" aerosol sprays which are sprayed onto a dust cloth should be avoided as these can introduce a wide variety of contaminants and solvents into the wood which may attack the finish of the wood.

If the calabash has acquired paint scuff marks from being in contact with painted surfaces such as shelves or walls, as is often the case, the paint, if it is a water-based Latex™ paint can usually be removed by gently rubbing with a damp cotton swab such as a Q-Tip™. Paint removers should never be used.

Polishing

Like aerosol sprays, liquid polishes are easy to use and this convenience is its main attribute. However, there are serious drawbacks to using spray or liquid polishes and their use should be avoided. The risk of introducing contaminants into the wood by

using aerosol sprays has already been mentioned. Liquid polishes are problematic as well. Again, because these are proprietary products, their contents may not be fully disclosed. Emulsion polishes which are water-based products containing waxes, oils, detergents and solvents can have extremely powerful cleaners which leave a bright, but short-lived sheen on the surface. These may also contain harmful abrasives.

Oil polishes are troublesome as well. They can contain a diverse and complex combination of ingredients and there are serious problems with using them. There are two basic types of oils: drying oils and non-drying oils. Drying oils, such as linseed and tung oil "dry" through a chemical reaction with the air. The drying process makes the oil increasingly difficult to remove over time. As the drying oil ages it also tends to become yellow or brown. Non-drying oils, such as lemon oil and mineral oil remain liquid on, or in the surface of the wood. Dust and other airborne contaminants will easily stick to the wet surface. Therefore, drying and non-drying oils should not be used to polish calabashes.

The most beneficial polish to use on a calabash is a semi-solid, micro-crystalline wax such as Renaissance[®] wax. This wax does not stain or discolor and will provide a very hard, moisture resistant protective layer to the surface of your calabash. Waxes are among the most stable of materials and the severe deterioration problems of drying and non-drying oils are not encountered with micro-crystalline waxes.

When using Renaissance[®] wax, a little goes a long way. The wax should be applied using a small, clean, lint-free cloth. A thin coating of wax should be applied to a small area of the calabash, then buffed out with a clean, soft, lint-free cloth. If too large an area is waxed at one time and the wax allowed to become too dry, it will be difficult to buff out the wax. Therefore, it is easier and more effective to work on a small area at a time, then move along to the next small area making sure to overlap them slightly so as to provide even coverage. It is important to use only a thin coating of wax.

Since many calabashes over the years have acquired a variety of nicks, scratches and gouges, if too much wax is used these surface defects will become filled with wax which when dry, will be very difficult to buff out. Fortunately, because Renaissance[®] wax is so durable and stable the calabash should require re-waxing only very infrequently, depending upon how often it is handled. The need for a new application of wax can be easily determined. If the surface can no longer be buffed to an appropriate sheen, it is safe to assume that the wax has worn off.

Storage

The goals of safe storage are to avoid insects, mold, dust, light damage and damage due to mishandling. Calabashes should be stored in a clean, dry, dark storage space. If the calabash is placed in a plastic bag, this will limit access of dust and insects. The storage space should not be one that is excessively hot. Nor should the calabash be stored in such a way that it is constantly being moved in order to gain access to other items in the storage space. The more often an object is handled or moved, the greater the likelihood that it will come to harm. It is important to remember that no matter what precautions are taken, problems can occur with time. It is essential, therefore, that all stored materials be examined at least once every three months for signs of insect activity, mold growth or any other observable change .

Display

The displaying of calabashes should proceed along common sense lines. Nevertheless, there are certain considerations that should be adhered to. As mentioned earlier, calabashes should not be exposed to display conditions of excessive light, heat or humidity, or conditions that will foster mold growth or insect infestation. Therefore, select an area where the calabash will not receive direct sunlight and be out of harm's way. It should be in an area where excessive moisture or leaks are not a problem.

If the calabash is displayed as a free standing object, placed on a shelf or piece of furniture for instance, there should be an interleaving material separating the calabash from the object it is placed on. This interleaving material will prevent the bottom of the calabash from getting scratched and abraded or picking up scuff marks of paint if the calabash is placed on a painted surface. Similarly, if the calabash is placed on a shelf, it should be far enough away from the wall to avoid damage that may ensue from the calabash hitting the wall. The calabash should not be used as an ornamental container to hold potted plants, for instance or any other material. These will only serve to attract insects and dust, as well as putting the calabash at risk from excess moisture that will be attracted to the material placed in the calabash.

A calabash can be displayed in a purposely built exhibit case. An exhibit case will protect the calabash from dust and insects. The case should use ultraviolet absorbing acrylic such as Plexiglas™ UF-3 or UF-4 grades, Lucite™ or Lexan™. The case should also provide for the maintenance of a stable relative humidity. This can be accomplished through the incorporation of silica gel dessicant into the case design. The use of silica gel to maintain an appropriate level of relative humidity can be complicated. Pacific Regional Conservation Center can provide a blueprint for the design and fabrication of a simple exhibit case. PRCC can also offer advice on the proper use of silica gel in the exhibit case.

Materials and Source List

Supplier	Product
Hawaiian Graphics 1312 Kaumualii Street Honolulu, HI 96817 808.841.7527	Hake and Chinese "pipe" white bristle brushes:
Honolulu Academy of Arts 900 South Beretania St. Honolulu, HI 96814 808.532.8700	Renaissance Microcrystalline paste wax:
Conservation Materials, Ltd	Silica Gel Dessicant: This product should be used only in consultation with a qualified conservator.

	Misuse can result in damage to the object.
Min Plastics 921 Kaamahu Place Honolulu, HI 96817 808.847.1511	U. V. Absorbing Plexiglass:

Bibliography

The Ancient Hawaiian House
William Brigham, Honolulu 1908

The Hawaiian Calabash
Irving Jenkins, Editions Limited, 1989

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