

Electricity, Magnetism, and Culture in Ancient China

This article gives an outline of Chinese knowledge about electricity and magnetism in ancient times¹ focusing on four aspects:

(a) static electricity; (b) thunder and lightning; (c) magnetism; and (d) the lodestone spoon and the compass.

The Chinese discovered static electric attraction and that many kinds of materials become electrically charged when rubbed: also that there is a flash and a noise when they discharge.

In history, for a long time people thought that thunder and lightning were expressions of the mood of the gods. Most philosophers and thinkers explained their causes with the Qi of the Yin and Yang. The philosopher Wang Chong [王充] of the Han Dynasty was the first to put forward the idea that thunder and lightning consist of fire. Apart from line lightning, many reports about ball lightning and bead lightning can be found in classical texts. There are innumerable observations of metal melting and lacquer ware remaining unscorched when struck by lightning; thus people acquired their first knowledge about conductors and insulators. The phenomenon of point discharge led the missionary Gabriel de Magalhães to believe that Chinese buildings were equipped with lightning conductors. In the sixteenth century, a group of soldiers tried to protect their camp from thunder and lightning by firing their rifles into the air.

In ancient China the attracting and repelling forces of magnetism and the polarity of magnets were known. This article highlights the knowledge of Liu An [刘安], King of Huainan in the Han Dynasty, and his followers about magnetism, especially the fact that they were the first to succeed in producing magnetic bars. Further, there are many stories about magic and conjuring tricks that employed magnetism.

The form of the compass in ancient times is discussed, and the genesis of the compass in ancient China. The compass whose needle points south was

¹ I should like to point out that the term “ancient” is not used by Chinese and Western historians in the same way. Chinese historians refer to the time before the Opium Wars of 1840 as “ancient”, whereas for Western historians the period before the fifth century, when the Roman Empire withered away, is “ancient”. In this chapter the Chinese convention is used.