

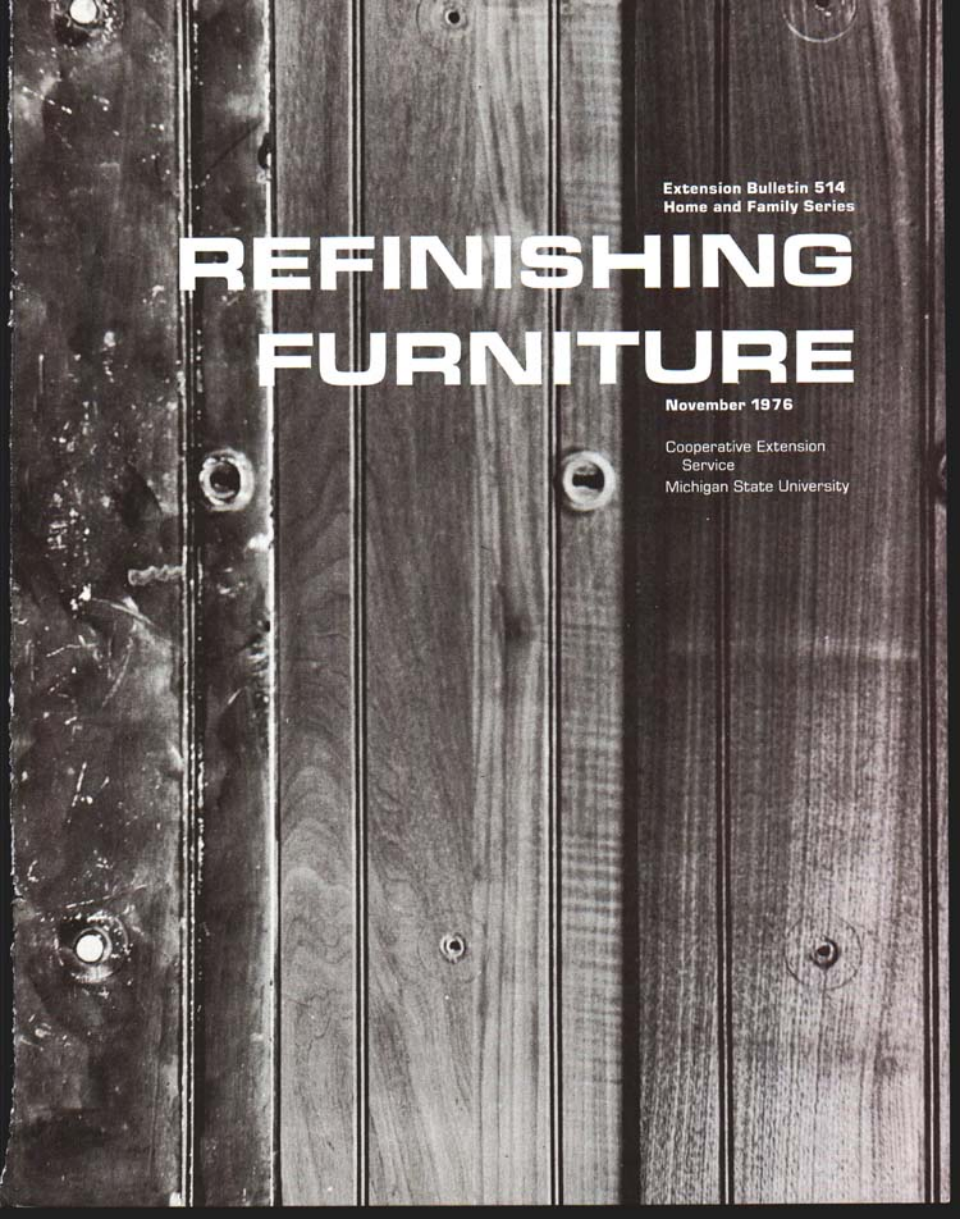
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Refinishing Furniture
Michigan State University
Cooperative Extension Service
Home and Family Series
Eldon Behr, Professor, Forestry Department
November 1976
32 pages

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The background of the cover is a close-up photograph of vertical wood panels. On the left side, there is a dark, possibly metal, strip with several circular fasteners or rivets. The wood panels themselves have a natural grain and several circular knots or decorative holes. The lighting is dramatic, highlighting the textures of the wood and metal.

Extension Bulletin 514
Home and Family Series

REFINISHING FURNITURE

November 1976

Cooperative Extension
Service
Michigan State University

REFINISHING FURNITURE

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1R-5M-1076-5q



WHY REFINISH FURNITURE?

More people are refinishing furniture today than ever before. In garage, basement, work room, back porch, and back yard, people in all walks of life are pursuing a craft once mastered mainly by the most skilled artisans. They are giving new life to antique furniture, the not-so-antique and to well-worn favorites and hand-me-downs. They are turning out articles of beauty and utility. They are producing objects of deep personal satisfaction.

How did their interest become so keen? What gives furniture refinishing a respected, often coveted status in the realm of do-it-yourself? There are several factors — among them are time, today's living patterns, new ideas about interior design, new chemical products, new kinds of tools. Let's look at some of them.

Time comes first to mind. More people simply have more time to do more than ever before. More time may mean more problems, or it can offer freedom and opportunities.

- There is more time now available for activities not directly related to one's principal job — whether the job is homemaking and family management or breadwinning.

- There is more time to do more things right at home — to go beyond basic necessities, to add beauty and distinction to the home and life in the home.

- And for both homemakers and women in careers outside the home (not to mention husbands and fathers — whether still working or retired) there is often more time for relaxation — time to take up creative, soul-satisfying pursuits.

Refinishing furniture is easily a common meeting ground for both

time-problems and time-opportunities.

Many men and women working under pressure on the job or at home say they like the mental and physical relaxation afforded by the simple repetitive motions involved in most wood refinishing processes. In a ready-made, pre-packaged world of instant convenience, they seek some activity where they can work at their own pace, apply their energy of their own free will, and involve themselves in something they feel to be uniquely of themselves.

Wood refinishing is an answer to these needs. It can let you get away from it all, regenerate the mind, work off frustrations. And besides, it bears tangible fruit — a product useful and decorative, a long-lasting prize for time and effort. Often the prize is something that would have cost too much to buy new or to pay someone else to do.

New living patterns and new ideas about home decorating offer opportunities to make good use of both added time and old furniture. Today, furniture refinishing has gone beyond the collection and restoration of fine authentic antiques that are rare and therefore expensive. There are growing quantities of moderate and low-priced furniture available. These may be individualized pieces that are artistically and even historically interesting in themselves, or they may not be old at all. They are easily adaptable to a distinctive role in modern home design.

New ways of using these furnishings have grown out of new knowledge exploding in all areas of human activity — including art. The bold, startling ideas in color, space and

texture that we have come to expect in modern art have found their way into everyday life. The decorative arts have brought these ideas into the home.

Taken all together and treated in creative ways, this new knowledge — the new colors, new materials, new approaches to the management of space itself, and new emphasis on the human element — has opened new home design vistas undreamed of a mere 25 years ago.

Today the emphasis is on people and living — on the home's livability, on attractiveness combined with ease of care, on getting the most satisfaction out of one's investment in time and money. There is a new freedom to be less concerned about whether a particular piece of furniture matches exactly the rest of the room. The new freedom encourages the homemaker and her family to find ways to make a favorite or discovered piece of furniture play its own distinctive and useful function for the home and the family.

Not long ago a homemaker in-the-know would scarcely have dared to mix furniture from several periods. It had to be all-modern, all-Colonial, all-Provincial. Somehow, rooms with such uniform treatment never looked quite livable. Today modern design dramatizes space for use, and space may be accented by furniture that has a sculptural quality. The perfect piece to complement the 1976 work of pure modern may be lying dormant in the attic, awaiting only a refinishing touch to bring out its delicate flowing workmanship.

Many older homes are finding new uses for the alcove — the architectural gimmick that went out of style when "openness" became the goal and houses became uniformly streamlined. This added space has advantages when furnished for specific uses, such as dining, television, games, music, or closed off as a guest room. It is ideally suited to make good use of refinished pieces of furniture — a spare table and four chairs, for example, done over in a distinctive finish to make a high-style game set.

A familiar desk or table may look lustreless. If the grain of its wood is

not particularly interesting, a new cover in a brash color can change a strictly utilitarian piece of furniture into a conversation piece.

Newly-marrieds often fall heir to relatives' spare furniture. Even in good condition, these "collections" are likely to hint at refinishing to bring forth their best qualities and usability — and be psychologically acceptable in their new role in a new household.

Saving money might have been more important than any other consideration in the past. Not so today in all cases. Manufacturers can deliver so many kinds of items at prices so low one has to judge comparable material and design to be certain there is any economic advantage in older pieces. Still, anyone attempting to furnish on the lowest possible budget should not overlook used furniture. Besides price, it may offer more in the intangible advantage of satisfaction and pleasure.

Industry has done its bit to bring furniture refinishing within the reach of more and more people. A variety of easy-to-apply finishes and materials for removing old finishes, spray equipment, electric sanders, brushes, and all colors imaginable, ready-mixed and easy to brush on — are all easily available, and their cost can be adjusted to almost any budget.

So, with the will to do, (the time you can arrange — it may run into several weeks) — the piece of furniture to be reborn, and a "just right" place for it when you finish it, ask yourself some questions. Your answers may influence how much you enjoy the project and the amount of satisfaction you and your family will derive from it. The whole thing is likely to be much more than a quick trip to the attic or the second hand store, and a few magic sweeps of a brush.

Some questions are:

Can I do a professional-looking job? Will it be worth the effort?

Even a beginner can see familiar furnishings blossom with new professional glamor. The materials and methods available today virtually

guarantee their own success — **provided you follow directions.**

What kind of finish is best?

Finish should be chosen by use of the piece of furniture and by the kind of wood — also your personal preference. Different finishes require different methods and time. You will have to decide which fits best into the daily life of you and your family.

How long will it take?

Some processes are complex and take a lot of time — many days or weeks. Others take little skill or time. You will spend a good deal of time waiting for coats to dry or harden before going on to the next step. A job may last a week or longer. Whatever you do, don't take shortcuts. Do each step in its proper turn.

How much of a nuisance will it be?

What kind of work space do you have? Can you use basement, workshop, or garage space that long without upsetting other family activities? Removal and refinishing materials have sharp odors. Is anyone in the family overly sensitive to the smell and fumes? Can you handle the furniture yourself, or will you need help? Will you be able to sit or stand comfortably at your work?

What equipment will it take?

Refinishing usually requires several operations, and each one may require different materials—a different brush and material and collection of sundry aids and accessories (tack cloths, sand paper, etc.) All of these pieces must be readied in advance.

What will it cost?

Expense of tools and materials will vary with the size and condition of the piece of furniture. Roughly for \$18.00 or so (1976 prices) you can buy all materials and items including brushes needed to refinish a table, a chest of drawers and a few chairs. The brushes will be good for other uses too.

To refinish or not — it's up to you. In refinishing furniture you are involved in time and money, in "practical" needs, and in the needs of the

mind and spirit; and you are involved with those around you.

IN THIS BULLETIN

In this bulletin, methods are discussed first to tell you (1) how to remove old finish; then (2) how to repair the surface, (3) how to use abrasives; (4) how to apply filler and stain; and finally (5) how to apply the topcoat, or technically, the "finish."

You might turn first to page 16 and the section on "Choosing a Finish." The type of finish determines the needed preliminary steps.

BEFORE YOU BEGIN

1. Learn each step in its proper order and the time intervals between steps.

2. Be safe. Some materials and equipment can be dangerous if not used properly. Study the directions for safe use of paint remover, bleaches, and rags given on pages 6-8 and 23.

3. Read the labels of all containers and follow directions to the letter. This bulletin offers only typical or general directions for the steps. Manufacturers may offer specific directions for their products. Follow them.

SOME PRECAUTIONS

Be sure you have the following:

- Old clothes to wear while working (smock or coveralls)
- Rubber gloves
- Well ventilated, dust-free, roomy work space
- Newspaper or covering to protect floor and other equipment or furnishings
- Rags
- Time to work
- Patience to follow directions and do each job well.

Given these, a careful following of directions, and family cheering from the sidelines, nothing need stand between you and the thrill and satisfaction of producing a professional-looking piece of furniture.

IF IT ONLY NEEDS

1. A CLEANING

Examine the piece first to see whether it needs only cleaning and/or repairing instead of a complete refinishing. If it has a wax surface, cleaning, repairing, and rewaxing the surface may be all that is needed.

For excellent appearance, certain modern furniture finishes such as lacquer need only to be kept clean. If they become soiled beyond the cleaning capacity of waxes, try one of the cleaning methods listed below. Before using either of them, remove the wax with a cloth dampened with a little turpentine.

Use suds from a liquid dish-washing detergent in water on a cloth or sponge to remove the soil. Use as little water as possible.

After cleaning, rinse with clean soft water on cloth or sponge which has been wrung out. Wipe dry with a dry, lintless cloth or chamois. With the average piece of furniture not subject to heavy soiling, twice a year is probably enough for such a cleaning. If desired, apply a coat of paste or liquid furniture wax or polish. Wipe up any spilled liquids immediately.

Not all processes are effective on all kinds of dirty soils. If the above does not clean, prepare a mixture of one quart of hot water, three table-

spoons of raw linseed oil and one tablespoon of turpentine. Keep the mixture hot by placing it in a pan of hot water while applying it. Stir well just prior to use to maintain the proper proportion of ingredients throughout the mixture. Wash the surface with a cloth dipped in the mixture and wrung out. Rub off all excess mixture immediately with a dry, clean cloth.

To get into crevices, fluting, and scrolls, use a cotton-tipped swab or toothbrush.

After either method, when the surface is dry and clean, repolish the furniture with a suitable wax. If the furniture has a dark finish or a penetrating oil finish, use a polish of two parts raw linseed oil and one part paint thinner. Rub the polish until it is dry. Remove all excess and let surface dry again. Then wax.

Sticky varnish or shellac usually indicates poor quality or poor application. Try wiping the surface with paint thinner. If this doesn't work, remove the finish altogether; then refinish.

Wax or oil finishes can be cleaned also with a cloth lightly moistened with paint thinner. Rewax or oil if necessary.

2. OR REWAXING

A thin layer of wax rubbed until dry and hard will give long-lasting protection to most furniture. If dirt is imbedded in the wax, remove the soiled wax with a cloth dampened with paint thinner. Then rewax. For complete directions, see the section "Wax Finish," on page 18.

Paste Wax is good for all wood surfaces, especially those that receive hard use. Put the wax between two layers of cloth so that only a thin layer squeezes through and coats the surface. Wax only a small area at a time. Buff it immediately with a soft cloth until it is smooth

and dry and finger marks don't show. Thick, under-buffed wax collects dirt.

Liquid polishing wax is a suitable alternate for paste wax, but it is harder to get a thin coating with it. Always pour it on a soft cloth, never directly on the furniture. Let it dry 20 minutes before buffing with a soft, lintless cloth.

Cleaning-polishing wax removes greasy stains as it polishes because it has more solvent in it than liquid or paste wax. Pour some on a clean damp cloth and apply it to the furniture. Let it dry a minute or two — then polish with a clean lintless cloth until hard and dry and finger marks don't show. The wax film is thinner and less durable than that of paste wax.

Cream wax is much the same as cleaning-polishing wax. The light-colored ones are especially good for light-colored furniture and enameled surfaces.

Wipe on - wipe off wax dries to a haze, which when rubbed leaves a hard, dry, dust-resistant finish. If the wax doesn't contain a cleaner, clean the furniture before waxing. Don't wipe the wax off until the haze is completely dry or it will streak. Buff with a soft lintless cloth.

Solvents in these waxes are designed for new furniture. They may destroy the carefully built patina (soft shine or glow) of very old furniture.

Self-polishing wax is designed for floors. Never use it on furniture. If you have used it on furniture, remove it with a cloth dampened with detergent and warm water.

New polishes are constantly being developed and marketed. No advice can be given on those.

3. OR REPAIRS

You can repair small marks, scratches, and dents without refinishing the entire piece of furniture.

CHECKING

Dry heat, direct sunlight, sudden temperature changes, and improper finishing may cause varnish and lacquer to check (a cracking of the finish). A paste of powdered pumice 2F or 3F or rotten stone mixed with boiled linseed oil will remove fine check lines. Rub the paste on the checked area with a soft cloth or 00 steel wool. Remove excess on surface.

Checks which extend down to the wood surface (hairline checking), however, are difficult to remove and restoring is usually needed.

WHITE MARKS

To remove white marks (usually caused by water or by excessive heat), try one of the following methods:

1. Rub the white area with a cloth slightly moistened with denatured alcohol. Then with a cloth, rub a bit of boiled linseed oil on the area. Or rub with equal parts of boiled linseed oil, turpentine, and vinegar instead of alcohol.

2. Apply household ammonia to a cloth, dampen it with water and rub lightly.

3. Try a cloth dampened with turpentine, essence of peppermint, spirits of camphor, or oil of wintergreen. Rub until the spot disappears, but watch to see that the surface doesn't become sticky. If it does, stop rubbing immediately. When it is dry, smooth the roughened spot by rubbing gently with a paste of rotten stone or powdered pumice 2F or 3F mixed in linseed oil.

4. Rub in lightly with your finger a paste of fine powdered pumice or rotten stone and oil.

5. To remove a water ring, place a damp blotter over the ring and hold a warm iron **above** the blotter, not directly on it.

6. Use a commercial product especially designed for removing white marks. Ask at a paint store.

With all these methods, you can restore the gloss by rubbing until dry with one of the polishes mentioned on page 3.

SPECIAL CASES

White spots and rings on lacquered furniture are hard to repair. For best results, barely dampen a lintless cloth with lacquer thinner and rub it lightly and quickly over the spot. If this doesn't work, it is best to live with the spot or refinish.

To repair a wax finish, remove the ring or spot with a cloth slightly moistened in paint thinner or turpentine. Then rewax the spot and furniture section or part on which it is located as directed on page 18.

For penetrating sealers (see page 18) and oil finishes, sand out the spot with a light application of 320 paper. (See page 11 for a list of sandpapers.) Then apply the sealer or oil as directed in original finishing directions.

SCRATCHES

First remove the wax from the surface with a few drops of paint thinner on a soft rag.

On woods that are not stained, apply a bit of boiled linseed oil or a commercial penetrating oil finish.

On bleached or stained woods, try one of the following:

1. Use a commercial "scratch remover" of the wood color. Clean and wax the entire surface. For dark brown furniture, a tincture of iodine solution can be applied.

2. Apply oil paint pigment of a matching color mixed with varnish. You can get oil colors of many

shades at any art dealer. Following are a few matching oil colors:

TO MATCH:	USE:
Red Maple	Burnt Sienna
Walnut and Mahogany	Burnt Umber
Yellowish woods	Yellow Ochre or Raw Umber

Fill the scratch with this mixture applied with a toothpick, cotton-tipped swab, or pointed brush. If the scratch is deep, apply a second coat after the first is dry. Smooth the hard edges with your finger while the surface is still wet. Allow this to dry 24 hours. Clean the entire surface and wax it.

3. Rub the marred area gently first with fine steel wool, then with powdered pumice or rotten stone mixed with oil. Apply a coat of matching oil wood stain to the area and let it dry 24 hours. Apply more coats until the color matches the original finish.

Fill the scratch with clear shellac or varnish using a pointed brush or toothpick. After it dries 48 hours, rub it gently with very fine steel wool.

DEEP MARS

First remove any old wax with a few drops of paint thinner on a soft cloth. If the wood is burned, remove the charred spot with steel wool.

Fill the hole with stick shellac of a color which matches the wood finish. Use directions for applying as given on page 10.

If color is removed, rub with a matching oil color thinned with paint thinner. Then restore the finish with clear varnish or coating-type sealer. Several coats may be needed to fill the blemish even with the wood surface.

DENTS

A heat-and-moisture treatment will remove dents unless they are very deep. First, remove the wax with a cloth dampened in paint thinner. Then dampen a cloth of several thicknesses and follow directions with hot iron as given on page 9.

Apply clear wood sealer over the repaired area. After it has dried 24 hours, rub with very fine steel wool and then wax.

SCUFFED LEGS

Wash the surface with mild soap, or synthetic detergent, and water. Rinse and dry quickly and thoroughly. Then rub the damaged parts with fine steel wool. Follow with a rub of a thick paste of powdered pumice or rotten stone, and linseed oil. Allow the rub with the grain of the wood.

Stain with either a matching oil color thinned with turpentine or an oil wood stain of a matching color. Let the stain dry at least 24 hours between applications if several coats are needed.

Rub the entire surface until dry with a mixture of two tablespoons quick-drying varnish, three tablespoons raw linseed oil and three tablespoons paint thinner. Use a soft cloth. Apply as many coats as needed to restore the gloss, allowing at least 24 hours between coats.

See page 9 for additional instructions on repairing before refinishing.

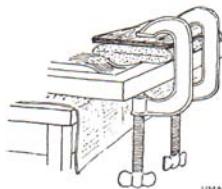
GLUING

Use liquid white glue to repair furniture. You can get it in a squeeze bottle at most hardware or variety stores. It sets at indoor temperatures. If article remains in a colder area after application, the glue will not set as well. Other equipment includes sharp knife, clean rags, newspapers, wood blocks (two for each clamp), and clamps (to hold the glued pieces together), tourniquets made of strong clean cloth, and nails.

If there are many parts to glue, number them to make rejoining easier and quicker. Scrape the old glue off the joints. If a joint fits loosely, place a strip or two of thin cloth over the part to be glued to tighten the joint.

Apply glue to all surfaces (including cloth if it is used) and rejoin the parts.

Wipe the excess glue off with a damp cloth immediately. If left on, the glue will dry on and spoil the finish.



Use "C-clamp" for light jobs.

Pad the clamps with wood blocks so the wood surface isn't dented. Also pad the area to be bound, using newspapers. Then bind the joint with a tourniquet of dampened strong rags and a nail. As the rag dries, it will shrink and tighten the binding. If there is a chance of glue squeeze-out onto the padding blocks or papers, place a layer of wax paper between the work and the pad or block.

Keep the glued piece of furniture out of use for at least an hour — or until the glue sets.

To glue chips and small pieces of wood, apply the glue to both chip and furniture.

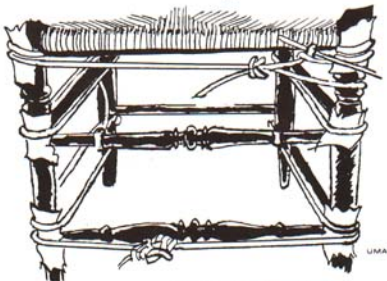
To glue veneer, first completely remove the veneer. Gently insert a knife under the veneer and work carefully so it doesn't split. Even though the veneer will probably be brittle, don't wet it.

Scrape off the old glue with a putty knife. Apply new glue to the furniture, not to the veneer. To aid in setting the glue, use a folded paper as a pad and a sandbag as a weight over the veneer. If necessary, put a weighted board on top of the sandbag for extra pressure.

Long cracks on articles which must bear weight, such as a split chair seat, are difficult to bond tightly unless securely clamped. Follow the above directions and check all joint gluing, clamps, and weights for as tight a bond as possible.



Clamp joints or breaks with gluing clamps — sometimes called cabinetmaker's clamps.



Tie joints together when glued.

REMOVING THE FINISH

You needn't do a complete refinishing job on a piece of furniture if it has only a few blemishes. Try using a scratch remover as outlined on page 4. Several different kinds are easy to use and available from many paint and building materials stores.

If these don't work, try a new, transparent finish without removing the old finish. But do this only if the old finish is essentially in good condition — not if cracked or chipped. Prepare the surface in the same way as directed for unfinished furniture (page 12) and apply a coat of sealer or varnish as described on page 19.

If such touch-up work won't do the job, remove the old finish down to the bare wood. Old finishes are most commonly removed by sandpaper and chemical removers.

Scraping off the old finish is inexpensive but time-consuming and hard work. Use a cabinet scraper on flat surfaces and coarse steel wool on curved portions. Use coarse abra-

sive paper of 50- or 60-grit size, scraping by hand or with a power sander.

Power tools themselves are slower and require more work than applying a good liquid remover correctly. Use only belt or reciprocating types of power sander. Operate them **parallel with the grain**. Don't use disk sanders on furniture; they leave scratches that are difficult to remove.

LIQUID REMOVERS

Paint and varnish removers must be handled with extreme care. **Non-aqueous solvent** type removers, most commonly in use, contain strong, volatile solvents that may be hazardous to health. Use them only outdoors or in places where ventilation is extremely good. **Keep them away from children and pets.** Be especially careful to keep these liquids from skin and eyes. Wear rubber gloves and aprons and old clothes.

If there is an accident, flush the affected area at once with large amounts of water. Phone a physician immediately if the eyes have been affected. Meanwhile flush eyes with large quantities of water. Apply a burn ointment to skin if the area reddens after water washing.

Types of Removers

Several types of liquid removers are available:

The safest types, more expensive but best in the long run, contain methylene chloride, which is not flammable but very volatile. They generally do not require after-rinse with paint thinner because they contain no, or very little, paraffin. Some can be flushed off with water. They do not discolor wood or create a fire hazard.

The least expensive, and less desirable, is made of benzene and methanol. This flammable mixture contains paraffin, requiring an after-rinse, and may be so fluid that it will not adhere well to a vertical surface. Another flammable type is much thicker and overcomes the objection to use on vertical areas. Check labels on this. In using both types, work away from fire, and don't smoke. Even better, avoid using this type.

Another type is a strong alkaline mixture that is dissolved in water before use. It darkens the wood, raises the grain, and may loosen glued joints. It requires a thorough after-rinse with water. Non-aqueous solvent removers, or the first type



A cabinet scraper will remove some old finishes from flat surfaces.



Steel wool is effective for removing finish from curved arms and legs.

Things You'll Need

Before starting to use remover, assemble the articles needed:

Paint and varnish remover, rubber gloves and apron, old clothes, putty knife or wide-blade scraper, old newspapers for floor, wide-mouth glass jar or coffee can, steel wool No. 1 or 2, abrasive paper (sandpaper) of grit 60, and 100, burlap or coarse cloth, paint brush, 1 to 4 inches wide (inexpensive kind), old tooth brush, screw-cap wide-mouth jar to hold any hardware removed from furniture, skewer or sharp sticks, and paint thinner and lacquer thinner (optional).

[methylene chloride] mentioned above, are preferred to these.

Do not use lye. It is too dangerous, especially if it enters the eyes. It is very hard to wash off the skin and causes severe burns.

When shopping, examine the container labels to learn which type of remover is offered. The label will give the chemical content.

Stripping is done commercially too. Consult your telephone directory.

Step No. 1

If only the top of a table needs a new finish, protect the remainder with tape and heavy paper during application. If the original stain color is removed with the old finish you can stain the area when you refinish to match the rest of the piece. Page 13 gives information on wood stains.

Step No. 2

Place the piece of furniture on old newspapers. In summer select a cool place. Keep furniture out of sunlight to prevent the surface from overheating, and to assure good performance of the solvent types of remover. In cold weather, use the solvent removers in places well-ventilated by fan or open windows.

Step No. 3

Unscrew the hardware and knobs and keep them together in a container.



Start at the bottom first. Set chairs up-side down. Begin on underside of rungs.

Step No. 4

Pour a few ounces of the remover in a wide-mouth glass jar or coffee can. Replace the top of the original container. Cans with a resin lining are less desirable because the remover may loosen the lining and hamper the application of remover.

Cheap brushes are adequate for applying remover. Use one 3 or 4 inches wide for most pieces of furniture with wide, flat areas like table tops. A narrower brush (1 or 2 inches) is better on narrow parts such as chair arms or legs. Nylon or bristle brushes are satisfactory for this use as are old brushes that are not heavily clogged with paint.

Step No. 5

- Apply the remover generously without squeezing out the brush on the can edge after dipping it.
- Do not brush it out like paint.
- Stroke in one direction only.
- Reload brush frequently.
- Be generous! Directions on most containers do not emphasize strongly enough how thickly the remover needs to be applied.
- Apply to an area small enough to allow you to scrape off the film before the solvent evaporates from the remover. Don't coat more than two square feet at one time.
- Blisters and wrinkles will appear quickly as the solvent begins to act.

Step No. 6

After waiting the directed time — usually 5 to 10 minutes — scrape off the softened finish with a wide, dull

blade scraper or putty knife. Wipe the loosened finish on a piece of old newspaper as you go along. Use long strokes of the scraper to keep the exposed surface as uniform as possible. Be careful not to dig the corner of the scraper into the wood.

Some removers call for a moist cloth to wipe off the old finish. You may have to apply a second coat to



Softened finish yields easily to putty knife.



Stiff bristle tooth brush is handy in grooves or moldings to remove finish.



Stroke in one direction only as you apply remover. Don't brush it out.



Moistened cloth will take up softened finish. Follow label directions.

remove the old finish completely — especially thick layers. The second application can be lighter than the first.

Be sure to remove all traces of old finish to avoid difficulty with subsequent steps in refinishing. Shiny spots usually indicate unremoved finish.

On curved surfaces such as turned parts, moldings and carvings, remove the old, softened finish with No. 1 or 2 steel wool or an old stiff-bristle toothbrush. Use a pointed stick or skewer on grooves and in

corners. You can also use the rough surface of burlap to help remove the loosened finish on turnings and moldings.

Step No. 7

Remove traces of softened finish with water (where label directions so state) or with a cloth moistened with paint thinner. Do this before the softened areas dry.

Step No. 8

After use, rinse the brush with water and detergent and then clear water.

point is that the possibly blotchy appearance at this stage will diminish greatly after stain has been applied. See page 14 for directions on use of stain during refinishing.

Bleaches are sometimes used to lighten the color of dark wood. You may like the natural grain pattern but want a lighter tone. Remember, the bleach cannot do its job unless all the old finish is removed.

A bleach is commonly made up of two liquids which should be combined in a glass jar. Don't spill any during mixing or use. If some does spill, wash immediately with plenty of water. Wear rubber gloves and rubber apron while applying it.

Apply the bleach with a sponge or wad of cheesecloth. Be generous, but avoid dripping.

Woods differ in how much they can be bleached. Some species are difficult, and most tropicals are impossible to bleach. There is also no sure way to predict the exact amount of bleaching possible on a given piece of wood.

If the color is still not light enough after one application, apply a second. If the color still remains, more applications are unlikely to produce much change. When the bleach on the wood is dry on the surface, remove the residue with a sponge wet with water. Be sure to remove all residue. Allow 12 hours to dry after bleaching and before proceeding with sanding as directed on page 10.

THE EXPOSED WOOD

The wood surface may be left unevenly colored because the remover took out more stain in one place than another. Remedy this in several ways:

1. Usually you can even up the old stain fairly well by rubbing vigorously in a circular motion, followed by strokes with the grain, using a cloth moistened in an equal mixture of lacquer thinner and paint thinner.

2. Or try *bleaching* all the old color. Bleaching takes additional time and has some disadvantages. The wood grain raises, glue joints are sometimes loosened, and bleaches are disagreeable to work with because of their caustic nature.

If you do use bleach, buy commer-

cial wood bleach (usually sold as a two-solution combination) and follow directions on the label closely.

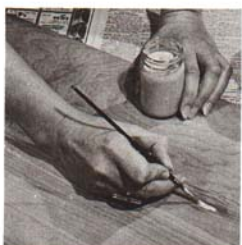
3. A third method is to sand off the surface to get down below the stain. But be careful not to sand through veneer. On certain areas where the cross section of wood is exposed, and on porous woods such as oak, walnut, or mahogany where a dark filler was originally used to level the pores, it may not be possible to remove the old color evenly or completely. In such cases, during the refinishing process (described later) use a stain of a darker color than the old remaining color, and apply less generously to these dark areas than to the lighter ones. This should even the color somewhat. One reassuring



Apply bleach solution with a sponge. Be sure to cover the area completely.



Mahogany table top, half of which is bleached. All woods do not bleach this well.



Enamel retouch will cover dark streaks on maple and other light colored woods.

PRE-FINISH PREPARATION

After the old finish has been removed, loose or broken parts should be reglued or otherwise refastened. Repairing old furniture of considerable value is an art. Discussion of such special treatments is beyond the scope of this bulletin.

DENTS AND SCRATCHES

1. Place a damp cotton cloth (immerse in water and wring lightly) folded several thicknesses over the area to be repaired.
2. Hold a warm electric iron at medium heat lightly over the damp cloth. The steam will swell the fibers of the wood.
3. Repeat if needed.
4. Allow the wood to dry thoroughly.
5. Sand with the grain using 80- or 100-grit abrasive paper. (See page 11 for description of abrasive papers.)
Some cabinet makers place a few drops of water on shallow dents and rub vigorously with the head of a hammer until the water disappears. This moisture, plus the frictional



Pressure of warm iron on a damp cloth causes fibers in dented wood to swell. Wood should dry thoroughly.

heat, causes the wood to swell to its old level.

To remove shallow scratches, see use of garnet cabinet paper in the sanding process described later on page 10.

The above methods cannot repair deep gouges, holes, chips, deep scratches, and the like. Use crack fillers to repair them. Different types of filler material are as follows:

1. **Wood putty** tinted in various colors of wood comes ready to apply.
2. **Spackling compound** for more precise matching of color is available as a powder to be mixed with water or as a prepared paste to mix with dry colors to arrive at the exact color desired. For instance, the dry color of burnt umber would be mixed to obtain the color of walnut, raw sienna and ochre for oak, and so on. Standard color charts, colors and compound are available at larger paint stores. Experiment a little to match the spackle color with that of the wood. Sand the filled spot flush



Tinted plastic wood applied with putty knife will repair deep chips and deep scratches.

with the wood surface, using 100-grit paper.

To prevent the repaired spot from absorbing too much stain later on, take this step: To the sanded spot, apply a coat of the same finish that you will use in redoing the piece. If you omit this step, the repaired area may darken too much when you apply the stain later.

3. **Use sawdust** of the same wood to prepare a filler. You will need some casein glue. Take fine sawdust or scrapings from the piece of wood being repaired or from one of the same kind of wood. Moisten with casein glue prepared with water as label directs for gluing wood. This will act as a binder. Casein glue powder is available in most hardware stores. Or use liquid glue.

4. **Use only tinted plastic wood.** The untinted kind does not take stain. Use a color that will match the final color of the refinished article exactly, otherwise filled areas will show later.

5. **Shellac sticks**, available in a wide range of colors, are good for filling deep depressions. But use them only after staining and applying the first coat of finish, because a shellac fill will not take stain well. Also, select a color that will match the finished article.

To use stick shellac, you will need a spatula or putty knife and a heat source near the work. You'll need the heat to melt the stick shellac and warm the spatula or knife. An alcohol lamp, propane torch, gas flame, electric soldering iron or electric soldering gun are satisfactory. If plug-in type or torch equipment is unavailable, use a small can of Sterno (available at hardware stores). Candles leave too much soot on the tool and shellac. Be careful with flame around all paint and finish materials.

USING SHELLAC STICKS

1. Heat the end of the shellac stick until it is ready to drip. At the same time, heat the knife or spatula blade.
2. Allow the melted shellac to drip into the blemish. Don't overflow.
3. With the heated blade, press the shellac into the blemish and smooth off with the heated blade. Be



"Canned heat" can be used to melt a shellac stick for repairing deep scratches.

careful not to gouge the wood.

4. The shellac will be hard in a moment. Then sand with 100 abrasive paper until level with the surrounding wood.

Matching the wood color of surface blemishes applies only to wood



Warm a putty knife or spatula to apply the melted shellac to the wood surface.

that is to have a natural finish—with the grain showing. If furniture is to be enamelled or coated with an opaque lacquer, you can use natural color plastic wood or spackling compound because the repair will not show.

PRE-FINISH SANDING

After completing all the necessary steps listed up to now, your next step is to sand the newly exposed area. This is final preparation for finishing.

Do all your sanding in another room away from where the final finish is to be applied to avoid contaminating the surface with the fine particles that settle from the air. The success of a finishing job depends to a great extent upon how carefully you sand the wood. You can get an attractive, smooth surface only by proper selection and use of coated abrasives.

ABRASIVE PAPERS

Four types of abrasive papers are used in wood finishing: flint, garnet, aluminum oxide and silicon carbide.

Garnet and aluminum oxide are recommended for smoothing wood **before** applying the finish. Use silicon carbide papers for sanding a finish coat.

Flint is the familiar "sandpaper" with a pale tan color. It is the cheapest but rather short-lived as it clogs easily, and quickly loses its cutting ability. It is not suggested for uses described in this bulletin unless other papers are unavailable. The fineness of grits on flint papers is designated by the words, "very fine," "fine," "medium," "coarse," or "very coarse." The table on page 11 shows the relation of the flint grit-size scale to those used for other types of grit.

Garnet paper with its rose-tan colored grit is recommended for wood sanding. You can get it at most hardware and paint stores. One 9" x 11" piece will sand a table top 24" x 36". You will also find assorted packs of 4 1/2-5 1/2-inch sheets as well as sheets made to fit power sanders.

Garnet papers are designated by grit screen size numbers. The larger the number printed on the back of the paper, the finer the grit.

Purchase paper in a C or D weight for most purposes. These weights are usually called cabinet papers and

are of proper thickness and strength for sanding new wood and sanding the surface of flat areas after old finish has been removed.

For curved surfaces, use A weight paper for grits finer than 100 (A — light, D — heavy).

A choice of grit coverage in garnet paper is also available. A paper completely covered with grit particles is called *full coat* or *closed coat*. One with fewer particles is designated *open coat* or *spaced coat*, or by a similar term. Get the latter type as it does not clog as rapidly with wood dust.

Determine the grit size paper to use by the smoothness of the surface and number of scratches or surface defects on the piece to be refinished after you have removed the original finish.

If you need to remove a considerable amount of wood to get rid of scratches, start with 60-grit and sand until the original scratches disappear. Then follow with 100-grit and then 150-grit paper.

The smoother the wood and the fewer the scratches, the finer a grade of paper can be used first.

If removing the finish reveals no scratches, sand with 100-grit over the whole surface until it seems to have about the same smoothness overall. This will probably require about 30 seconds of sanding in each area.

Sand likewise with the 150-grit paper, testing after the 30 seconds per area. Do this by running fingertips over the wood surface. Ordinarily only one weight paper in a particular grit is needed for finishing work described in this bulletin.

Grit sizes are given in the accompanying table. Correct sizes and weights for the specific job at hand will become clearer by experience and further reading of the text.

Aluminum oxide paper is sold under various registered trade names such as *Aloxite*, *Production Paper*, or *Adalox*. It may also be labeled aluminum oxide. The grit color is medium to dark brown. While somewhat more expensive than garnet, it is available in most of the same grit sizes, paper weights, and grit coverages as garnet paper, and is usable

in exactly the same way wherever garnet paper is called for.

Aluminum oxide paper is preferred for hand-sanding hard, dense woods such as maple, and for use on power sanders where more heat is generated than in hand-sanding.

Silicon carbide grit is gray to black. It has the same number designations as garnet or aluminum oxide. This paper is used mostly in sanding the finish layers (especially the last) as each is applied, rather than used directly on the wood.

For example, when the final coat of varnish is dry and hard, you can remove the surface gloss and irregularities by rubbing 400- or 500-grit

waterproof-type silicon carbide paper lubricated with water and soap or with paint thinner mixed with mineral oil. (See page 20.)

Both the paper and the bond between grit and paper are waterproof, so that the paper does not lose its grit when moist. Lubrication keeps the paper from clogging and allows a longer life. This paper can also be used dry in the same way as garnet or aluminum oxide papers. It is so specified on later pages for sanding between coats of varnish or other finishing materials.

Complete directions for its use will be found under discussion of the finishing process on page 20.

SANDING METHODS

Be sure the wood is perfectly dry. Allow about two hours for drying after using a solvent-type paint remover and 12 hours after a water rinse or bleach. If you have removed the old finish with coarse grit paper such as No. 60, then sand the same surfaces with 100 and 150 in sequence. If you used a solvent-type liquid remover, whether bleached later or not, sand with 100 and 150. After using each paper, wipe off the dust and loose grit with a dry cloth, or blow it off if a source of forced air is available.

Hand Sanding

Use a sanding block for flat surfaces. Several types are available at low cost. A simple substitute is to tack or hold the abrasive paper to a smooth block of wood with the grit face outward. Use a layer of thick felt or rubber between block and paper. How much pressure to apply is a matter of choice except that you must not cut through corners and edges or through veneers. For grooves or carved surfaces, etc. fold the paper into quarters and use without a block. "A" weight paper will

ABRASIVE PAPER APPLICATIONS

Operation	Type of Abrasive	Size of Grit or Grade of Steel Wool
1. Removing old finish and removing scratches in wood.	Garnet or aluminum oxide	60
2. Smoothing wood after removal of old finish by liquids or use of 60-grit paper or after bleaching.	Garnet or aluminum oxide	100 followed by 150
3. Smoothing repair patches such as stick shellac, spackle, putty, etc.	Garnet or aluminum oxide	100 or 150
4. Preparing sanded, unfinished furniture for finish.	Garnet or aluminum oxide	150
5. Smoothing shellac used as a sealer on end grain or under a wax finish.	Garnet, silicon carbide aluminum oxide, or steel wool	220 or 240 00
6. Smoothing first coat for coating-type sealers or varnishes.	Silicon carbide, garnet, or aluminum oxide	220 or 240
7. Smoothing final coat of coating type sealer or varnish.	Steel wool with finish surface wet with liquid wax	00 or 000
8. Satin finish on gloss coating-type sealer or gloss varnish.	Silicon carbide with finish surface wet with soap and water or 3 parts paint thinner and 1 part mineral oil.	360 followed by 500
9. Smoothing enamel or paint under-coat.	Garnet or aluminum oxide	150 or 180
10. Smoothing second coat of enamel or paint.	Garnet, aluminum oxide, or silicon carbide	220 or 240

EQUIVALENT GRIT SIZES AND DESIGNATIONS OF ABRASIVE PAPERS

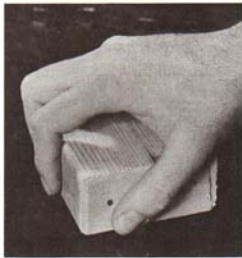
Aluminum Oxide Garnet	Silicon Carbide	Garnet	Flint
600			
500			
400			
360			
320			
280			
240			
220	6/0 Extra fine	Extra fine	
180	5/0		
150	4/0		
120	3/0 Fine	Fine	
100	2/0		
80	0 Medium	Medium	
60	1/2		
50	1		
40	1 1/2 Coarse	Coarse	
36	2		



Fold paper into quarters and use without a block on turned areas, grooves, etc.



Sanding blocks of various types are available at paint and hardware stores.



You can make your own by tacking abrasive paper to a wood block.

be flexible enough to reach these surfaces.

Always sand with the grain. Sanding across the grain leaves scratches that always show through a clear finish. The only exception is in smoothing end-grain (cross-cut) surfaces, where you sand perpendicular to the grain.

Electric Sanders

Portable vibrator or belt sanders are great labor savers if you have much sanding to do. Some models are available at moderate cost, although it is questionable if they are worth the cost if you are only going to use them once in a great while. Renting might prove more economical.

Power sanders have disadvantages. Portable hand varieties are especially well-suited for smoothing large, flat, horizontal surfaces, but



Power sanders are good but take skill.

are hard to use on vertical surfaces. You can remedy this sometimes by turning the furniture on its back or sides. A power sander can easily sand too much or too unevenly because it removes wood faster than by hand. Watch out for this on veneers and edges. Keep the machine under control and practice first on the less visible spots or on an old piece of scrap wood.

Try out sanders with an orbital movement to make sure they do not leave cross-grain scratches that will show on the completed finish. (An orbital sander moves the paper in a back-and-forth motion and a slight sideways motion.) Such scratches would be more visible with clear rather than opaque finishes.

Furniture sometimes contains pieces of wood glued so that the grain runs at right angles in adjacent boards. Before sanding such an area, cover one of the pieces with masking tape to avoid cross-grain sanding. Protect the end grain (wood cross-section) from splintering during sanding by holding straight pieces of scrap wood flush to the sides and end of the wood with a C-clamp.

Other aspects of sanding are discussed on pages 19 and 20.

UNFINISHED FURNITURE

Most new unfinished furniture is pre-sanded. If it is not, or feels rough, first remove the hardware; then start with 80-grit paper and follow with 100 and 150 before finish-



Sanding a curved surface, hold paper with thumb and little finger on the abrasive side; the other three fingers on the smooth side.



On curved surface, hold paper as shown above; press down with three fingers, work with the grain. Always sand with the grain. Press evenly throughout the stroke.

ing. Even if the furniture is sold as sanded, go over it lightly with 150 paper to remove any fingerprints, soil or slight roughness.

After sanding, wipe off as much dust as possible with a cloth lightly moist with paint thinner or use a vacuum cleaner. Now the piece is ready for your choice of finish.

WHEN WOODS NEED STAINING

Many woods have a pleasing natural color and grain pattern. Others can appear richer by staining — the grain pattern is accentuated and the dark- and light-colored parts can also be made less contrasting. In unfinished wood, Philippine mahogany usually does not need stain. Ponderosa pine, spruce, or maple are usually benefitted. But the choice is your personal one.

WHEN TO STAIN

No stain may be needed at all on furniture from which you've removed the old finish. Examine the various parts to see if the color tone is about the same throughout. If it is evenly blended, do not stain unless you want a different tone. If not, first try blending the residual stain in the wood by rubbing with a solvent-filled cloth as suggested elsewhere on this page. If this gives unsatisfactory results, stain it.

Do not omit staining just because you think it is difficult. It isn't, and the results may be well worth the slight effort. However, if you are going to enamel the unfinished furniture, of course you won't use stain.

HOW TO DO IT

Methods of applying stain are the same in all cases. Turn the article upside down and apply to under areas first, such as bottoms of chair rungs, on undersides of chair back rails, and so on. Then move to parts that are seen most when the piece is in use. When the piece is right side up, start at the top and work downward. Avoid dropping fresh stain on areas already stained and wiped.

Many types of stains are on the market, but the amateur will find the

pigmented type easiest to use with excellent results. Although sometimes labelled *oilstain*, it differs from the kind which contains only an oil-soluble dye and solvent. You can tell the true pigmented type by its sedimentation — the solids in the bottom of the can when you first open it. Labels will direct you to stir well.

Oil stains (dye plus solvent) come in screw top cans; pigment stains come in pry lid cans.

Keep a can of turpentine or paint thinner handy while using pigmented stain in case you have to remove excess stain.

HARDWOODS

1. Stir well, and apply a liberal coat with a paint brush in the grain direction. A cheap 1½- or 2-inch brush is good enough. Clean it after use by dipping in paint thinner or turpentine.

2. After waiting a few seconds to

5 minutes, depending on depth of color desired (the longer the deeper), wipe off all the stain that can be absorbed by a lint-free cloth. Wipe parallel to the grain.

The longer the stain remains in contact with the wood before wiping, the more will soak in and darken the wood. Thus, for lighter tones of a given stain, wipe the excess immediately; for darker colors allow about 5 minutes before wiping. Lighter tones can also be obtained by diluting the stain with equal or more volumes of paint thinner before applying to the wood.

Furniture to be refinished may require a longer "set period" before wiping than unfinished furniture. To avoid uneven staining, do not apply stain to an area larger than you can handle in the time stated on the stain label (or found by trial).

3. If there are both dark and light areas in some boards, allow the stain to stand on the light areas longer before wiping, to even up the color.

4. If the piece is made of more than one species of wood, try staining the underside to see if they all absorb the stain at the same rate. Then, when staining the exposed side, wipe almost immediately on the more absorptive boards but allow a longer contact for more resistant boards. This should even up the overall color.



After the filler surface has flattened, wipe across the grain to force filler into pores.



Finish wiping the filler, using cheese cloth with light strokes with the grain.



Mix pigmented stains thoroughly. Reduce color intensity with turpentine or paint thinner.

5. On the end grain of wood, where liquids are absorbed rapidly, apply stain very sparingly. The stain will soak in quickly, and wiping may not remove enough to give the color you want. Try diluted stain for lighter shades.

6. If pieces become stained darker than you wish, moisten a soft cloth with turpentine or paint thinner and wipe the wood to remove unwanted color. Do this before the stain dries — not over 10 minutes after application.

7. Allow at least 8 hours drying time, or longer if directed on the label before proceeding to the next operation.

SOFTWOODS

In staining softwoods like pine, spruce, or fir you may find the "summerwood" and "springwood" do not absorb stain equally and you'll get contrasting streaks. (The summerwood is the darker part of each growth ring. It appears as dark lines or "U" shaped streaks. The springwood is the lighter-colored area between summerwood areas.

To reduce this absorption and get a more even color, use a wash coat over the whole area of sanded wood before staining.

A fast-drying wash coat can be made from 1 part of 4-pound cut shellac and 7 parts denatured alcohol. Allow to dry for an hour after application to wood before staining.

The wash coat can be used on the end grain of either hardwoods or



Apply stain with brush, cover thoroughly. Stain only one surface at a time such as leg, top, etc.

softwoods before applying stain in order to reduce stain absorption and consequent overstaining. When using a wash coat on end grain only, don't let it spread to the side grain, or unwanted lighter spots may result. Wipe off any such drips of wash coat immediately.

Check the surface after drying and use 220 paper or 00 steel wool to remove roughness before staining.



After stain sets a while, wipe up parts that did not penetrate wood. Wipe evenly to leave a uniform tone.

Use the same brush you used for the stain. Inexpensive 1-inch brushes are suitable on end grain but are too small for wide areas where a 2- or 3-inch brush is better.

A brush used to apply a shellac wash coat must be cleaned in denatured alcohol and allowed to dry before applying stain. Use one brush for staining and another for shellac.

Dispose of stained cloths in a metal can or by burning them.

WHEN WOODS NEED FILLING

Filling is done after staining on porous woods.

Is your wood porous, semi-porous, or non-porous? You need to know in order to prepare the surface for refinishing.

To test for porous wood, draw your fingernail perpendicularly across a flat surface. If it catches in many spots, the wood is classed as porous and needs filling; or ask someone who can identify the species.

Porous wood is sometimes called *open grain*. No amount of sanding will change the porosity, but the test should be made after the wood is sanded smooth and ready for the various finishing steps.

In general, only new, unfinished wood needs filling. Finished pieces

have already been filled, but refinishing may remove the original filler. In that case, you should fill before proceeding further.

Wood from some broadleaf trees like oak, mahogany and walnut, contains large vessels and are therefore very porous. When such lumber is cut and planed at the mill (either for solid or veneer cuts), the tubular cells are severed, leaving tiny "troughs," running lengthwise. These must be "filled" in order to obtain a smooth finish.

Birch, maple, and gum are considered hardwoods but their vessels are so small they do not usually require "filling."

Soft woods from coniferous trees (pine, cedar, and redwood) have no

vessels and are grouped as nonporous. They do not require filling.

Some open-grain woods requiring filler are: oak, walnut, chestnut, mahogany, hickory, elm, ash, and lauan. All are hardwood.

Close-grain woods that require no filler are: birch, gum, maple, beech, poplar, sycamore, cottonwood, and cherry — all hardwoods; and fir, cedar, and pine — all softwoods.

PASTE WOOD FILLER

Paste wood filler is a thick, heavy suspension of finely-ground, transparent pigment in an oil-solvent mixture. It is available in "natural" (a pale tan), and in shades identified as walnut, light mahogany, dark mahogany, etc.

When finishing a medium-to-dark-colored porous wood like mahogany, lauan, walnut, or any other open-grain species that has been stained dark, a dark filler will give a more striking finish. On light-colored woods such as ash, oak, or elm, if not stained to a dark shade, the natural filler may be a better choice. If you cannot find the color of paste wood filler you desire, prepare it by adding oil-pigment stain to natural wood filler until you get the desired color. (See next section.)

The Wash Coat

In finishing open-grained hardwoods, it is customary to use a wash coat before filling. This keeps oils from the filler from soaking into the wood and marring the appearance. It also simplifies wiping the filler. While not necessary, a wash coat can improve the finish. Use the shellac wash coat described on page 14. A very thin film is needed over the wood pores, so apply evenly and do not allow it to accumulate in the pores or crevices, etc. Let dry one hour.

Then follow this procedure:

1. Stir the paste in the can thoroughly until any surface oil has disappeared and the mixture is uniform.
2. Thin before applying. If you use a natural filler, add about one vol-

ume of paint thinner, turpentine, or naphtha to each volume of wood filler. The exact measurement is not critical, but it is better to be generous with the thinner. Stir well to mix. Stir from time to time during use to keep the solids from separating.

If you want to color the filler, obtain the desired tone by adding pigmented stain in place of the paint thinner. If it is still not dark enough, you can use ground-in-oil colors available in collapsible tubes. Stir the mixture well before adding more color or it may become too dark. If it does become too dark, add a little natural wood filler just as it comes from the can. Then if it is too thick for brushing, add more paint thinner. Again, the amount is not critical.

3. Apply with a brush. Brush either parallel or across the grain or in a circular motion. The important thing is to cover all areas liberally. Apply only to an area that you can easily wipe in about 10 minutes.

4. When the entire surface of the wet filler on the wood "flats" — that is, turns dull from its original glossy appearance — and thickens, wipe off the excess. The surface will flat in perhaps 5 to 10 minutes, depending on the room temperature and kind of thinner. If you wait longer, it may be very hard to wipe. For best results work on only one section of the furniture at a time.

Wiping

Rub a coarse cloth pad or burlap across the grain to remove all filler from the wood surface but leaving the pores and depressions filled. Rubbing *with* the grain removes the filler from pores.

Then complete the job with a clean, soft cloth, rubbing very lightly with the grain to remove any remaining deposits.

Clean the hard-to-get-at parts, such as grooves, by placing a cloth over a skewer or sharp stick and wiping before the filler hardens.

5. Allow to dry and harden overnight — preferably 24 hours.

6. After drying, the surface should be smooth and free of any grainy deposit of filler. If a few spots were missed, sand very lightly with 220

paper or 00 steel wool. If the pores do not appear well-filled — a common occurrence on red oak and Philippine mahogany — repeat the filling operation.

7. Place the cloths in an air-tight metal container. Swab rubber gloves with paint thinner before spots of filler harden on them.



Stir paste wood filler to uniform consistency. Thin with naphtha or turpentine.



Brush thinned paste wood filler to cover an area not over 2 square feet in size.



Filler is flattened and ready to wipe off if it rolls into a ball when you run your finger over the surface.

THE FINISHING COAT

CHOICE AND APPLICATION

Your final choice — the choice of finish — depends on many things. Current fads may determine the finish selected by manufacturer or purchaser. Other reasons influencing a factory's choice are: cost of application, durability, adaptability to production schedules, ease of application and so on. In any case, there's a wide range for you to choose from.

Specific finishes include oil, wax, penetrating sealer, varnish, coating-type sealers, lacquer, shellac and enamel.

Make sure the stain does not bleed into the topcoat by a trial on a scrap of wood. If it does, try another brand or type.

THE WOOD ITSELF

When selecting a finish, consider both the species of wood and its grain. These are the first considerations. Some people might like a knotty-pine desk finished so that the diverging grain around the knots stands out. Others may want to enamel the surface to cover up this feature.

One thing is certain: You cannot make pine look like mahogany or walnut even with a stain that has a color of mahogany or walnut. So choose your wood originally for the grain you want.

EFFECT OF LIGHT

The sheen or appearance of reflected light from the furniture should also be considered. Do you prefer gloss, or satin or dull finish?

Products that contain "flattening" agents produce the duller surface. These are labelled "satin varnish" or "dull" or the like. You can also pro-

duce a satin finish by rubbing (described later). Oils also leave a soft sheen.

USE OF FURNITURE

Picture, too, how you will use the furniture. Varnishes or certain sealers give a hard surface that will take wear and is easy to clean. Oils and waxes on bare wood are fairly easy to maintain and repair, but not as easy to keep clean. Their surface

does not become as hard as varnish or certain sealers. An oil finish has less water resistance. A linseed-oil finish takes longer to apply and darkens the wood but seems to go well with certain antiques or items that will not be handled a great deal.

And so it goes, with each type of finish having unique advantages for certain purposes. Choice of finishes is large — transparent or opaque, penetrating or surface coating, glossy or non-glossy.

APPLYING THE FINISH

Apply the finish in a room as dust-free as possible.

Wet-mop or vacuum the floor before starting, especially if you use varnish or enamel, since these are slow-drying.

Place clean paper under the work. Wear lint-free clothes.

Don't sand and finish in the same room.

Next, remove all dust from the piece to be finished. Use a lintless cloth barely moist with paint thinner. Better yet, pick up the dust from the work — like the professionals do — with a tack rag. You can buy a tack rag at a paint store or you can make one from a piece of cheesecloth about 18 by 18 inches or an old, clean cotton handkerchief.

Wet it with water and squeeze lightly.

Then sprinkle the moist cloth liberally with turpentine or paint thinner.

Drip 2 or 3 teaspoons of varnish onto the cloth.

Now fold and squeeze the cloth until the varnish is distributed

throughout the cloth. Some of the water will come out of the cloth.

Keep the cloth in a tightly closed screw-cap jar when not in use. Never let it dry out. If it does become dry during use, sprinkle a little water and turpentine over it.

BRUSHING

Plan the order in which you are going to operate so that after brushing on the finish, the various parts of the wood can remain untouched and undisturbed until dry.

When finishing chairs, small tables, etc., start by placing them upside down on clean papers on a table.

Apply finish to the under parts first.

Then, handling carefully so as not to touch the wet spots, turn the article right side up to complete the work.

On large, open articles such as bookcases or china cabinets, apply finish to the interior area first. Then finish the sides and front.



Straight stiff wire on coffee can makes a good container. Dip bristles to about one-third length and wipe off excess on the wire.



Hold brush as shown. Apply sealer, lacquer, varnish, and other transparent finishes with the tips of the bristles. Keep brush from clogging up.



Tip furniture up and apply enamel to underside first. Complete the underside of rungs, seat, and arms before placing chair upright.

On dressers or chests, first remove drawers. Apply finish to the interiors first and then finish the fronts. In this way, there is less chance of touching the wet finish.

Use a Quality Brush

To apply lacquer, enamel, varnish and coating type sealers, use the best brush you can afford. Either tapered nylon or hog bristle is satisfactory. High quality brushes have longer bristles, and are worth their added cost. An inexpensive brush is all right for filler and stain.

In using varnish or coating-type sealers, pour out enough for the job into a wide-mouth jar, clean tin can with top cut out, or a "hot drink" paper cup.

When finished, discard what is not used rather than pour it back so that any dust or color particles picked up during use will not contaminate the unused finish in the original can.

Also, before starting to brush, dip the brush and spread the varnish or sealer back and forth a few times on a piece of wrapping paper to remove any dust that might be embedded in the brush.

Dip the bristles to about one-third their length. Dipping full-length forces the material into the heel of the brush. Then it will ooze out on the handle, cake on the bristles and make your work difficult. In applying any kind of finish, hold the brush about like you would a pencil, not

grasping the handle like that of a hammer.

Spray application equipment can also be used for finishing — in fact, can be more satisfactory than a brush in many cases. Lacquer, for example, can be applied better by spray.

Also a sprayer may save time where brush work is extensive or detailed. Instructions for its use are not included in this bulletin. Directions may be obtained where sprayer is purchased or rented.

In any case you will want the right type. An even, run-free coating is hard to obtain with the vacuum-cleaner-type attachment. For good work with a sprayer an air compressor is needed. One of the great-

est problems, though, is removal of atomized spray. In factories, droplets of spray mist are removed by a fan and spray booth. Inside the home or in a garage, spraying without adequate ventilation may create a health and fire hazard.

Aerosol cans of lacquers, enamels, etc. (spray cans) are best suited for touch-up work or many-sided objects like lattice work, or for use in hard-to-reach places. Proper use requires a good deal of practice for general work because the spray pressure is somewhat low for good atomization. Runs and drip frequently result until one is experienced in using them. Range of colors and shades is sometimes limited, and the cost of such a spray finish is high.

KINDS OF FINISH

OIL FINISH

Linseed oil finishes are best suited to unstained wood. They give a deep, rich finish. The oil penetrates the wood, darkening it and making stain less necessary — unless, of course, you want another color than the natural tone. Also, stains tend to "bleed" into the oil, sometimes detracting from the appearance of the grain pattern.

Oils seem best adapted to use on nonporous hardwoods (close grain)

rather than porous hardwoods or softwoods. Open grain (porous) hardwoods, however, can be oil finished. But before oiling, fill with paste filler as directed on page 13.

Remember that while you need less skill to apply an attractive oil finish than you do for varnish or coating-type sealers, it takes a lot more labor and time. Long hand-rubbing is necessary. Also, at least a week is required between each application of oil, with at least four

such coats required, sometimes more.

Applying Oil Finish

Following are directions for applying the oil finish:

1. Prepare a mixture of 2 parts boiled linseed oil and 1 part turpentine. A quart of boiled linseed oil should be enough for a dining room table and six chairs.

2. Warm the mixture by placing the container in a pan of warm water at a temperature of about 130° to 150° F. for at least 10 minutes. Do not heat over a direct flame.

3. Apply liberally with a pad of folded, lintless cloth. Rub the pad over the wood surface until the wood won't absorb any more oil. This will take 5 to 20 minutes, varying with species of wood and oil temperature.

4. If any areas of the wood still appear wet, wipe off with a clean, dry, lintless cloth. Be especially careful to get all of the oil out of grooves, carvings, and other depressions before it hardens there, or a wrinkled, gummy deposit will result.

5. Now, rub these oiled parts with a woolen cloth for 10 to 20 minutes. An old woolen sock wrapped around a brick makes a good polisher for flat areas. Rubbing will heat the surface and help to increase the sheen.

6. Wait a week and apply another coat as just described, starting over with Step 1.

7. At least 4 coats of oil mixture are needed for a well-built finish and as many as 12 are sometimes used. Additional coats should be applied at regular intervals. Each succeeding coat requires more time to enter the wood.

Before applying successive coats, test the wood surface by placing your hand on it for a minute. If the wood under your hand becomes oily, it is still too wet for the next coat. (The furniture can be used after the second coat dries.)

8. Repeat the oiling once a year.

9. To reduce warping of table leaves, apply a brush coat of varnish to their under side at any time before the third oil coat is applied.

CAUTION: Oil-soaked cloths are flammable. Burn them immediately or place in an air-tight metal container.

WAX FINISH

By "wax finish" is meant:

1. Wax applied to sanded wood that has no stain or finish coat, or

2. Wax applied over wood that has been sanded, stained, filled (if a porous species) and has a coat of shellac.

Waxing directly over unfinished wood is quick and easy but is best suited only for articles that get very little wear and handling. It is commonly used for woodwork and panel finishing.

Waxing over a stained, filled and shellacked finish gives better protection to furniture. Like the oil process, it's a lot of work and rubbing, although unlike the oil finish, the coats can be applied within an hour of each other.

Over Sanded Wood

The stain and wax are purchased as a mixture. The label will carry the name **wax** as some part of the brand name. You will also need a separate can of paste wax. After the wood is sanded and dust free, fill the wood if it is porous. (See directions for filling on page 13.) Then, after drying overnight, follow these steps:

1. Stir the wax-stain mixture until it is uniform.

2. Apply with an inexpensive



Apply paste wax with a cheese cloth pad. Spread evenly and smoothly. Buff with clean wool cloth.

brush kept only for this purpose or use a cotton rag.

3. Allow to stand 2 to 10 minutes.

4. Rub with lint-free cloth, using a rotary motion until the wax has penetrated the wood and any excess is absorbed by the cloth. Use long strokes parallel to grain to even any color differences.

5. Apply paste wax to several layers of cheese cloth. Fold cloth so that the wax is enclosed. Spread on the wood with circular motion. Do not allow any lumps of wax to remain on the wood as they will be hard to smooth out.

6. Allow the wax 10 minutes to dry.

7. Rub with a woolen cloth, using long strokes with the grain until the surface is smooth and lustrous.

Waxing Stained Wood

This type of wax finish requires an undercoating of shellac.

1. Follow directions for staining or staining and filling wood and let dry as specified.

2. Brush on a coat of white shellac. Make the shellac by adding one volume of denatured alcohol to an equal volume of 4-pound cut shellac. Use a clean brush. Apply very carefully in long strokes with the grain of the wood. Do not overlap strokes or restroke more than once or twice. Shellac sets rapidly and such overlaps will show.

3. Apply a second coat and allow to dry.

4. Sand with 220 paper until smooth.

5. Apply 2 to 4 coats of paste wax, allowing at least one hour drying time between each coat. Use the same method of application as given in the directions for paste wax above.

PENETRATING SEALER

Penetrating sealers are quite simple to apply and give a pleasing appearance. But because they do penetrate, they darken the wood. They can be used on stained or unstained wood, filled or unfilled wood but

are best suited to unstained, unfilled woods. You can't get a high gloss with them.

Since the finish is in the wood instead of on it, small dents or scratches do not show up as distinctly as they do on varnished wood. The appearance of the finished wood is of the "Danish" type.

There are many penetrating sealers on the market. Trade names may or may not include the words, seal or sealer. Label directions should indicate whether the product penetrates the wood.

VARNISH

There are many varieties of varnish available in gloss, satin, or dull sheens. Choose one labelled "Furniture and Trim Varnish" or "Bar-Top Varnish" or "Rubbing Varnish." Others are also suitable. The label should suggest the best uses.

The total varnishing process takes a week or more of accumulated drying times, depending on how many sanding and rubbing steps you carry out.

Although it takes more skill to apply varnish than a penetrating seal, it can give a high gloss and good water resistance. Two or more coats provide a tough, protective coating that is well suited for furniture that is handled and used extensively. On the other hand, varnish, especially gloss type, shows scratches and requires more skill for repairs than a penetrating finish. One pint should be enough for a 3 x 5-foot table.

How to Apply

1. Apply a coat of gloss varnish diluted at the rate of one volume paint thinner or turpentine to 8 equal volumes of varnish (1 pint to 1 gallon). Use gloss varnish undercoat even though satin or dull varnish is to be the last coat. For best results, the air temperature should be 70°F or above.

Start in the middle of flat areas like table tops and work each way to the edges. Apply with a liberal brush load, only lightly drawn over the top of the container, and proceed in the grain direction. Lap each

stroke slightly. Do the edges last. Do not start in a corner.

After a flat area is covered, brush across the grain. Finish the coating by stroking lightly with the grain in one direction. Excessive brushing

leads to brush marks and may introduce air bubbles.

2. Allow to dry 24 hours.

3. Sand lightly to remove dust particles, using 220 or 240 paper. Sand with the grain, beginning at



In sanding topcoats, use waterproof abrasive paper around a wood block with pad of felt or sponge rubber between paper and block.



While sanding the soapy surface lightly, test for smoothness, using thumb or a piece of cardboard as a squeegee. When surface is uniformly smooth, stop sand-

ing and wipe dry with a soft cloth. Then rub lightly with steel wool. As a final step, wipe surface clean to prevent iron rust from fine steel wool deposits.

4. Wipe dry with a clean cheesecloth.

5. Let stand 12 hours.

6. Repeat steps 1 through 5.

7. Remove any irregularities on surface by rubbing with 00 steel wool.

penetrating sealer if needed. Touch lightly at 3- or 4-minute intervals to see if surface is becoming tacky. If so, proceed to next step instead of waiting for the time shown.

3. Rub lightly with No. 0 steel wool to remove the excess sealer. Rub with the grain.

4. Wipe dry with a clean cheesecloth.

5. Let stand 12 hours.

6. Repeat steps 1 through 5.

7. Remove any irregularities on



Sprinkle solution of water and hand dishwashing liquid on finished wood surface or apply with a cloth or sponge.



ing and wipe dry with a soft cloth. Then rub lightly with steel wool. As a final step, wipe surface clean to prevent iron rust from fine steel wool deposits.

leads to brush marks and may introduce air bubbles.

2. Allow to dry 24 hours.

3. Sand lightly to remove dust particles, using 220 or 240 paper. Sand with the grain, beginning at

the edges and working toward the center. Be sure all glossy areas are dulled and no ridges remain.

4. Wipe up all dust by running a tack rag (see page 16) over the surface.

5. Apply second coat of gloss varnish as it comes from the can following the same brushing technique.

6. Dry, sand, and wipe with tack cloth as before. (Repeat steps 2, 3, and 4.)

7. Apply third coat of varnish. This should be gloss varnish if a shiny surface is desired, or satin or dull if a less glossy surface is desired.

8. A glossy top coat should dry at least 4 days if "hand rubbing" — as described below is to follow. Apply with same brushing technique as used with other coat.

If the third coat is satin or dull finish, complete the job by sprinkling liquid wax over the varnish surface until the whole surface is barely wet. Rub with 00 or 000 steel wool in the grain direction. This should require only a minute or two in each area of steel wool application. Occasionally wipe the liquid wax off an area an inch wide by a few inches long to inspect for smoothness.

Continue rubbing with steel wool until the surface is smooth, but be careful not to cut through the finish. When the surface is smooth, remove residue with a dry cloth and clean with detergent and water (same strength as for hand dishwashing) on a soft cloth.

9. Hand-rubbing the top coat of gloss varnish takes extra time and work but gives a surface sheen found on the best furniture; however it is not necessary.

Wet the surface liberally with a mixture of 3 parts paint thinner and 1 part mineral oil. Sand all flat areas with 360 waterproof type, "A" weight silicon carbide paper to smooth and level the surface. Use 000 steel wool on chair runs, carvings, mouldings, etc. The steel wool doesn't need lubrication. Rub areas with steel wool until uniformly dull. All sanding and steel wooling should be parallel to the grain.

10. After all flat surfaces are smoothed and leveled, wipe up the

lubricant and residue with a soft cloth.

Then go over the surfaces with 500 silicon carbide "A" weight paper, using the fresh lubricant in the same manner as described for 360 paper above (9). Use a sanding block with a felt or rubber pad between paper and block. Sand until all areas appear uniformly dull and there are no glossy spots left. This can be checked from time to time by squeezing an area with a piece of cardboard.

11. Wipe up the lubricant and particles of finish with a clean, soft cloth. If any debris is left in grooves, carvings, etc., use a cloth wrapped around a sharp stick or skewer to clean.

COATING SEALERS

The name "sealer" usually refers to a liquid finishing material that is applied over bare wood, stained wood or filled wood as a base for the final coat that you see on finished furniture. However, many products are now called sealers that can be used also as final coats. "Coating type sealers," therefore, include transparent finishing materials that are not true varnishes, lacquers or penetrating types of materials. (The word sealer, in fact, is today more or less a catch-all — difficult to define.)

These products are sold under a wide variety of trade names that may or may not contain "seal" or "sealer" as part of the designation.¹ Some are as nonpenetrating as varnish. Others penetrate the wood to an extent between that of a varnish and a penetrating sealer or oil. Ask a salesman for help in choosing the proper product.

These sealers give a satisfactory finish for most furniture and are easy to apply. Some are also available in gloss and satin types. With a variety of products prevalent, directions vary slightly with each.

The directions below suggest steps involved in applying most coating-type sealers. They pertain to those

¹Trade names include Beauty-lok, Guardsman Furniture Finish, Dutch Boy Clear Sealer, Wood Love, and others (Products named are listed for clarification only and do not imply endorsement.)

12. Clean surface with a hand dishwashing detergent and water on a soft cloth.

13. If you want a high gloss, apply hand-rubbing compound as per label directions, rubbing with the grain until a uniform sheen develops over the surface. Check this by wiping surface free of compound over a strip. Pumice, 3F or 4F, with rubbing oil can also be used. Omit step 13 if you like the sheen produced in step 10.

14. Wipe up all residue and repeat step 12.

15. Let dry and apply liquid or paste wax according to label directions if desired.

that penetrate the wood in the first coat more deeply than varnish. Remember — directions may vary with each product.

Follow These Steps

1. Apply a liberal coat of gloss or satin sealer as it comes from the can, brushing with the grain. It is advisable to have a separate good brush for these. A brush suitable for varnish or other top coat is satisfactory.

2. Allow at least 4 hours to dry.

3. Sand lightly with the grain with 220 or 240 paper.

4. Remove sanding dust with a tack cloth.

5. Apply second coat with the same brushing technique as described for varnish application, drawing the liberally-loaded brush carefully with the grain, proceeding from the middle outward, lapping lightly, and otherwise following full directions.

6. Allow to dry 24 hours.

7. Remove any dust particles by rubbing with 00 steel wool.

8. Wipe with a rag moistened slightly with paint thinner to remove all steel wool remnants.

9. Apply a coat of paste or liquid wax, following label directions.

LACQUER

Lacquers are fast-drying finishing materials that leave a thin, hard coating entirely by evaporation of the solvents in the lacquer. Shellac,

FINISHES

Name of Finish	Transparency	Gloss	Type	Use Characteristics
OIL	Transparent	None	Penetrating	Repair easy laborious application
WAX	Transparent	None	Penetrating	Simple to apply; not very durable
PENETRATING SEALER	Transparent	None	Penetrating	Easy to apply; fair water resistance
VARNISH	Transparent	Gloss, Dull or Satin	Coating	Offers good protection to wood; slow dry
COATING SEALER	Transparent	Gloss or Satin	Coating	Easy to apply; partly penetrates wood
LACQUER	Transparent or Opaque	Gloss or Flat	Coating	Skill for application; fast drying
ENAMEL	Opaque	Gloss or Semi- Gloss	Coating	Best for woods of unattractive grain pattern; hides wood

in this sense, is also a lacquer. Varnishes, most sealers, and oils all change from liquid to solid form by chemical reaction with oxygen.

Lacquers are available in a wide variety of types, some specified for brush application, but most intended for spraying, due mainly to their extremely fast drying time. Some are pigmented, others are transparent with a glossy or a dull sheen effect after drying. Many are quite resistant to water. Their fast drying makes them harder to apply by brushing than sealers and some varnishes. Drips or runny areas on vertical surfaces are hard to brush out before they dry.

The solvents are so strong in lacquer that one coat tends to soften the next during application. Thus, spraying is the best method. Colored enamels are preferable to pigmented lacquers for brush application where an opaque finish is desired.

Some lacquer trade names do not include the word lacquer. Usually you can identify these by label directions that indicate lacquer thinner for cleaning the brush. A typical lacquer, when used with a brush, is applied as follows:

1. Using a clean, good quality

brush, apply lacquer in a full even coat. Do **not** brush back and forth.

2. Dry 3 to 4 hours.
3. Sand lightly with No. 220 or 240 paper.

4. Wipe off dust with tack cloth.
5. Brush on second coat.
For a more water-resistant finish, apply three coats. If stain bleeds into lacquer (check this on an inconspicuous place), apply a 1 to 1 thinned shellac and dry one hour. Sand with 220 paper before proceeding with step (1) above.

Clean brush in lacquer thinner. Lacquer is not recommended for brush application unless you have developed skill for application.

SHELLAC

Shellac has been used by wood finishers for hundreds of years. It is fast drying, readily available, and produces attractive effects.

It has very serious drawbacks, however. These are: no resistance to alcohol, poor resistance to water, staining and chipping easily and deterioration in the can.

These disadvantages are serious enough so that shellac is recommended in this bulletin only for use under wax finish and as a wash coat, and sealer under lacquer.

ENAMEL

Woods with very little grain pattern or an unattractive pattern are advantageously finished with an opaque cover such as gloss or semi-gloss enamel. Examples are pine, Douglas fir, spruce, gum, basswood, and poplar. While the surface pattern of the first three is occasionally accented, such as knotty treatments for wall paneling, these woods are generally enameled when used in furniture, although white pine is now popular as stained, lacquered tables and chairs.

If a special undercoat is recommended on label instructions, apply it on the bare wood. It is advisable to use the same brand of undercoater as top coat. Most manufacturers do not specify a special undercoat for semigloss enamel. Flat or dull enamels are not recommended for furniture. They are not as easy to keep clean nor do they wear as well as gloss or semigloss enamel. Some of these enamels are available as odorless types, which may be desirable if finishing is done in poorly ventilated places. Latex semigloss paints are more readily available than solvent-thinned kinds and can be used following label directions.

They do not spread as well as solvent thinned types, but dry faster and have little odor. Whites do not yellow with age like some solvent-thinned sorts.

Use masking tape to cover areas which are to be painted a different color than an adjacent one. Follow the directions on page 19 for varnish application as far as coverage is concerned. Work in a dust-free room for a good enamel finish. Temperature of room and work should be above 70°F.

Knots in pine, Douglas fir, or spruce furniture may contain large amounts of resin which may continue to run. This resin or sap will discolor enamel unless the knots are sealed. Seal them with a coat of shellac or special knot sealer. Dilute shellac with an equal volume of denatured alcohol. Allow to dry for 30 minutes, sand lightly with 150 or 180 paper, and proceed as follows. One

pint of most enamels will cover about 50 square feet, one coat.

GLOSS ENAMEL

1. Brush on a coat of enamel undercoater.
2. Allow to dry the time directed on the undercoater label.
3. If putty is used to fill nail holes or other imperfections, apply with knife at this point. Dry 24 hours unless a latex putty is used.
4. Using sandpaper block, sand lightly with 150 or 180 paper until any dust particles, brush marks, or other irregularities are removed.
5. Mix one part enamel undercoater and one part gloss enamel. Brush on.
6. Allow to dry as directed on gloss enamel label.
7. Sand with 220 or 240 paper until dust particles are removed and surface is even and smooth.

8. Apply top coat of gloss enamel as it comes from the can. Flow on a generous coat, using a minimum of brushing back and forth. On vertical surfaces do not apply enamel so heavily that it begins to run.

SEMIGLOSS ENAMEL OR LATEX SEMIGLOSS

This type of enamel may also be called "satin" enamel.

1. First apply a coat and dry for time specified on label. With latex, use undercoater as directed on label.
2. If putty is used to fill holes, apply and dry 24 hours unless a latex putty is used.
3. Sand with 150 or 180 paper to remove dust and other irregularities and provide a smooth level base for next coats.
4. Apply second coat, dry and sand with 220 or 240 paper.
5. Apply third coat.

NOVELTY FINISHES

The beauty of finished wood is determined by its natural grain and color. You should use every care in finishing in order to bring out these characteristics. For instance, stain may be unnecessary unless the wood has no beauty — either of grain or color. Often special finishes are desired to match other pieces or to get a special color and textural quality. Some of these are discussed below.

LIMED EFFECTS

Limed or pickled finishes are "toned" effects that are particularly good on oak furniture. They are also used on close-grained woods such as pine, birch, etc.

The furniture should be washed thoroughly after removing the old finish. Bleach the wood by following the suggestions on page 8. Sandpaper smooth, working with the grain of the wood. There are then two ways to achieve the limed effects.

Platinum filler methods for open-grain woods. Use a paste wood filler, tinted with an oil stain of platinum color to fill the pores of open-grain woods. Brush the paste filler well into cracks, crevices, and holes. When it dries, wipe immediately across the grain with a coarse cloth to remove the excess. Follow with a soft cloth. This leaves a light-tone deposit in the pores and gives the desired limed effect. If you wipe with the grain, you will remove some of the filler.

Dry thoroughly.

Then apply two or three coats of a coating sealer or varnish — drying and then sanding lightly between coats. Remove sanding dust with a tack cloth. To get a satin finish, rub the last dry coat after at least 72 hours drying with a mixture of linseed oil and pumice stone, or use a wax finish.

White filler method for close grain woods. Brush on a coat of white in-

terior undercoater. Immediately, with a soft cloth, wipe the surface across the grain of the wood, just as when applying paste wood filler. After the excess is wiped off, finish wiping with a clean cloth with the grain to give a uniform effect. This leaves a thin, white deposit on the softer portions of the wood and gives the desired limed or pickled effect.

When dry, apply a coat of white shellac diluted 1 part to 2 with denatured alcohol. Let it dry and sand it lightly. Then apply a coat of varnish in either gloss or satin. A shellac and wax finish is also appropriate for limed or pickled effects.

TWO-TONED EFFECTS

White or natural filler on a dark, open-grained wood like mahogany or black walnut will likely give the effect of partial bleaching because the large pores of the wood will retain a considerable amount of the filler and give the whole surface a whitish cast.

White paint as a filler will produce a similar effect. Brush the paint on, let it remain for 10 to 15 minutes; then wipe it off across the grain. The effect is less pronounced on light-

colored woods such as birch and maple, but the result is pleasing.

After the paint is dry, brush on 2 coats of varnish, drying between coats. When dry, rub with 320 wet or dry abrasive finishing paper which is kept moist with soap and water.

"ANTIQUÉ" FINISH

Antique finish is a two-toned blended or shaded finish, achieved by applying tinted glazing liquid over an enameled base. This is also called glazing or French Provincial, as it gives the effect of that period.

The term, "antiquing," refers technically to a manufacturer's process that gives wood a look of age. However, it is also used interchangeably with the term, "glazing."

Traditionally, the antique glaze is applied over white or ivory enamel, but the modern trend is to color. With the wide range of colors available in enamels, along with tinted

glaze, you can achieve an endless variety of antique finish effects.

First, apply the enamel according to directions. Two coats are necessary for new wood, while one coat may suffice for previously-painted surfaces. See that the surface is clean and free from dust or wax.

Apply a **glazing liquid** tinted with the tinting color such as burnt umber, lamp black raw, greens, reds, blues, and so on (tubes of artist oil paints) to the shade that will give the desired effect.

Wipe off the glazing liquid in several spots. Then with a soft cloth or dry brush, blend unwiped areas into the wiped areas. If the effect is not to your liking, wipe off glaze with cloth dampened with thinner (or solvent suggested on glazing liquid container) and start again. Apply a finish coat of varnish or coating type sealer when dry.

Kits are available that contain the necessary materials for an antique job to previously painted furniture.

NATURAL FINISH

A good natural finish will have a:

Satin luster — even overall. Not glossy like varnish or lacquer, but a soft, mellow, effortless-looking sheen.

Smooth surface — well sanded. Pores filled. Holes filled with stick shellac and color blended. No dust specks or bubbles, or drippy finish.

Dry, hard finish — not sticky but with good serviceable body.

Color — appropriate for the wood and style of piece.

If the surface is:

Sticky — look for wax from varnish remover; or grease or dirt; moisture in wood; or some coats applied too soon.

Dull in spots — may not be enough coats of finish.

Sticky or powdery when finger rubbed quickly and with pressure over surface — a poor finish was used.

Rough — Look for causes of insufficient smoothing; finish not

strained; particles of steel-wool or dust not cleaned off between coats; steel-wool fragments not cleaned out of corners and crevices; too much pressure on brush if lacquer or varnish is used; too much stirring brush in varnish.



Heavy, older varnish was removed from this chest — not an antique — to restore the natural color and grain of the maple wood.

WOOD PANELLING

Large wood-paneled areas that bring out the natural wood grain are popular today. Prefinished panels are recommended. Finishing old wood panelling is a big undertaking. Don't start it unless you have plenty of time and are patient, and only if the present old panelling warrants it.

You must start with bare wood. You will have to remove any old finish.

First a caution: apply stain only if it appears to be needed. It will add color to a plain wood or will disguise unwanted colors.

Walls may consist of many tongue-and-groove boards or plywood which may vary greatly in color and texture. Some parts of the wood may be more absorptive than others. This will affect the finished result. When stained, the wood may show undesirable, extremely light and dark contrasts. So for reasonable uniformity, stain one board or plywood section at a time, manipulating the stain when wiping it to get the effect you like. Perhaps allow more time for it to soak in on resistant areas of the wood while you wipe the absorptive areas where the stain soaks in quickly.

However, don't carry uniform staining to such an extreme as to spoil the natural beauty of the light and dark contrasts of the grain.

MORE PRECAUTIONS

1. Many liquids used in refinishing are highly flammable or explosive. Work in well-ventilated rooms and away from open fire. Work outdoors if possible.

2. Wear rubber gloves at all times. Paint or varnish removers are dangerous to skin. While working with them, keep hands away from eyes. If removers spatter on your skin, bathe at once with cold running water.

3. Keep small children away from refinishing operations. Keep all materials out of the reach of children.

CARE OF BRUSHES

A high-quality brush costs money. It will last for years if given proper care. If mistreated, it will be a poor tool and will not last.

First, a few **don'ts**:

Don't allow finishing materials to remain in a brush and harden, even overnight. Clean out after use.

Don't allow a brush to rest on the tips of the bristles in solvent. Suspend it from the top of the can or jar.

Don't allow a bristle brush to soak for long periods of time in water.

Don't habitually press the brush hard against a surface during application.

Don't use a brush edgewise.

CLEANING

A clean brush is essential for top coats such as varnish, lacquer, en-

amels, sealers, etc. Keep brushes clean by taking care of them immediately after use and before storage. If possible, have a separate brush for each major step of the refinishing process.

Use the solvents shown for brushes used in various finishing materials:

1. **Oil stain** — paint thinner or turpentine.

2. **Filler** — paint thinner or turpentine.

3. **Linseed oil**, penetrating sealer, wax, varnish, enamels, coating type sealer — paint thinner or turpentine.

4. **Shellac** — denatured alcohol.

5. **Lacquer** — lacquer thinner.

Pour some solvent in a small or medium-size wide-mouth jar or can. Press the brush into the solvent to allow it to penetrate the bristles to the place where they are fastened to

the handle. Pour solvent into a second large screw-cap bottle or can and save. The pigment and some of the resins will settle and the clear thinner can be used for this operation again.

Repeat the immersion twice more, with fresh solvent in the wide-mouth jar, retaining the liquid after use as before in the storage bottle or can.

If any finishing material remains at the base of the bristles, use an old stiff toothbrush to move such solids downward toward the tips and off the bristles. Dip the toothbrush in solvent to remove the solid particles.

With enamels, this procedure may still not get all pigment out. If so, do the following:

1. Squeeze out all the solvent possible by pressing a flat stick of wood on the bristles from base to tips of bristles while holding the brush against an absorbent cloth.

2. Now twirl the brush holding the handle between the palms of your hands. Do this in an old oil or garbage can to protect your clothes.

3. Finally, wash the brush by hand with a laundry detergent and water. Rinse in clear water. Then fold a piece of wrapping paper completely around the bristles so that they are in the same position as in a new brush. Comb if necessary.

4. Allow to dry in flat position before using again.

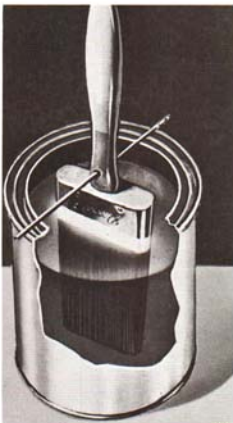
RECONDITIONING

If a brush is caked with dried paint, varnish, filler or the like on the bristles, especially at their base, soak it in a solvent-type brush cleaner. For most of these cleaners, soaking for several hours followed by rinsing in water is all that is needed. Follow directions on the product label.

STORING

Devices for storing brushes are available for purchase. If a brush is going to be used the next day, omit the water-washing step since the brush will probably not dry overnight. Water-wet bristles will interfere with the next operation.

Store brushes with wrapping paper folded around the bristles to keep them from curling. Store by laying flat or hanging. Resting brushes on the tips of the bristles gives them a permanent curve which makes the brush difficult to use.



Between the finishing steps store brushes in a can of turpentine, mineral spirits, or lacquer thinner, depending upon the next material to be applied. Drill a hole in handle and insert a straight, stiff wire.



When cleaning a brush, remove most of the material in the appropriate solvent. Then twirl the brush, holding the handle as shown. This will remove most of the remaining solvent.

SOME EXAMPLES FROM TWO MICHIGAN HOMES



Penetrating sealer was applied to the natural finish of this gumwood bookcase in the R. A. Van Meter home, Bloomfield Hills, Mich.



Oil finish was applied to this one-drawer table in the living room of the Robert A. Dryden home in Bloomfield Hills.



Black satin finish enamel restored an ancient woodbox to its original use in the Van Meter family room.



LEFT — Retaining many marks of age and use preserved the character of this pine "dry sink" — with oil finish — in the Dryden family room.

LOWER RIGHT — Transparent coating sealer on pine "bishop's bench" — the Dryden home.

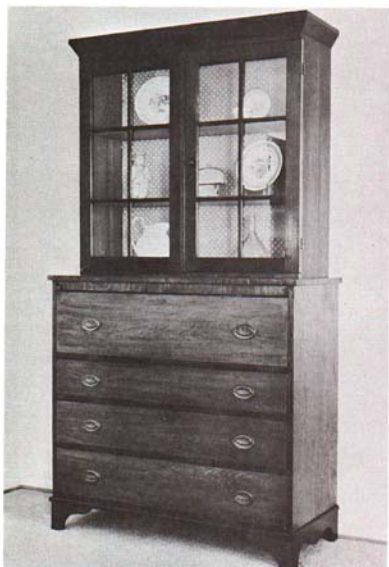
LOWER LEFT — Closeup of drawers in bookcase on page 25 — deep mars left unrepaired.





Penetrating sealer applied on a variety of woods: tiger maple veneer, cherry top and assorted hardwood legs. — Van Meter home.

Marble-top Victorian commode of walnut restored to original finish with transparent penetrating sealer. Van Meter home.



Coating sealer on antique walnut chest and on cabinet built recently to match the chest. — Dryden home.





Cherry drop leaf table with penetrating sealer adapts pleasingly to modern furnishings in the Van Meter family room.

Cherry chest of drawers finished with penetrating sealer — Van Meter home.

Penetrating sealer has been used on maple chairs in the dining room of the Dryden home.



SOME DEFINITIONS

Abrasive—any hard, sharp material used to wear away another surface (wood) in pressure contact. Flintpaper, emery cloth, garnet paper are all abrasive materials.

Bleed—To dissolve into a coating that is applied over a stain color.

Enamel—Opaque covering usually used with woods with little grain pattern.

End grain—The cross-cut surface of a board. (The surface perpendicular to the long direction of a tree trunk). The most absorptive surface of wood.

Garnet paper—An abrasive coated paper bearing the natural mineral garnet. Widely used in woodworking.

Grain—The direction in which most of the fibers of wood are aligned. The direction parallel to the long dimension of the tree trunk.

Limed effect—Special finishes obtained on coarse, open-grained woods by wiping colored paint or white filler into grain of wood. This leaves the pores of the wood filled with color.

Lintless cloth—One which does not shed lint or short fibers when used. Cheese cloth or old cotton handkerchiefs that have been laundered many times meet this requirement.

Liquid wax—A solution of wax in a solvent such as turpentine or one of petroleum origin.

Mineral oil—A petroleum derived liquid of low volatility. Sold in drugstores as a laxative.

Non-aqueous solvent—A solvent that does not contain water or mix with it. These are such things as petroleum distillates, synthetic chemicals, coal tar distillates.

Paste wood filler—A commercially prepared paste used to rub into pores of wood to give a smooth-er surface.

Penetrating sealer—Finishing material that soaks into the wood.

Pumice—A spongy, porous stone of volcanic origin. Available as a stone or in powdered form at paint and hardware stores. Comes in No. 1, 0, F, FF, FFF, FFFF grades of coarseness. No. 1 is coarsest.

Rottenstone—A soft stone, sometimes called Tripoli after the country of its origin. Powdered rottenstone is used for fine polishing.

Rubbing compound—Graded abrasive in paste form. Used in obtaining a smooth surface on topcoats.

Sealer—Any finish used to cover surface of furniture to protect it. Usually refers to the kind used on bare or filled wood surface.

Shellac—A substance exuded from trees found in India, processed and dissolved in denatured alcohol for use as a coating on wood. It hardens by evaporation of the solvent.

Steel wool—A fine mesh of metal coils commonly used as a kitchen abrasive or cleaner. Excellent for removing paint finishes, smoothing finish surfaces and polishing. Its coarseness is measured numerically, 2 is coarse, 4/0 the finest.

Tack rag—A treated cloth used to remove the fine dust that a dry cloth won't touch.

Varnish—A transparent or translucent liquid that hardens by oxidation and polymerization upon exposure to air. Considered here as made from resins, drying oils, and solvents.

Veneer—A thin layer of wood glued to the surface of less desirable appearing wood (or more durable wood) to enhance its appearance.

BOOKS TO READ

Sherwin Williams Co., *How to Finish Furniture and Woodwork*. Cleveland, Ohio.

Gibbia, S. W., *Wood Finishing and Refinishing*. N. Y., D. Van Nostrand Co.

Hager, Joseph A., *How to Finish Furniture Beautifully*. Grand Rapids, Mich., Guardsman Chemical Coatings, Inc.

Marsh, Moreton, *The Easy Expert in Collecting and Restoring American Antiques*. Philadelphia, Pennsylvania, J. B. Lippincott Co.

Mould, Ruth Greene, *Refinishing and Decorating Furniture and Other Home Accessories*.

Newell, A. C. and Holtrop, Wm. F., *Coloring, Finishing, and Painting Wood*. Peoria, Illinois, Chas. A. Bennett Co., Inc.

Scharif, Robert, *Complete Book of Wood Finishing*. New York City, McGraw-Hill Book Co., Inc.

Wakeling, Arthur, *Wood Finishing and Painting Step by Step*. New York City, Home Craftsman Publishing Corp.

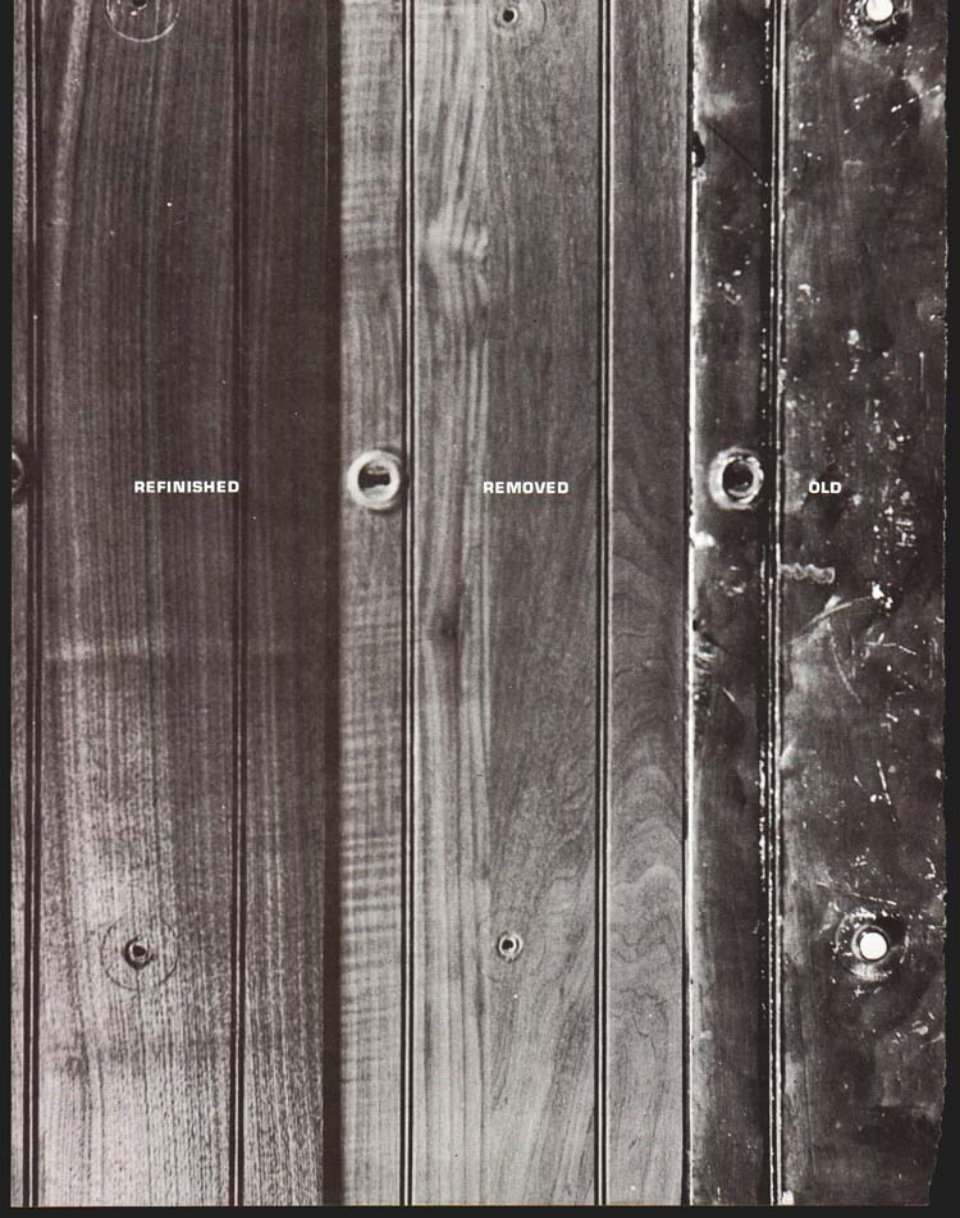
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