SCIENCE AND MECHANICS.

To Write in Various Colors with the same Pen, Ink and Paper.—Take a sheet of paper and wet some parts of it with a solution of sub-carbonate of potash, which must be diluted with water so as not to appear on the paper when dry. Wet some other parts with diluted muriatic acid or with juice of lemon.—Some other parts may be wet with a diluted solution of alum; and others with an infusion of nut-galls (water in which bruized or pulverized nut-galls have been steeped.) None of these preparations must be so strong as to color the paper.—When these are dry, take some finely powdered sulphate of iron, and rub it lightly on some parts of the paper, that have been wet with the sub-carbonate of potash and infusions of galls. Then with the juice of violets, or of the leaves of red cabbage, write on the paper as usual with a pen. The ink is of itself a faint purple; where the paper was wet with acid, the writing will be bright red; on the sub-carbonate of potash, it will take a beautiful green; on the alum it will be brown; on the sub-carbonate of potash that was rubbed with powdered sulphate of iron, it will be deep yellow; and on the infusion of galls that was rubbed with powdered sulphate of iron, it will be deep yellow; and on the infusion of galls that was rubbed with powder, it will be black. The juice of voilets will take a brilliant yellow on the alkali if it be very strong. The juice of voilets or red cabbage may be kept a long time by means of the addition of a few drops of alcohol; or the leaves may be dried by the fire, and thus may be kept ready for use; and it is only requisite to steep them in hot water, in order to prepare the ink at any time.—*Sci. Mech.*

To Wash Iron or Steel with Gold.—Mix together in a phial, one part of nitric acid, with two parts of muriatic acid, and add as much fine gold as the acid will dissolve. For this purpose gold leaf is the most convenient, as it will be the most readily dissolved. (This solution is called the nitro-muriate of gold.)—Pour over this solution, cautiously, about half as much sulphuric ether;—shake the mixture; and then allow it to settle. The ether will take the gold from the acid, and will separate itself from it also, and from an upper stratum in the phial. Carefully pour off this auriferous ether into another phial, and cork it close. Wash any piece of steel or iron with this ether, and immediately plunge it in cold water, and it will have acquired a coat of pure gold. With this also, any flowers or letters may be drawn or written, even with a pen, and will appear perfectly gilt. The steel or iron should afterwards be heated as much as it will bear without changing colors, and if the steel be previously polished, the beauty of the gilding may be much increased by burnishing with a cornelian or blood-stone.—*Sci. Mech.*

Pneumatic Horse Power.—One of the most novel inventions, and arrangements of machinery that has come under our inspection, is a horse-power engine invented by that well known scientific genius, Jesse Fitzgerald, of this city. In this machine two large double-acting air pumps do not compress air, but merely work against the atmosphere, producing a vacuum and consequent rush of air through two branches of a long pipe to supply the exhausted cylinders. This current of air, in its course to the pumps, is made to work a small cylindric engine by the force of atmospheric pressure: and this engine, constructed in all respects like a steam engine, is made to operate whatever machinery is required to be driven by the horse power. The advantage of this arrangement is the ready increase of speed from the moderate motion of the horse to a rapid velocity, without the use of speeding geer. The air pipe may be extended to any required distance from the horse-circle to operate machinery in other apartments or buildings; and if the machinery is nicely made, the loss of power by friction, &c., will be less than by the wheels and pinions of ordinary horse geer.—*Sci. Mech.*

To Wash Copper or Brass with Silver.—To half an ounce of nitric acid in a phial, add one ounce of water, and one-fourth of an ounce of good silver. It will soon be dissolved and if the acid and metal are both pure, the solution (which is called nitrate of silver) will be transparent and colorless. Add to this a solution of nearly two drachms of muriate of soda, in any quantity of water; this will precipitate the silver in a white opaque mass. Pour off the water with the acid, and add to the silver an equal quantity of super-tartrate of potash, thus forming a soft paste; dip a piece of soft leather in this paste, and rub it on the metal to be silvered; continue rubbing it till it is nearly dry; then wash it with water, and polish by rubbing it hard with a piece of dry leather.—Another method is, to add sub-carbonate of potash to the nitrate of silver, as long as ebullition ensues; then the acid is poured off, and the precipitate (which is white at first, but becomes green when dry) is mixed with double its quantity of muriate of soda, and super-tartrate of potash. With this composition, being moistened, the metal is rubbed over, &c.

Electrical Light.—Mr. Staile is lecturing in England, and exhibiting his mode of producing light from electricity. The light, which was of astonishing brilliance and beauty, was placed under an air-tight glass vase. When the gas was turned down it sufficiently lighted the spacious building, and bore the closest resemblance to the great orb of day of any light ever witnessed. So says a spectator: but it may take a long time to introduce this light to practical utility.

Looking-Glasses for Birds.—The following plan which I discovered by accident, is, I think, perfectly efficient for scaring birds from fruit and other produce. One of my servants having by chance broken a looking-glass, it occurred to me that the broken pieces, suspended by a string, so as to turn freely in every direction, would give the appearance of something moving about, which would alarm the birds. I accordingly tried the plan, and find that no bird, not even the most fool hardy of them, dare come near. They had attacked my peas. On suspending a few bits of the looking-glass amongst them the marauders left the place. Tomtits attacked my Seckel pears, to which they seemed very partial; a bit of looking-glass suspended in front of the tree put a stop to the mischief. My grapes were next much damaged, before they were ripe, by thrushes and starlings; a piece of looking-glass drove them away, and not a grape was touched afterwards. I have before tried many plans, but never found any so effectual as the above.—*Gardeners' Chronicle.*

To Die Silk a Brilliant Gold Color.—Take any quantity of nitro-muriate of gold, and evaporate by exposing it to a gentle heat, in a glass tumbler or phial; the gold will form itself in crystals on the bottom and sides of the vessel; collect these crystals and dissolve them in ten times their weight of pure water. Then put a gill of water into a common flask, and add one ounce of granulated zinc, and one fourth of an ounce of sulphuric acid. Hydrogen gas will be evolved, and rise through the neck of the flask, which must not be stopped. Immerse a piece of white silk in the above mentioned aqueous solution of gold, and expose it, while wet, to the current of gas as it rises from the flask; the gold will soon be revived, and the silk will become beautifully and permanently gilt. Any letters or flowers may be drawn on the silk with a camel-hair pencil dipped in the solution, and on being exposed to the action of the gas, will be revived and shine with metalic brilliancy. The silk must be kept moist with water till the gold is dissolved.—*Scientific Mechanic.*

To cut Glass with a piece of Iron.—Draw with a pencil on paper, any pattern to which you would have the glass conform; place the pattern under the glass, holding both together in the left hand, (for the glass must not rest on any plane surface;) then take a common spike or some similar piece of iron, heat the point of it to redness, and apply it to the edge of the glass; draw the iron slowly forward, and the edge of the grass will immediately crack; continue moving the iron slowly over the glass, tracing the pattern, and the chink in the glass will follow at the distance of about half an inch, in every direction according to the motion of the iron. In may sometimes be found requisite; however especially in forming corners, to apply a wet finger to the opposite side of the glass.—Tumblers and other glasses may be cut or divided very fancifully by similar means. The iron must be reheated as often as the crevice in the glass ceases to follow.

Acids.—Paint any figures or flowers on a piece of marble with common oil paint; dip the figured surface in diluted muriatic acid, and, in a short time the acid will be found to have taken off the surface of the marble, between the painted figures, leaving them raised in relief. The paint may be removed and the figures will remain.

Add a little carbonate of Soda, (saleratus) to very dilute muriatic acid; the carbonic gas will be expelled so rapidly as to produce a violent ebullition.

Spread over the surface of a piece of glass a little melted beeswax, and with the point of a needle draw any letters or flowers by scraping off the wax; then pour over the wax a little fluoric acid, and in a little time the figures will have been fairly etched in the glass, and will remain permanent when the wax is removed.

Vivid Combustion of Three Metals.—Mix a grain or two of potassium with a like quantity of sodium. This mixture will take place quietly; but if the alloy of these two bodies be brought into contact with the globule of quicksilver, the compound, when agitated, instantly takes fire, and burns vividly.—*Sci. Mech.*

Gold.—If a grain of gold be melted with a pound of silver, and a single grain of the mass be dissolved in nitric acid, the gold, which is only the 5,761st part of a grain, will fall to the bottom and be plainly visible.

Indian Ink.—Ink equal to China or Indian Ink may be made by dissolving six parts of isinglass in twelve of water, one part of Spanish liquorice in two of water, mixing them when warm and incorporating gradually with them one part of the best ivory black, stirring well. When the mixture is complete it is to be heated in a water bath until so much of the water is evaporated as to leave a paste which may be moulded into any required form.

Twisted Wires in Telegraphing.—The London Railway Gazette lays it down as a well-founded axiom in electric science, that the current is rapid in proportion to the thickness and uninterrupted position of the wires; and that through a coil of (only) 3,500 yards (less than a mile and a half) of the finest copper wire made, (No. 35,) insulated and tightly wound in a coil, the electric fluid has the same difficulty, *and takes the same time in passing*, as over 100 miles of wire, perhaps one-eighth of an inch diameter and 100 miles in length *not coiled*, but perfectly unobstructed.

Melt together in a crucible, three parts of copper with one of zinc and the alloy will be found to be the common brass