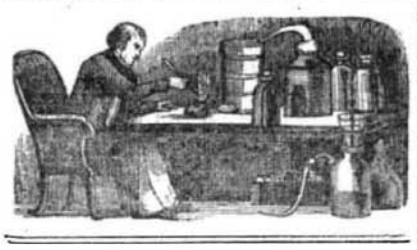


For the Scientific American.

The Magnet.

The peculiar power of some iron ores to attract and hold fast iron, was known in ancient times, even the days of Thales. It was not, however, until a much later period, that the discovery was made that these ores, or magnets, could like a charmer, impart their powers to the metal they attracted, thereby making artificial magnets. Pure cobalt and nickel have magnetic qualities, but they are weaker than iron. Minerals which are not metallic after having been exposed to the action of fire, are more or less attracted by the magnet and every part of animal and vegetable matter after combustion are attracted by the magnet, but no doubt owing to metals contained in the ashes. Natural and artificial magnets have two opposite points called magnets poles, and one of these poles points always to nearly the North and the other to nearly the South, if the magnet is poised freely to vibrate on the centre. One thing singular about the magnet is, that where two magnets are brought near together, the poles of the North when brought into contact repel each other and the South and North poles when brought together attract each other. If we observe single magnets carefully, we will find that the effects of attraction or repulsion takes place at short distances and diminishes in proportion between the square and the cube of the distance. There are some differences in this respect, owing to the form, size and other circumstances connected with the magnet. The magnet has no attraction for iron completely rusted, nor red hot iron and a white heat destroys the power of the magnet entirely. When pounded to powder, magnets also lose their virtue, but if a magnet in the shape of a bar be cut perpendicularly through its axis, even in a great number of pieces, each piece will be a magnet. If a sheet of iron is placed with its two surfaces turned to the poles of two magnets, their powers are much weakened, but if the poles of the magnets are applied to the opposite edges of the sheet of iron, then (the poles) attraction is increased. Exhaustion of air from the place where the magnet stands does not destroy its virtue. The strength of a small magnet is greater in proportion than a larger one. Very small magnets will sometimes support sixty times their own weight, while magnets that weigh two pounds will rarely support more than four times their weight, hence sixteen magnets of an ounce each will support more than one weighing one pound. If a weight to be supported by a magnet consists of all iron, a heavier weight will be lifted than if other weights are attached to the iron It is singular that the power of a magnet is increased by making additions to the weight it supports, while if it has no opportunity to exercise its strength in this manner on iron, like an enervated man it grows weaker by degrees. It is favorable to the power of a magnet to keep the north pole uppermost. The means of giving a magnet the greatest power is to arm it, thereby concentrating the power of both poles to which a piece of iron is applied. A natural magnet for this purpose is made smooth at the poles, and two pieces of soft iron to project on one side are applied to the magnet. These two pieces of iron becomes themselves magnetic and are held fast on the magnet by a brass or silver box. A piece of iron called a *lifter* and having a hook and scale for carrying a weight, furnishes a means for determining its power. Artificial magnets are armed in the same manner. The effect of arming a magnet is very great, one that would support only one grain in its unaided state, has been made to support five hundred grains. Magnetic power may be communicated from a magnet to another body by mere touching. Iron may be rendered permanently magnetic by proper magnets, natural or artificial. The effect takes place, particularly on bars of soft iron, placed for some time in the magnetic line—all that is required, is that the iron does not deviate at too great an angle from the line, hence iron bars which hang in the magnetic meridian horizontally, (such as iron balance beams) grow magnetic, also iron bars which in regions distant from the magnetic equator, are placed perpendicularly. In the northern hemisphere, the upper end becomes the south pole, the lower end the north pole. In the southern hemisphere the contrary takes place. The magnetic virtue is promoted by giving to the iron bars, a tremulous motion, by hammering or boring. Tongs and fire forks by being often heated and set to cool again in a nearly erect posture, have gained this magnetic property.

The way of communicating magnetic power to iron by rubbing it with a magnet, is the most common and most effectual. Steel sufficiently hard may be rendered permanently magnetic, while soft iron can never be made so. Take a steel bar eight inches long and half an inch wide and an eighth of an inch thick, put the north pole of a magnet in the middle of the bar and draw it to one end, return without touching the bar to the point where you began and draw again down to the end. Do this from ten to twenty times. This part of the bar is now the south pole, the other end the north pole. The artificial magnet is strengthened, if the other half is rubbed in the same way with the south pole of the natural magnet. This is the *singlestroke* process. Another way is called the *double stroke*, and is done by putting both poles of the magnet in the middle of the bar and to draw the magnet without changing the direction of the poles several times frome one end of the bar to the other taking away the magnet finally at the middle of the bar.

(*To be continued.*)

Weight of Metal.

To find the weight of wrought iron, ascertain the number of cubic inches in the piece, and multiply by 2.816, the weight of one cubic inch ; the product will be the weight in pounds.

To find the weight of cast iron, ascertain as above and multiply by 2.607.

To find the weight of copper, ascertain as above and multiply by 3.118 ; the product is the weight in pounds.

To find the weight of lead, ascertain as above, and multiply by 4.015 ; the product is the weight in pounds.

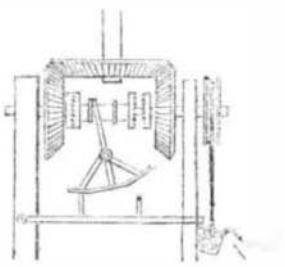
Planting Cotton.

J. J. Wadsworth, Esq. in writing to the Arkansas State Gazette, says in relation to an improved mode of getting an early and good crop, that he lives in latitude 35° N. and has felt the necessity of some plan for getting an early stand, and the following by experiment has proven to be the best for that latitude :—Have the cotton lands well cleaned, and about three or four weeks before the intended time for sowing seed, mark off the rows in width according to the strength of the soil, and turn four furrows nearly together with a turning plough, and at the time of sowing add a furrow of fresh dirt to each side of the previously formed bed, and then open a furrow on the bed, with a suitable plough, very shallow ; sow the seed and cover with a block two feet six inches long, twelve inches broad and eight inches thick, curved on one side so as to fit the bed and move the loose dirt from each side to the centre. The block must be attached to a stock made for the purpose ; the bawk may be ploughed out before working the cotton.—The object and advantage of preparing the beds previous to sowing seed, is that the bed may become firm and settled ; observation and trial will show that in a dry time the moisture will rise to the surface of settled beds sooner than it they were loose. When beds are fresh made and loose in a dry time, which often happens at that season, a loose bed will absorb, and the sun penetrates and dries the bed to the depth of the seed, which often remains there half swelled and sometimes dried and the result is a bandstand of cotton.

If a slip of tinfoil be put on both of the eyes, and a piece of silver in the mouth by bringing these pieces in contact a faint flash will appear before the eyes.

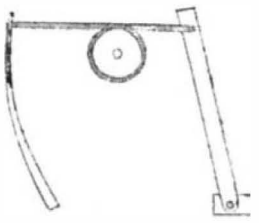
MECHANICAL MOVEMENTS.

Bevil Wheel Coupling.



Supposing the horizontal bevil above to run with uniform speed and the two other bevils to be loose on the horizontal shaft, to which the central coupling is connected by a rib or otherwise, either of the perpendicular bevils being connected to the shaft by means of the coupling, will revolve it, but in opposite directions. Connected to the coupling is a lever which alternately puts the coupling into geer with the opposite bevils as the bucket suspended from the pulley comes in contact and acts on the horizontal lever beneath.

Traverse Motion.



This is a modification of traverse and also of reciprocating motion. It is represented in the above cut by having the bar held to the wheel by a cord passing round its periphery connected with a flat spring. The wheel in this case is a fulcrum—a basis for the application of power.

Novel French Frigate, Destructive Weapons of War.

A French ship of war, the Psyche, at present stationed in the Tagus, is exciting the wonder of naval men. The Psyche is a smart frigate of forty guns, and though rated a 40 gun ship, she carries but thirty, but these are of tremendous weight : the 22 on the main being all 84 pounders, and the eight on the upper deck 32 pounders. These guns can be used indifferently for shell, round shot or grape ; but they are exclusively devoted in the Psyche for experiments on a concussion shell, which being a recent Gallic invention is exclusively employed in the French service. The shell in question has no fuse, and it is perfectly harmless until it passes a certain distance through the air, with a certain degree of velocity. It ignites by concussion, and not by percussion , and its chief destination and operation is that of lodging in the matter aimed at, and of setting fire to it, though it should pierce the object aimed at, it will produce the effect of an ordinary shell as it explodes. It is harmless, until it gains a certain velocity, and it may be rolled on the floor or dropped from the upper deck to the lower without the least injury, and even if it be broken in the fall no mischief will ensue. The shell was invented by Capt. Bilette of the French naval service, and it was actively used in 1844, at Mogador, with such terriffic certainty, that wherever it fell the town was instantly on fire. Persons in the habit of firing them say, that half a dozen lodging in a line of battle-ship or frigate, would set the ship in a blaze the moment they struck the side, as each burrows in the wood, tears up all about it, and ignites everything with which each morsel of the contents comes in contact. There are neither mortars nor howitzer on board the Psyche, all her guns are fitted in the ordinary manner, as the shell to be effective requires no more elevation of the gun from whence it is discharged than an ordinary round shot. The vast superiority of a frigate having her main-deck guns 84 pounders, and firing ten inch shells from each is evident, but the admirers of the Psyche will not rest there, as they assert that she is more than a match for a line of battle-ship. Capt Billette, the inventor of the shell died a few weeks since in the Naval Hospital at Paris. The secret of the new shell is only known to the proper department of the Government; the officers on board are unacquainted with it. All they know is, that such articles are served out with other munitions of war, and that, when they have witnessed the operation of the shell, the result has been invariably the same.

Sea Spray on the Hill-tops.

The height to which the foam of the sea is carried, during a hurricane is astonishing, we must, however, remember that the rotary motion of the blast would contribute in some measure towards this. It cannot be supposed that the gyrations act only on the surface of the water ; they ascend following their rotary motion, and no doubt carry by gyration the sea-water in their course. During the severe gale which touched Tortola in 1831, I was residing with the late President Donovan, at St. Bard's, a hill, the summit of which is about 1000 feet above the sea, the dwelling house, however, is at an elevation of 920 feet. The day after the gale the leaves of the trees and plants in the garden, which had remained, became black from the contact with the sea-water spray, and the rain-water in the cistorn and vats which was to be used for domestic purposes was rendered brackish.—*Schomburgh's History of Barbadoes.*

Fill a saucer with water and let fall into it a piece of potassium of the size of a pepper corn, about two grains. The potassium will instantly become red hot with a slight explosion, and burn vividly on the surface of the water, darting at the same time from one side to the other with great violence, in the form of a red hot ball.

Melt four parts, by weight of Bismuth, two and a half of lead, and one and a half of tin, together in an iron ladle over a fire, so as to form one mass. If a piece of this metal be put into water it melts when the water begins to boil, and remains melted, as long as the water is kept boiling. This is an excellent composition for moulds for electrotyping.

Anthracite Coal.

It is reported that a new coal basin has recently been discovered in Rhode Island, from which the coal can be mined and delivered in Philadelphia at about three dollars per ton. The basin is supposed to be about twenty miles long, and five wide.

It is supposed that all the canals of Pennsylvania will be opened for navigation by the 15th of this month.

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