Glass and crystal

Cristal d'Arques, Bohemian crystal,...

The word «crystal» often evokes **transparency, clarity and sparkle**. It is synonymous with beauty and wealth and many a royal dinner service had been made of rock crystal. Middle-class taste has followed suit, with 'objets d'art' and fine-cut glass in so-called «crystal».
But this is glassware, like volcanic obsidian; it has been too quickly cooled to be crystal.

Glass is not a crystalline material.

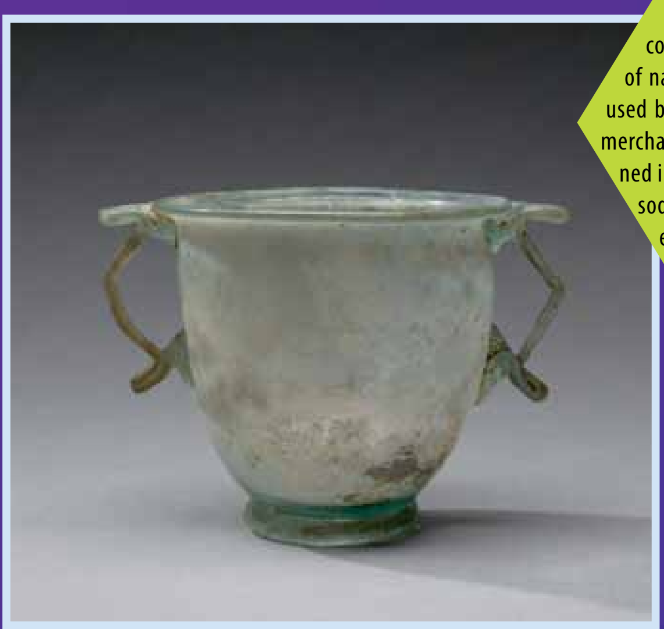
Glass is an **amorphous** material, containing atoms in a disorderly arrangement, like an immobile liquid. Different types of glass have been produced artificially since ancient times, but it took several centuries before glass could be made as transparent as rock crystal. Rock crystal is very different; it is highly transparent, it is composed of crystallised silica and has an ordered arrangement.

There's crystal and «crystal»

In a true crystal the atoms are arranged like the wooden bricks in this wall. In glass the atoms are disordered, like the same bricks in this pile; if you try to build the wall too fast, you just get a pile of bricks.


A glass pearl (-100 – 300 BC).
Musée de Bretagne - Rennes © A. Amet

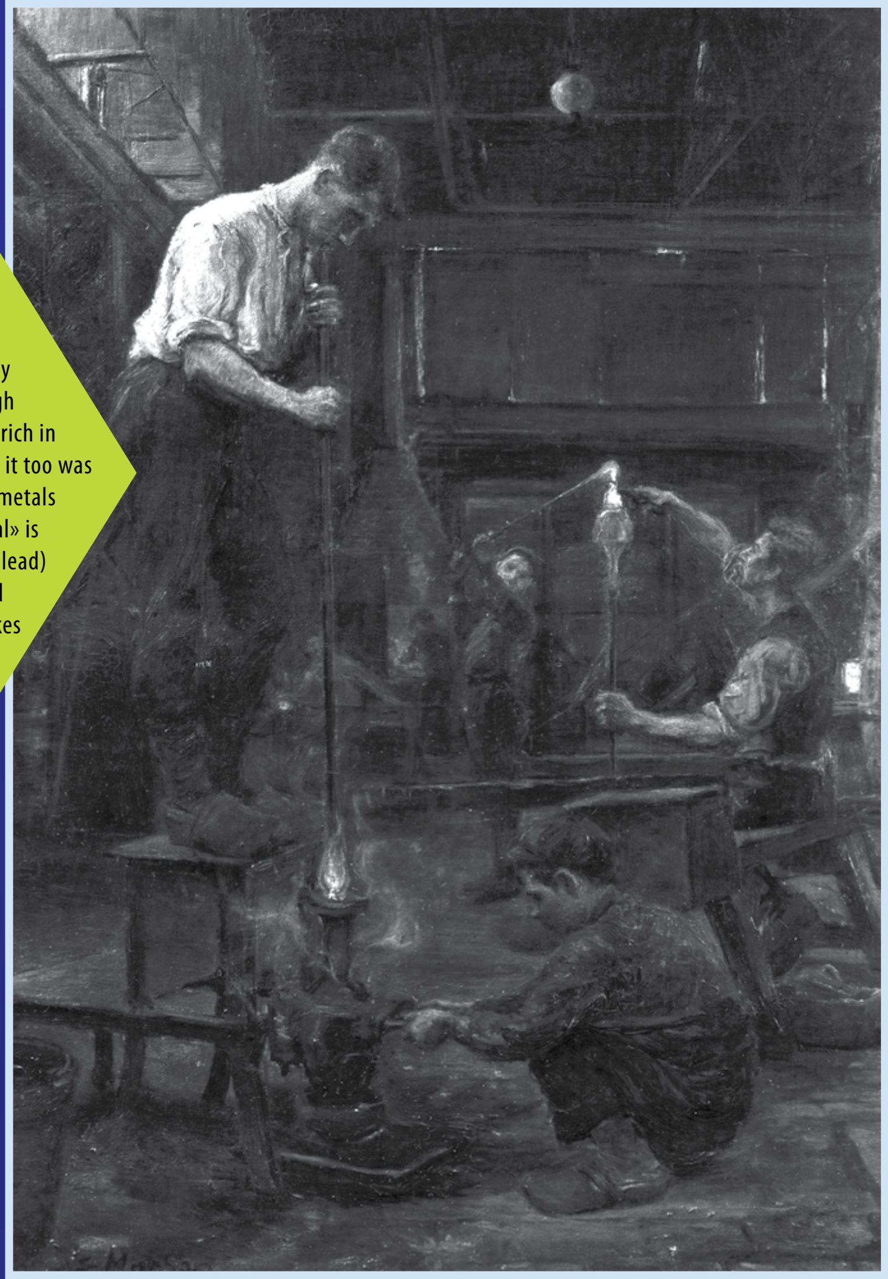
Our earliest information (Pliny the Elder) suggests that glass was a Phoenician/Egyptian invention: Egyptian merchants stopping off on the Phoenician coast lit a fire on the beach close to their bags full of natron. Natron contains sodium carbonate and was used by the Egyptians to mummify their dead - when the merchants woke up the next day their bags had been turned into stone. The silica in the sand had mixed with the sodium in the natron to make a form of glass. This early glass - like that of the Romans and Gauls - was opaque. It took several more centuries before transparent glass could be produced.


Skyphos (1st century) Pompeii. RMN - © RG. Ojéda

«Crystal» glass

The word 'crystal' has historically been associated with perfectly transparent materials - and with crystal glass in particular.
Glass was first qualified as 'crystal' in Venice at the end of the 15th century by the Venetian glassmakers, for their exceptionally clear and fragile artefacts. In the 18th century another form of high quality glass came into being - Bohemian crystal - made from sand (rich in quartz), potassium and chalk. Because of its transparency and sparkle, it too was called crystal - «Bohemian crystal». The glass was coloured by adding metals or metal oxides during manufacture. The highly reputed «lead crystal» is obtained by adding a minimum of 24% lead oxide (minium or red lead) to the glass mixture (sand - silicium SiO_2 -, chalk, etc.). The lead makes the glass more malleable and easy to work. It also makes it clearer than ordinary glass and it can be cut more easily, being softer. Lead glass first appeared in England in the 17th century.

Source : Société Chimique de France


Glass-blowers at the Val-Saint Lambert crystal works. © IRPA-KIK, Brussels