

4.1 Adhesives

*The time has come," the Walrus said, "To talk of many things:
Of shoes—and ships—and sealing-wax— Of cabbages—and kings—*

- Lewis Carrol, *Through the Looking Glass*

Good old C. -L. Dodgson had it right. In a desperate attempt to keep their gemstones in place, amateur cutters have talked of (and tried) many things. Although there are no recorded successes with cabbage, the previous item in the list, sealing wax – or its lapidary equivalent, called dop wax – has been the traditional faceting adhesive for centuries. More recently, alternative adhesives, in particular cyanoacrylate glue and epoxy resin, have enjoyed increasing popularity

4.1.1 Dop Wax

Modern faceters can choose from a variety of dop wax types. These are typically distinguished by colour, each indicating a particular melting temperature (see Table 4-1 and Chapter 7.2.1). Note that modern dop wax is actually a mixture of wax, shellac, and neutral fillers. Generally speaking, more shellac means a higher melting temperature but a more brittle bond. Dop wax typically costs a few dollars a stick, enough for dozens of stones.

Table 4-1 Dop wax types and melting temperatures

<i>Dop Wax Type and Colour</i>		<i>Softening / Melting Temperature</i>	
		<i>°F</i>	<i>°C</i>
Cabbing Wax	Green or Red	160	70
Standard Dop Wax	Black	170	77
Diamond Setter's Wax	Brown	180	82

Excess heat on the lap, particularly during polishing, can soften dop wax and cause shifting of the gem. This, in turn, will force you to do a great deal of cheating to get things right. This, in turn, will cause you to pull your hair out. I use and strongly recommend the high temperature brown diamond setter's wax. Of course, heat sensitive stones may force you to a lower temperature mix or a cold dopping technique.

4.1.2 Cyanoacrylate Glue and Epoxy Resin

The other important adhesives used in faceting are cyanoacrylate (CA) glue and epoxy resin. CA is often known by the trade name "Krazy Glue," although there are multiple manufacturers throughout the world. Your local hardware store will charge about five dollars for a small tube of cyanoacrylate. Although seemingly costly, a little bit of CA goes a very long way, and my experience is that the tube dries out or gets hopelessly gummed up long before you actually run out of glue.

There is a huge selection of epoxy resins on the market, ranging from "instant" epoxy, which takes approximately a minute to set, to slower resins, which can remain workable for hours.

Bug Juice

When I was a kid, my school cafeteria used to serve a beverage universally known as “bug juice,” a grayish-orange mixture of unidentifiable fruit concentrates and water. This drink was the traditional accompaniment to their other signature dish: “mystery meat.”

I did not like bug juice nor bugs generally, and thus it came as a bit of a surprise to me to learn that “real” bug juice plays a central role in the hobby we all love. It turns out that dop wax contains shellac, and shellac comes from bugs.

More specifically, shellac is a refined product made from *lac*, a resinous secretion of the lac bug, known formally to the scientific world as *Laccifera lacca*. These industrious insects swarm on several types of tree native to India and Thailand, ingesting the sap and secreting lac resin in the form of tubes. Workers harvest these cocoon-like structures and process them to remove residual tree bark and insect parts. What remains is dried flakes of shellac, which can range from pale yellow to deep brown, depending on the type of tree and season. Dissolving these flakes in denatured alcohol produces liquid shellac, unquestionably the most important wood sealant and finish over the last five hundred years. Incidentally, I do not recall whether my school cafeteria had “resinous secretion” on its menu, but it would not surprise me.

Shellac has had some other, rather surprising uses beyond the furniture industry. As a natural polymer, shellac can be mixed with other agricultural products to form a solid mass that is for all intents and purposes a plastic. In fact, phonograph records were made exclusively from shellac compounds until the advent of vinyl in the 1950’s.

Despite – or perhaps because of – its insect origin, shellac is edible, and in fact, it is still used regularly as a protective coating on pharmaceutical capsules and pills, as well as (gasp!) for candy. Have you used confectioner’s glaze in any of your culinary experimentation? Yup. Bug juice.

The list of uses for shellac could go on forever. Perhaps my favourite – beyond dop wax, of course – is as a fuel and colourant for fireworks. Although now largely supplanted by other materials due to cost, shellac was an essential ingredient for coloured flame fireworks. Apparently, this versatile substance produces unusually pure blue and green flame, an effect difficult to achieve with other fuels.

So the next time you hold that stick of dop wax over an alcohol lamp, give a moment’s thought and a healthy dose of respect to good old bug juice, a substance that has been enriching our lives for millennia. Oh. And give the mystery meat a pass...

Typically, the longer the setting time, the more durable the ultimate bond. On the other hand, even the fastest setting, weakest epoxies are much stronger than you will ever need. I tend to use the five-minute type.

Note that epoxy resin has a finite shelf life, and may need to be refrigerated after opening. As a result, the larger, “economy” tubs of resin may not be a real value, unless you are some sort of otherworldly faceting speed-demon. The smaller, toothpaste-sized tubes cost a few dollars