Appendix

Scientific Background

In the course of researching and writing this book, I found that a handful of important topics came up again and again. To make your reading easier, I've compiled here a quick and dirty rundown of a few of the most relevant background topics.

Vapor Pressure and Volatility

Possibly the most important topic when it comes to understanding the properties of alcohol described in this book, vapor pressure is also unhelpfully defined in most readily available resources. They usually tell you some story about the hypothetical pressure in a closed container, and you've forgotten what you were looking for by the end of the paragraph.

Vapor pressure is simply an indication of how volatile a liquid is—that is, how likely it is to release some of its particles as gaseous vapors. The pressure buildup in a closed container due to those vapors is the best measurement we have for that likelihood, and so it's our common shorthand for volatility.

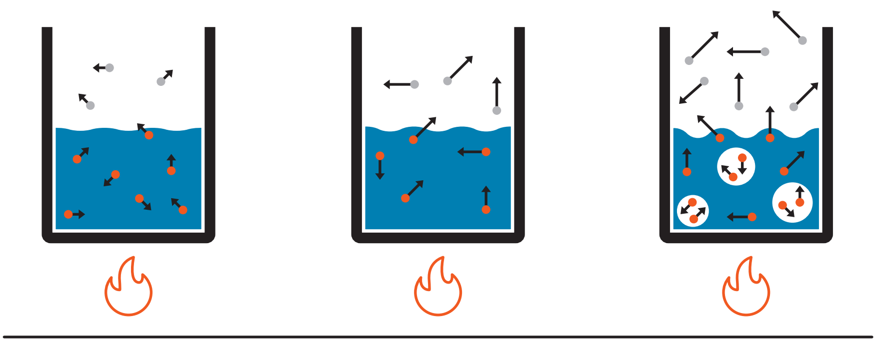
A given liquid has different vapor pressures at different temperatures. This is why hot water evaporates faster than cold water does. Dial the temperature up and you reach the boiling point, which is where the liquid's vapor pressure—its tendency to move outward into the air—becomes equal to the atmospheric pressure pushing back on it.

This is, incidentally, why cooking times in Denver aren't the same as those in Boston. Water boils at a lower temperature at high altitudes because of the lower atmospheric pressure.

Got all that?

Because a particular substance's vapor pressure changes with temperature, it might not seem like a good general benchmark for volatility. Fortunately for us, the hierarchy of vapor pressures is pretty consistent: if one substance is more volatile than

Vapor Pressure



WATER

At 148.5°, water is hot but not boiling. Some water molecules will evaporate from the surface and escape as water vapor; some of that vapor will also condense back into the liquid.

ETHANOL

Ethanol is more volatile than water at the same temperature, so it evaporates more rapidly and condenses more slowly.

METHANOL

Methanol is more volatile than either water or ethanol and boils at 148.5°. Vaporization still happens at the surface, but now it also happens deep in the liquid, resulting in the formation of gas bubbles.

another at sea level, you can expect that still to be true at the bottom of Death Valley and the top of Mount Everest.

How does this connect to booze? It's how stills work, for a start: they rely on the fact that water, ethanol, and nasties like methanol all have different volatilities. The distillation process normally involves boiling one off while leaving (most of) the rest behind.

It's also an important component of smell, which is, in turn, an important component of taste. Your nose can tell what's in something because a few of its molecules have wafted up to make contact with your olfactory bulb. A more volatile substance will have a stronger smell. Distillers often refer to the aromatic chemicals in their spirits collectively as the "volatiles."

That volatility has another implication, of course, which is that scented things can wear out over time. It's true: if you leave a bottle of fine Scotch open on the counter, its flavor chemicals will evaporate, just as water does.

Ethanol as a Solvent

To continue our recap from high school chemistry, a solvent is a substance (for today, let's stick to liquids) in which something else can be dissolved. That something else is the solute. If you stir sugar into a glass of water, the sugar is the solute and the water is the solvent. Together, the two substances constitute a solution.

Things dissolve because the bonds holding their molecules together are broken and have trouble re-forming. A good solvent has to be effective at breaking those bonds and at preventing their restoration.

Ethanol is a useful solvent in some important ways: it mixes easily with water, for a start, but there are also things that dissolve more easily in ethanol than they do in water. Anethol, which is responsible for the ouzo effect, provides the most dramatic example of this.

Emulsions: Absinthe and Milk Punch, p. 85