

For the Seientific American. Varnyshes.
The more minutely the gum is run, the greater the quantity and stronger the produce. The more regular and longer the boiling of the oil and gum together, the freer the varnish wall work. When the mixture of oil and gum is too suddenly brought to string by strong heat, the varnish will require more than a just proportion of turpen tine to thin it, whereby its oily and gumms quality is reduced, whi ch renders it less dura ble, and it will not flow so well in laying on The greater the proportion of oil used in var nishes, the less liable are they to crack, be cause tougher and softer. By increasing the proportion of gum, the thicker will be the stratum of varnish, the firmer it will set and the quicker dry. When varnishes are per fectly new and must be applied betore they are of sufficient age, they should be left thick er than if kept a proper time before using. African copal possesses the best qualities of elasticity and transparency. Too much driers in varnish render it unfit for clear and delicate colors. Copperas does not combine with, but ouly hardens varnish. Turpentine improves by age and varnish by being kept in a warm place. All copal and oil varnishes should be kept some time after they are made befor they are ased.

## Forthe Scientific American

Composition for Weiding Cast Steel. Take ten parts of borax and one part of sal ammoniac; grind them together and fuse them in a motal pot over a clear fire taking care to continue the heat until all spume has disappeared from the surface. When the liquid appeais clear, the composition is ready to be poured out to cool and concrete, when, it is ground to a fine powder and isready for use. To use this composition the steel is put into the fire and raised to a bright refrangible is then dipped among the welding powder and again placed in the fire untilit attains the same degree of heat as before, when it is ready to be placed under the hammer.

## Method of Bringing out Scuipture apon

This process is founded upon the property which alabaster or sulphate of lime bas of being slowly eaten out by cold water, so that the polish is destroyed.
In the first place the sculplures in relief, and all the parts intended to be preserved, arecovered with a varnish, insoluble in water composed of wax dissolved in oil of turpentine, mixed with white lead, or rather with a turpentine varnish, to which white lead and a little animal oil has been added to prevent the varnish from hardening and adhering too strongly to the alabaster. This is applied with a soft paint brush, moistened with oil of turpentine, into which it must be dipped every time that varnish is taken. The reserved parts being thus covered, suffer the vessel or ornament to dry for some hours, and then place it in a vessel filled with cold water, and lease it there for 48 hours, or longer if it is thought necessary The varnish is then removed with a fine sponge dipped in varnish of turpentine, and the vesse dried with a soft, and very dry rag. When the vessel is thus cleared of its varnish, and dried, pass over it a new soft brush, dipped in finely powdered plaster. This powde fills the pores of the plaster, which have been attacked by the water, and renders it flat, which brings out the transparent parts of the alabaster in relief.
To clean ornaments and sculptures in ala baster:-wash out any greace spots with oil of turpentine, then put the piece in water, and suffer it to remain until it is freed from its impurities. When you take it out, rub it with a very dry paint brush: let it dry, snd pass over it powdered plas:er. In this
way the piece will be perfeetly washed, and will look as though it had just come from the hand of the carver.

## To Ornament Piotare Glassez With Gold

The glass must be first washed perfectly clean and dried: then moisten it by breath ing on it, or wet it with the tongue, and im mediately lay on a leaf of gold, and brush it down smooth. When this is dry, draw any letters or flowers on the gold with Bzunswick blacking (a solution of gum asphaltum ir، spirits of turpentine, and when dry, the super fuous gold may be orushed off with cotton, leaving the figures entire. Afterwards the whole may be covered with blacking, or painted in any color, while the gold figures will appear to advantage on the opposite side of the glass. This work may be elegantly shaded by scratching through the gold with a steel instrument, (in the end of which many sharp points are formed,) previous to laying on the blacking. Oil paints of any kind may be substituted in the place of blacking, but will not dry so quick.

## Phenomena of Light.

The different colored rays of light are not equally luminous-that is to sav, do not im. press our eyes with equal brilliancy. A prece of finely printed paper placed in yellow light can be read at a much greater distance than in any other color, and from this the light declines on either hand, and gradually fades away in the violet and the eed. The light of he sun is accompanied by heat. Dr. Herschel found that by interposing pieces of different colored glass between the sun and a thermometer, that the temperature of the latter was differently affected by different colored glasses. The heat is least in the violet and continually increases as we descend through the colors, the red being the hottest of them all. Late discoveries have shown that every ray of light can produce specific changes in compound bodies. Thus, it is the yellow ray which controls the growth of plants, and makes their leaves turn green; the blue ray which brings about a peculiar decomposition of the iodides and ci.lorides of silver, bodies which are used in photogenic drawing.Those substances which phosphoresce after exposure to the sun are differently affected at the diferent rays-the more refrangible producing their glow, and the less extinguishing them.

## Horses

A horse trarels 1200 teet at a walk, in $4 \frac{1}{2}$ minutes; at a trot in two minutes; at a gaiop in 1 minute.
He occuptes in the ranks a front of 40 inches, and a deptr of 19 feet; in a stall $3 \frac{1}{8}$ to $4 \frac{1}{2}$ feet front ; and at picket, 3 feet by 9.
Average weight of horses 1000 lbs . each
A horse carrying a soldier and his equip merits (say 225 lbs.) travels 25 miles in a day (8 hours.)
A draught horse can draw 1600 lbs. a day weight of wagon included.
In a horse mill, a horse moves at the rate if 4 feet in a second. The diameter of the track should not be less than 25 feet.
The strenyth of a horse is equal to that of five men.
The expense ot conveying goods at 3 miles an hour per horse teams being 1 , the expense at $4 \frac{1}{2}$ miles will be 1.33 , and so on, the expense being doubled when the speed is $51-8$ miles per hour.

New use of Waste Steam.
A manufacturer who has a steam engine which discharges much waste steam, conceived the idea of using it to raise pine apples. The steam was introduced under the roots of the plants, and the heat and moisture united, acted so powerfully that the pine apples soon ripened; while the body of the plant being exposed all day to the open air, assumes a
healthy and agreeable taste, which renders the fruit tar superior to those which have been ripened in hot houses.

Dinity of Blue Glass for Hot Houses.
In vesetable growth the blue rays are the most active, the red ones the least 80. Hence green for the roofs of hot houses.

## MEOHANIOAL MOVEMLGNTS.

Continuous Circuiar Motion.


In this figure the ratchet wheel is fixed on he shaft seen in the centre; but the spur wheel to which a clip is attached, runs loose on the same shaft, so that its rotary motion will only act in one direction, namely, when the click holds on the ratchet. At the back of the spur wheel is another similarly arranged, with a click, and ratchet wheel, and geering into the opposite rack, which is not on the same plane. Thus, the alternate tra verse of the perpendicular rack-piece will produce continuous circular motion in the shaft which carries the wheels.


Draughtsmen have frequently to use an in trument as a guide to draw parallel lines The one in most common use for that pur. pose, is two rules joined together by the same joints as are represented in the above engraving The above instrument is superior to the double rule, for the drawing of a greater number of parallel lines, inasmuch as when the joints are closed, the instrument ocoupies scarcely any more space than the double rule, yet it can guide to double the number of lines without being shifted.

## To prevent the ravages of Mloths.

The ravages of the woolen moth may be prevented by the use of any of the tollowing substances; tobacco, camphor, and perhaps the most agreeable for wearing apparel, a mixture of one ource of cloves, one ounce of rhubarb, and one ounce of cedar shavings, tied up in a bag, and kept in a box or drawer. If the substance be dry, scatter it in the folds of the cloth, carpet, blankets. or furs: if liquid scatter it freely in the boxes, or on the cloth or wrapper, laid over and around it.

## Hints to Lovers of Flowers

A most beautiful and easily attained show ot evergreens may be had by a very simple plan, which has been found to answer remarkably well on a small scale. If ge:anium branches taken from luxuriant and heal. thy trees just before the winter sets in, be cut as for slips, and immersed in soap water, they will, atter drooping for a few days, shed their leaves, put forth fresh ones, and continue in the finest vigor all winter. By placing a number of botlles thus filled, in a flower basket, with moss to conceal the bottles, a how of evergreens is easily insured for the whole season. They require no fresh water

## Etching.

Heat the large blade of your pocket knife and rub it with a piece of beeswax, so as to ive it a thin coating When cool take a large needle and scratch letters through the wax. Drop on them two drops of water, and one of nitric acid, and in one minute the etters will be quite deeply etched in the steel.

## Cheap Roof.

If a shingle roof is covertd with cotton cloth, and then painted, and sand laid upon the top of the paint and all suffered to dry a roof will be made thereby to last twice as long as without the said covering Cheap boards, will answer as well as shingles and the cloth will keep the roof perfectly tight trom leaking.
The weight of platinum, the heaviest know for bulk nature, is 435,000 times greater, jalk est known body in nature.

## Corn Cob.

It is believed by many, that there is very little nutriment in corn cobs; but as one proof to the contrary, we will adduce the following. A farmer in Virginia, a few years since, afratd his corn crop would not be sufficient to last through the winter, determined to try, and did winter his horses on corn cobs alone, pounded in a common homing mortar with his own hands. They received no other substance except long forage, as hay and fodder. Upon this they did their work and were in very good condition.- $\boldsymbol{C}$. $\mathcal{N}$. Bement.

Among the evidences of the nutriment contained in the corn cob, the experiment, by distillation, of Mr. Minor of Virginia, showed that five bushe's of cobs contained four gallons of spirit. He also found other nutritive matter than the saccharine, as mucillage and oils.

## Vegetable Flights.

The distribution of vegetable species is secured by a variety of means. In some instances the seeds are furnished with light silky plumes, or wings, which flutter in the air, and are transported afar by the windsothers, by means of a viscous, hard, impermeable envelope, float on rivers, and decend their courses without suffering the least change, or losing their germinating power There are seeds again of a sulficiently coherent texture, to resist the cigestive action of the stomach of animals that eat fruits tha the stomach of animals that eat fruits that
contain them, and which are conoequently found deposited at great distances from the plant that produced them.

## New Fruit.

A new fruit has been introduced at Charleston, S. C. from Japen. It is an evergreen, and bears flowers of a delightful almond-like fragrance, twice a year Last summer, the fruit in small quantity came to maturity in July This year it bore more luxuriantly, and the froit is now ripe. It is of a rich orange color, about the size ard shape of the nectarine, although a little more elongated.

Buttling Asparagns.
A very delicate dish is procured by placing glass bottle over an asparagus head just as it breaks the ground. The plant rapidly fills the bottle, which is then broken and a large head, tender, delicate, and compact as a cau liflower, is secured.


This paper, the most popular publication of the kind in the werld, is published weekly At 128 Fulton Sireet, New York, and 13 Court Street, Bostor,

## BY DIUNN \& COMPANY

The principal office being at $\mathcal{N}$ ero York.
The SCIENTIFIC AMERICAN is the Ad vocate of Industry in all its torms, and as a Journal for Mechanics and Manufacturers, is not equalled by any other publication of the kind in the world.
Each number contains from FIVE to SEVEN ORIGINAL MECHANICAL ENGRA. VINGS of the most important inventions ; 2 catalogue of AMERICAN PATENTS, as is. sued from the Patent Office each week; notices of the progress of all new MECHANICAL and SCIENTIFIC inventions; instruction in the various ARTS and TRADES, with ENGRAVINGS ; curious PHILOSOPHICAL and CHEMICAL experiments ; the latest RAILROAD INTELLIGENCE in EUROPE and AMERICA; all the different MECHANICAL MOVEMENTS, published ina series and ILLUSTRATED with more than A HUNDRED ENGRAVINGS, \&c. \&c.
The Scientific American has already attained the largest circulation of any weekly mechanical journal in the world, and in this country its circulation $s$ not surpassed by all the other mechanical apers combined.
the other mechanical apers
por or terms see inside.

