Wood News

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WELCOME to Atlanta's IWF 86, Sept. 6 - 9

You are cordially invited to attend the largest woodworking show ever held in the Western hemisphere. It will take place at the Georgia World Congress Center in Atlanta from Saturday, September 6 through Tuesday, September 9. Some exhibits will also be open at the Atlanta Civic Center from September 5 - 8.

The show is the International Woodworking Machinery and Furniture Supply Fair, sponsored by three of America's manufacturing and importing trade associations. More than 700 companies from the U.S., Canada, Europe and Asia will display and demonstrate the latest in woodworking technology. 50,000 people are expected to attend.

Highland Hardware will again exhibit hand tools, supplies and power machinery at the show, with a special presentation this year of our Arti aniline dyes for wood. **Be certain to visit the Highland Hardware exhibit at booth 3256 in the Georgia World Congress Center.**

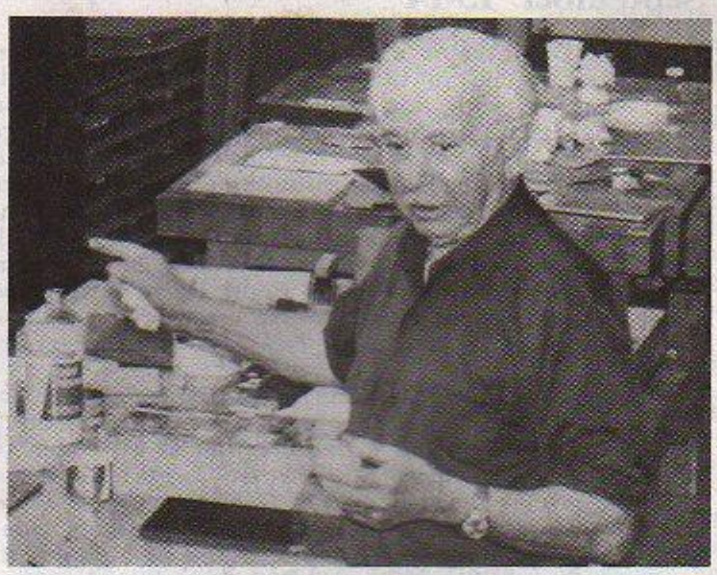
IWF will again feature the biennial Student Furniture Design Competition, in which student entries from around the country will be evaluated on the basis of design, manufacturing adaptability, workmanship and product marketability. Prototypes of the award-winning entries will be displayed on the connector concourse between the World Congress Center's two main halls.

Admission to IWF 86 at the door is $10.00. However, included on page 23 of this issue of *Wood News* is a discount registration coupon which will save $5.00 off the $10.00 registration fee. Complete the coupon, and bring it with you to IWF 86 along with your $5.00.

Show hours are 9 am to 6 pm daily, except the Atlanta Civic Center only will be open Friday, Sept. 5 from noon to 7 pm. No one under 16 will be admitted.

IWF 86

INSIDE Wood News 18



Master wood finisher George Frank is pictured above during a past seminar at Highland Hardware. He returns to Atlanta October 10 - 12 for an evening lecture and weekend seminar.

Fall Seminars at Highland Hardware

The Fall season brings a full schedule of seminars available to woodworkers in the Southeast. Highland Hardware will host Mark Duginske, George Frank, and Liam O'Neill as guest instructors, plus our resident pedagogue Zach Etheridge will offer a number of weekend courses. Below is a list of dates and topics. Complete details follow on pages 2 and 3.

Sept. 12	**Lecture: The Crisis in American Craftsmanship, with Mark Duginske**
Sept. 13-14	**Jigs and Fixtures with Mark Duginske**
Oct. 4 and 5	**Sharpening with Zach Etheridge**
Oct. 10	**Furniture Refinishing and Caretaking with George Frank**
Oct. 11-12	**Wood Finishing with George Frank**
Oct. 18	**Adjusting & Using Planes with Zach Etheridge**
Oct. 25	**Stationary Power Tools with Zach Etheridge**
Oct. 31 - Nov. 2	**Bowl Turning with Liam O'Neill**
Nov. 8	**Basic Joinery with Zach Etheridge**
Nov. 15	**Routers and Jigs with Zach Etheridge**

highland hardware

FALL SEMINARS AT HIGHLAND HARDWARE

JIGS AND FIXTURES for the Table Saw, Router Table, & Bandsaw September 13-14

Mark Duginske is a fourth-generation woodworker, first trained in the "old school" tradition while working with his father, a cabinetmaker and patternmaker in Marathon County, Wisconsin. At the age of sixteen, Mark began working for a German housewright who specialized in building cabins in remote places without electricity. Later he worked as cabinetmaker for a designer who was a student of Frank Lloyd Wright. Mark now works as a designer-craftsman. His work includes restoration of Frank Lloyd Wright and other "Prairie School" designs. He recently co-authored the book *Precision Machinery Techniques: A Woodworker's Handbook.*

September 13-14, Mark returns to Highland Hardware to share his innovative approach to machine joinery. Mark's insights have led to the creation of a number of techniques which speed up the woodworking process while preserving the standards of fine joinery.

According to Mark, the goal of the craftsman today should be to produce a repeatable volume of high quality work in a way that relates to 20th century production needs. Those who have seen him work agree that his methods produce exceptional accuracy at an optimum pace.

Joints covered in the jig-making seminar will include basic joints such as butt, dowel and biscuit joints; intermediate joints such as rabbet, dado and stub tenon; and complex joints including bridle, finger, mortise and tenon, haunched mortise and tenon, and dovetail joints produced on the bandsaw, table saw and router table.

Part of his demonstration will provide a method for rapidly making identical pieces using bandsaw pad-and-following jigs and table saw jigs, followed by final clean-up using a flush-cutting bit at the router table.

Whether you're interested in earning your entire living at woodworking, just supplementing your income with your hobby, or merely stepping up your own personal production, you will certainly benefit by attending Mark's seminar.

Cost of the two-day workshop is $60.00, which also includes admission to Mark's lecture on Friday night, September 12. Seminar hours are 9 am to 4 pm on Saturday and 9 am to 3 pm on Sunday.

WOOD NEWS No. 18 Fall, 1986

Editor . . . . . Chris Bagby
Assistant Editor . . . Zach Etheridge

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Wood News solicits manuscripts contributed by its readers. We pay $50.00 (in tools) per newsletter page for material selected for use in Wood News. Enclose b/w or color photos. Submit material to Editor, c/o Highland Hardware. Deadline for next issue is Oct. 15, 1986.

LECTURE: "The Crisis in American Craftsmanship" Friday, Sept. 12

During this two-hour Friday evening lecture, Mark Duginske will share his thoughts on the future of the independent wood craftsman in America. His talk will include a history of American craft, touching on the effects of the Shaker movement, the Arts and Crafts movement, the Prairie School, Henry Ford and mass production, and high-tech manufacturing. Illustrating this portion of the talk, he will show slides of some of the heavy equipment used in furniture manufacture during the first half of the century.

Returning to the contemporary scene, he will look at the return to craftsmanship during the 60's and 70's and the effects of the counterculture on crafts, examine the difference between craftsmanship and art, and consider the survivability of the craftsman and what the next "movement" might be.

The lecture is Friday, Sept. 12 from 7:30-9:30 pm, with **an admission of $5.00.** Please reserve a space in advance.

SHARPENING with Zach Etheridge October 4 and October 5

Zach Etheridge repeats this extremely popular one-day seminar on Saturday, October 4 and on Sunday, October 5. Each day, a group of about a dozen students will receive hands-on instruction in sharpening plane irons and chisels using Japanese waterstones. Participants should bring tools to be sharpened and stones if you have them. (Stones will be provided for those without.) By the end of the day, everyone attending will have first-hand experience in the fundamentals of maintaining keen edges on the most commonly used cutting tools.

Seminar hours are 9 am to 4 pm with an hour off for lunch. **Cost of each seminar is $25.00.** Specify whether you prefer Saturday or Sunday when registering.

FURNITURE REFINISHING AND CARETAKING with George Frank Friday evening, October 10

In this evening lecture, George Frank will share with anyone interested the best techniques for preserving, restoring, and replacing quality finishes on old furniture. The class will appeal not just to woodworkers, but to anyone who owns furniture and wishes to maximize its beauty.

Participants are welcome to bring with them to the class pieces for which they would like to receive George's advice. The class runs from 7 pm to 10 pm, and admission is **$10.00** (free to those in the weekend seminar).

To register for seminars, use the registration form at the bottom of page 23, or call us at (404) 872-4466.

WOOD FINISHING with George Frank, October 11-12

Probably the best-known finishing expert in the world, George Frank has been practicing and teaching his craft longer than most of us have been alive. Born in Hungary in 1903, George emigrated to Paris at age 21, where after working in several finishing shops, he was hired to the prestigious position of foreman at Jansen, Europe's leading interior decorating establishment. Later he opened his own shop in Paris, and after emigrating to the U.S. in 1940, operated a shop in New York for 33 years. His book *Adventures in Wood Finishing* published by the Taunton Press in 1981 is by far the most entertaining book on finishing ever published.

George's efforts today are aimed at sharing with woodworkers his extensive knowledge of the finishing process, and inspiring new research in the field. We are pleased to welcome his third visit to Highland Hardware, which will occur October 10-12.

His two-day seminar on Saturday and Sunday will bring alive the pages of his popular book, and will be an excellent chance to pick up a thorough understanding of French polishing, along with methods to color wood in ways more beautiful than you could ever imagine. A master storyteller, George's wit and humor will make this seminar a weekend to remember, as well as a rich educational experience.

Seminar hours are 9 am to 4 pm on Saturday and 9 am to 3 pm on Sunday. **Admission is $60.00,** which also includes entry to his lecture on Friday night.

ADJUSTING & USING PLANES with Zach Etheridge, October 18

This is a one-day hands-on class designed to help participants master fundamental use of hand planes. Zach will begin with a general discussion of the various kinds of planes and their uses, after which the class will spend the day at the bench making shavings. Instruction will be responsive to individual needs. Students should bring with them one or more planes to use, and should already possess adequate sharpening skills, or enroll in one of the sharpening classes October 4 or 5.

Admission is $25.00. Hours are 9 am to 4 pm. Register early, as space is limited.

STATIONARY POWER TOOLS with Zach Etheridge, October 25

On Saturday, October 25, Zach will give a **FREE** seminar on stationary power tools, covering techniques useful in the operation of tablesaws, jointer-planers and bandsaws. Special offers on many of our Inca tools will be available to those attending this seminar. The information provided will be valuable to owners of all makes of power tools, and will be a worthwhile investment of time for those interested in getting optimum performance from their tools.

Hours are 9 am to 4 pm. Seating is limited, so please register in advance.

BOWL TURNING with Liam O'Neill October 31 - November 2

Liam O'Neill, the internationally known turner from Shannon, Ireland will be at Highland Hardware for a weekend seminar Oct. 31 - Nov. 2.

Founder of the Irish Woodturners Guild, Liam has been turning for 18 years. His unique style and special techniques have drawn a great deal of attention at the numerous seminars and exhibitions he has conducted across the U.S. in recent years, including Arrowmont in Tennessee, BYU in Provo, Utah, and the Brookfield Craft Centre in Connecticut.

His seminar here will begin Friday evening, Oct. 31 with a slide lecture which will cover the history of turning from ancient times through the contemporary era. One of his slides depicts a bowl reputedly turned over 2000 years ago. He will also cover the management of his shop and how one succeeds at turning for a living in today's marketplace. Some of the slides will depict the work shown at the *Woodturning - Vision and Concept* exhibition at Arrowmont last Fall.

Saturday and Sunday he will demonstrate the techniques and style for which he has become known, turning a wide variety of functional and artistic bowls and other small objects, including natural-edged burl bowls, spalted bowls, decorative boxes, platters, thimbles, twig pots, and spinning tops.

In particular, he will show how he specially modifies his high speed steel bowl gouges to enable much faster roughing out and a much finer finish. In effect, he regrinds his gouges in such a way as to produce a shearing cut on his bowls much as one gets using a skew chisel during spindle turning. He will have available some of the specially ground chisels for those interested in purchasing them.

Seminar hours are 7:30 to 9:30 pm on Friday evening, 9 am to 4 pm on Saturday, and 9 am to 3 pm on Sunday.

Cost of the weekend seminar is $60.00. Admission for Friday night only will be $5.00 (free for those enrolled for the weekend). Please register early as seating is limited.

BASIC JOINERY with Zach Etheridge, November 8

This one-day seminar will provide participants a hands-on opportunity to practice cutting some of the basic woodworking joints using hand tools. Zach will cover stock preparation, dovetails, mortise and tenons, and other joints as time permits.

Students should bring with them a fine-cutting back saw, cutting gauge, sliding bevel, square, marking knife, coping saw, mortise chisel, mallet, and bevel-edged chisels.

Admission is $25.00. Seminar hours are 9 am to 4 pm.

ROUTERS AND JIGS with Zach Etheridge, November 15

Zach will give a day-long demonstration of today's most popular and versatile hand power tool, showing how to customize your router for precise and accurate work and accelerated production using homemade jigs and fixtures. Participants will learn many of the countless ways routers can be used to achieve speed, accuracy, and variety in everyday joinery.

Admission is $25.00. Seminar hours are 9 am to 4 pm.

Charles Hutchison, An Artist in Wood

by Tom Frazer

Charles Hutchison is an artist-woodworker who harvests "waste" cypress and tupelo gum from the muddy swamps of his native New Orleans, then crafts them into lifesize wildlife carvings which have sold for as much as $24,000.

"Hutch", as he is known to friends, got his start as a young man fashioning "working" duck decoys. Such working decoys, made for actual use by duck hunters, traditionally are more serviceable than artistic.

Later, Hutchison and his son Eric were encouraged by Charles W. Frank, Jr., a local carver, historian and author, to try their hands at carving elaborately detailed "decorative" decoys. In the past two decades, the utilitarian decoy has been transformed into an object of art, sought by collectors and museums throughout the United States.

According to historian Frank, decoy carving is a truly American art form, its origins traceable to the reed and feather lures that the Thule Indians, predecessors of the Northern Piute, left in Lovelock Cave in the Nevada foothills. Discovered in 1924, these first decoys are about 2000 years old.

Tall and spare and topped with a thicket of wavy gray hair, Hutchison, 65, is retired from his job as a painter at the U.S. Public Health Service Hospital in New Orleans. Before that, he had worked as a furniture restorer and repairer. Attracting friends like honey draws flies, Hutchison is always ready to laugh and offer a stream of folk philosophy. One saying that should appeal to struggling woodworkers: "I'm free to do just about anything I want because I'm independently poor."

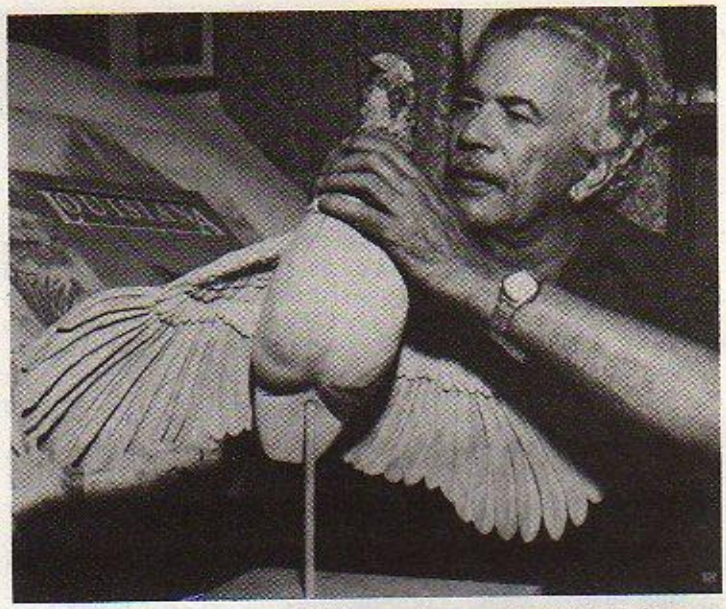
For scores of Louisiana carvers, decorative decoys have become the ultimate art form. Individual feathers are outlined, and the texture of the feathers burned in with special tools. Painted in lifelike natural colors, decorative decoys are hard to tell from the real thing.

After Hutchison won a number of prizes with such decoys, he reached out for a more daring challenge - creating lifesize "habitats" featuring birds of prey in their environment carved with perfect accuracy, like a three-dimensional Audubon. As an added feature, he chose to begin individually carving each feather and attaching it to the carved body. It was a challenge in magnitude and detail apparently never before attempted by a woodcarver. Why this quest for lifesize perfection?

Answered Hutchison, "I wanted to draw attention to birds of prey. For too long they have been misunderstood and unreasonably feared by man. And now, of course, most of them are on the endangered species list because they are so scarce. The American bald eagle, for example, is magnificent. It is the symbol of our country, but it is being destroyed. I hope my carving will help in some small way to bring back the beauty of this thing. It should be saved, and we should be waking up ourselves."

Hutchison and son Eric began a series of these habitat groups and generally cleaned up at the Louisiana Wildfowl Carvers and Collector's Guild annual competitions in New Orleans. The self-taught artist won the open competition carving events in 1977 and 1978 and the guild's "most outstanding member" silver cup for 1979.

In one habitat, an osprey is flying away from the surface of a marsh pond, grasping a speckled trout in its talons. Two more speckled trout are skittering across the surface, while four more trout are darting about under the surface. Three frightened killdeer are catapulting off the surface of the water in front of the osprey. The "water" is made of clear plastic, while the birds and fish are carved from wood.



Charles Hutchison puts some finishing touches on a pheasant at his home.

In another habitat group, a golden eagle is flying off with a muskrat in its claws. One of the muskrat's rear legs is caught in a trap which apparently the eagle was able to pull clear of its anchor. The "steel" trap with its dangling loose chain is actually made from wood. A delightful detail is a drop of marsh water about to drip off a link of the chain.

The fifth in Hutchison's series of habitat groups, a pair of American bald eagles fighting over a redfish, became the wildlife artist's all-time winner in 1979 when a Lexington, Kentucky art gallery paid $24,000 for the work. Frank said that to his knowledge, it was the highest price ever paid for a wood carving in Louisiana.

While the carving was displayed at New Orleans' prestigious Coleman E. Adler & sons, Inc., a woman was heard to say "But I thought these eagles were on the endangered species list." The carving was so lifelike that she had assumed they were real birds mounted by a taxidermist. Even the scales of the redfish were raised up where an eagle's claws had dug into its flesh.

For decoys and his habitat groups, Hutchison, his son Eric, and his brother Rudy search out cypress and tupelo gum stumps in the nearby swamps. Some of the best places to look are along recently dug canals or cleared highway rights-of-way where bulldozers have uprooted the stumps so valuable to carvers.

Unlike the trunks which have definite grain, the lower portions have a soft, undefined grain that makes carving easy. It's almost like carving a bar of soap. Using a chain saw, the roots and stumps are cut into manageable pieces and then carried back home to dry in Rudy's workshed. Because much of the wood has been submerged in mud for years, it sometimes yields an interesting blue-gray color.

When it's time to carve, the three Hutchisons choose from among the scores of dried blocks stacked along the walls of the shed. Where the old-timers hacked working decoys out of blocks with hatchets, the Hutchisons prefer modern tools. For instance, they use a large bandsaw to cut out the decoy's horizontal and vertical profiles according to the species of duck it will resemble. While Rudy prefers a drawknife to then give his decoy a rough

shape, Charles Hutchison and son Eric prefer using a rotary rasp.

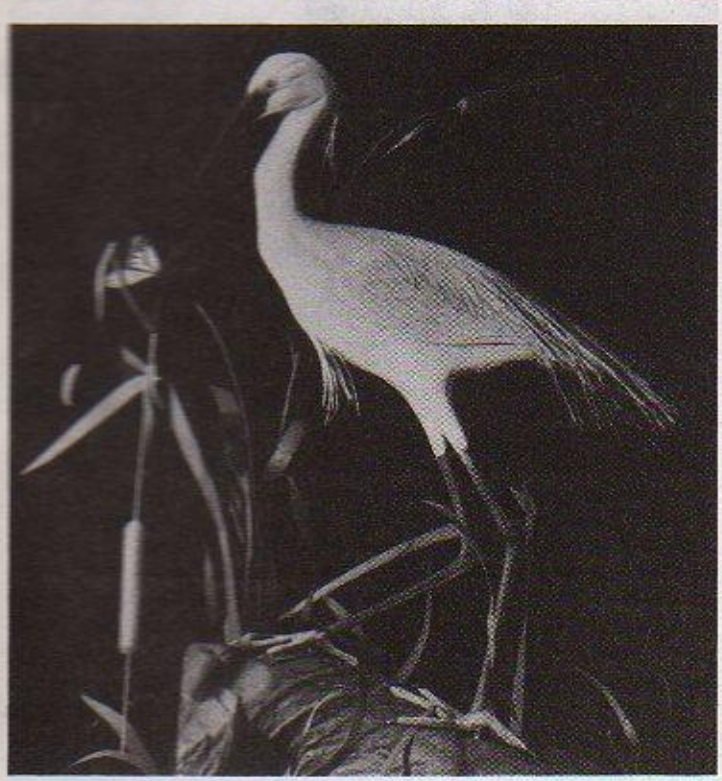
But when it gets down to the final careful carving, they use special knives they've made themselves by grinding down high-carbon straight razor blades obtained from barbershops. "We use everything from chain saws to scalpels," exults Hutchison. A lot of final carving is done with ordinary Case brand pocket knives, while the scalpels are used for the finest details.

Although the core or body of their habitat creations often are made from cypress, they carve the individual feathers from tupelo gum, ripping the gum into extremely thin strips using a table saw.

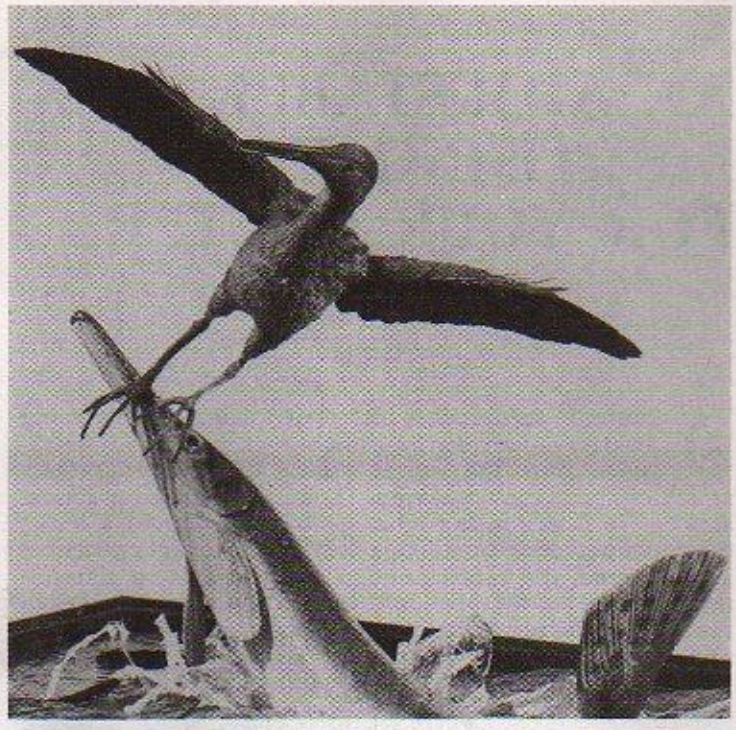
One technique that makes the Hutchison wildlife ensembles so lifelike is that often they are copied from the feathered skins of real birds. Officials of LSU's Museum of Natural Sciences in Baton Rouge think so highly of Hutchison that they lend him rare preserved bird skins. With the skins before him, Hutchison can achieve accurate coloration and get exact measurements and profiles of individual feathers for his re-creations in wood. Each of these feathers is "textured" individually with a special burning tool. As a project nears completion, Hutchison draws these numbered and coded wooden feathers from the safety of a plastic bag and carefully attaches them to the core of his model bird.

The bird experts of LSU also advise Hutchison of the correct flora and fauna found in the bird's environment. So when Hutchison and Eric created a small flock of tropical parrots in the treetops of a Peruvian rainforest, the carved flowers, moss, and butterflies were each scientifically correct. Their current major project is a pair of peacocks, and you can bet that each prominent tailfeather will be exactly like the real thing.

In recent years, Hutchison, Eric and Rudy, along with several carver friends in New Orleans, have become something of celebrities in local artist circles. In addition to being the subject of two local television features, Charles and Eric Hutchison were invited by the National Council for the Traditional Arts to exhibit and explain their work at the 42nd Annual National Folk Festival held at Wolf Trap Farm Park in Vienna, Virginia in 1980. As a consequence, Hutchison's work has been recorded in the Library of Congress.



A white ibis, surrounded by cattails and a monarch butterfly, stands on a fallen log.



A garfish carved from wood splashes out of plastic water in an effort to make a meal out of a shoreboard.

While at Wolftrap, the Hutchisons were "picked up" by a BBC-TV crew which later interviewed and filmed them in New Orleans for eventual broadcast on "The World About Us" program from London.

And in 1982, Charles, Eric and Rudolph Hutchison traveled to Los Angeles to participate in "Wildlife Sculpture: A Bayou Heritage", an exhibit sponsored by the California Museum of Afro-American History and Culture. *The Los Angeles Herald Examiner* described the exhibits as "breathtaking wildlife woodcarving" by seven Louisiana Creole artists. Soon, a pair of video tapes depicting their work will become part of the museum's official collection.

A completely self-taught artist, Hutchison has an innate ability to make his objects look lifelike. His is not an expensive craft as some of us have found our woodworking to be. He scavenges the wood that's best for his purposes, and that wood is free for the taking (although a few Louisiana entrepreneurs harvest cyress and tupelo gum carving blocks to sell to carvers). His power tools, quite old for the most part, have been accumulated over the years by Hutchison and his brother.

What Hutchison uses is an open mind and ingenuity to create a special tool or treat a strip of wood a certain way to transform it into a peacock's feather.

With a well-developed social consciousness, Hutchison gladly makes the rounds of schools, encouraging youngsters to develop useful lives, and hopefully recruiting future craftsmen who will keep alive the tradition of duck decoy carving.

Hutchison's fondest wish is that his son Eric will follow in his footsteps, a wish that seems to be coming true.

Tom Frazer is a newspaper writer and amateur woodworker from Metairie, Louisiana. Photos by Armando Solis, Los Angeles.

AN ADJUSTABLE MORTISING JIG FOR YOUR ROUTER

by Victor F. Ptasznik

A router's accuracy is primarily achieved by using guides which can be attached either to the workpiece or to the router itself. In some operations attaching to the workpiece is the only practical alternative (e.g., routing mortises to flush mount a hinge on a cabinet door or a table leaf). If multiple mortises are required, the recommended procedure is to clamp a three- or four-sided plywood jig to the workpiece. When the router is placed within the jig and freely moved about, the router bit cuts a mortise of the exact depth and area. (See *Tage Frid Teaches Woodworking, Book I - Joinery*, page 176).

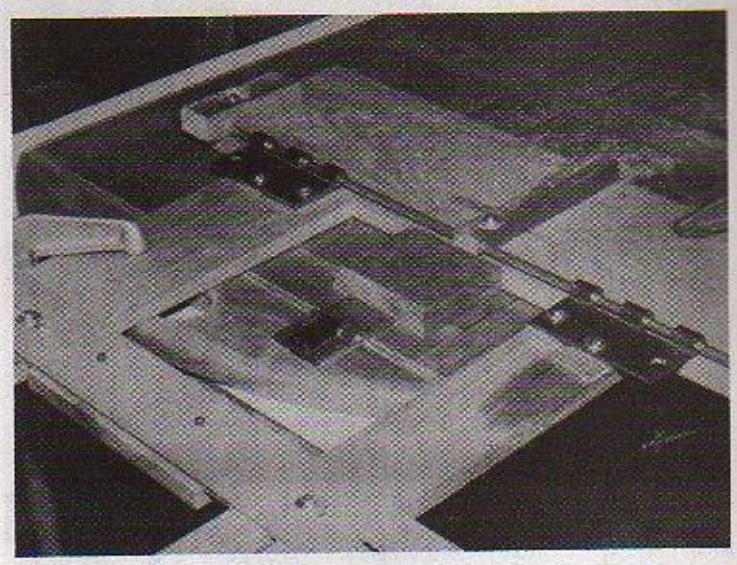
However, making a new jig each time a different dimension mortise is needed is not only a waste of material but can also be a difficult and time-consuming task. For some of us it's no easy job cutting a board at a precise 90° angle, let alone cutting three or four straight lines that meet at 90° angles in the interior of a piece of plywood. Further, the time spent building an accurate jig must be weighed against other methods of stock removal, which although perhaps less accurate, may be faster.

The adjustable jig shown in the accompanying photos solves these problems. Because it is so quick and easy to set up, it also makes it practical for you to obtain the accuracy of a jig even when you are making only one such dimensioned mortise. The jig is designed to make square or rectangular mortises having dimensions as small as 5/16" x 1-1/2" or as large as 5-1/4" x 5-1/4". Of course, the range of dimensions depends on the diameter of your router's base and the bit used. If you clamp some stop boards to the jig, you can also turn your router into a poor man's horizontal slot mortiser.

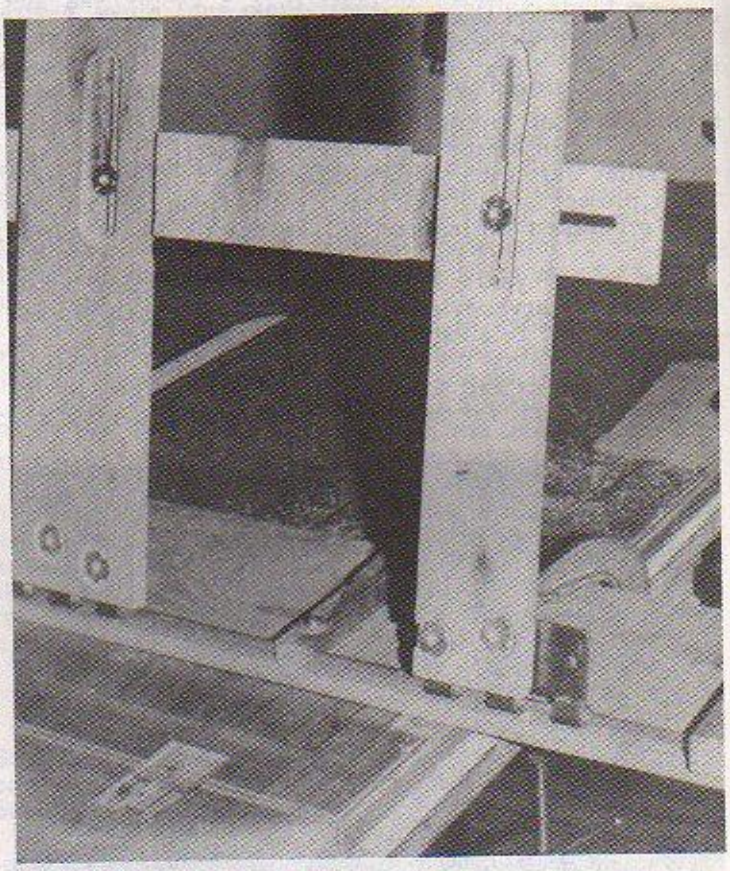
To make the jig, you need four 1/2"-thick hardwood straight edges, a 1/4" x 21-1/2" soft steel dowel, T-nuts with prongs plus T-nuts with brad holes, compatible round-head machine screws, lockwashers, and a pair of butt hinges (3-1/2" x 3-1/2" x 1/8") with removable pins and rolled joints.

Since the diameter of the dowel is determined by the size of the hinge pin holes, get the pair of hinges first, perhaps from an old door. After removing the pins, use the hinge leaf from each which has the most pin holes. If you can't find a steel dowel that is the exact diameter of the hinge pin, get one which is slightly smaller than the hinge pin, and crimp the hinge joint. When the hinge is fitted on the dowel, it should slide easily without side-to-side play.

Three hardwood scraps (with holes the same diameter as the dowel) hold the steel dowel. Each scrap is in turn screwed into T-nuts in the bottom of the base straight edge (21-1/2" x 6"). These T-nuts, like all in the jig, are recessed to avoid marring the workpiece. The holes in the scrapwood should be located in such a position that upon tightening the three screws with lockwashers, the leaf hinges will not slide on the dowels.



In photos above and below, jig is in position to flush mount a table-leaf hinge.



Each hinge is screwed into T-nuts in the bottom of two narrower straight edges (2-1/2" x 13") which then slide perpendicular to the base straight edge. To insure that the straight edges of these boards and the base are on the same plane, insert shims as necessary under each leaf. Use screws with a diameter smaller than the hinge leaf screw holes. This will enable you to finely adjust the three straight edges to form two 90° angles.

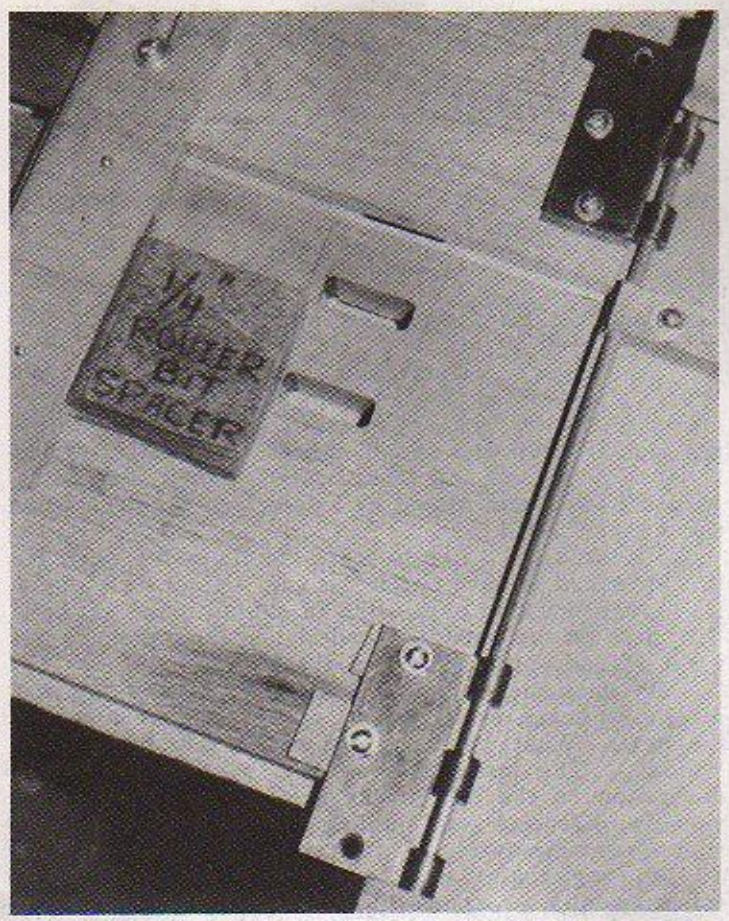
The fourth straight edge is glued to the bottom of a longer board (1/4" x 2-1/2" x 15") which overlaps and is in turn screwed into the sliding straight edges. This fourth

straight edge is adjusted by sliding the screw and T-nut (with brad holes) assemblies along elongated holes in all three adjusting straight edges. Although it might appear necessary to have a number of different-length fourth straight edges to accommodate the full range of mortise sizes, this is not the case. Because a router with a 6"-diameter base never touches any part of a straight extending up to 2-7/8" from any corner, a fourth straight edge having a length of only 6" is able to support the entire range of mortise sizes of this jig.

The key to a speedy adjustment of the jig and its perfect placement on the workpiece is a spacer block (shown in picture at right) which you make for every size router bit you intend to use with your router and jig. Each spacer block should have a side whose length is the exact distance between the cutting edge of the bit and the edge of the router base. The spacer block is of course removed after the jig has been accurately set.

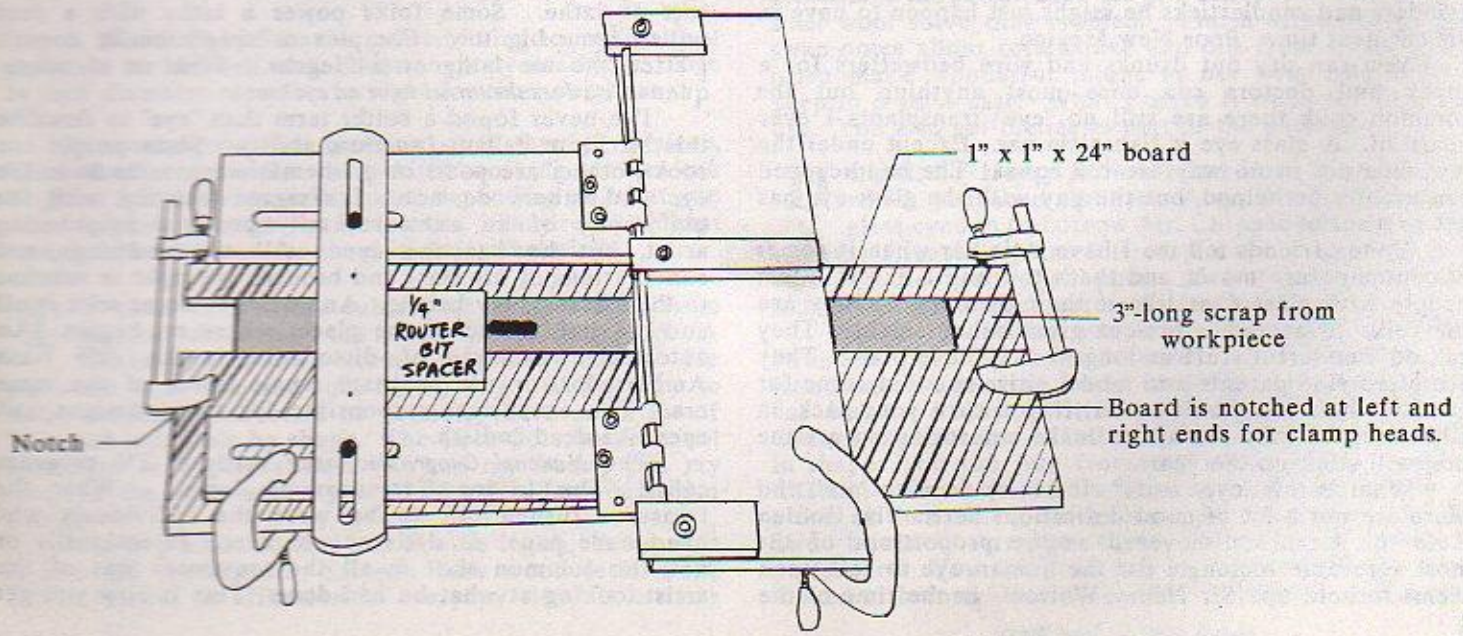
To adjust and test the jig's dimensions, use a scrap piece of plywood on which the mortise dimensions have been scribed. Correctly position the base straight edge to one of the mortise lines with the spacer block and clamp the base straight edge and the plywood sheet together. The jig and workpiece should be clamped to your workbench for stability. After you have adjusted the two sliding and fourth straight edges, measure from corner to corner on a diagonal to verify that you have formed four 90° angles. This is also a good time to make sure your router base is centered properly on the router.

To use the jig for mortising in frame joinery, you must make a three-piece stop board assembly (indicated by diagonal shading in the drawing below). First, cut two indentations (for clamp heads) at each end of a 1" x 6" x 24" board as shown in the photograph. Then at one end of it, clamp a 3"-long scrap of the workpiece to be mortised and a 1" x 1" x 24"-long board. After sandwiching the workpiece (indicated by gray shading in the drawing below) into the resulting cavity, clamp it in place at the other end. Clamp the stop board assembly to the jig such that two cutting lines of the mortise are a "spacer block" away from the jig edges.



Adjust the jig with the spacer block for the two remaining cutting lines. To remove the mortised workpiece and insert a new workpiece, remove only the one clamp at the cavity opening. If the mortises on a frame are off center, the stop board assembly should be reversed on the jig in order to cut the second mortise on each frame workpiece.

Victor Ptasznik is a Detroit bank lawyer and part-time woodworker whose articles on woodworking have appeared in Fine Woodworking and The Woodworkers' Journal.



Commodity, Firmness and Delight

by Wallace Macfarlane

The Devil Whispered Behind the Leaves
It's Pretty, but is it Art?
Rudyard Kipling, from
The Conundrum of the Workshops

A pleasant man from New Mexico phoned one day and came by my shop. He subscribes to *Wood News* and knew me from having read a past article. We talked about wood, and I showed him how I make sawdust. He was twice as smart as I about collet, three-jaw, jam fit, cup and spigot chucks. He was informed about turning tools and sophisticated in their sharpening. As usual, when confronted by a dedicated engineer, I felt like a klutz. Until . . .

He asked if I'd like to see a sample of his work. He just happened to have one in his car. Of course I would. He brought back an object like an old-fashioned nut bowl with bark on the outside, a pedestal in the middle to put a nut on, and a little gavel for whacking it.

Oh dear me, it was a real dog. Everything was disproportionate, each part in uneasy relationship with the next. What was supposed to be smooth was not smooth. The pedestal was the wrong size. The decoration on the mallet was painful. The whole was vaguely offensive and unhumorously funny, like a stomach rumble during silent prayer.

A long time ago friends showed us their new offspring with an upper lip from chimpanzee genes not too far down the line. My smart wife cooed "What an interesting face." Then she gave the full measure of praise, "That's a baby!"

I said "How interesting" to the man from New Mexico. Happily unklutzed, I learned things from him about lathe speeds and S-curve tool rests. He was bright and able and ept. The only trouble was, he did not have an eye for the work. He could not "see". You might say he had a glass eye. Still, the challenge of turning wood was technically fascinating to him. I suggested bowls. How can an engineer screw up a bowl? He wasn't much interested. What he had in mind - I think - was to make complicated artistic creations for friends to admire. I look forward with some trepidation to the pepper grinders and candlesticks he might just happen to have in his car next time. Poor New Mexico.

You can dry out drunks and wire bedwetters for a shock and doctors can cure most anything but the common cold; there are still no "eye" transplants I ever heard of. A glass eye is like a tin ear. Except under the law, men are in no way created equal. The handicapped can usually be helped, but the guy with the glass eye has got to want to see.

Young friends tell me I have a tin ear when it comes to contemporary music, and that's the way I like it. Most people with glass eyes like it their own way. They are the folks to assemble pre-cut grandfather clocks. They can do wonderful stuff as long as they have plans. They are often fine parents and model citizens and a force for good in their communities, but if you turn your back, in all innocence they are apt to make something on a lathe that will stink up the years.

What is this "eye" stuff? It has to do with "art", and there are not a lot of good definitions here. The Golden Rule the Greeks discovered as the proportions of the most agreeable rectangle for the human eye to rest upon seems to hold up. Sir Henry Wotton - in the time of the first Elizabeth - listed the desiderata of architecture as Commodity, Firmness and Delight.

Commodity means designing to a function: don't make a small box if you want to put a gallon in it. Firmness means that a translucent bowl is not the place to store old plumb bobs. And without the last essential item, all food in the world is cold oatmeal, barracks are the only efficient housing, and a masher is no better than a rock, instead of having the potential of an elegant shape to ravish the senses (as well as mash potatoes).

In real life, the best thing is to point at something and say "That's art." Imperial declarations aside, this is where disputation has occurred from the caveman on. At the lowest common agreement, every artifact is art, and after that the bloody war begins. "Arts and Crafts" is a division responsible for as much trouble as the War Between the States. People will draw swords and stick each other in the gizzard over "fine" and "utilitarian" art. Some claim that anything tainted by the mechanical is not art, and they will want to punch you in the nose when you ask where brushes and paint and canvas come from.

All this sort of discussion is flapdoodle. People who talk most fluently about art rarely commit it. The artist can be full of opinion not much better than the next guy's, but one of the indicators of an artist is that he gets some work done. Too often he also talks a lot, usually through his hat. Artists are better at doing it than defining it.

Before the second World War, I saw a woodturner on a sidewalk in Port-au-Prince. He had a kid working the pedals of a bicycle frame by hand to power his homemade lathe. He had a chisel made from an old file. The work he turned from lignum vitae and mahogany was handsomely conceived and delicately executed. I still have a box he made. I have looked at it with pleasure for 40 some-odd years. If the "role model" psychologists talk about makes sense, mine is that skinny black man in rags in the summer of 1938 in Haiti.

Maybe he would have done better with a fancy lathe and five different kinds of chucks. I don't think so. By the magic of the spinning shaft and cunning hand, the wild and inexplicable mystique of woodturning generated an artifact which has given me pleasure for nearly a half century. It is the same mystery involved in any endeavor when all preoccupation narrows to *now*, and later on you wonder where the time has gone.

At that, my Haitian woodturner had an advanced sort of lathe. Some folks power a lathe with a cord pulled by a big toe. Complex or simple really doesn't matter, the toe lathe or a Hegner. What is of consequence is, *does the turner have an eye?*

I've never found a better term than "eye" to describe this attribute, talent, function, ability. Some people are cooks, others are poets or mathematicians, some have the eye and others do not. I disagree heartily with the philosophy of an extraordinarily creative neighboring artist, but he has the eye. All the writhings and convolutions of his glass and bronzes are right in relation to themselves; they belong. An object at home with itself and integral, is one of the places where art begins. An automotive example of dissonance is the 1955 Nash Ambassador, or the pregnant whale Buick of the same era. The executives responsible for those designs had eyes like dead codfish.

The *National Geographic* once made a TV program called "The Living Treasures of Japan". What the treasures turned out to be were the individuals who hand-made paper or dolls or whatever. Intentionally or not, the common shot in all the sequences was of the artist looking at what he had done. This is how you get

the eye. You look around a lot. You look at what you're doing and cut a little here and a little there and when it's done you look some more.

There is no handy-dandy book called "How to Get an Eye", but it's possible to approach the subject and look at it a little: all things have a proper size. If you are not a midget or a basketball player you are the right size. I once worked at a desk next to the second tallest man in the United States. He was the wrong size.

From past experience, here are some ranges for "the right size" for a few turned objects:

A rolling pin including the handles can run from 10 to 18 inches long and should be about 3 inches thick. I made one 24 inches long and 6 inches in diameter. It was much admired but nobody bought it, so I gave it to my son, who needed a house gift for people who like too-big things. French rolling pins - those tapered ones - are about an inch in diameter and I've never made one; the kind I make are plus-or-minus 3 inches thick at the midpoint and up to 20 inches long. A pastry cook bought four, one after another for his friends.

*

Foot rollers are from 9 to 12 inches long and 2 inches-plus thick. Anything less is skimpy and anything longer is too much.

*

Culinary mashers can run from 6 to 24 inches, with either end of the scale a little specialized.

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An ostrich egg is too big, but hen and goose and turkey egg sizes are acceptable for darning eggs or as elegant ornaments. I sent away for a catalog from people who make wooden eggs, and after that I could tell my hostess the koa egg I'd brought her meant she could put a dollar value on my pleasure ($14.50 retail, not counting sales tax and postage).

*

A bowl can be a salad bowl for two people or a church social size, for holding chips or chocolates or contact lenses. Bowls are as variable in size as the needs they meet.

*

Boxes are the same. I ask people what they're going to put in them and some people know: jelly beans and keys and cotton balls and matches and coins. An extraordinarily nice anthropologist told me she coiled her harp strings in one, so boxes are for whatever they're used for.

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A 30-inch Lazy Susan is a dumb thing to make out of redwood for the hell of it - does anybody need one? 12 to 14 inch diameter seems to be right for most purposes.

*

A champignon, for mashing stuff through a sieve, has a handle of handle size but the working surface can be from 2 to 6 inches in diameter depending on what you want to push through the interstices. They're an elegant tool, but the demand for them is underwhelming.

To close in on this subject of what-is-right from another direction: the wood should feel good. A friend with a store wanted to sell my things. He put some in a case and sold hardly any. While I try to make shapes as seductive as possible, there are a lot of folks not seducible by shape. The Coca-Cola bottle is not attractive to Pepsi fanciers. When my buddy put my treen in the open where you could cop a feel, he sold a bunch.

It took a while to find out how to finish. A lot of it is personal preference. Smooth, bare wood feels great, but is subject to affliction in everyday life. It attracts dirt like buzzards to a flat rabbit. Blackberry jam and ink jump at it. So I tried salad oil first. It wasn't nice. I rubbed in Danish oil and a lot of proprietary embrocations. Tried tung. All the oils were labor-intensive dust magnets. High maintenance besides. You had to oil and buff the stuff all the time.

Whatever you put on bare wood, including water, is going to change the color and feel. Because I live in an area where the air sucks water from kiln-dried wood from the coast, I had to have a finish to deter wood movement, to retard the moisture exchange between wood and atmosphere. Shellac didn't make it. Varnish was nasty bright - if you want to disguise wood as plastic, try spar varnish - but satin polyurethane came close, especially after I found out how to avoid drips and sags and brush marks. How I learned was cleaning up my mistakes. Every once in a while, as Eve was tempted by the serpent, I think about a baby spray paint outfit. So far the idea of cleaning up the equipment has saved me.

I read an expert who deplored satin finishes because of the sludge in the product to make it less bright. He said to use gloss and hit it with steel wool to blur the sparkle. Uh-huh. I used the rest of the gloss on the concrete floor to make sweeping easier. I worked a long time to cut the glare on my treen.

What I ended up with as a finish was two coats of satin polyurethane, both steel wooled, and a coat of Johnson's paste wax to finish it off. It has a nice sheen, feels dandy and is durable. When you get people fondling the stuff with a far-away look in their eyes, kiddo, that's it.

Part of the game of wood is to work with as little effort as possible. I have power sanding tools, but I always seem to end up with sandpaper rolled around a roll of cloth. I keep trying new things that don't work for me, like grit on a sponge or a bar of bubbles blown in glass, and here I am, old efficient me, sitting on the bench with my feet on the old Shopsmith, wearing down medium steel wool, thinking there must be an easier way. None of this 4-aught stuff. I want action. Coarse steel wool scratches polyurethane and fine doesn't blur quickly enough. No question, I don't get the mirror finish so highly regarded by piano top makers. What my finish does is protect the wood, enhance the patterns and slow the attrition of time.

There are devoted people who want positive air pressure in a sterile room for finishing. I paint polyurethane at an outside bench under shade. The wind sometimes blows sawdust. 100-grit sandpaper and medium steel wool solve that problem. Finish affecionados who swap notes about rottenstone and oils from exotic places often make wonderful things to use with reverence or keep in a glass case. What I make is treen for everyday use. You also get feelies as part of the package.

Delight, Sir Henry Wotton's last item, is the one for which you need the eye. A good solution for the glass-eyed is to borrow Mr. Chippendale's eye. You can buy first-class plans lots of places. If you get your kicks in the production phase of woodwork, you very likely will make much better chairs than I.

Where it's at for me is in the shape of things. Bounded only by considerations of commodity and firmness, an unending world of delight is open. Always has been. Always will be. In Monte Alban out of Oaxaca, the museum is full of 600-year-old pots and bowls in shapes you can buy from any potter today. Each is different. Some shapes are more shapely than others. As a test of that reality, set a dozen pots in a row. Or your own bowls. Arrange them in order of price or preference. You will find you have standards you never looked at before. Rearrange the bowls until they're right

(continued on next page)

Commodity, Firmness & Delight (contd.)

and come back after lunch and check again. If you mark numbers on the bottom and scramble the order, you can test your consistency a week later.

Delight is a matter of the first consequence. It is rarely discussed because it's hard to pin down important things. School boards may spend ten minutes on curriculum and two hours on the layout of the toolshed. It is much easier to approach the blueprintable, and avoid intangibles that squirm like quicksilver when you put a finger on them.

This is where the eye comes in.

This is where delight lives.

This is why I make treen.

I bust my gut trying. I've made ugly things, but it wasn't for want of good intentions. I turned an Art Deco box of silky Chinese elm with a deep groove in the edge of the lid and a couple more at the base and a cone-shaped knob to lift the top off. Nobody would touch it with a barge pole, nice finish and all, until a man came by and he bought it because he wanted it. Did he have all the discrimination and taste of a hungry dog? Was his discretion frozen in time? Or was the design inherently good? I can't answer any of the above. However, I haven't made any more Art Deco stuff. That I can tell you.

Sometimes I get tired. I think I've made all the kinds of boxes there are. Treen is blah, and then mysteriously a new shape swims to the top of my head and I turn it three dimensionally on the the lathe. And walk out to the shop at bedtime to look - sometimes with delight - at how it turned out.

Anthropomorphism means ascribing human characteristics to things not human. I have made clever bowls and bland bowls and sexy bowls. I've done boxes that want to be cuddled and austere boxes and boxes that keep secrets. I once made a breadboard with button plugs - somebody gave them to me and I've since thrown the rest away - and that board did not like me. The feeling was mutual. Someone else had to sell it. I hope it found a compatible home - perhaps with the Addams family - or was burned.

There are woodturners who would no more sell one of their creations than they would sell a child. I am the proprietor of an orphan asylum - easy come, easy go - and am pleased to sell any child to a good home. Or a bad one. Maybe it will improve the environment.

The marketplace is the final checkpoint. Oh, I know about old One-Ear Van Gogh. Never sold a thing. I also know about Pablo Picasso who kept what he pleased and peddled the rest and ended up a millionaire.

Treen is different. To me, treen means objects of common household use, made of wood. If it doesn't find a common household, obviously I've done no good.

I still don't know what "art" means or what "creativity" is about. What I do know is that my incipient woodturner from New Mexico should take up some other line of work, because he has an eye like Raggedy Andy. I am obliged to him because his example has encouraged me to refurbish my old prejudices and hack my way through a wilderness of opinion to establish some fixed points and guideposts and trees to climb for a view of what's good and why.

The only beginning for a unified field theory about wood I've stumbled over is not awfully inspirational, but it comforts me and may comfort you: there is no end to it. Keep trying.

Besides turning wood in his Santa Ysabel, California shop, Wallace Macfarlane is a published science fiction author.

New INCA Table Saw

Professional 12" Model 2100 with Tilting Arbor

After years of engineering, Injecta Inca of Switzerland brings to market this fall their newest woodworking machine, the professional model 2100 12" table saw. Designed especially for the American marketplace and based on a painstaking study of the best features of all heavy-duty table saws now available, the 2100 is a truly state-of-the-art machine.

Seeing the machine is a pleasure in itself, and you will be able to do exactly that at the upcoming International Woodworking Fair at the Georgia World Congress Center in Atlanta September 6-9. **The saw will be demonstrated by Injecta Inca experts at booth 2912.**

For Inca, the saw marks a change in the scale of woodworking equipment the company has traditionally offered, marrying Inca's reputation for exacting precision with the needs of today's small-to-medium-sized production woodworking shops. In a related move, Inca is also about to introduce a new larger jointer-planer with 15-3/4" width capacity. It also is expected to be demonstrated at the Atlanta show in September.

One of the most appealing features of the 2100 12" professional saw is the Inca Masterfence, a well-engineered and highly versatile rip fence which allows instantaneous setting of precise cutting widths. The auxiliary straight edge on the fence can be used in any of four positions to accommodate workpieces of all sizes. Ripping capacity with standard rails is 25" left or right. Optional long rails increase ripping capacity to 50".

The standard table size is an incredibly large 27"x 31" with a full 12" of table surface in front of the blade. The mitre guide is the classic Inca design featuring a fully adjustable fence and adjustable drop stop.

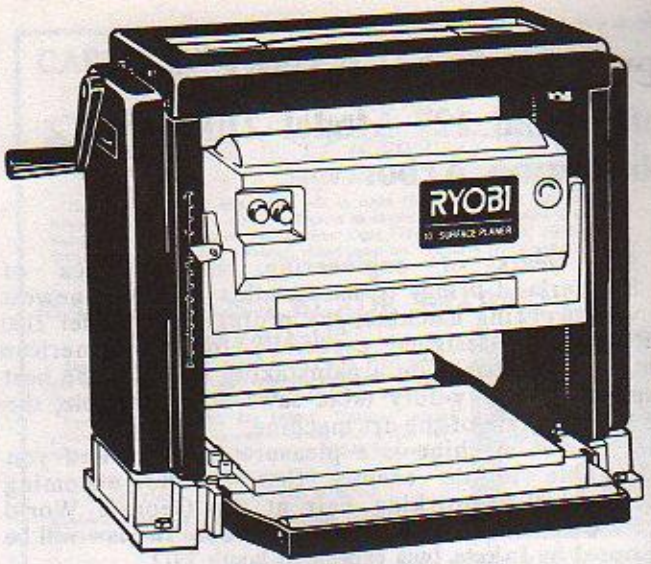
For bevel-cutting the saw's 1" arbor tilts up to 45°, and a vernier scale allows setting the angle to within an accuracy of 1/6°. Optional accessories include an extremely solid and well-built mortise table (which may be tilted up to 45°), a large, heavy-duty sliding table for production cross-cutting, and an extension table designed to accommodate a router underneath, thus creating what is perhaps the world's finest router table.

The saw will accommodate single phase motors up to 3 hp and three phase motors up to 5 hp, all controlled by magnetic switches.

The preliminary price indicated for the basic 12" saw is $2585.00, not including motor and controls. After the Atlanta woodworking show in early September, Highland Hardware will have the model 2100 table saw set up for display and demonstration at its store, and machines will also be available for delivery.

INCA 2100 12" Table Saw shown with optional SUVA-style blade guard.

RYOBI AP-10 Compact Planer Introduces a New Era of Affordability



The AP-10 portable 10" thickness planer costs less than $400 and it works. If that isn't enough to get your attention, see your doctor today. The usual reaction to a first look at the AP-10 goes something like this: "No kidding - does it work? What's that price again? That's amazing! Why didn't they come out with something like this years ago?"

No kidding: the AP-10 will take a 1/16" depth of cut across a 10" width of hardwood. It will automatically feed work through itself at about 26 feet per minute, and will provide a clean, smooth surface on the finished piece. When you've finished a job you can fold up the support rollers, grab the carrying strap, and toss the 58-lb. machine into your glove compartment (well, almost).

A 13 amp (2 HP) motor drives the two-knife cutterhead at 8000 rpm, delivering about 51 strokes per inch on the work. (Strokes per inch can give you a good idea of the surface quality a planer can provide; the higher the figure the better. 51 strokes per inch is pretty good.) Maximum stock thickness is 5-1/8". The AP-10 measures 16-3/4" wide by 14-1/4" high. With the outrigger stock support rollers folded down for use, front to back length is 19-1/4". Two wooden skids are provided with the planer; bolted to its base they offer an easy means of clamping or bolting the machine to workbench, sawhorses or Workmate. Plan on providing extra support for any stock more than a few feet long. The power feed rollers do a remarkably good job of moving stock through the planer, but they aren't designed to fight gravity as well.

After all the exclamations about price, size and performance have faded into the routine of daily use, you'll begin exclaiming all over again when it's time to sharpen the knives. Removing them from the cutterhead is routine; loosening some bolts is all that's required. Re-installation is where the headache comes in on most machines, as limited access, fidgety adjustments, and primitive mounting systems combine to try the resolve of the most stalwart worker. The AP-10 is different. Most cutterhead designs include some sort of steel cap or bar which secures the knife to the cutterhead and stiffens it against shock. Ryobi has taken this blade binder, as they call it, and hung a little lip off the back edge. This little lip nests down into a slot in the cutterhead, thus locating the blade binder and the blade along with it. So when it's time to re-set the knives, you're not faced with setting the knife in the cutterhead; you set the knife in the blade binder, using an extremely simple jig provided for the purpose and doing the work out in the daylight where you can get at it. When you pop the blade and binder assembly back into the cutterhead, the cutting edge of the knife is automatically set precisely where it should be, and only gross negligence could leave one knife set differently from the other. Knife installation is a five-minute job for the first-time user, and that all by itself is a revolution.

Those of us blessed with ready access to a thickness planer so quickly take it for granted that we sometimes forget that woodworking can be done without one. However, a look of blank amazement isn't much help to someone who asks if a planer is really all that useful an investment. Some of a planer's uses are obvious: you have a piece of wood 3/4" thick and you need a piece of wood 1/2" thick; your planer turns one into the other. That's thickness planing. You aren't always planing for particular thickness, though. If your planer is good enough (like the AP-10), you'll probably find yourself using it more often as a substitute for your belt sander, taking just a very light skim pass just to clean up a surface and prepare it for finishing. Think about that for two seconds: while I'm putting a belt on my sander, you're watching 26 feet of wood go by. While I'm generating clouds of dust you're generating piles of shavings. While I'm switching to a finer grit you're giving the work two licks with a scraper or a finish sander. While I'm behind schedule and over budget as usual, you're lolling at the beach with your planer by your side.

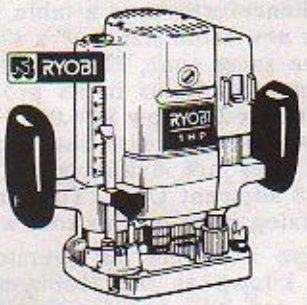
The AP-10 planer embodies an idea whose time has been around for a while now, waiting to be noticed. The folks at Ryobi are to be congratulated for recognizing and seizing this opportunity to bring an automatic planer within reach of thousands of hobbyists, carpenters, and small-budget shops for whom a large $1000+ machine was not the answer to their needs. We're pleased to add the AP-10 to our line, and we fully expect you'll be equally pleased to add one to your shop.

As an introductory promotion, Highland Hardware is offering a package deal on the AP-10 planer and a Ryobi JSE60 industrial duty variable speed orbital jigsaw. The two units bought together cost only **$449.00 postpaid**, *while our current supply of jigsaws lasts. List price on the jigsaw alone is $214.00. This is an unbeatable deal! Should you choose to buy the planer without the jigsaw, your cost is only* **$399.00 postpaid.**

If you've been waiting for the right price on a good thickness planer, don't hesitate, as supplies are limited. To order on Visa or MasterCard, call us toll free at **(800) 241-6748**, *or send check or money order to: Highland Hardware, 1045 N. Highland Avenue, Atlanta, GA 30306.*

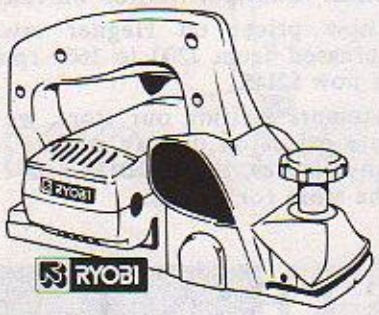
RYOBI TOOL SALE

A special purchase of Ryobi tools just prior to Ryobi's last price increase enables us to offer the incredible bargains shown on this page. Sale quantities are limited on most items, so act now for big savings.



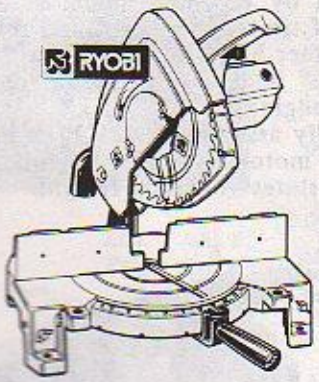
R-150 1 HP Plunge Router

This is the nicest small router we've seen on the market. Features rugged but lightweight all ball bearing construction, 3-position depth stop, 0-2" plunge capacity, 1/4" collet capacity, and 24,000 rpm speed. Weighs 6 lbs.
Ryobi list **$164.00**. Sale price **$89.95** plus $4.20 shipping.



L-120U 3-5/8" Planer

Easy to change blades make this little planer a real pleasure to use. 3-5/8" width surfaces 2x4s in one pass. Two-knife cutterhead rotates 15,000 rpm. Length is 10". Maximum depth of cut is 3/64". Maximum rabbetting depth is 1/4". All ball bearing construction.
Ryobi list **$159.00**. Sale price **$89.95** plus $4.20 shipping.



TS-251U 10" Miter Saw

Great portability is what distinguishes this fine-cutting miter saw from others on the market. Weighing only 33.5 lbs. and featuring a carrying handle on top, it is easily transported from job to job. Slotted metal table rotates with blade. Positive stops at 90, 22-1/2 and 45° right or left. Spindle lock for easy blade change. Electric brake stops blade in seconds.
Ryobi list **$359.00**. Sale price **$179.95** plus $5 shipping.
Optional accessory kit includes vise assembly, table extensions and dust bag, add **$20.00**.

JSE-60 Orbital Jigsaw

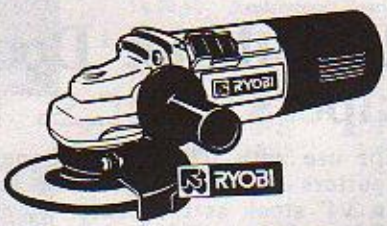
This variable speed orbital jigsaw features an advanced electronic module which delivers constant speed and torque regardless of load. 1000-2700 rpm. Choose straight reciprocating action or one of three orbits depending on material being cut. Length of stroke is 1". Accepts universal blades. 3.5 amps. 5.5 lbs.
Ryobi list **$214.00**. Sale price **$89.95** plus $4.20 shipping.

S-500A Orbital Sander

This ultra-compact pad sander uses a sanding sheet 3" x 5-1/2" (1/6 of a full size sheet). 1.5 amps, 12,000 rpm. Weighs 2.6 lbs.
Ryobi list **$59.00**. Sale price **$34.95** plus $3.30 shipping.

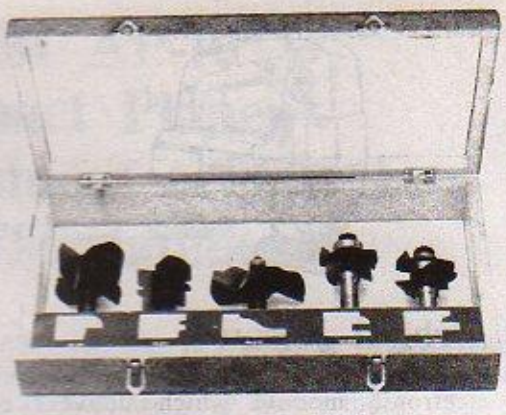
B-7075 3" x 21" Belt Sander

An excellent buy in an industrial-duty belt sander. Sands flush on right side. Unique mechanism assures proper belt tension. 12-1/4" long. 6-1/4" wide. 9.6 lbs. 8.4 amps. Dust bag is included.
Ryobi list **$199.00**. Sale price **$99.95** plus $5.00 shipping.



SG-1000K 4" Sander-Grinder Kit

This is an unbeatable deal on a small industrial-duty grinder. Hardened steel gears, all ball bearing. Includes reversible side handle for extra control, spindle lock for easy changing of grinding wheels. 4.3 amp, 11,000 rpm. 9-1/4" long. Weighs 3.5 lbs. Kit includes backing pad for sandpaper, grinding wheel, rugged plastic carrying case.
Ryobi list **$99.00**. Sale price **$59.95** plus $3.30 shipping.

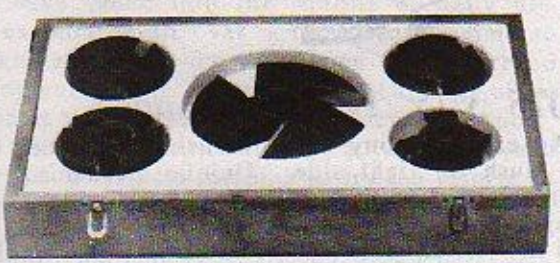


FREUD Router Bit Door System

We now offer an excellent buy on a complete set of five carbide-tipped router bits ideal for producing raised panel cabinet doors in 3/4" stock using your 1/2" router. Each bit is made with the finest carbide available and sharpened with a 600 grit diamond wheel. Bits included produce the rail and stile, raised panel, and door lip. Also, a glue joint cutter is included for producing strong joints while gluing up panels from narrower stock. Worth noting is the fact that separate bits are included for both the rail and stile profiles, rather than requiring a single bit to be restacked to produce the two shapes (as on our other rail and stile router bit).

The five bits are packed in a fitted wood case. Featuring a list price of $248.00, the model 94-100 router bit set is on sale for **$199.95** plus $5.00 shipping. The pair of rail and stile bits alone can be bought for **$125.00** plus $5.00 shipping.

A special 20-page booklet written for Freud by R. J. DeCristoforo explains the set-up for using each of these bits. It also provides plans for building a rather nice router table excellent for use when making raised panels. The book is free with either router bit set above, or can be ordered from us separately for **$1.00** postpaid.



FREUD Cabinet Door Set for Shapers

Designed for use with 1/2" or 3/4" shapers, the five carbide-tipped cutters in this set produce basically the same patterns in 3/4" stock as the router bit door system above. The EC-900 set includes Freud's EC-260 rail and stile cutters, EC-210 raised panel cutter, EC-001 door lip cutter, EC-031 reversible glue joint cutter, and a fitted wood case. Also included is R. J. DeCristoforo's 20-page booklet "A Guide to Using Carbide Tipped Shaper Cutters".

With a list price of $449.00, the EC-900 set is on sale for **$329.00** plus $5.00 shipping. The booklet can be bought separately for **$1.00** postpaid.

HEGNER Saws On Sale

Hegner recently announced a design change on its extremely popular Multimax-2 scroll saw. Historically the best-seller among Hegner's four scroll saw models, the Multimax-2 will henceforth have a table that's 60% larger than before. The new table size is 9" x 17".

At about the same time, Hegner also announced a price increase for most items in its product line. New price on the Multimax-2 is now **$995.00**. However, we still have in stock several units with the smaller size tables. While they last, they are available for **$795.00**, freight prepaid (in the 48 adjacent U.S.). This price includes the stand. Our 86 catalog price on this tool was $895.00.

We also have available an overstock of Hegner Multimax-1, also known as the Hobbymax. While our supply lasts, you can buy one for just **$349.00** postpaid. Its new retail price is $495. Stand is optional ($84.00).

The Multimax-1 features a C-shaped one-piece rocker arm and the same blade suspension design found on the Multimax-2. Throat depth is 14"; max depth of cut is 1-9/16". Length of stroke is 5/16". The enclosed fan cooled 0.7 amp motor is rated for continuous duty. Weight is 10 lbs. One-year limited warranty.

Other new prices on Hegner saws: Multimax-3 (recently increased from 1200 to 1660 rpm) is now $1695. Polymax-3 is now $2145.

For customers visiting our store, we also have cash and carry sale prices on display models of two premium quality Hegner lathes, the HDB175 and HDB200. Please inquire at the store for details.

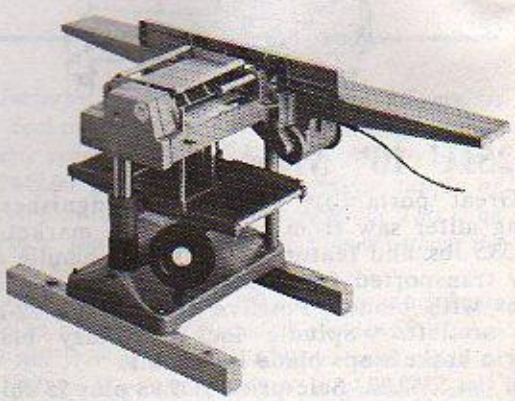
LAST CHANCE !

Makita 2030 Planer-Jointer Clearance

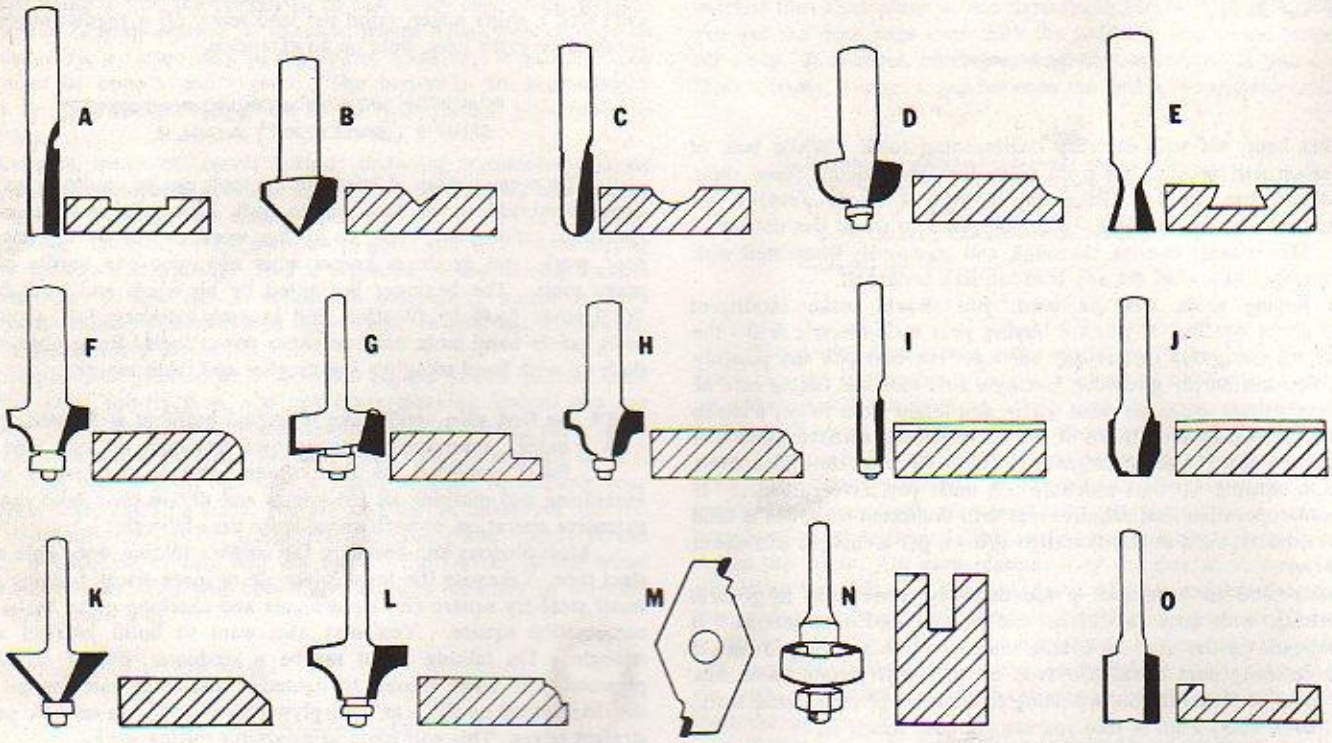
Long a favorite because of its capacity compactness, this machine is available in limited supply at a tremendous savings. Offered for $1499 in our catalog, the 2030 can be bought for only **$1295 POSTPAID** while our supply lasts.

Superseded by the new model 2030N, the 2030 has stood the test of time as a rugged and reliable workhorse. Its autofeed planer handles stock up to 12" wide by 7-1/2" thick. The 6-1/8" wide jointer has a total bed length of 59" for serious edging duty.

Arrives fully assembled with high performance 2 HP 110 volt Makita motor. Weighs 276 lbs. Shipped free in the 48 adjacent states via truck freight.



GIANT SALE ON CARBIDE ROUTER BITS



Our industrial-duty carbide-tipped router bits are well known for their quality precision and long edge-retaining characteristics.

Now they are on sale at tremendous savings from our 1986 catalog prices. Sale prices are good through October 31, 1986. Add shipping charges indicated on page 23.

All but residents outside Georgia

ORDER TOLL FREE
(800) 241-6748
(Orders Only)

A STRAIGHT BITS

	Cutter Diameter	Shank Diameter	List Price	SALE Price
10.20.01	1/8"	1/4"	12.20	8.95
10.20.02	3/16"	1/4"	12.20	8.95
10.20.03	1/4"	1/4"	12.20	8.95
10.20.04	5/16"	1/4"	13.50	9.95
10.20.05	3/8"	1/4"	13.50	9.95
10.20.06	1/2"	1/4"	13.80	9.95
10.20.07	5/8"	1/4"	14.90	10.95
10.20.08	3/4	1/4"	15.60	11.95
10.20.52	3/8"	1/2"	14.20	10.95
10.20.81	1/2"	1/2"	14.20	10.95
10.20.53	5/8"	1/2"	16.80	12.95
10.20.54	3/4"	1/2"	18.50	13.95
10.20.55	7/8"	1/2"	21.60	15.95
10.20.56	1"	1/2"	22.80	16.95

B V GROOVE BITS — 90° Angle

	Diameter	Shank	List Price	SALE Price
10.20.10	1/4"	1/4"	14.80	10.95
10.20.11	1/2"	1/4"	20.90	15.95
10.20.57	5/8"	1/2"	34.80	25.95
10.20.58	3/4"	1/2"	43.20	32.95

C ROUND NOSE BITS

	Radius	Shank	List Price	SALE Price
10.20.59	1/16"	1/4"	16.80	12.95
10.20.60	1/8"	1/4"	17.60	13.50
10.20.12	3/16"	1/4"	23.50	17.50
10.20.13	1/4"	1/4"	23.90	17.95
10.20.14	5/16"	1/4"	24.50	18.50
10.20.15	3/8"	1/4"	24.90	18.95
10.20.82	1/2"	1/4"	38.90	26.95
10.20.61	1/4"	1/2"	28.80	21.50
10.20.62	3/8"	1/2"	35.90	28.95
10.20.83	1/2"	1/2"	48.90	36.50
10.20.84	5/8"	1/2"	56.90	42.50

D COVE BITS

	Radius	Shank	List Price	SALE Price
10.20.16	3/16"	1/4"	31.80	23.95
10.20.17	1/4"	1/4"	31.80	23.95
10.20.18	3/8"	1/4"	31.80	23.95
10.20.19	1/2"	1/4"	32.80	24.95
10.20.63	3/8"	1/2"	33.80	25.95
10.20.64	1/2"	1/2"	33.80	25.95

E DOVETAIL BITS

	Diameter	Angle	Shank	List Price	SALE Price
10.20.28	3/8"	9°	1/4"	15.90	11.95
10.20.29	1/2"	14°	1/4"	15.90	11.95
10.20.65	3/8"	9°	1/2"	17.90	13.50
10.20.66	1/2"	14°	1/2"	19.90	14.95

F ROUNDING OVER BITS

	Radius	Shank	List Price	SALE Price
10.20.20	1/16"	1/4"	27.60	19.95
10.20.21	1/8"	1/4"	27.60	19.95
10.20.22	3/16"	1/4"	27.60	19.95
10.20.23	1/4"	1/4"	27.60	19.95
10.20.24	5/16"	1/4"	29.80	22.50
10.20.25	3/8"	1/4"	29.80	22.50
10.20.26	1/2"	1/4"	34.80	25.95
10.20.68	1/4"	1/2"	27.60	19.95
10.20.69	5/16"	1/2"	29.90	22.50
10.20.70	3/8"	1/2"	29.90	22.50
10.20.71	1/2"	1/2"	34.80	25.95
10.20.27	3/4"	1/2"	54.80	39.95
10.20.85	1"	1/2"	105.00	78.95
10.20.86	1-1/4"	1/2"	139.00	104.95
10.20.87	1-1/2"	1/2"	128.00	110.95
10.20.50	Replacement Bearing		3.80	2.95

G RABBETTING BITS

	Depth	Shank	List Price	SALE Price
10.20.30	3/8"	1/4"	27.60	19.95
10.20.72	3/8"	1/2"	27.60	19.95
10.20.50	Replacement Bearing		3.80	2.95

H ROMAN OGEE BITS

	Radius	Shank	List Price	SALE Price
10.20.31	5/32"	1/4"	32.90	24.95
10.20.32	1/4"	1/4"	33.90	25.95
10.20.73	5/32"	1/2"	32.90	24.95
10.20.74	1/4"	1/2"	33.90	25.95
10.20.51	Replacement Bearing		3.80	2.95

I FLUSH TRIM BITS

	Cutting Length	Shank	List Price	SALE Price
10.20.33	1"	1/4"	15.60	11.95
10.20.75	1"	1/2"	17.80	13.50
10.20.50	Replacement Bearing		3.80	2.95

J LAMINATE TRIMMER BIT

		List Price	SALE Price
10.20.34	Laminate Trimmer Bit	11.90	8.95

K CHAMFER BITS — 45° Angle

	Carbide Length	Shank	List Price	SALE Price
10.20.76	5/8"	1/4"	32.40	24.95
10.20.35	5/8"	1/2"	32.40	24.95
10.20.50	Replacement Bearing		3.80	2.95

L BEADING BITS

	Radius	Shank	List Price	SALE Price
10.20.36	1/16"	1/4"	27.60	19.95
10.20.37	1/8"	1/4"	27.60	19.95
10.20.38	3/16"	1/4"	27.60	19.95
10.20.39	1/4"	1/4"	27.60	19.95
10.20.40	5/16"	1/4"	27.60	19.95
10.20.41	3/8"	1/4"	29.80	22.95
10.20.77	1/4"	1/2"	27.60	19.95
10.20.78	3/8"	1/2"	29.80	22.95
10.20.79	1/2"	1/2"	34.80	25.95

M TWO WING SLOT CUTTER

	Thickness	List Price	SALE Price
10.20.43	1/8"	13.20	9.95
10.20.44	1/4"	13.20	9.95

N

		List Price	SALE Price
10.20.45	1/4" Arbor & Ball Bearing	7.60	5.95
10.20.49	Replacement Bearing	3.80	2.95

O MORTISING BITS

	Cutting Diameter	Shank	List Price	SALE Price
10.20.46	1/2"	1/4"	12.80	9.95
10.20.47	5/8"	1/4"	13.90	9.95
10.20.48	3/4"	1/4"	16.80	12.95

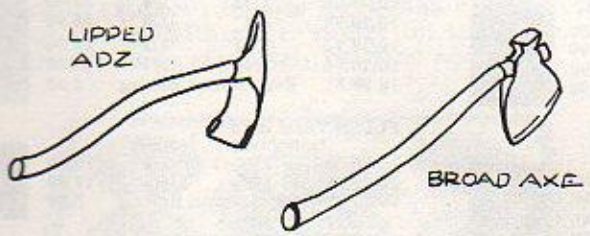
BOATBUILDING TOOLS

This issue we will describe boatbuilding tools. While lack of space will prevent me from going into great detail about their actual use, Fred P. Bingham's *Practical Yacht Joinery*, an excellent book on boatbuilding, is a good place to study the details of tool use. Marvelously concise, thorough, and generously illustrated with clear drawings, it's a must for any boatbuilder's bookshelf.

In buying tools, new or used, you should make intelligent decisions about quality. If you are buying your main electric drill - the one you'll be using day in and day out - get the best you can possibly afford. You can hardly go wrong getting a fine tool and taking care of it. However, there are some cases where you might want to get a cheap drill. If you plan to drive a lot of screws in joining epoxied joints and you know the drill is going to get all fouled up with resin in a short time, get a cheapie. It will probably last until you have ruined it. If you have an operation that requires one drill dedicated to it, but is used only occasionally, such as the Portalign system, get a cheapie and use it only for that.

Tools used in boatbuilding are basically those used in general woodworking, with some additions and one or two subtractions. It really depends on the kind of boatbuilding you are planning to do. If you are building new boats, the type of boat will dictate those few specific tools needed. If you are going to do a lot of restoration work, you will need every kind of tool you can get your hands on.

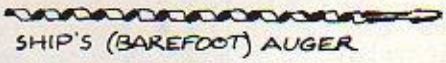
The appropriate tool skills should be mastered before applying a tool to your boat project. Practice, experiment, get it down right. Then go to your good material and proceed with confidence. I'm a sucker for tools. I always find a good excuse for buying this one or that. I have fun taking it to the shop, reading all about it, playing with it, practicing, finding new ways to utilize it, etc. This way, by the time it needs to go into production, I have pretty well mastered its basic use.



Nearly all the tools you will need for boatbuilding are available at Highland Hardware, or through special mail order houses supplying the boatbuilding trade. There are some vintage tools you'll hear mentioned in connection with the shipwright's art - the adz, broad axe, broad hatchet, and ship auger. These are traditional boatbuilding tools and are not needed for the average person building today's boat, but I'll cover them briefly for those interested in building more traditional and larger boats.

The broad axe is just what the name implies, an axe with a very broad blade. It is used to hew logs into large timbers and is swung from a standing position. Work is done on the sides of the log. The broad hatchet is a smaller version of the same, used at closer quarters. The adz is more like a hoe or mattock, and is swung between the legs, straddling the log, to hew the top surface. All three are rather dangerous, but in the hands of a master can bring timber surfaces level and smooth. A smaller adz, the lipped adz, is swung somewhat overhead, as in working down the sloping sides of a keel/deadwood assembly in a larger boat, where the lower planking curves down into solid wood aft. It is still used for this type of work in many traditional shops today and can result in very fine surfaces.

The ship's auger is a single or double worm auger with no lead screw at the foot. It is used for boring long holes, such as an engine shaft log, or cabin side bolt holes. The lead screw is omitted as it would tend to lead the auger off in a direction other than dead straight. Directional control is maintained by jigging outside the bore. If you can't find a ship's auger, grind the lead screw off a regular auger. If it needs to be extra long, weld on an extension.

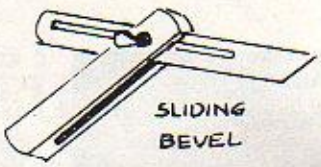


SHIP'S (BAREFOOT) AUGER

The normal array of boatbuilding tools can be quite extensive. Since boatbuilders, in addition to hull joinery, also build cabinets, furniture, carve, rout, inset, do leather work, canvas work, metal work, rope work, and goodness knows what else, you can hardly have too many tools. The beginner is limited by his needs and bank balance. We'll cover tools by function, and in each category, talk about hand tools, power hand tools, and stationary power tools. Remember, you can do it all with hand tools; it's just tougher and takes longer.

The first step you'll take in actual building is to *measure and mark*. Interestingly, in my own inventory of tools, and in the list I compiled for this column, this is the largest category. Measuring and marking all the angles and curves on a boat can be an extensive operation, so we'll spend some time with this.

Most obvious and basic are the six-foot folding wood rule and the steel tape. Likewise the level (a couple or more sizes), framing square, small steel try square (for square cuts and checking other tools), and a combination square. You may also want to build yourself a large triangle - I'm talking about maybe a six-footer, out of quarter-inch plywood, with some cutouts to lighten it and make carrying easier. It should be dead on 90^{O} - as most plywood is - and have smooth, perfectly straight edges. This will come in handy for lofting work.



SLIDING BEVEL

Perhaps your most vital measuring tool is the sliding bevel. You'll use it constantly for taking the angle of a cut or bevel off a lofting (full-size drawing of the boat's lines) or off a part of the boat to cut a joining part. Get a good sliding bevel and use it with tenderness. It is forever. You may need a protractor for those cases where angles are given to you in degrees. Depth gauges and contour gauges are mighty handy at times. And, of course, ice picks.

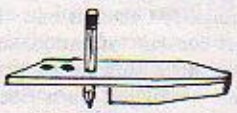
Never heard of ice picks in woodworking? I'll name just four good uses that come immediately to mind. The ice pick is an excellent scriber. You may have several other scribers, but an ice pick is hard to beat. It's the perfect depth gauge for nail and screw holes you want to probe to determine the proper-length fastener, especially in repair and restoration work. In the same way, it is a good probe to see if the wood under that paint is solid, or as you feared, a bit punky. Most important, ice picks are used in lofting: transferring a set of offset measurements from tabular form to full-size curves on the floor. We'll get into lofting in detail later. To connect a series of points taken from the table, a long clear strip of wood is laid on the floor and bent through the points to make a *fair* curve, i.e. one that is smooth, sweet, and without humps or hollows. The ice picks hold the batten in place. Some people drive nails or brads - not *through* the batten, but on either side of it - but I prefer ice picks. They are eaily driven in with the palm of your hand or a light mallet, and easily jerked out to move around. You'll do a lot of that. Get them by the dozen.

BATTEN WITH ICE PICKS

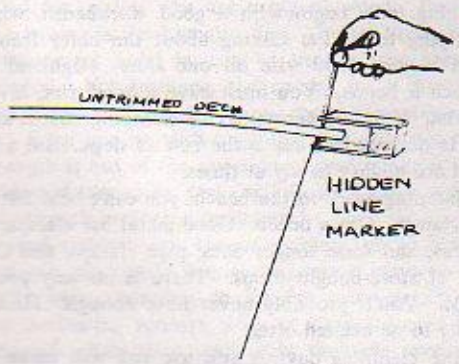
The battens should be considered measuring/marking tools and a boatbuilder will have quite an assortment of such battens, starting with small 1/4" x 1/4" strips of straight mahogany or ash, two to four feet long, and going up through twenty-footers of 1x1 pine or spruce. The important thing is that the battens be of absolutely clear stock, straight grain, and of constant section. Sometimes, where a long slow curve ends in a sharp turn, a batten may be tapered to make that transition. The taper must be smooth and perfect. The batten is the boatbuilder's version of the straight edge, of which you should also have an assortment.

Calipers, compasses (several kinds including trammel points for making a beam compass), dividers, and traditional marking and cutting gauges are all handy at one time or another, just as they are in most woodworking. One use of the compass (a good one with screw setting and bow spring) is in *spiling*. This is a process of transferring a curve from one place to another. It is not the complex or arcane mystery people often think. I'll describe it later when we talk about planking, where it is most often used.

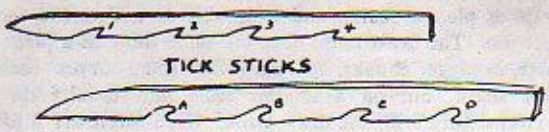
Get plenty of pencils, no. 2 and no. 3 regular yellow pencils, some ball point pens, felt-tip pens, and any other marking devices you can think of. You'll use them all some time or another. Stand them in an empty can near the workbench. For fine joinery cuts, a marking knife is indispensible. Get a good one that is handy to use. In scribing your line with a sharp marking knife, you are making the initial cut into the wood. You are severing the wood fibers smoothly and cleanly at the surface. Subsequent cutting will not disturb the surface of the wood beyond the line and you will obtain considerable accuracy by working just to that perfect line.



Learn, from the beginning, to make measuring and marking devices of your own, for in time these will become your main tools for layout and marking. I'll discuss just a few; you will invent more as the needs arise. First is a scriber, or what I have rigged up and called a scriber. It is better, to me, than a compass, which is often used for scribing. The point of the scriber follows some contour to which you want to fit another piece. Drill the hole for the pencil anywhere, or a special distance for some particular project, or drill several holes. The important thing in using such a scriber (or compass, or anything like this) is that you keep the tool at the same angle to the workpiece throughout. *Do not* swing it around and try to keep it normal to the curve. Rather, keep it parallel to the length of the workpiece, or some imaginary line. If you keep changing the angle of the tool relative to the workpiece, you will not get a matching curve.



Another scriber which I'll call a Hidden Line Marker is used where the contour to be followed cannot be seen, but is interrupted by the piece you are marking, such as trimming a deck to follow the sheer curve. These gadgets are easy to make and I usually have one or two laying around ready to use. Just glue two tongue depressors, or sucker sticks, to a scrap of pine about an inch thick. Since these fingers are of equal length, one will always be over the other and will mark the same line. Do you see the danger, though, in marking your deck line like this? If your hull sides have any flare (angle from the vertical) you must allow for that flare on your deck edge, so that the actual edge you cut is outboard of the line you mark. Solution: cut well wide of your marked line, then plane at the flare angle, following the hull side, until you get the deck edge even with the hull side and at the proper angle all along. It changes, of course, from stem to stern. If you do not do this carefully, you get a gap between the deck edge and rub rail.



Tick sticks masquerade under many names, but they are all pretty much like the illustration. They are necessary for getting a pattern for an odd-shaped piece, such as a bulkhead. Suppose you have to fit a bulkhead (partial bulkhead, cockpit floor, whatever) into a space on a boat. Clamp a scrap of stiff cardboard or plywood firmly in place in the same plane as the piece will go. Now place the tick stick flat on it in various positions, each of which puts the pointer at a point on the periphery of the bulkhead. For curves, use as many points as needed to define the curve. On each placement of the tick stick, trace the little wiggles of the tick stick onto the pattern board, and label them. When this is done, tape or tack the pattern board to your bulkhead stock, place the tick stick in the marked positions on the pattern board, one by one, to get duplicate points on the stock. Follow the dots, mark out, and cut with confidence. If you have smooth curves, use a batten to fair them through the dots.

Pattern stock is most important - pieces of cardboard such as pad backs, scraps of cheap wall paneling, thin plywood, door skins, thin hardboard, anything you come by. I keep a stack of art pad backs, nice stiff cardboard, for patterns. Easy to cut and snip with razor blade and scissors until a pattern fits, then trace that onto your wood. I believe in patterns.

This is but a partial list of all the measuring and marking tools available. They are all useful one time or another. You'll find yourself making many as you go further into boatbuilding. Remember, boatbuilding consists very much of inventing: devices, jigs, fixtures, do-dads, etc. Be creative. That's the fun.

After you mark, you *saw*. A good back saw and dovetail saw, the kind that looks like a small back saw, are needed for fine joinery of small parts. Learn how to use these saws properly and they'll do wonders for you. A keyhole saw is handy, especially if you do repair or restoration work. Keep a decent hack saw around for those bolts, etc. that occasionally have to be shortened. If you like the Japanese saws, these work well for cutting joints and do some things the others won't.

Two saws are needed in the power hand tool department: a saber saw, which some people seem determined to call a "jig saw", and the standard hand circular saw. You don't need a big one unless you are building a rather big boat. Best choice is probably the 8-1/4". Get a good one.

Stationary power tools for sawing are real labor savers in boatbuilding. The main one is the bandsaw. Old traditional boatbuilders built their shop around the "ship saw", which is a huge bandsaw whose table remained level and the entire blade assembly tilted. A good shop today will have two bandsaws, a fourteen-inch model with thin blade for doing curved work, and a larger saw with ripping blade for ripping, resawing, and a host of other things. This almost eliminates the need for a table saw, a lethal beast which has little use in my shop. This is even more true if you have a radial arm saw, another workhorse. If you have a limited budget, you can get along fine with a radial arm saw and 14-inch bandsaw.

(continued on next page)

Boatbuilding Tools (contd.)

Cutting tools - shearing, paring, slicing, scraping, boring - will be your biggest inventory. You will do most of your shaping with these. The roughest, or I should say primary shaping of very large pieces is done with the adz, as mentioned before. Other timbers, not so large, are shaped with a drawknife. It is good to have at least one of these handy, know how to use it, and keep it sharp. I mean *sharp*. Similar to the drawknife is a spoke shave. You will collect them if you do much small boatbuilding. Both of these tools are but special kinds of planes, really, and it is well to understand them and their correct use. The draw knife does the same thing as a plane, but it does it faster, in bigger chunks, and can follow some curves. Same thing for a spoke shave, but on a smaller scale and usually on curves. Exercise extreme care with the draw knife. Used carelessly it can chew up good wood, not to mention otherwise good boatbuilders.

Cabinet scrapers are marvelous tools. If you do much coating with epoxy resin, they are mandatory. The kind that have various curves are handy, but the straight Sandvik type is the mainstay. Learn how to sharpen and use it and it will save you many hours of labor and give you a fine surface.

You'll need a number of chisels. The large boat-builder's chisel, called a *slick*, is used in heavy shaping. Several really fine paring chisels, kept perfectly sharp, are important. Mortise chisels and butt chisels are not often needed. A few general bench chisels for some odd rough work might be handy, as will one or two gouges. I like to have a small range of cheap chisels for rough work, some better chisels for medium good work, and three or four really fine chisels for fine joinery.

Planes, of course. The more, the better. You can hardly have too many. Kept sharp and in good order, they will serve you well on most every job. You should have a jointer, a jack, and a smooth in the regular bench planes. A couple or so block planes, one a low angle job, are needed. Add a rabbet plane - I like the 3-in-1 kind - and some special wood planes, maybe of your own making. One wood plane that you'll need if you are shaping concave surfaces is the Japanese scooping out plane, a real jewel for hollowing certain places on planks and oar blades. Where a plank of solid wood fits against a tight turn of the boat's bottom in a round bottom boat, the insides of the planks must often be hollowed to fit well. The traditional boatbuilder used a hollowing or backing plane - a wood plane with a curve.

In addition to your marking knives, which are really cutting tools, you should have one or two carving knives, a utility knife, and an assortment of odd knives, such as kitchen paring knife, butcher knife, butter . . . You'd be surprised how such things can come in handy in the strangest ways. When prying off moldings and small rails or trim pieces on a repair or restoration job, the butter knife and paring knife are just the ticket.

Another tool which you may need on board and away from shore is a hand drill, the egg beater type, with an assortment of bits. A cordless battery type today replaces this if you want to invest in one. You will not try to build a boat without an electric hand drill. The 3/8" variable speed reversible drill is best. Get one or two main good ones, and a set of regular twist bits. Keep these sharp. As your work dictates, you may want to add some extra-long bits, Forstner bits, and brad point wood bits. The usual spade bit I find a little rough for most work, though if you keep it sharp, go slow, and use a backing block, it may do well in some cases. For drilling screw holes and countersinking or counterboring for plugs, all in one operation, the taper drill combination set is the best we have present, I'm afraid. Some adjustment has to be made for the fact that this bit has a continual taper while screws don't. It requires some fiddling to keep the collars in place and it clogs every few holes. Still, it is the best thing I have seen to date, and if you are drilling a lot of screw holes, it's a real labor saver.

If you counterbore for plugs, you also need a plug cutter, sized to your counter bore diameter. Cut plugs from the waste wood nearest the work you are plugging so the color and grain will match best.

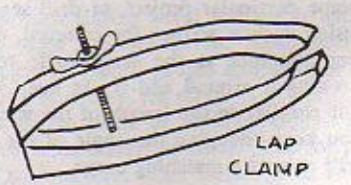
One gadget you might find useful if you are boring holes which must be at right angles to the surface is the Portalign drill guide. It attaches permanently to a drill. Good if you have a spare drill.

If your boatbuilding is going to be sizable, consider an electric hand plane, small or large, depending on your work load. Planing is something you do almost constantly in boatbuilding, and if you have to take off very much material in places, this little tool will save you a lot of sweat. You can get near your final surface with it, then finish up carefully with a bench plane.

The router is a tool that has found its way into nearly all sections of woodworking and has become a real benefit to boatbuilding as well. I use three. An old beat-up router is screwed under a flat piece of plywood with a laminate top surface. When I have to run a chamfer or quarter-round on very much wood, I haul this out, clamp it between two benches, and use it like a shaper. I have an "everyday" router on the shelf for all those little jobs best done this way. Then I have a large router fastened into a scarphing jig. Scarphing is the joining of two pieces, boards or sheets with a long tapering glue joint so that the strength of the wood is maintained as well as its shape and bendability. There are several ways to cut scarphs, which I will describe in a future issue. If you are going to scarph much plywood, for long sheets of planking, a gadget called the Scarffer(tm) is marketed by the Gougeon Brothers of epoxy fame. It attaches to your circular saw and makes an 8 to 1 scarph cut in plywood.

In stationary power tools you will do well to consider a jointer, planer, and drill press. Even a cheap bench drill press is better than none. Hard to do without this. If you can't afford a jointer or planer combination, you will have to find a friend with these tools, or pay to have such millwork done. I cannot imagine planing sixteen foot boards all four sides, by hand. Not many, anyway.

When you think of cutting tools, think of *sharpening*. If you don't keep cutting tools razor sharp they drag, burn, dig, dull and make up work, at best. I am not a big sharpening buff. If I can get a tool sharpened cheaply and quickly, I send it out. But chisels, plane irons and drill bits need almost constant attention, so you'd best learn to do these yourself. Get or rig up a slow speed grinding wheel. The fast ones like most shop grinders will just burn fine chisel edges and plane irons. Once burned, they have to be retempered. The slow wheel reduces this danger. Get some Japanese waterstones too, and take good care of them. They are today's sharpening miracle. A few strokes on two or three successive stones will keep your cutting edges in top shape and razor sharp. Accept no less. There is a gadget that mounts to the bench, next to the grinding wheel to sharpen drill bits. Hard to beat. Forstner and spade bits can be sharpened with a small metal file. For router bits, I use only carbide, and when they get dull, I send them out. I send out all saw blades. Time is better spent building.



Clamping tools begin with a good workbench, which is itself a clamping tool. I'm talking about the hefty free-standing kind with a good solid vise on one side. Highland Hardware has plans for such a bench. You must have a good, flat, level surface you can depend on. You will constantly be clamping boards and panels to it. A tail vise is not needed, nor is the row of dogs. But a stop or two at the vise end are mighty handy at times.

For clamping work to the bench, you can't beat the wooden-jawed cam-action clamps. Get a dozen. Good metal bar clamps, six or eight in a couple sizes, and some longer ones, pipe clamps, and C-clamps round out the list of store-bought items. There is no way you can have too many clamps. You'll probably never have enough. Heavy sash clamps are not likely to be needed often.

Half the clamping devices you use you will make yourself. For lapstrake planking, where the planks do not fit edge to edge, but overlap each other, a special clamp is needed to hold the laps together while clenching. You can buy these, but you might as well make yourself a bunch if you are going to plank boats lap strake. As needs arise, you will devise clamping gizmos to solve the problems. Old bicycle tubes, not fit for holding air, make great tubing. In boatbuilding, especially in laminating veneers, we have come to think of staples as clamping devices. Nails, too. With epoxy resin as

adhesive, you need only enough pressure to keep parts together until the resin sets.

Something should be placed between metal clamp pads and your wood, to protect it from being marred. I cannot imagine fiddling around with putting wood blocks under clamps each time I use them. Get a sheet of 1/8" cork and glue cork pads to the bearing surfaces of all clamps. When the cork gets buggered up with glue, etc. scrape it off and replace. Learn to gauge pressure on clamps by feel. Often you do not need a ton of pressure on a joint. You just need firm, even pressure to assure good contact and glue distribution. What *is* important is the direction and evenness of pressure. Learn to use pieces of wood, cambered if necessary, to spread pressure. In laying a deck, for instance, always clamp from the center out, so that adhesive spreads out and drives out any trapped air.

Driving tools are hammers, mallets, punches and nail sets. You'll need a variety. Get good ones that feel right. And *don't* overpower. I cringe when I see someone driving a six-penny finish nail with a 20 ounce hammer. This is basic.

Driving tools are those used to pound one part into or through another. If the part is wood, use a mallet, or block of wood to save the finish. When rivetting with a ball peen hammer, many light blows will do the job. Heavy blows may cause the rivet to collapse. We're talking about very small hammers here. Driving drift pins into heavy deadwood calls for a sledge.

Joining tools take in hammers used for nailing. The main hand tool is the screwdriver. If you are doing fine joinery and driving bronze screws, please get a set of good cabinet screwdrivers that fit the slots. They will save a lot of marred wood.

A brace and screwdriver bit are necessary to get the torque on screws larger than 10x2", roughly. Be careful here, as with power drivers, that you do not overtorque and twist a screw off. Bronze is not as hard as steel and brass is softer yet. You've got to learn to *feel* the difference between a screw driving in and a screw that is stuck and twisting, ready to shear off. You can feel it. You will learn this feel very quickly after you have twisted a few off and have to dig them out.

If you find screws binding in holes and twisting off, you have several options. Go to a smaller screw. Drill a larger hole. Wait a few minutes for the screw to cool. Lubricate the screw with *beeswax*.

Of course, your variable speed reversible electric drill is a great driving tool, with the precautions noted, plus the added caveat of making quite sure the bit fits the slot and it does not slip out. Slip out with a power drill and you can chew up a lot of nice wood. In a production situation, it is often best to have one person drilling the holes and a second person coming along behind driving in the screws.

Quite often we have to make up a transom, rudder, solid bulkhead, etc. out of stock not wide enough for the whole piece. Edge joining is called for, unless you are using plywood. Best tool in the world for edge joining is the Lamello Top. Do not think, however, that this tool, as wonderful as it is, can be used where great cross-grain strength is needed. For instance, the rudder on a thirty-foot sailing yacht is a large expanse of wood in many cases. The stresses at sea can be quite high. Edge joining with anything that does not reinforce the cross-grain strength is out of the question. Either make it up composite - laminates, plywood laminates, etc. - or join the boards with long drifts for cross-grain strength and warp resistance.

Air-powered staplers are becoming more of a joining tool for boats now that you can obtain bronze and monel staples. Main use of staples is really as a clamping device for cold molding techniques. When you are laminating veneers, a lot of staples spread over an area will do a great job. You must make sure they are evenly distributed and have enough of them. If the staples are bronze or monel and stay in the boat, they are then also joining fasteners. If they are merely to apply pressure while resin sets, and are to be removed later, you can spread the clamping action by stapling through tongue depressors. This also aids in removing the staples. As permanent fasteners, staples are excellent for holding and, due to their speed of entry, are less liable to split wood than a fastener pounded in.

Abrading tools are most important, as any of my apprentices will tell you. You need a good assortment of files and rasps. If you have to start out with just one, get a patternmaker's rasp, Nicholson no. 50 or thereabouts, and a square wood rasp. A four-in-hand is mighty handy. Half way between abrading and slicing comes the Surform tool, a good performer, especially on rough resined surfaces.

The big one, of course, is sandpaper and blocks. I find it lamentable that so many people consider sanding a thankless drudge to be gotten through as quickly and painlessly as possible. Actually, that is the attitude that makes it so painful. Now, I have no quarrel with the "tool finish" school of woodworking. My hat is off to the person who will touch no sandpaper because he wants to work fine wood down with good sharp tools and nothing more. That's great for museum furniture.

It's probably good philosoph for a clamming skiff, too. But if you are going to build boats and paint and varnish them, better get your head around to a different angle about sanding. Sanding, in addition to being a good aerobic exercise - don't laugh; do it in plenty of ventilation and wear a dust mask - is a calm, quiet, almost meditative exercise. You can think while you sand. You can daydream a bit, let your mind relax. And all the while, that wood is becoming smoother, softer and more beautiful. Grain patterns emerge. A glow begins to form. You know you have done something worthwhile.

Naturally, if you have done a good job with plane or scraper, there is no need to sand initially. If you have coated with resin, use a scraper to level things off, then sand with 80, followed by 120. Wait until the resin has fully cured before you sand. Scrape before it cures fully. If, after it cures fully, your sandpaper clogs, wash the surface with ammonia and water. Let it dry, then sand.

Rough wood, as on restoration or repair work, should be sanded with 80, then 120 usually. More of sanding specifics when we get into finishing. Finishing is sanding. Sanding is finishing. The best paint or varnish in the world isn't worth a darn over poorly prepared surfaces.

You should have an assortment of production grade paper, garnet or aluminum oxide, in 60, 80, 120, and 180 grits. Blocks of wood, or better, cork sized to fit a quarter sheet of paper, pulled over the sides of the block are a must. You might put a pad of felt, cork, or rubber on the blocks. For really soft work, there are soft pads available.

I buy sanding belts and lengths of belting, all sizes and grits. I am continually gluing such strips to lengths of plywood, hardboard, cardboard, laminate, veneer, and so on. I make rasps by gluing coarse belting to 1x2s or whatever. I use emery boards for small places. I use what the automobile people call body files. I call them hull files. Take a 2-to-4 foot strip of plywood, as wide as your sand belt, glue on a rubber mat, and adhere the belting to this with 3M sanding disk adhesive. Nail and glue a couple of handles on top and you have the perfect tool for making a hull fair. I have a dozen or so with varying grits and varying degrees of flex, for round hulls, long runs, short work, fine work, whatever. Builders in FRP often use a hard foam block to fair a hull. It is very coarse, fast, and wears to the curve you are sanding. Boatbuilders call it fartrock. Use some and you'll find out why.

Power sanders are a blessing if you have much surface to cover. The little hand block sander, jitterbug, is a dandy. Some of the larger vibrating and orbital models are good, too. A belt sander is great at times, but so very risky. You'd better get a good one and learn how to use it. It must be adjusted properly, which the el cheapo models can't be. Keep it *flat* and *moving*. The body grinder or disk sander can do a lot of damage in a hurry, but if you learn to use one properly, you have a better tactile and visual check on your work than with the belt sander. Tilt the body grinder a bit, using the rim of the disk. Keep it moving and watch what is happening just beyond the disk. You can get a really fine touch with one of these if you practice.

(continued on next page)

Boatbuilding Tools (contd.)

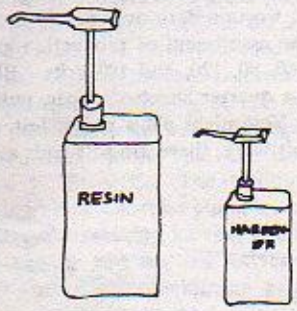
Fitted with a soft foam pad and a 100 to 120 grit disk, the body grinder becomes a finishing tool. This is the way to go on a FRP hull that needs to be painted. Does anyone still believe the gel coats last forever?

I have drawers full of disks, drums, burrs and flappers of every kind. You can hardly have too many sanding gadgets, many of which you will make yourself.

Stationary power sanders are the belt, disk, and drum sanders, all useful at times. The little bench top belt and disk combo is very nice. A good way to use your belt sander is to jig it up in a permanent horizontal or vertical stand and consider it a stationary tool. The usual shop grinder is for wearing down heavy metal - axe heads, bolts, straps, etc. The slow grinder is for sharpening.

Cleaning tools are important. Unless you have a separate "clean room" for painting and varnishing, they are a vital aspect of your work. I rarely use a shop brush or whisk broom, but take a shop vac to everything that gets dusty. If you have a shop with stationary power tools, it is good to have a dust collection system. It saves a lot of mess. As an in-between measure, you can devise ways to hook the shop vac to each stationary tool.

A few small syringes are good to suck or blow dust out of screw holes after they are drilled. Rags, towels, etc. are needed to wipe down surfaces for inspection and finishing. Before you varnish, use a tack rag thoroughly, wiping carefully over every surface to be finished.

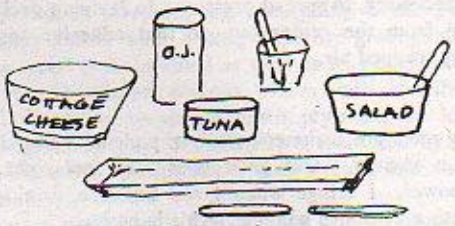


Finishing tools, of course, include brushes of all kinds. For fine enamel work, get the best brushes you can possibly buy and take care of them. Before each use, rinse the brush in the solvent that thins the paint you will use. After use, wipe all the paint you can on newspaper, then rinse the brush in some dirty solvent you have in jars for this purpose. Jig it up and down and press it against the bottom of the can you are using. When you feel you have dissolved all the pigment out that you can, drain the brush, then go outside and shake it well, tapping it against your outstretched shoe. Now go to a jar of somewhat cleaner solvent and repeat. Keep doing this until you get to clear solvent and it remains clear after rinsing. Now wash the brush in warm, soapy water, rinse well, and hang it up soaking wet.

For varnish work, get throw-away foam brushes. In many instances, where you are not cramped and can work freely, these foam brushes do a fine job and leave no brush marks. Varnish can be stretched out more thinly. And you do not have to clean a brush when you finish.

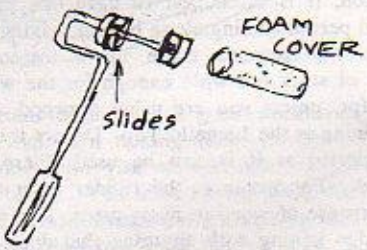
A complete shelf of solvents, jars, cans, etc. is part of the finishing inventory, along with paints and varnishes. You should also invest in some strainers, or use old underwear fastened to a jar with rubber bands. Most paint and all varnish forms a skin on the surface if much air is left above the unused portion. This must be cut out (use your kitchen paring knife) and the stray lumps and bits strained before use. A vital finishing tool - do not be without it - is a tight-lidded metal can for disposing of solvent rags. No one can afford a fire. If you are painting with materials that are the least bit toxic (and most paint solvents are), ventilate well and/or use a toxic vapor mask.

If you are using *resin*, and I think mainly in terms of epoxy resin, there are special *tools* to gather for its use. Unlike some other materials, epoxy resin must be mixed in precise ratios. WEST System(tm) resin must be mixed in a ratio of 1 part hardener to 5 parts resin, by volume. Gougeon Brothers supplies pumps for dispensing resin and hardener in proper volumes. If you are not using large amounts, get the Mini-pumps, which are plastic, inexpensive, and screw onto the containers. Very handy. If you are going to do any large-scale resin work, consider their piston or gear pumps which, while not cheap, save a lot in waste and time.



For mixing, find someone who drinks a lot of orange juice or lemonade and buys it in the frozen cans. Also, scrounge canned meat cans (like tuna), paper and plastic containers of the heat-and-serve dinners, cottage cheese containers, potato salad and slaw containers, picnic cups, aluminum baking pans - anything that is cheap or free. After you have dispensed the proper amounts of resin and hardener into a can, there are two steps in mixing. First, stir the hardener and resin together *thoroughly*, in a juice container or the like. Use a tongue depressor or popsicle stick. Next, pour the resin into its use container - cottage cheese pot if you are going to brush or daub, aluminum baking tray if you are going to roll. The more you get the resin spread out and exposed to the air, and the quicker you do it, the less chance of it setting up on you too soon. Especially so in summer. Really big jobs call for a regular paint tray.

Don't use good brushes. The epoxy will ruin them. Get cheap throw-away brushes, but not the foam kind. They don't work with resin. Get the cheap wood-handle bristle brushes you can buy for about 39¢ and pitch them when you're through. Understand that brushing resin is not like brushing paint. You must regard the brush as a flexible spatula and use it to move the resin around on the surface and put it where you want it. Quite often a squeegee works best. Gougeon supplies great plastic squeegees. If you use a brush, get a sharp butcher knife and whack off about half the bristle length. This makes it stiff enough to be effective.



The only rollers and roller covers worth considering for epoxy are those supplied by Gougeon Brothers. They are adjustable from about an inch to four inches. The roller covers are seven inches. You can cut any size roller cover you want, depending on the job, and slide it on. Or you can slide on the full seven-inch cover. Very slick. When you are through, immediately grab the cover with some newspaper (it will be very slick) and pull it off the roller frame. Don't wait, or it will adhere to the frame and be there forever. Throw away the used cover and dunk the frame in acetone. Swish it around. Get it really clean and it will last for years.

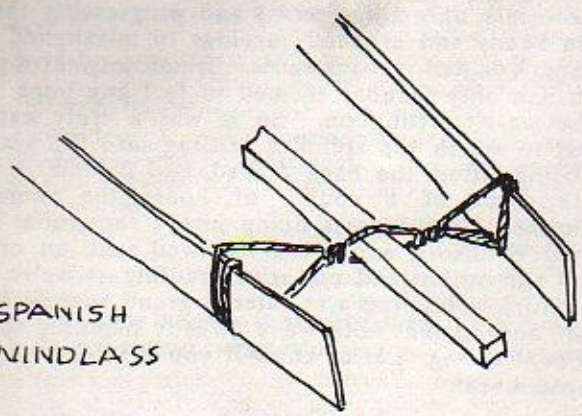
In winter, a good tool for resin work is an electric space heater or two. Even with the fast hardener (there are two kinds of hardener, fast for winter, slow for summer) resin may not set up quick enough for you in frigid weather. A little local heat applied will work.

Soft plastic containers - the larger freezer type - are good for other system materials. You may be using cotton fibers, colloidal silica, microspheres, microballoons, sawdust, etc. Keeping these materials in tight-lidded plastic containers is a good idea. Get some large, cheap ladling spoons for dispensing these dry materials, and in the case of cotton fibers which get lumpy, a small flour sifter.

Safety equipment is a good follower to resin. If you are going to use epoxy, for goodness sake respect it. Some few people are sensitive to epoxy resin right off. Thou'll know it by the immediate appearance of rashes or other symptoms. They can never use the stuff. The rest of us can become sensitized sooner or later. Why let that happen and lose the use of such a powerful tool? Wear protective skin cream and disposable gloves. Ventilate the area where you are working with resin, and if you are using large amounts, wear the appropriate toxic vapor mask.

Wear a mask whenever you are creating a vapor or dust. We hear more and more that these materials will nail us in time if we don't prevent inhalation. Sanding "green" resin, resin that has not cured fully, say 3 or 4 days, is quite dangerous, not only to your lungs but to sweaty skin. Wear skin cream.

Any woodworker knows, or should know, that goggles or a face mask are imperative when grinding or doing work that makes chips fly. If you are going to operate a high speed machine for more than a few minutes, wear ear protection. If you think it can't happen to you, it probably will.



The last category of boatbuilding tools I'll call *jigs, fixtures and et ceteras.* People see all manner of weird contraptions in a boat shop. There are just too many odd operations for which no tool is manufactured. You have to make your own. That is part of the fascination of this work: the constant challenge to your ingenuity. The word ingenuity comes from the same root as the word engineer. I can't name all the jigs and fixtures you'll engineer in your boatbuilding. You'll come up with them.

Weights - lead chunks for weighting down things - are useful. Heat sources such as a hot gun, hair dryer, or the tiny hot tool for burning designs into wood all find use. You may need a variety of heat sources.

Pry bars, table knives, paring knives, spatulas. Mirrors for seeing under decks and places where you can't poke your head. Clamps you make out of hardwood. Protective battens, which are 2x4s covered with felt for supporting pieces you don't want to scratch. If you resin a lot of pieces, you'll want to make spike boards. Drive brads in a pattern of one inch squares through a piece of thin plywood. This fakir bed will hold your resined pieces up so that you can remove them easily and have only small dimples to sand out.

Don't forget the old Spanish windlass, a device you'll use many times in boatbuilding. Crude, but mighty effective in pulling boards together. Experiment, engineer, devise, scheme, be creative. That's what's fun about boatbuilding.

John Wermescher is an Atlanta commercial artist and part-time boatbuilder.

Letters to John Wermescher

Regarding your discussion on boat fastenings in Wood News 17, just how do you make the choice among various metals for a fastener or bit of hardware, since not everything is available in silicone bronze or monel?

Your question deserves a bit of detail. First, simplify things. Your real concern is with metals in the water, or metals which will be wet a good bit of the time, and this is only vital in salt water. Also, if you hunt, you will find a lot available in some kind of bronze. Now, let's try to answer the question directly.

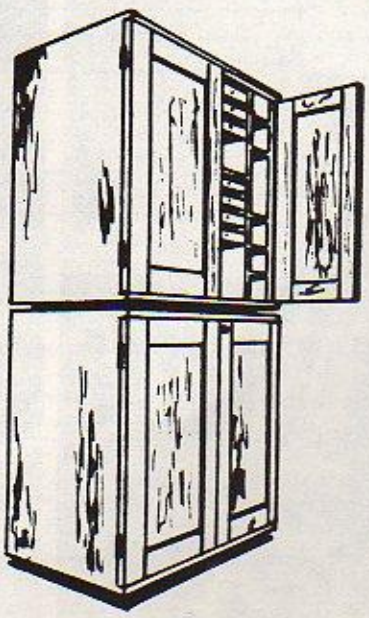
Use all the data at your disposal: availability, electrolytic chart, distance from other metals; then take your best shot. The important thing is to *think* about your choice of metal (*think* about every blessed thing you put in the boat) and make an intelligent decision based on that thinking.

Example: on a recent boat, I wanted a kickup rudder that would look good, be sturdy and dependable, kick up easily when it hit an obstruction, and be easily snapped down again. I did not want a friction holding system. I came up with a lower wood blade that has a slot in it. This pins into an aluminum plate fastened into the upper section, or stock. What to use for a pin?

After much pondering, I decided on a aluminum rod, peened over a stainless steel washer on each side. The pin, being soft aluminum, will go first. It's easily replaced. The hole in the aluminum plate, through which the pin passes, will wear more slowly than if the pin were a harder metal. Looking at the galvanic chart (see *Wood News 17*), I see that aluminum and stainless are not that far apart. The aluminum rod is easily worked, so it is not a bad job to peen it over. It will not rust and looks neat in its place.

Plans for Tool Cabinet

We now offer a detailed plan for building the spacious tool cabinet pictured below. Order from Highland Hardware for only **$14.95 postpaid.**



Making Windsor Chairs with Michael Dunbar

Most of the classes we put on here at the store are one or two-day weekend affairs, but this spring we branched out a bit and hosted a five-day hands-on chairmaking class for 15 ambitious craftspeople from around the Southeast. The class was conducted by Michael Dunbar, noted authority on Windsor chairs, Federal period furniture, antique woodworking tools, antique furniture conservation and restoration, New England architecture and New Hampshire politics.

Though experience levels within the group ranged from novice woodworker to accomplished professional, the quality of instruction and the unusual array of traditional hand tools being used kept everybody working at roughly equal rates, and work they did. Nine hours a day was about average, and at that there wasn't much time to spare. Though the materials kit provided all necessary turnings, the students were responsible for making all other chair components: adzing and scorping out the seat; steaming and bending the back and bow riving, drawknifing and shaving the spindles; and drilling about a zillion holes with brace and spoon bits.

During the first day Dunbar drew up a remarkably prescient "mood graph" which showed exactly how the class would proceed. After a first-day high (mostly innocent enthusiasm along with a little seat-scooping fun the mood went steeply and steadily downhill, starting with sore arms and shoulders (nothing to do with age, of course - just unfamiliar tools) and progressing through broken bends and crooked carvings to misaligned holes and tapers drilled in backwards. By midway through the fourth day only Dunbar seemed to feel any hope at all and he wasn't letting on. So it was a truly cathartic process to watch the spindles settling into the seat, the bow being fitted, the back drilled, and behold: a chair In the space of a couple of hours the room was transformed from a parts dump into a showroom for 15 finished Windsors, and there followed such an orgy of mutual admiration and posterior cradling as we've never seen before. The class was rated a grand success by one and all, and on that note we're already planning to do it again next spring. Let us know if you're interested - we'll save you a seat.

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IWF 86

Save $5.00 Courtesy of Highland Hardware Booth 3256

Complete this coupon in advance and bring it with you to IWF 86 along with the $5.00 discount admission charge. Without this Coupon, there will be an on-site registration fee of $10.00.

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2. Your Job Description:
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a. ☐ President
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g. ☐ Designer
h. ☐ Sales
i. ☐ Maintenance/ Service
j. ☐ Other (please specify)

3. Check the business type which best describes your company
(check only one)

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b. ☐ Cabinet Manufacturer
c. ☐ Distributor/ Rep./Dealer
d. ☐ Supplier
e. ☐ Sawmill/ Planing Mill
f. ☐ Other Woodworking
g. ☐ Press/Media
h. ☐ Other (please specify) _____

4. Check product categories that your company manufactures:
(check all that apply)

a. ☐ Furniture Manufacturer, Wood
b. ☐ Furniture Manufacturer, Upholstered
c. ☐ Furniture Manufacturer, Metal
d. ☐ Furniture Manufacturer, Plastic
e. ☐ Partitions and Fixtures
f. ☐ Bedding
g. ☐ Cabinets
h. ☐ Manufactured Homes
i. ☐ Boats
j. ☐ Architectural Millwork/Molding
k. ☐ Hardwood dimensions & Flooring
l. ☐ Plywood Veneer
m. ☐ Industrial Wood Products
n. ☐ Upholstering
o. ☐ Equipment/Tool Manufacturer
p. ☐ Raw Materials Supplier
q. ☐ Finishing Products
r. ☐ Textiles/Fabrics
s. ☐ Hardware
t. ☐ Pallets
u. ☐ Windows, Doors, Sashes
v. ☐ Other (please specify) _____

5. Number of persons employed by your company:
(check only one)

a. ☐ More than 500
b. ☐ 250-499
c. ☐ 100-249
d. ☐ 50-99
e. ☐ 1-49

6. What is your company's approximate annual sales volume?
(check only one)

a. ☐ 100 million or over
b. ☐ 50 million to 99.9 million
c. ☐ 10 million to 49.9 million
d. ☐ 5 million to 9.9 million
e. ☐ 1 million to 4.9 million
f. ☐ less than 1 million

7. Do you specify, select, recommend and/or approve the acquisition of machinery, supplies or services?

☐ YES ☐ NO

For the trade only.
No one under 16 admitted.

Photocopy this form to register additional people. Be sure to include $5 Show registration fee for each person.

For more information about Show Registration, call IWF Customer Services: (203) 964-8287.

Except where otherwise noted, prices in Wood News 18 are valid through October 31, 1986.

Registration and Order Form

Name _____
Address _____
City _____ State ____ Zip ____
Telephone Day: _____
Night: _____

Seminars **Amount**

_____ ____
_____ ____
_____ ____
_____ ____

Paid by:
____ Check
____ Money Order
____ MasterCard
____ Visa

Total ____

____ Please send me a free catalog with my order.

Charge Card No. _____ Exp. Date ____

Qty	Description	Price	Amount

MC/Visa users outside Georgia
ORDER TOLL FREE
(800) 241-6748
(Orders Only)

If your merchandise totals: Add shipping charges (except for postpaid items)
Up to $30.00 . . . . . $2.50
$30.01 to $60.00 . . $3.30
$60.01 to $90.00 . . $4.20
$90.01 and Over. . . $5.00

Sub-Total ____
Georgia residents add 3% Sales Tax ____
Atlanta residents add 5% Sales Tax ____
____
TOTAL Amount Enclosed ____

New RYOBI Resaw

Those thousands of woodworkers who dreamed of buying a Makita 2116 resaw only to find it had gone off the market just as they were about to buy one can now breathe a sigh of relief. While the Makita version remains unavailable in the U.S., Ryobi of Japan now offers a machine with similar specifications and features.

Our first shipment of Ryobi resaws arrived about a month ago, and we're pleased to report that it performs with the same superb accuracy and has the same rugged power as its Makita predecessor. Some of its features, including maximum blade width and rip fence design, represent improvements over Makita's model 2116 resaw.

Perhaps best of all, current promotions allow us to price the Ryobi resaw about $300 less than what the Makita resaw sold for when it was still on the market. **While our current supply lasts, purchase the Ryobi BS-360NR resaw from Highland Hardware for only $1199.00** (shipped freight collect).

Tremendous blade size and high speed sawing are the secrets behind the saw's extreme accuracy and power in resawing and ripping. A 3"-wide stellite-tipped blade comes as standard equipment. The stellite tips (just under carbide in hardness, but less brittle) clear a kerf just wider than the body of the blade, which proceeds in effect to fence itself in the kerf for the straightest possible cut. The blade travels at 3660 feet per minute - 42 mph - leaving a very smooth surface at a fast rate of feed.

Maximum depth of cut is 12-1/4", and the throat is 13" deep, making the Ryobi saw the ideal machine for milling your own lumber from logs or cranking out 1/16" veneers from those pieces of extraordinary lumber too valuable to be used only once. For most users, this Ryobi saw can eliminate reliance on the tablesaw for ripping lumber, thanks to its advantages of a 1/16" kerf, very fast feed capability, and much safer operating characteristics.

The bandsaw wheels are lined with rubber, which permits also the use of much narrower blades suitable for scroll work. While Ryobi claims a blade range of 1/4" to 3", our own tests indicate that a 1/8" blade also works superbly, greatly increasing the machine's utility as a heavy-duty scroll saw.

The saw comes equipped with a sturdy rip fence which extends past the blade, and is bored and tapped to allow attachment of a taller auxiliary fence if desired. The rail to which the fence attaches has a unique micro-adjust feature, allowing precise positioning of the fence for accurate ripping and resawing.

The sturdy cast-iron table measures 17-5/8" x 18-1/2". It tilts up to 45° for bevel cutting, and is braced by a heavy telescoping support leg. The saw's frame is also of heavy cast-iron construction.

Overall dimensions are 34-5/8" x 23-5/8" x 52-3/8". Net weight is 242 lbs. Blade sizes available from Highland Hardware include 1/8", 1/4", 1/2", 5/8", 3/4", 1", 2", and 3". Blade length is 101-3/4".

Woodworking World Charlotte Show November 21-23

North Carolina woodworkers be certain to visit us at booth 87 of the Woodworking World Show at the Charlotte Civic Center November 21-23. 100 exhibitors are expected. Free seminars by noted speakers are included with admission to the show. For more information, call the show management at (603) 536-3768.

highland hardware

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