

terial existence. Destructive and conservative agents are everywhere acting in concert, and to take away one or both would be to create an inextricable confusion.

#### POLARITY AND INDUCTION.

From a very early age it was known that the natural magnet or loadstone has the property of directing itself to the north and south poles of the earth, and from the writings of Plato we may judge that the ancients were not unacquainted with the fact that the same power might be communicated to bodies containing iron. Whether they were informed as to the conditions which are most advantageous for the reception of the magnetic power is doubtful, but it is now well known that hardness is a property essentially necessary for permanent induction. Soft iron is strongly magnetized by mere contact with a magnet, but the moment the magnet is removed the property is lost. Steel also is magnetized under the same circumstances; but the induction is less rapid, though after a long contact it permanently retains the communicated property, and becomes a magnet.

#### VARIATION OF THE MAGNETIC NEEDLE.

When a magnet is freely suspended in such a manner as to have the power of horizontal motion, it turns itself nearly north and south, and, if disturbed, returns, after a few oscillations, to the same position. There are few places where it points directly to the north and south poles of the earth, but to the east or west of these poles; this deviation is called the variation of the compass, and differs in amount and direction according to the geographical position of the place in which the experiment is made, although there are some places in which there is no variation.

The variation of the magnetic needle was not known for many centuries after the discovery of the directive power. No experiments of importance were made till the close of the sixteenth century, and yet it appears probable that the simple fact of variation was known as early as the year 1269. Cavallo has quoted from a letter written by Peter Adsiger, dated the 8th of August, 1269, in which the variation is positively stated:—"Take notice that the stone, as well as the needle that has been rubbed by it, does not point exactly to the poles, but that part of it which is reckoned to point to the south declines a little to the west, and that part which looks