

## 69. Facts about glass - Cutting and shaping glass

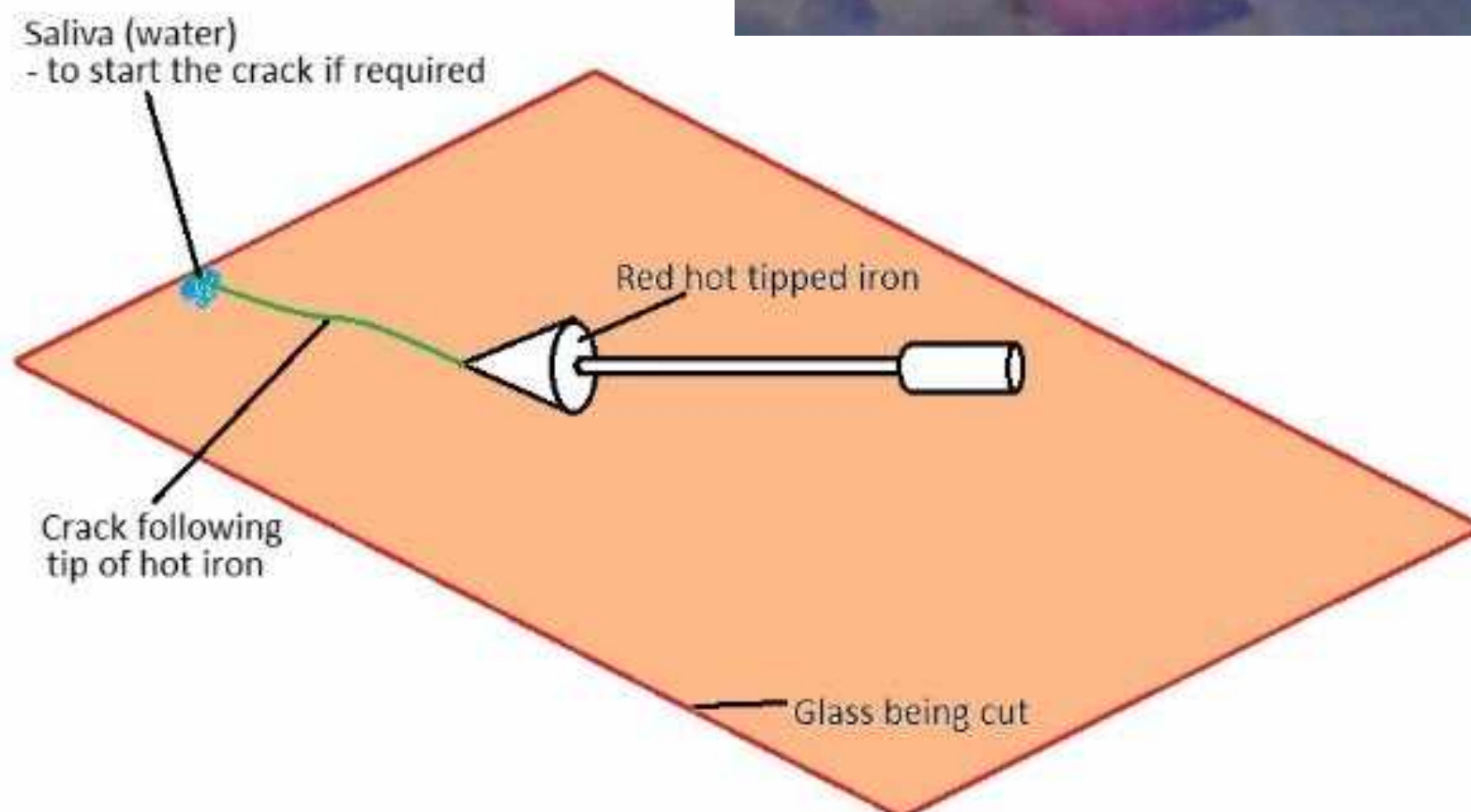
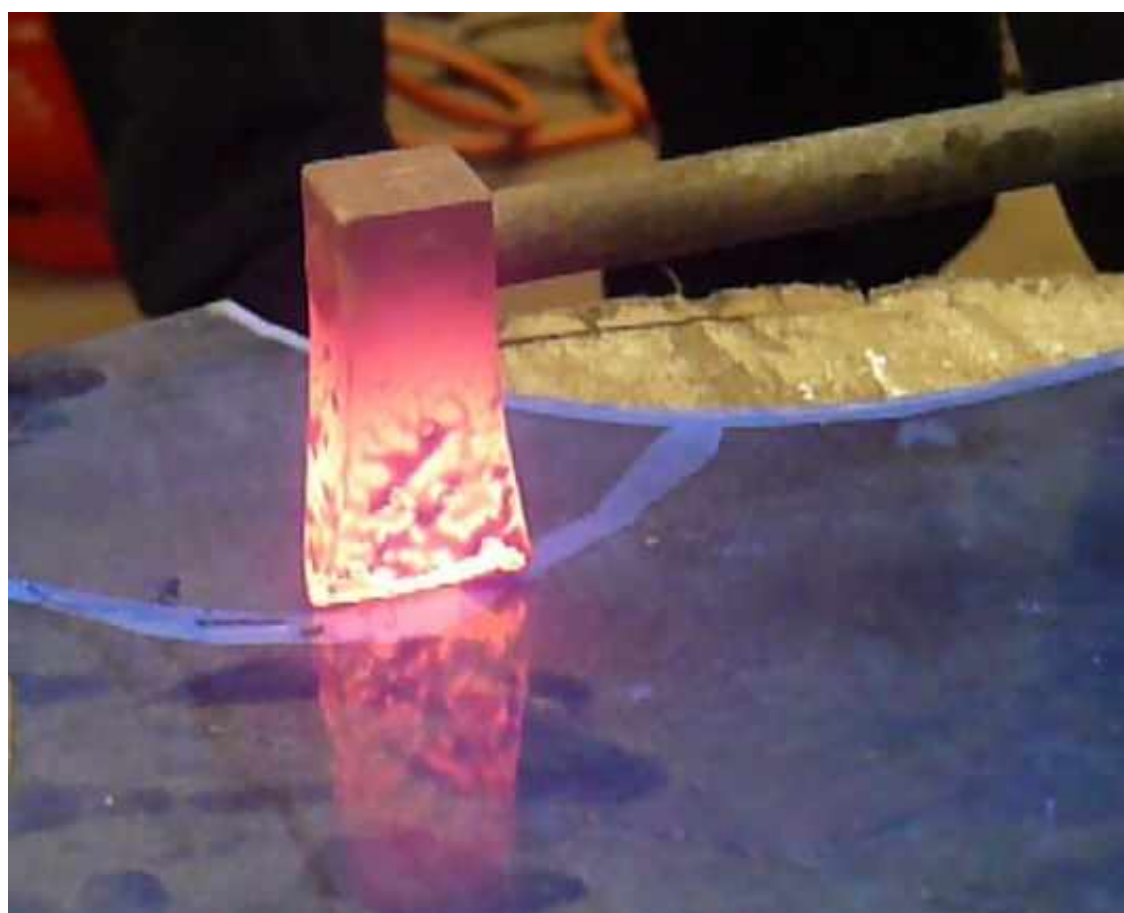
Once a design for a window has been finalised the coloured glass is then chosen and cut to shape ready to be painted. When the Boppard windows were made glass cutting techniques were different to those we use today. Some medieval treatises survive which shed light on these early techniques.

The earliest surviving reference to the medieval process of glass cutting is found in the 12th century treatise “On Divers Arts”, written by a Benedictine monk known as Theophilus Presbyter. He very clearly explains in detail the techniques involved in painting, glassmaking and metalwork. Theophilus is believed to have been shown how to make stained glass windows by practicing craftsmen. He tells us to:

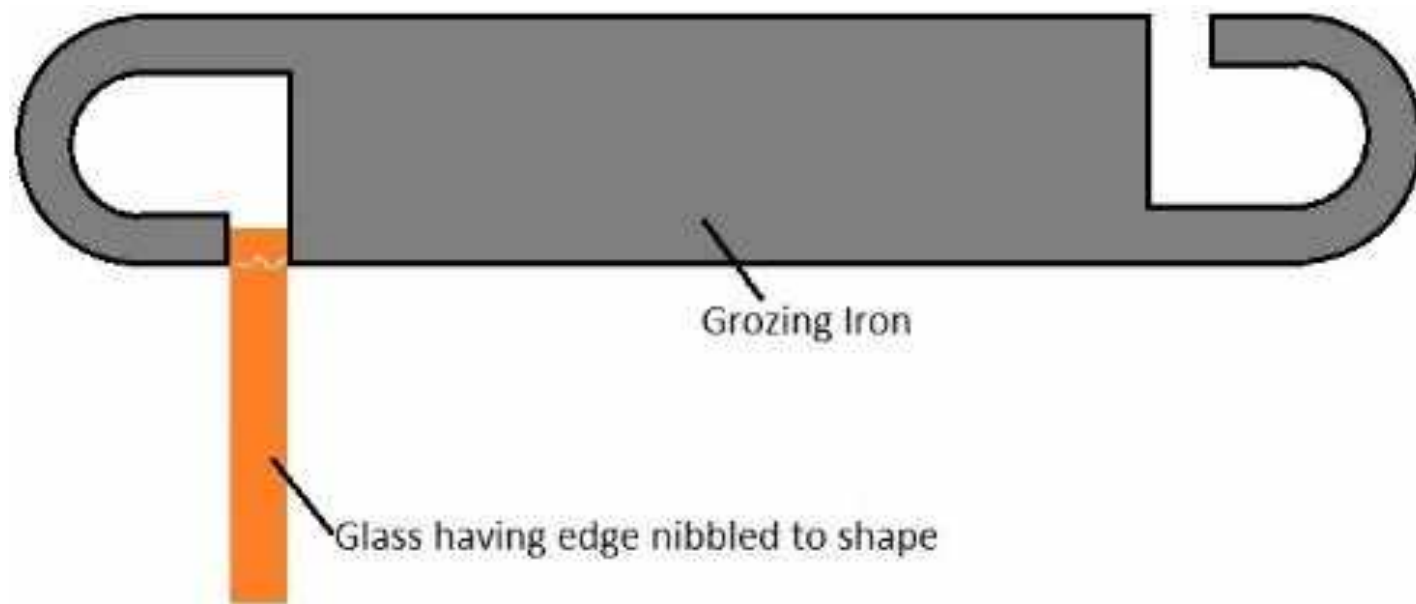
“heat on the fire an iron cutting tool, which should be thin everywhere except at the end, where it should be thicker. When the thicker part is red hot, apply it to the glass you want to cut, and soon there will appear the beginning of a crack. If the glass is hard, [and does not crack at once], wet it with saliva on your finger in the place where you had applied the tool. It will immediately split and, as soon as it has, draw the tool along the line you want to cut and the split will follow.”

People have tried to recreate the medieval glass cutting techniques described by Theophilus – below are some examples of this using slightly different shaped tools:

RIGHT: USING A RED HOT IRON TO CUT GLASS.  
IMAGE COURTESY OF KATIE HARRISON



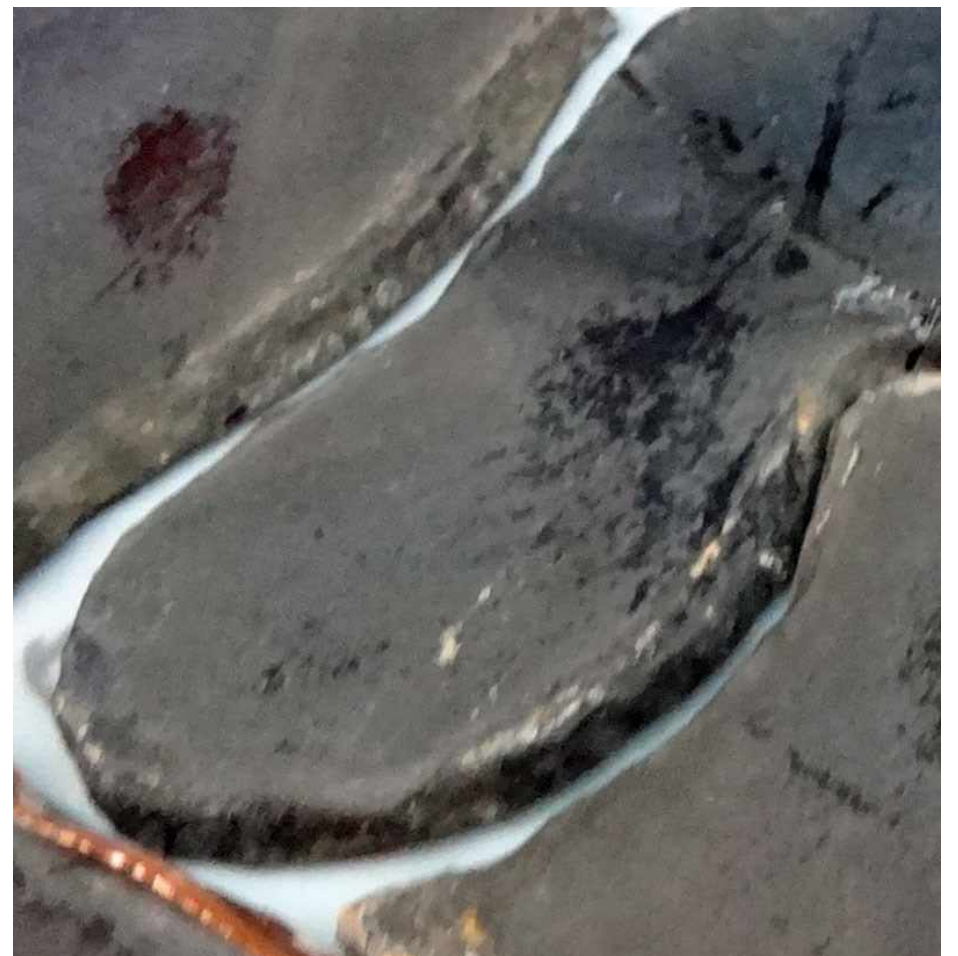
“When all the pieces have been cut like this, take a grozing iron, a span long and bent back at each end, and trim and fit together all the pieces with it, each in its proper place”. The grozing iron removes chips of glass from the edges to shape the glass, leaving a very distinctive chamfered edge.



You can see, in the photos below of the Boppard glass during restoration, the textured edges of the shaped glass pieces where they have been nibbled with a grozing iron.



TWO EXAMPLES OF GLASS SHAPED WITH A GROZING IRON  
FROM THE BOPPARD PANELS



Another treatise, dating from the late 14th century, also describes the use of a hot iron to cut glass. In contrast to Theophilus, this manuscript was written by an experienced glazier, known as Antonio da Pisa. An example of one of his windows, which was commissioned in 1395, survives in the nave of Florence Cathedral.

It is interesting to note that in addition to the use of a red hot iron to cut glass, he describes two other techniques; the application of a thread soaked in sulphur, wrapped around the glass and set alight (probably only used for very thick glasses) and the use of a hard stone, such as diamond or flint. This is the earliest known reference to diamond cutting of glass, which developed into the modern diamond wheel cutters we use today.

It is not known which was the preferred method at this time, it may well have varied from studio to studio. It is most likely that the change in techniques was gradual, and either the hot iron or a hard stone, such as a diamond, was used based on personal preference, before grozing the glass where necessary. The setting alight of threads dipped in sulphur would have been quite hard to control and therefore imprecise and so is unlikely to have been common practice.

Once all of the pieces of glass had been cut, they were then ready to be painted, fired and leaded together.