GLEIG'S SCHOOL SERIES. ON MAGNETISM, VOLTAIC ELECTRICITY, AND ELECTRO-DYNAMICS, FOR THE USE OF BEGINNERS. IN WHICH THE PRINCIPLES OF THE SCIENCES ARE FAMILIARLY EXPLAINED AND ILLUSTRATED BY NUMEROUS EXPERIMENTS AND DIAGRAMS

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CONTENTS.

MAGNETISM.

VOLTAIC ELECTRICITY.

ELECTRO-DYNAMICS.

MAGNETISM.

THE MAGNETIC POWER.

SUBSTANCES endowed with MAGNETISM attract pieces of iron, and the substances possessing this property are called MAGNETS. Magnetic substances possess various other remarkable properties, which shall hereafter be described. There are two kinds of magnets, — natural magnets and artificial magnets.

Natural Magnets, or loadstones, are iron ores, found at almost every place on the earth. The ancient Greeks were acquainted with the attractive property of the natural magnet, or loadstone; they gave the name of magnet to this mineral, probably because it was found most abundant in the vicinity of Magnesia, a city of Lydia, in Asia Minor.

Artificial Magnets are generally made of steel bars, and the way in which the magnetic property is imparted to them will shortly be described. Artificial magnets are named according to their shape; thus, we have the *bar magnet*, represented in *fig.* 1., and the *horse-shoe magnet*, represented in

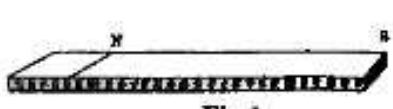

Fig. 1.

Fig. 2.

fig. 2. When several bar magnets or horse-shoe

magnets are combined, the whole is called a *magnetic battery*, or a *compound magnet*.

The magnetic power of a magnetised bar chiefly resides in its extremities, which are called the magnetic poles; one being called the north pole of the magnet, and the other the south pole. In order to distinguish these poles from each other, a mark is usually drawn across the extremity corresponding to the north pole of the magnet.

One of the most remarkable properties of the magnet is, that it communicates its properties to a steel bar or needle that is rubbed for a few times, in the same direction, across one of its poles.

MAGNETIC ATTRACTION.

Experiment 1. Sprinkle some iron filings on a magnetic steel bar; the iron filings will be attracted to the extremities or poles of the magnet, whilst the other portions will be left nearly bare, as shown in *fig.* 3. When the steel bar exceeds eight or ten

Fig. 3.

inches in length, we *sometimes* find two other poles besides those that are at the ends, as shown in *fig.* 4.

Fig. 4.

Exp. 2. Attract a series of pieces of iron wire, *a*, *b*, *c*, to the extremity N of the magnetic bar N S, as shown in *fig.* 5. Here the wires, while they are in connection with the magnet N S, become a series of little magnets, whose lower extremities are all north poles; that is, of the same name as the pole of the magnet to which they are attached.

Fig. 5.

Exp. 3. *To magnetise a Pen-knife.* — Rub the knife, for several times, *in the same direction*, that is, from heel to toe, across one of the extremities, or poles, of a magnet; apply the point of the knife to some iron filings, or small pieces of iron, — they will be attracted to the point of the knife.

The Attraction between a Magnet and Iron is reciprocal.

Whilst the magnet attracts iron, the iron also attracts the magnet.

Exp. 1. Suspend a piece of iron wire by a thread, so that the wire may hang horizontally. Bring the one extremity of a magnet near to one end of the wire; the wire will be attracted by the magnet.

Exp. 2. Suspend a magnetised needle in the same manner; bring the extremity of the iron wire near to either pole of the magnet; the magnet will be attracted by the iron wire.

Magnetic Attraction transmitted through various Bodies.

Exp. 1. Interpose a thin screen of wood, or glass, or copper, or any substance excepting steel and iron, between the magnet and the iron wire of the foregoing experiments; the attraction will take place just as if there were no substance interposed.