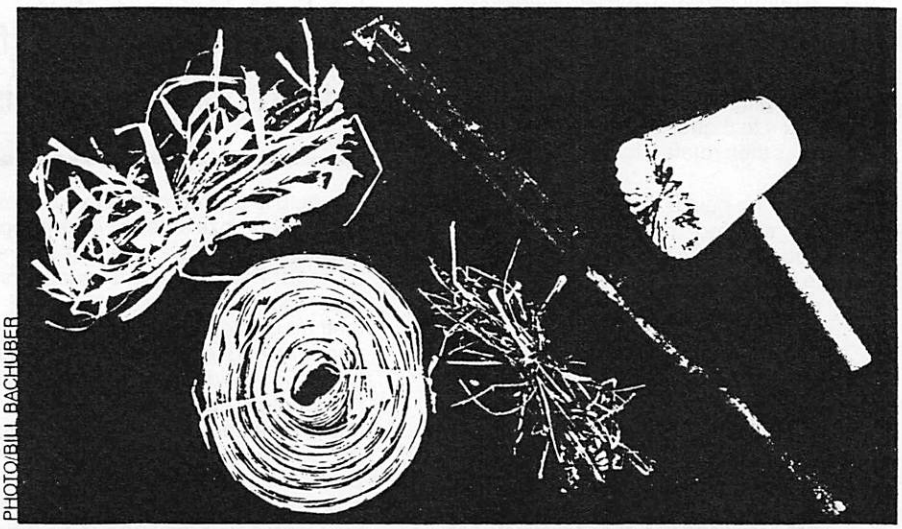
Alternative fibers

Plant fibers for cast papermaking

By Lillian A. Bell

When I began making my own paper in 1976 for use in my sculptural work it was obvious that I had neither the funds for a Hollander beater, nor the inclination to use thick white rag paper. I proceeded to do some research on oriental papermaking techniques, hoping to develop and adapt some simple ways of turning plant fibers into quality papers suitable for art objects. In contrast to the production papermaker, I did not have to be concerned with speed and volume. Since the main focus of my work is to produce art, I did not want to commit too much time to papermaking processes beyond the initial experimentation, or invest in a lot of equipment. My guidelines were to be those of simplicity of preparation, technique and equipment.

After receiving a $5,000 fellowship in 1977 from the Western States Arts Foundation, I was able to go to Japan and Polynesia to study papermaking techniques, set time aside for experiments with plants, and have the resulting papers tested by a conservator. I was searching for fibers that were obtainable in local stores, or by mail order, or were obtainable from wild or cultivated plants. I was also looking for fibers that were available in quantities large enough to produce a reasonable amount of pulp, that could be easily harvested and prepared, and that would have a light enough color without bleaching. Since fiber length is an indication of final paper strength, I was looking for fibers that were more than three millimeters in length. The fibers that I finally settled on for the main part of my work are Milkweed, a bast fiber that I collect in the fall from weeds growing in the eastern parts of Oregon and Washington; Mulberry, another bast fiber that I am now growing as well as buying from Japan and Tonga; and Gampi, also a bast fiber which I purchase from Japan. I also use Manilla, a Philippine leaf fiber that I purchase from a fiber outlet in Hawaii. There are many other plant fibers that I use only occasionally. These include Sisal, purchased from the hardware store, Yucca and Daphne, which I grow, and Hop Vines, a local crop residue that I collect in the fall. I continue to use rag or wood linters for deep casting.



PHOTO/BILL BACHUBER

Fibers and hand beating tools, (clockwise from center), long ironwood pounding mallet from Samoa; oakwood mallet, replica of Japanese pounding mallet used in Mino; milkweed fibers from Ellenburg, Washington; coil of inner mulberry bark from Tonga, South Pacific; gampi fiber bundle from Japan.

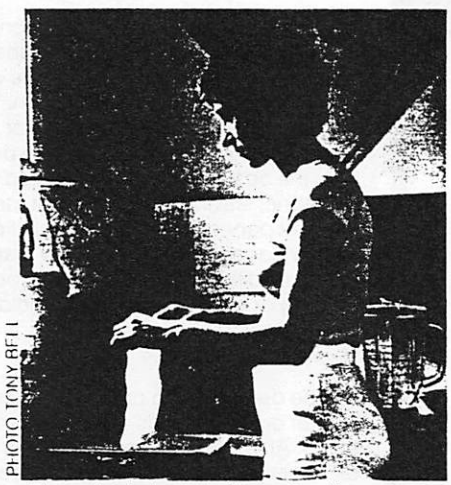


PHOTO TONY BELL

The artist in her studio, using the Nepalese Leaf casting technique.

Lillian A. Bell teaches papermaking at the Oregon School of Arts and Crafts in Portland. Her own works have been widely exhibited, and she has traveled extensively in her study of both Eastern and Western hand papermaking techniques and materials. She will be taking part in the International Exchange Symposium on Washi, Tapa, and Western Handmade Paper to be held this June in Honolulu.

In order to prepare the fibers into pulp, a cooking process is required. The dry fibers are soaked in water overnight, drained, placed in a stainless steel pan and covered with water. For each quart of water, one tablespoon of lye is added, and the fibers are cooked for two hours. Cooking is completed when the fiber strands pull apart easily with the fingers. After a thorough rinsing, the fibers are ready for dyeing. I use Procion dyes, following package dyeing directions for textile fibers.

My beating repertoire involves the use of hardwood mallets for hand pounding soft bast fibers like Gampi and Milkweed. Small amounts of these fibers need approximately 15 minutes of pounding after which they are dispersed in water to make up the pulp. A mechanical beating technique I use involves the use of a ball mill for leaf fibers like Manilla and Sisal. This simple machine, which has been used by paper company test labs for

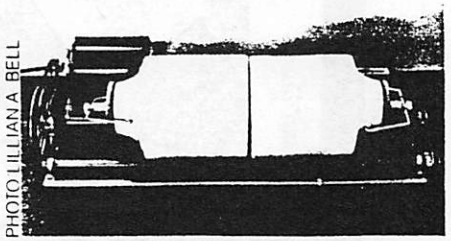


PHOTO LILLIAN A. BELL

The Ball mill. Porcelain pebbles, fiber and water are tumble-beaten inside the jars as they rotate for several hours.

testing sheet formation and beating characteristics, works by pounding the fibers in water with porcelain pebbles against the sides of a porcelain jar which is rotated on a motorized stand. Its action is rather similar to the old stamping machines. For a 1½ gallon jar approximately 1 oz. of fiber (measured while dry before soaking and cooking) is cut into 2 inch pieces and 5 lb. of porcelain pebbles and 4 to 5 quarts of water are added. The jar is then rotated for about 3½ hours.

After the pulp is drained and the pebbles are removed, the pulp is ready for use. In addition to the ball mill and pounding mallets, I am also using a blender for mixing linter pulps for deep casting.

I have chosen two unusual methods of sheet formation for shallow casting, primarily because they both offer me the greatest aesthetic flexibility. The first method is a combination of an ancient Nepalese technique and the leaf casting process used in paper company labs.

"Oriental sheet formation allows layer after layer of pulp to be built up in the making of a single sheet.... When the pulp used for layering is translucent, all added pulp imagery is clearly visible."

The pulp is poured onto a fixed 30 mesh plastic or bronze screen with a deep deckle floating in water, and is then stirred by hand. The sheet forms as the mold is drawn out of the water. The second method is adapted from Japanese papermaking. A mucilage (a powdered synthetic version of a natural root called *tororo-aoi*) is added to the pulp, which is cast by the cupful onto a moveable bamboo screen with a shallow deckle. The pulp is distributed over the screen by rolling the screen back and forth. The mucilage allows the fibers to be evenly suspended in solution, slows the water drainage, and results in excellent sheet formation characteristics. Both methods offer the added advantage of requiring only small amounts of pulp, allowing me to easily change pulp type or color as the work demands.

Couching for both methods is done by transferring the wet sheet of paper onto a piece of cotton fabric. In the Nepalese Leaf Casting technique, a wet piece of fabric is laid on top of the screen, excess water blotted off with a felt, and the paper, while adhering to the fabric, is peeled off the screen. In the Japanese adaptation, the bamboo screen with the wet paper is laid, paper side down, onto a dry piece of fabric, and the screen is peeled off.

Drying for the two techniques is done by rolling the newly formed paper, adhered to the fabric, paper side down, onto a wood board, using a felt and a rolling pin. The papers are air dried for 24 hours, or until dry to the touch. After the fabric is peeled from the board, the paper is peeled from the fabric, leaving a perfectly flat, dry piece of paper. For sculptural relief prints, the dry paper is dampened and manipulated into dimensional form by embossing, draping or stacking over wood molds. A press is not required.

For the deep casting process, 2 inch deep plaster or wood molds are used with linter pulps. After the pulp comes out of the blender, it is strained through a piece of fiberglass screening to remove excess water. Then it is placed in the mold by the handful, and water is sponged out until the pulp clings, damp-dry, around all the mold surfaces. A variation is to ink the mold prior to placing the pulp. The casting is dried in the mold and separates quite easily when completely dry. The drying process can be speeded up by directing an air flow from a fan over the castings.

As I became more involved with the papermaking process, I discovered that one of its most fascinating aspects as a medium for imagery is that the pulp is both

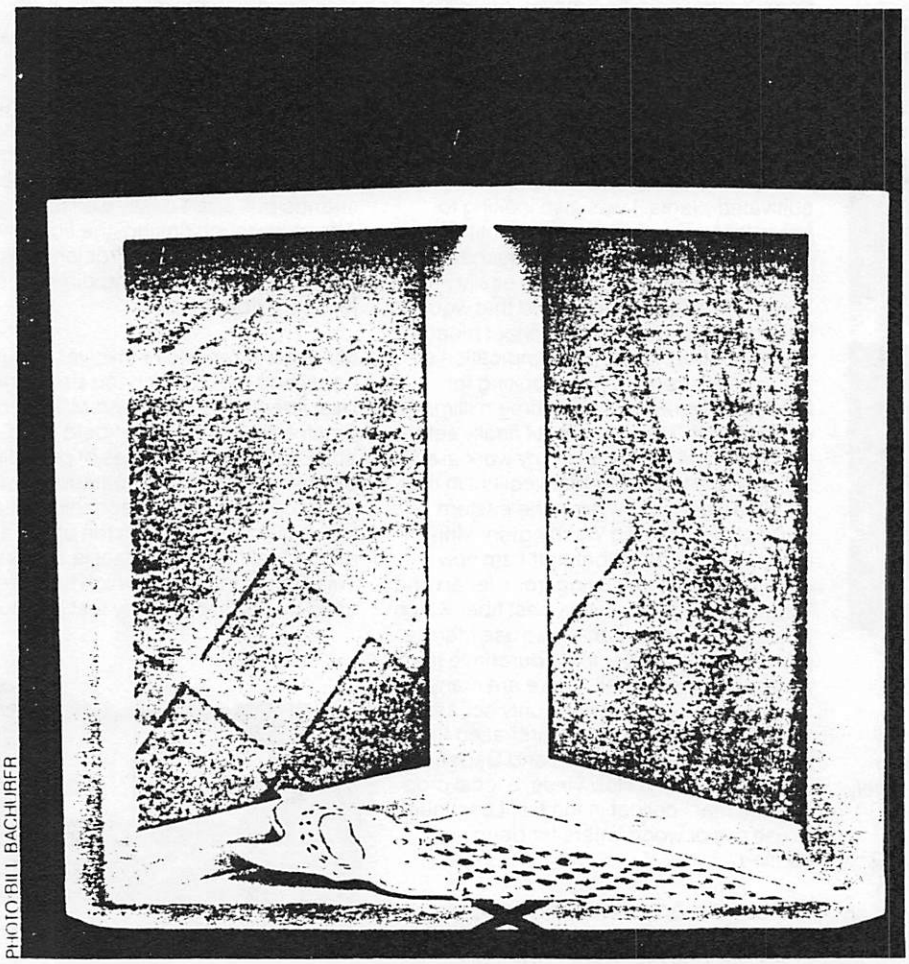


PHOTO BILL BACHURER

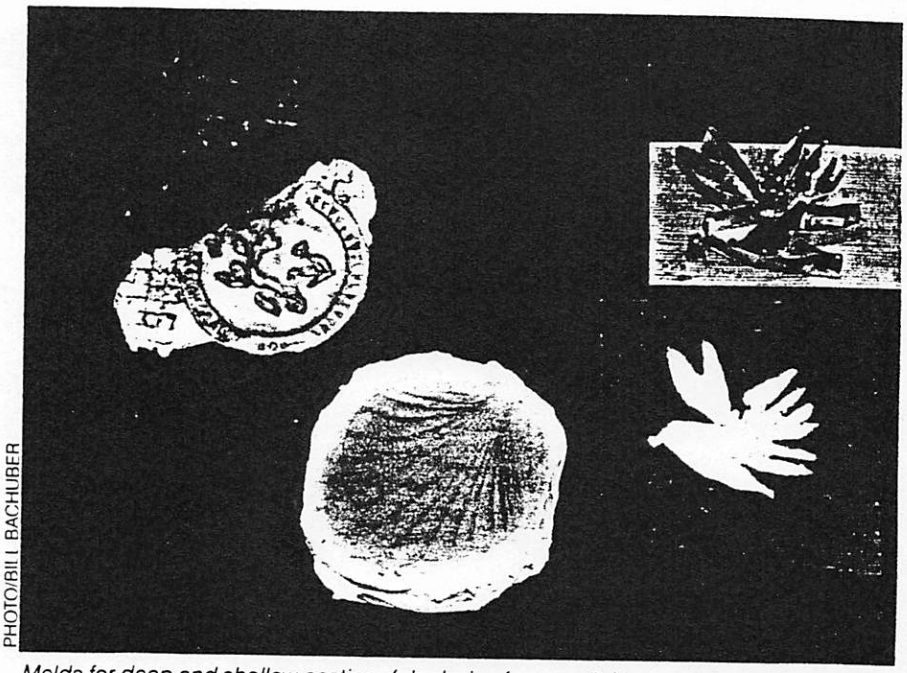
Lillian A. Bell—"Oregon Mist" (from the Fallen Monuments series). 1979. Cast paper (gampi, cattail, mulberry, rag, and wood fibers), 40.6 cm (w) x 25.4 cm (d) x 35.6 cm (h).

surface image and ground. The artist can work "in" and "under," as well as "on" the surface, an aspect that is even further enhanced by the use of oriental sheet formation techniques with translucent plant pulps containing mucilage. Oriental sheet formation allows layer after layer of pulp to be built up in the making of a single sheet, a feature that I have taken advantage of by inserting images and other pulps between the layers. Furthermore, when the pulp used for layering is translucent, all added pulp imagery is clearly visible. A collage approach to art without glue! Layering gives the finished "print" a depth that cannot be achieved with western papermaking methods. In contrast to rag paper, plant papers also have a lustre and sheen as well as great strength in very thin papers. All these features have resulted in my decision to work primarily with plant fibers and oriental methods.

Among the many oriental papermaking techniques that I am currently using, there are some that are essentially printmaking techniques with pulp. These include thin sheet casting through shaped metal molds, the casting being laminated and pressed to a base sheet, and coated to seal with a final layer of translucent Gampi pulp while still wet. This process is similar to silk screen or stencil printing, with the pulp taking the place of the pigment.

Another technique is basically a subtractive one, where some of the pulp is removed by spraying water through a screen over a newly cast sheet covered with wax paper shapes. These resist the water spray and retain images in the sheet. The wax paper is removed after spraying, and a thin layer of Gampi pulp is cast over for strength as the final layer.

I hope I've offered new insights into old techniques that hold implications for other paper artists. Since papermaking is a surface process very much related to conventional printmaking, other printmakers may be interested in expanding their vocabulary to include cast paper. The two mediums offer an interesting combination for those who wish to explore beyond the paper surface.



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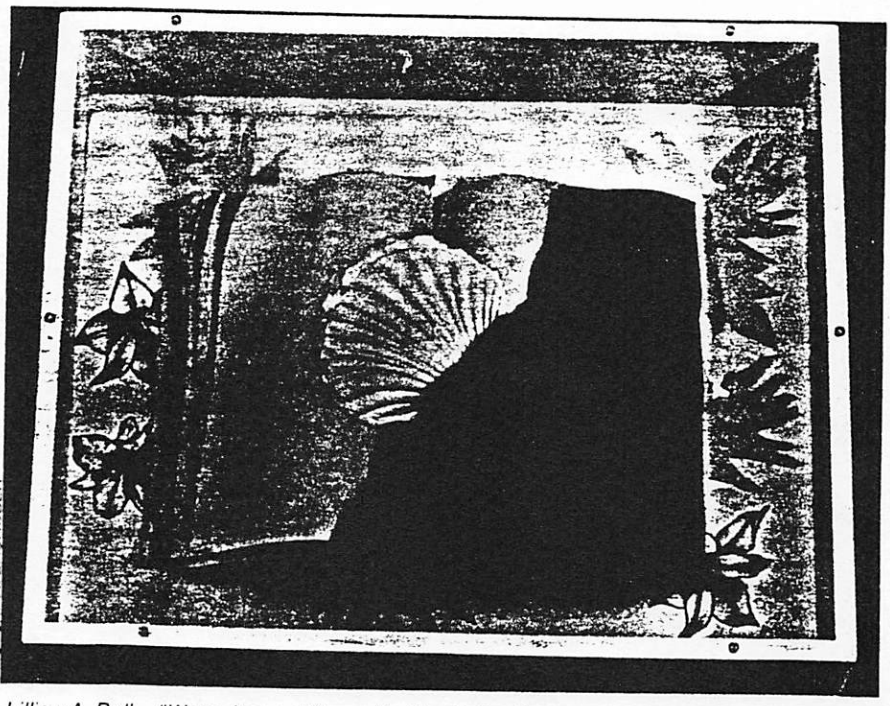
Molds for deep and shallow casting, (clockwise from top left), carved wood mold, with resulting paper cast; metal mold of sheet aluminum, with resulting casting; plaster mold.



PHOTO/BILL BACHUBER

Lillian A. Bell—"Wrap Around" (from the South Pacific series). 1980. Cast paper (mulberry, cornhusk, wood, rag, and milkweed fibers), 43.2 cm (w) x 36.8 cm (d) x 10.2 cm (h).