

Inlaying Mother-of-Pearl

Watching one banjo maker cut and fit a delicate design

by John Lively

Though most often found as decoration on musical instruments, mother-of-pearl inlays traditionally have graced a diversity of articles—furniture large and small, gunstocks and knife handles, walking sticks and billiard cues. Mother-of-pearl and its more colorful cousin, abalone shell, are sold in small, thin pieces (the box below lists some suppliers), that are quite abrasive, hence hard on tools, and extremely brittle. You can't just saw it as though it were maple veneer. A highly developed craft practiced by the Chinese as early as the 14th century, mother-of-pearl inlay was very popular among the 18th-century *ébénistes*, and it distinguishes the work of such

20th-century inheritors of that tradition as Louis Süe and André Mare (pp. 44-45).

To learn how to cut and inlay mother-of-pearl, I visited Richard Newman (whose banjo appeared in *FWW* #1, Winter '75) at his shop in Rochester, N.Y. He demonstrated the technique by cutting a stylized Georgian dolphin in pearl, then inlaying it into a piece of scrap ebony. Here's how he did it:

From his stash of mother-of-pearl chips, Newman selected one and pasted a paper cartoon of the sea beast on top of it. Next, he clamped his bird's mouth (a rectangular block with

Sources of supply for mother-of-pearl and abalone

Mother-of-pearl does not come from the oyster that produces seed pearls, but from various bivalve mollusks, some of which grow as large as 2 ft. in diameter. Most pearl shell is imported from the western Pacific; the cold waters of Australia produce the finest shells, less likely to be damaged by sea worms, barnacles or other parasites. Colors range from white and grey to pink and deep gold; gold pearl, from the lip of the shell, is the most expensive cut. Some pieces of pearl are preferred for their evenness of color; others are iridescent and highly figured, sometimes design-

nated wavy or fiddleback after the wood figures they resemble.

Abalone is cut from the shell of a monovalve mollusk native to southern Californian and Mexican waters. It is generally more spectacular than pearl, with black fracture lines along twisting planes of bright colors that blend and shift under changing light. There is green abalone, which has become rare, and there is larger, less expensive red abalone. The central portion of the shell, where the muscle attaches, is called the heart and is most prized. It looks something like crinkled tinfoil, sparkling with green, blue and red.

Suppliers cut mother-of-pearl and abalone with a lapidary saw, attending to the figure and curvature of the shell. The

pieces are irregularly shaped, usually about 1 in. square (a 3-in. piece is considered large). Then they're ground to thicknesses ranging from 0.035 in. to 0.060 in. The thicker stock is best for curved surfaces, like fretboards, and for fine lines and sharp curves. Some suppliers grade their stock "select" (for exceptional figure and size), "#1" (good and clear), and "#2" (some parasite damage). Cost is figured by the ounce, \$15 to \$25 an ounce being typical. Some suppliers, as indicated below, will custom-cut designs; some provide pre-cut blanks in a limited number of designs. —Arthur Sweeney

Arthur Sweeney is a professional stringed-instrument maker. He lives in Napa, Calif.

Suppliers:

Erika, 12731 Loma Rica Dr., Suite G, Grass Valley, Calif. 95945. Mother-of-pearl and abalone blanks.

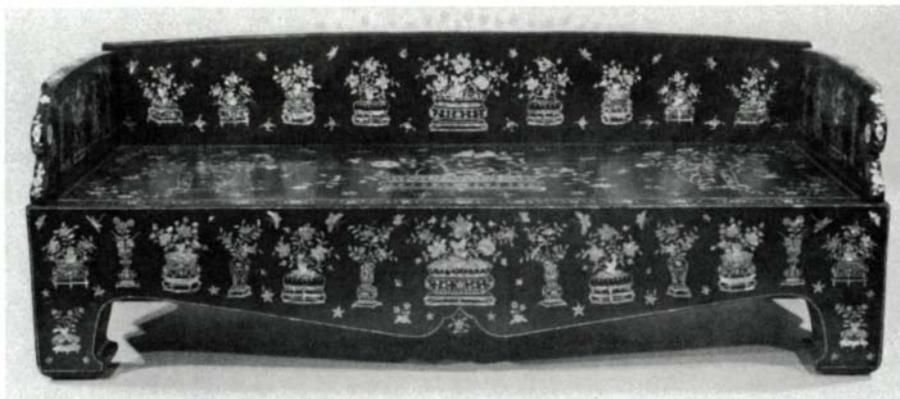
Handy Trading Co., 8560 Venice Blvd., Los Angeles, Calif. 90034. Mother-of-pearl and abalone in bulk.

Pearl Works, Larry Sifel, Rt. 3, Box 98B, Mechanicsville, Md. 20659. Mother-of-pearl and abalone blanks; pre-cut designs; will custom-cut designs.

Vitali Imports, 5944 Atlantic Boulevard, Maywood, Calif. 90270. Mother-of-pearl blanks.

David Russell Young, 7134 Balboa Boulevard, Van Nuys, Calif. 91406. Mother-of-pearl and abalone blanks.

Zaharoff Industries, 26 Max Ave., Hicksville, N.Y. 11801. Mother-of-pearl and abalone blanks; will custom-cut designs. □



Chinese k'ang (a type of bed) from the Ming dynasty (1368-1644) exemplifies the sophistication of mother-of-pearl inlay work before it became popular in Europe. Metropolitan Museum of Art, gift of Mrs. Jean Mayzè, 1961.



Very fragile and brittle, pearl must be sawn with a studied technique and special care. Left, with jeweler's saw and bird's mouth (the V-notched board clamped to his bench), Newman cuts a mythical sea beast from a mother-of-pearl chip. Top right, Dremel equipped with a tiny end mill routs the recess for the pearl inlay. It must fit easily, but with no gaps. Center, Newman uses an engraver's block to hold the stock when incising detail into the pearl. Engraver's blocks are necessary for good results, since engraving requires moving the work into the tool rather than the other way around, as is the case with carving wood. Engraved gouges filled with epoxy/aniline dye mixture delineate details and add depth to the finished dolphin (about twice actual size), right. Newman used black dye, but other colors would work as well.

a V-notch cut in one end) to his bench. With jeweler's saw in hand, handle up, teeth down, he proceeded to cut around the shape of the beast, using a #3 jeweler's blade (photo, above left). Sometimes moving the pearl into the blade and sometimes moving the blade into the pearl, his easy sawing rhythm kept the blade from binding, which, had it occurred, would have fractured the pearl. Rhythm, he told me, is especially important when sawing tight curves, because interrupting the up-and-down motion can snag the blade, chip the pearl and ruin the whole job.

While sawing away, Newman pointed out that pearl dust is toxic and said you should blow the dust away from your face. He uses a respirator when sawing it for extended periods, and warns that lung damage can result from inhaling too much of the powder. To saw the sharp points on the tail and pectoral fins, he always cut from the outside in, sawing out little loops in the waste part of the pearl to make space for a new angle of attack. This part of the job was slow-going, but the tedium paid off. The finished dolphin required only a few deft touches with a needle file to make its profile precisely right.

To prepare the ebony for inlaying, he glued the pearl dolphin on the surface with Duco quick-dry cement. Then,

carefully, he traced around the figure with a sharp machinist's scribe, deepening the scratch a little at a time until the outline was clearly visible. Tracing complete, he slid a razor blade under the pearl and popped it free, leaving its silhouette behind. For routing out the area for inlaying, Newman used a 2-flute, single-end micro-miniature end mill with a $\frac{1}{8}$ -in. shank (available from the Woodson Tool Co., 544 W. 132nd St., Gardena, Calif. 90248). The bit was mounted in a Dremel Moto-Tool equipped with a router base (photo, top right). Newman set the depth of cut slightly shallower than the thickness of the pearl. This end mill will cut a channel as narrow as $\frac{1}{32}$ in., thus minimizing the areas that will need to be filled in later at sharp corners.

It took a little trial fitting and re-routing to make the pearl drop neatly into place. Next, Newman applied silver leaf to the back of the inlay, and then he mixed a pinch of ebony sanding dust into a batch of five-minute epoxy (full-cure epoxy is better), smeared some into the recess and inserted the dolphin, pushing down gently and letting the epoxy/dust mixture ooze out slowly. He covered the inlay with plastic wrap and clamped a block on top of it. After 30 minutes drying (the epoxy has to set hard), he removed the block and



Newman saws mother-of-pearl the traditional way.

filed, scraped and sanded the whole business flush with the surface of the wood. Whatever gaps there were between the pearl and the wood (I saw only a speck or two) had been neatly filled with the dust/epoxy mixture.

Sanding, of course, made powder of the original cartoon. But he had lots of them on hand (they're photocopies of his original drawing) and got another out to use as a guide for penciling on the blank form all of its details—eye, scales and frilly gill. To engrave these little details into the beast's surface, Newman secured the wood in an engraver's block (photo, previous page, center). Unlike carving wood, where one moves the tool into the work, engraving calls for moving the work into the tool, which is held almost stationary. The engraver's block, with its heavy hemispherical base, is designed for this. You can order one from Brownell's Inc., Rt. 2, Box 1, Montezuma, Iowa 50171, or from Paul H. Gesswein Co., 235 Park Ave. South, New York, N.Y. 10003. With a square high-speed steel graver, Newman incised the details into the pearl. You can engrave pearl without an engraver's block, but it's not easy. You'll have to clamp and re-clamp the stock to your bench because you will need both hands to control the tool, and your avenues of approaching the work will be limited, since you must lock your arms to your sides and move your whole body into the cut.

With the engraving done, Newman made another epoxy puddle, mixed in powdered black aniline dye and spread the inky stuff over the entire surface of the pearl, filling in the engraved areas. When the mess had dried, he sanded it down flush with the surface of the wood. Upon lifting the sanding block and wiping the dust away, some three hours after taking saw in hand, there lay the finished dolphin, its incised features boldly alive and vividly defined. □

Inlaid lap desk

This lap desk took Larry Robinson of Petaluma, Calif., 100 hours to make. It's of crotch and curly maple, bordered by ebony and inlaid with some 400 pieces of various woods, metals, and other materials, including crushed blue glass, crazy-lace agate, ivory, mother-of-pearl, abalone and opal. Robinson says he uses cyanoacrylate (Crazy) glue because it adheres to anything and it dries clear and free of the bubbles that characterize many epoxy mixes. He prefers to work with relatively thick materials ($\frac{1}{8}$ -in. wood and 18-ga. to 20-ga. metals) because they're easier to saw and less likely to sand through than thinner stock. After sawing with a 4/0 or a 6/0 jeweler's blade, he tack-glues the pieces to the surface to be inlaid and scribes, then highlights the outline with chalk dust before routing. Combining various materials requires that the least dense ones be thickest and that all the pieces sit flush on the bottom of the inlay cavity, so sanding can bring their top surfaces flush.



Photo: Dave Murphy