

Introduction to Electricity

What is electricity? Where does it come from? How can it be produced? Is there more than one type of electricity? How do positive and negative electric charges interact?

It was through rubbing certain materials together that mankind first discovered and investigated the mysteries of electricity. The earliest recorded experiments took place around 600 BC, in the era of Pythagoras, Confucius and Buddha. The pioneering physicist was Thales, who lived in Miletus, a Greek-run territory located in the south-eastern corner of what is now modern Turkey, Thales demonstrated that if amber (a yellow tree resin used for ornamental purposes) was rubbed with animal fur, the amber would attract to it pieces of dry straw or feathers.

In England in 1600, William Gilbert, personal physician to Queen Elizabeth 1, published a study which listed many other substances capable of producing the same effect after rubbing. Gilbert called these substances ‘electrics’, after *elektron*, the Greek word for amber. The next step forward came in the 1730s from the work of French scientist, Charles Dufay: he found that there was not just one type of electricity – but two. Furthermore, Dufay found that like types of electricity repelled, while opposite types attracted. We can illustrate Dufay’s discovery with the following experiment.

Take a piece of amber and a piece of glass, two substances which can be electrified by rubbing them with fur and silk respectively. Electrify the amber and glass, and suspend each by a thread so that it is free to move. Now bring them close together. Result: the amber and the glass attract one another. However, if two pieces of amber are brought close, they repel one another. Similarly, two pieces of glass repel if they are suspended in close proximity.

After numerous experiments with many substances, no type of electric was ever discovered that was not attracted either to the amber or the glass. In other words, there were two types of electricity and only two: the amber-type and the glass-type.

In 1747 the American inventor and statesman Benjamin Franklin introduced the terms **positive charge** and **negative charge** into the language of electricity. Franklin described substances which act like electrified amber as having a negative charge and those which act like electrified glass as having a positive charge. We continue to use Franklin’s terms today and can now state Dufay’s discovery, which is a fundamental law of electricity, in these terms:

Unlike charges attract one another, while like charges repel.

It is important to note that the words positive and negative are purely arbitrary terms; positive electricity is not in any way better than negative electricity.