

3.5 Flames

Historically flames were the first form of artificial lighting. They are occasionally still used to create a particular atmosphere, but they are not considered as major sources of artificial light.

3.5.1 Candle

It is said that the ancient Egyptians invented the candle. They made candles by soaking reeds in molten tallow (animal fat). However this was not the candle as we know it today as it had no wick as such. It appears that the Romans made the first true candle with a wick, but it still used tallow.

The problem with tallow candles is that they produce a lot of smoke and acrid smells. In the Middle Ages beeswax was introduced for making candles. It overcame the problems of tallow candles, but due to its cost only rich people could afford them. The last advance in candle making was in the 19th century when whale oil wax and paraffin wax were introduced.

The actual processes involved in a candle burning are very complex; in 1861 Michael Faraday was able to fill a series of six lectures just discussing them. The key points of the process are that the heat of the candle flame melts the wax, which is absorbed in the wick, which transports it to the flame where it is burnt. In the burning process some particles of carbon are produced. These particles glow as they are hot.

3.5.2 Oil

The oil lamp has been around for a very long time. Some of the earliest examples are hollowed out stones that were filled with oil and these may be 70,000 years old. There are examples of earthenware lamps made by all the ancient civilisations. In Europe the most common oils used in these lamps were olive and colza. The wick was generally made out of bark, moss or plant fibres.

The first major development in modern history was the use of a flat wick in the lamp that started in 1773 and the tubular wick in 1784. This coupled with the glass chimney made the lamps significantly more efficient. Figure 3.32 shows such a lamp.



Figure 3.32
An oil lamp with
a tubular wick and
a glass chimney