Cooking up the right finish is paramount
As every throwback woodworker knows, using natural oil-resin varnishes yields a fine surface

Any time when the furniture makers are seeking to replicate "the old ways" of working, we overlook the finish. All too often, I have seen wonderfully made period furniture, crafted in both the style and technique of an earlier age, yet inaccurately finished, appearing too dry or wrapped in plastic. It seems so much easier and simpler to slather on something we can pick off the shelf of the hardware store than to carry through to the end our desire to reflect and honor earlier technologies and arts. It doesn't have to be so.

Although contemporary opinion favors shellac as the primary historic furniture coating, from the late 17th century through the end of the 19th century, natural oil-resin varnishes were important parts of practically every woodworking shop's inventory. Here is a brief introduction to making and using coatings that have been used in decorative and protective applications for at least a thousand years.

Pros and Cons
Oil-resin varnishes dry essentially through a chemical reaction with the atmosphere rather than evaporation of a "spirit," which means it can take quite a while for them to harden. The result is a varnish generally tougher than shellac, but that also makes it more difficult to repair later. Oil-resin varnishes need to be formulated, not simply mixed. Often, the process of making them entails high-temperature concoctions prepared under a watchful eye and with great attention to safety.

On the other hand, vegetable-based oil-resin varnishes are not only "natural," but they can render rich, saturated surfaces that have a certain "glow" that we generally find attractive. Applying an oil-resin varnish actually requires very little expertise; if you can recognize the business end of a good brush and avoid drips and runs, you've pretty much conquered the craft aspect of the technology.

Ingredients
Making your own historically accurate oil-resin coating requires that you know what ingredients were used and how they were mixed. In short, there are five parts to a successful oil-resin varnish:

Oil: Linseed oil is often where varnish formulation begins. But there are many other options among nut and seed oils, which each bring their own special qualities such as clarity, low color, ease of use, or ultimate performance once fully cured. By all measures, true tung oil (china nut oil) is a superior product to linseed oil, but is no longer widely used. Walnut oil and sunflower seed oil can be used for varnishes where extreme clarity and minimal yellowing is utmost, but both dry more slowly than linseed or tung oils.

Resin: All of the resins employed for oil-resin varnishes before 1900 were vegetable-based, mostly refined tree saps of one kind or another. Important historical varnish resins included the copalts, mastic, sandarac, damar and amber. Colophony was widely available since it is the solid fraction of pine sap, but performs poorly, darkens rapidly, and is not a good choice unless the piece demands it.

Solvent: Dissolving the resin is normally accomplished by heating the resin and oil. The really important function of the solvent is to lower the viscosity for better brushing. Historically, turpenentine distilled from pine sap was the main solvent diluted in oil-resin varnishes, but it is a virulent allergen so I tend to substitute mineral spirits or naphtha. For a varnish that dries quickly, use naphtha; for one that flows longer for maximum smoothness, use odorless mineral spirits.

Driers: Since oil-resin varnishes cure through a slow chemical reaction with oxygen, a catalyst or "drier" is often added (called a sciccative in the literature). Most driers are metallic compounds, historically ground-up leaded glass, but modern driers are often manganese or cobalt.

Sometimes simply cooking the oil and blowing air through it jumps starts the polymerization reactions necessary for drying.

Plasticizer: The resins used for oil varnishes tend to be hard and brittle, so a plasticizer may be necessary. Fortuately, the oil component serves as a plasticizer to some degree, but including some of the softer resins like elemi, benzoin, or balsam-like Venice turpentine serve the purpose well.

Making your Own
Unlike shellac, which when mixed with alcohol will dissolve, most varnish resins must be "run" or melted, sometimes at temperatures approaching 600 degrees Fahrenheit, and then mixed with hot oil to form the varnish. This means the safety of you and your space are a top priority.

This really is more dangerous than cooking French fries. For higher temperature varnish-making, I move my work station outdoors.

Some oil-resin recipes call for only modest heat, while others require extreme heat and the utmost care in handling the materials. A portable hot plate (not an open flame) works fine. I use a sand bath setup, using a cast iron cooking pot fitted with enough play sand to push in my Pyrex mixing beakers to heat my ingredients.

Putting a cold jar into hot sand will probably shatter the jar, so heat everything together from cold. Make sure to use heat protective clothing, eye protection and gloves that can withstand spills of scorching hot oil.

If possible, handle the hot jars with breaker tongs or something similar. Here are some of my favorite varnish recipes. All temperatures are in Fahrenheit and, yes, you can use a meat thermometer, although I use a digital kiln thermometer myself. Other tools you will need include a thrift-store coffee grinder for pulverizing resins and a metal stirring rod.

One of the simplest old varnishes is

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to take one part of powdered mastic added to an equal part (by weight) of raw linseed oil, and slowly heat until the resin melts completely. It should not take much heat to accomplish this, so warm slowly and stir regularly; stirring does not have to be continuous. Once the heated oil dissolves the mastic resin, remove from the heat, add one part turpentine or mineral spirits, and the formulation is complete. This varnish dries pretty slowly because there is no drier, but it performs well even if it does yellow a bit with age.

A little more complex formulation is two parts ground copal heated in a clean jar in the sand bath until it melts at about 600 degrees. Watch carefully and do not heat past the point where it is all melted. Add this molten copal to one part of hot (400 degrees) linseed oil and stir them together until it all cools down to about 150 degrees. Then add two parts Venice turpentine. When the mass has cooled, thin with mineral spirits or turpentine until it acts like you want. If it dries too slowly for your needs, add a teaspoon of alum or a dash of commercial "japan drier" to speed up the hardening process. Sometimes I put a dab of lead white artist's oil paint into a jar of varnish to make sure the reaction goes well.

An even more complicated varnish is one part pulverized amber and one part pulverized copal each in their own jar, melting in the sand bath. These must be heated until they melt or "run" at about 600 degrees. Do not overheat. As soon as they melt, they should be added to a jar of four parts raw tung oil that has been cooked (350 degrees) for three hours in a clean jar. (I drape a piece of metal window screen over the ingredients as they are cooking to keep dust and insects out.) Like the previous recipe, add one part Venice turpentine when the soup is warm. Again, once the mixture is complete, I add diluent and drier to suit my particular need.

And finally, here is my interpretation of the historic Vernis Martin recipe that was touted as the ultimate varnish 200 years ago. There are a couple of versions of this recipe in the historic literature, and quite frankly neither makes perfect sense to me, so here's my take on the subject: Take four parts Venice turpentine, eight parts of powdered amber, and one part powdered copal, and cook them together at about 950 degrees until the concoction is homogenous (30 minutes or so). At this point it will probably be a cloudy soup with the consistency of heavy syrup. Crank up the heat in your sand bath to about 600 degrees and watch carefully to see when everything melts and the solution becomes honey-clear, then turn off the heat. Once the solution cools just a little, add one part hot linseed oil. When cooled completely give it a test drive, and add diluent and drier as needed. Historically the drier of choice would have been lead white or litharge, a red lead pigment.

Making and using oil-resin varnishes takes a bit of preparation and practice, but it can yield an attractive, robust, historically accurate finish that makes it worth the effort.

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