



## 11. APPRENTICESHIP



Even after twenty years of working with glass, including a time of study on the island of **Murano** in **Venice**, **Ethan Bond Watts** had never known anyone to make glass completely from scratch, using naturally gathered materials.

Glass artists usually begin with “**cullet**” — recycled bits of glass from previous creations that can be easily remelted.

To make glass directly, three primary ingredients are needed: **silica** ( $SiO_2$ , to create the basic structure of the material); a “**flux**” such as **potassium carbonate** ( $K_2CO_3$ , to lower the required melting point of the silica); and **limestone** ( $CaCO_3$ , to increase the hardness of the resulting glass).

These ingredients are typically sourced in bulk from industrial suppliers, to guarantee their purity. Once sourced, they’re usually heated in a high-powered propane or electric furnace to reach the temperatures required for the so-called “**glass transition**” to occur (2,500+ degrees Fahrenheit).

All of this complexity makes the prospect of manual glass-making more or less quixotic, and so it is rarely attempted.

Beyond the quest for glass itself, this ritual was also a way for me to become acquainted with the physical realities of life at **High Acres Farm**. For many years, I’d lived in New York City, working within the “global idea economy” as an “Internet artist” practicing “data visualization” and “interactive storytelling.” I’d never really worked with physical materials before — never driven a tractor, never used a chainsaw, never swung a maul. Through my apprenticeship with Ethan, I was learning not only the creation of glass, but also the ways of being a Vermonter.

In this ritual, we set out to gather the various ingredients from around the local landscape to make our own glass completely from scratch, including building our own hillside furnace.

To gather **clay** for the walls of our furnace, we dig a series of pits in the fields of High Acres Farm, and mix the harvested clay with water, gravel, and straw to create a **cob** mixture.

To gather **potash**, we use a two-man band saw to fell a dead tree, a chainsaw to slice it up into sections, and an axe and a maul to split it into logs. We make a bonfire to burn my mother’s private paperwork — her divorce agreement from my dad, her medical records, her marked up books on psychology, and other sensitive documents. We harvest ashes from the dying bonfire, dissolve them into water, then pour the settled water through a series of sieves, eventually boiling off the liquid to isolate its potassium carbonate to use as our **flux**.

To gather **silica**, we visit the “**scree fields**” of the nearby Bristol Cliffs Wilderness to harvest **Cheshire Quartzite**, the mineral with the highest concentration of silica found anywhere in Vermont. We pulverize the quartzite at a plywood crushing station using my grandfather’s sledgehammer, his heavy steel anvil, and an old steel tamper bar. We sieve the resulting powder to isolate its finest particles, ending with a granularity of 300 mesh.

To gather **limestone**, we visit the local **Shelburne Quarry** where we harvest a few jar-fulls of powder.

Certain other steps are not shown in the film — notably the lightning strike that destroyed the nearby “**Old Dairy Barn**” at **Shelburne Farms** on the morning of September 11, 2016. The barn housed a twenty-year-old collection of lumber that was blackened and largely destroyed in the fire, but much of this lumber we salvaged and used to feed our furnace.

All together, these steps took seven months to complete.

*Performed in 2016 — Duration 17:20*