



“I’M NOT GOING TO DRINK THE STUFF, FOR HEAVEN’S SAKE”

It was the spring of 1957, and I was 12 years old when my mother wisely decided that my afternoons should be filled with activity that was more constructive than hanging out with friends, whom she correctly disapproved of.

She offered to teach me how to finish very nice furniture and also offered pay me while I worked with her. At 12, I really was not particularly concerned about developing finishing skills, but the money sounded good. What I did not know she had in mind was that I would work with her on a six-foot-long sideboard and then continue on my own with two serving tables and 12 dining room chairs and a few other pieces she liked, all of which had come from my grandfather’s estate. My spring and summer were now committed, and Mother had outsmarted me again. But this article is not about my learning finishing skills or my mother staying ahead of me; it is about material changes in one product used in the finishing process—denatured alcohol, also known as methylated spirits.

Mother learned about finish work while growing up in Athens, Georgia, in the 1920s and 1930s, and she learned from a local furniture maker named Eugene Thomas. He was revered in Athens, and he was referred to only as “Mr. Thomas” by everyone in Athens and still is. In fact, in 2014 the Georgia Museum in Athens had an exhibition of Mr. Thomas’ furniture under the program name of Georgia Bellflowers. Mr. Thomas’ preferred method of finishing was to prepare the wood to about a 220-grit sanding and then thoroughly clean the piece with clean rags soaked in denatured alcohol. Next he would use only enough color to get it in harmony. Then came four coats of varnish, each coat being sanded to level and remove any defects, then it was thoroughly cleaned with rags soaked in denatured alcohol.

Then two final hand rubs, one with FFFF pumice and paraffin oil and one with rotten stone and paraffin oil, both followed by a thorough cleaning with denatured alcohol. That is a *lot* of denatured alcohol.

Today I use far more shellac than varnish for furniture finishes because I like shellac’s look, and I find it easier to work with and less labor-intensive than varnish. The shellac, however, involves the use of even more denatured alcohol than Mr.

cohol) has been subject to taxation by the federal government since 1791. The “Whiskey Tax” even led to the “Whiskey Rebellion” in western Pennsylvania in 1794. Later, in 1906 the federal government established regulations by which manufacturers of industrial ethanol could avoid the whiskey tax. The regulations exempted from taxation industrial ethanol-type alcohol that was “denatured” through the use of poisonous or foul-tasting additives that make the alcohol unpotable. The predominant denaturing agent, which was and still is used was methanol (CH₃ OH—aka, wood alcohol, wood spirits, colonial spirit, Columbian spirit, etc.). Much later, in 2005 and 2007 Congress passed two pieces of legislation that had a significant impact on the cost of producing corn-based ethanol.¹ The legislation and resulting rules required that vast quantities of ethanol be blended into gasoline.



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Thomas’ varnish work, and the denatured alcohol from the hardware store or the big-box store today is not the same denatured alcohol that I began using in 1957 or even that of 15 years ago.

“What changed and why?” you ask.

Historically, denatured alcohol was predominantly composed of ethanol (CH₃ CH₂ OH), the same form of alcohol that is found in grain alcohol, beer, wine, and distilled spirits (whiskey). Distilled spirits (drinking al-

The impact was substantial and swift. The price of corn rose, and the cost to produce ethanol also rose. For example, between 2000 and 2005 I was buying 95% ethanol-4% methanol denatured alcohol for \$10 - \$12 per gallon. Today I pay about \$10 per quart—nearly a fourfold increase in price, although the price has dropped some in recent months. The alcohol manufacturers’ response to the price rise was to change the formula of the product to include a



Denatured Alcohol (continued-2)

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greater percentage of less expensive but highly toxic methanol. In some instances, the methanol content is as high as 60%. That's a 15-fold increase in exposure to methanol.

"I'm not going to drink the stuff, for Heaven's sake," you say. "So what's the big deal?"

You do not have to drink it to absorb it. Methanol can be absorbed by breathing the fumes and by having it come into contact with your skin. Several controlled tests involving relatively short exposure to methanol fumes have shown significant increases in methanol levels in the participants' blood, saliva, and tears.² Methanol, in very small quantities, can cause permanent neurological damage, including blindness through the destruction of the optic nerve. A dose of no more than one-quarter of an ounce can cause blindness, and less than an ounce can cause death.

Initial symptoms of methanol intoxication can include a compromised neurological system, including depression, headache, dizziness, nausea, lack of coordination, and confusion, much the same as ethanol intoxication. The symptoms go away in much the same way as ethanol symptoms do, but they return in 10 to 30 hours with blurred vision, potential blindness, and in extreme cases, death from respiratory failure. The return of symptoms from methanol ingestion occurs because it is not metabolized in the same manner as ethanol. In the body, methanol is first converted into formaldehyde and then into formic acid. It is the formic acid that does the damage. What is even more insidious is that since it is not processed out of the body, it can very quickly be cumulative. Say, for example, that you have a big French-polishing project that will take three or four days. By the time the symptoms return, you could have three days of exposure with the vast majority

of the toxins still in your system.

"Well," you say, "that's very interesting, but what do I do about it?"

The first thing that you should do is to educate yourself about the products that you are using. If the product you are using has a high content of methanol, be aware that low-methanol-content denatured alcohol is still available. For example, Klean Strip produces "Klean Strip Denatured Alcohol," which is 52.5% - 55% methanol; however, "Klean Strip Green Denatured Alcohol" is 85% - 90% ethanol and only 5% methanol. These two Klean Strip products are easily distinguished as one container is red and blue, and the other is green. Sunnyside also has more than one denatured alcohol; however, they are not easily distinguished. The Sunnyside packaging appears the same, except that one of Sunnyside's products is designated "834" and consists of 52.5% methanol and 45% ethanol, while its other product is designated "934" and is composed of 95% ethanol and 5% methanol. The numerical designation is in small print on the side of the can, otherwise the cans appear to be the same.

There are other alternatives out there. Denatured alcohol is produced that does not use methanol as the denaturing agent. For example, Behlen produces its shellac solvent Behkol by blending 95% ethanol with 5% isobutanol as its denaturing agent. There are other manufacturers making denatured alcohol that has low or no concentrations of methanol; consequently, you simply need to know what you are getting.

Another alternative to methanol denaturing is to pay the tax. Go to the liquor store and purchase 190-proof grain alcohol. It is 95% ethanol and 5% water—no methanol whatsoever. Everclear and Golden Grain are two brands

of grain alcohol that are bottled at 190 proof, and both work just fine as a solvent for shellac. Everclear is also bottled at 151 proof (75%), which I would not use with shellac.

Before you buy any of these products, if you refer to their Material Safety Data Sheets (MSDS), you'll know exactly what your denatured alcohol contains. The MSDS is available at the manufacturer's website. Note, however, that I've used all of the alcohol types mentioned above: low-methanol concentration, high-methanol concentration, Behkol (non-methanol denaturing agent), and grain alcohol and have found no discernable difference in the quality of the final finishes.

Should you elect to work with less expensive denatured alcohol with higher concentrations of methanol, it would be prudent for you to visit the website of the Methanol Institute (<http://www.methanol.org/>) and review their section on Health and Safety. The Methanol Institute recommends against the use of air-purifying respirators using OVA cartridges because the cartridges rapidly become saturated and of no use. It recommends the use of air-supplied respirators with a full face piece. At concentrations of 5%, I would not be very concerned about a respirator, but that is a personal decision each person must make. The Methanol Institute recommends the use of either butyl or nitrile gloves. I, however, always wear gloves when doing finish work because, if I don't, I can never get my hands clean. —MS

References

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