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**The young man's book of amusement**

**Halifax, 1848**

Experiments in Magnetism

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## EXPERIMENTS IN MAGNETISM.

THE smallest natural magnets generally possess the greatest proportion of attractive power. The magnet worn by Sir Isaac Newton, in his ring, weighed only three grains, yet was able to take up 756 grains, or nearly 250 times its own weight: whereas, magnets weighing above two pounds, seldom lift more than five or six times their own weight.

For the more clearly explaining the following experiments, it is to be observed, that the two ends of a magnet are called its poles. When placed on a pivot, in just equilibrium, that end which turns to the north is called the north pole, and the other end the south pole.

*To Find the Poles of a Magnet.*

Immerse a magnet in iron filings, and when drawn out, it will be found covered all over with them; but it will be observed that there are two places, diametrically opposite to each other, which are the poles, where the filings are closer, and where the small oblong fragments stand as it were upright, while in other parts they lie flat.

*To shew the effect of the Magnet Poles on each other.*

Fix two touched needles horizontally on two separate pieces of cork floating in water; then place the pieces of cork beside each other, the needle being in a parallel position, with the poles of the same name together, (north or south) and they will mutually repel each other; but if the poles of contrary name be placed together, they will draw each other nearer

*The Magnetic Wand.*

Bore a hole, three-tenths of an inch diameter, through a round stick of wood; or get a hollow cane about eight inches long, and half an inch thick. Provide a small steel rod, and let it be very strongly impregnated with a good magnet; this rod is to be put in the hole you have bored through the wand, and closed at each end by two small ends of ivory that screw on, different in their shapes, that you may better distinguish the poles of the magnetic bar.

When you present the north pole of this wand to the south pole of a magnetic needle, suspended on a pivot, or to a light body swimming on the surface of the water (in which you have placed a magnetic bar,) that body will approach the wand, and present that end which contains the south end of the bar; but if you present the north or south end of the wand, to

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*The Learned Swan.*

Have a large marble or china bowl, painted inside the rim with the letters of the alphabet; a small swan in which is concealed a steel or iron pin, is set to swim in the bowl, and on being desired, will select any letters, say those which compose your name—to effect this, the performer of the trick must have a magnet in his pocket, by means of which, as he moves round the table, the swan will be attracted to every letter at which it is required to stop.

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*The Mysterious Watch.*

You desire any person to lend you his watch, and ask him if it will go when laid on the table. He will, no doubt, say it will; in which case, you place it over the end of the magnet, and it will presently stop. You then mark the precise spot where you placed the watch, and moving the point of the magnet, you give the watch to another person, and desire him to make the experiment; in which he not succeeding, you give it to a third (at the same time replacing the magnet) and he will immediately perform it.

This experiment cannot be effected, unless you use a very strongly impregnated magnetic bar, (which

may be purchased at an optician's) and the balance of the watch must be of steel, which may be easily ascertained by previously opening it, and looking at the works.

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*Concealed Money,*

May be discovered by means of the magnetic compass, if it be previously loaded with a touched needle. This may be effected by boring a hole in the edge of the money, and having driven in the needle, let the hole be filled with a bit of pewter, or silver, to hide the head of it. Next take a needle that is balanced on a pivot, in the same manner as the mariner's compass, and this will turn towards the needle inclosed in the money. Desire any person to lend you a crown, or other piece of money, and having dexterously changed it, let him at his option, secretly place the piece in a snuff-box, or not, as he thinks fit, and it then becomes your task to say whether he has or has not done so, without touching the box. Your own compass, or needle upon a pivot, enables you to do this, by placing it near the box: if the needle maintains its northerly direction, unalterably, be assured the money is not contained in the box, unless the north-pole of the needle, (which lies hid within the money) happens to be placed in a northerly direction—a thing not very likely to happen. However, to be quite sure, find fault with the position of the snuff-box—contrive to move it—and if the needle

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does not vibrate one way or the other, the loaded money is not in the box. Two points remain, upon which you may deceive yourself, viz. first, your needle must be very sensible, or the influence will be too inconsiderable to effect any change in it; second, take good care that your adversary (or person acted on) does not change your piece for another, and thus defeat the accomplishment of your purpose.

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*To suspend a Needle in the Air by means of the  
Magnetic Fluid.*

Place a magnet on a stand to raise it a little above the table, then bring a small sewing needle, containing a thread, within a little of the magnet, keeping hold of the thread to prevent the needle from attaching itself to the magnet. The needle, in endeavouring to fly to the magnet, and being prevented by the thread, will remain curiously suspended in the air.

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*The Magnetical Table.*

Under the top of a common table, place a magnet that turns on a pivot, fix a board to cover it, so that it may not be discovered. At one end of the table, secretly place a tin, that communicates with the magnet, and by which it may be placed in several different positions. Strew some steel filings, or very small

nails, over that part of the table where the magnet is, and requesting the loan of a knife or key, apply it to the filings, and it will have the same effect on the larger ends of these as a magnet would. Then placing your hand as if carelessly on the pin at the bottom of the table, alter the position of the magnet, and giving the key or knife to any one you will disappoint, he will be unable to perform the experiment as you have done; changing the pin's influence again, you may shew that you have these things at command.

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### CHEMISTRY.

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FOR many of the experiments mentioned in this book, useful apparatus may be made with a common Florence oil-flask, divided into two parts by means of a thread, previously dipped in oil of turpentine, tied round the middle and ignited; the upper part will make a good funnel, the other will contain chemical ingredients, which may require to be held over a flame.

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#### *To Procure Hydrogen Gas.*

Provide a phial with a cork stopper, through which is thrust a piece of tobacco-pipe. Into the phial put

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