For the Scientific American.

Enamel Colors and Fluxes.

Ultramarine is used in enamel where very bright blues are wanted, but there are few instances where zaffer (a mixture of cobalt) will not answer equally as well, that is if it is used with borax, and a little calcined flint to take off the fusible quality of the borax. The ultramarine requires no preparation when used in enamel painting, previously to being mixed with a flux.

Ultramarine ashes are used where light semi-transparent blues are wanted but these are often adulterated with precipitations of copper which turn green on fluxing and great care is therefore necessary in its use.

Zaffer is used to produce blue, green, purple and black colors on enamel. Zaffer, or as it is more usually known by the name of cobalt, assumes a strong blue color approaching to purple as it vitrifies. Cobalt is known to be good or bad only by trial and comparison with some that has proven to be good.

Red Enamel.—The protoxide of copper affords a fine red color, only it must be taken at the proper point of fusion. If this is raised to too high a temperature it may be brought back by adding some combustible matter such as tallow or charcoal. It is possible by pushing the heat in this way to reduce entirely a part of the oxide and the particles of the metal scattered over it, will look like a stone called *avanturine*. To procure the protoxide of copper pure, boil equal parts of sugar and the acetate of copper in four parts of water, a powder of red is deposited which after two hours boiling is set aside to settle and the precipitate washed and dried.

Purple Color.—A preparation of gold is used to make the *purpureus* color, which is done by dissolving fine gold in aqua regia and some tin dissolved in the same kind of spirit, and after all effervescence has ceased, drop some of the gold solution into some water and some of the tin into the same, and a red precipitate will be the result which must be washed and dried and is then fit for use. Of course, a great or small quantity can be treated accordingly. This is the precipitate of gold. Crude tin is often used to precipitate the powder of gold without dissolving it in muriatic or nitro-muriatic acids.

A powder for red enamel may also be produced by using salt of tartar to deposit the gold instead of the salt of tin, and if it be not well washed from the salt, it will not answer for without washing it is the *aurum fulminies* from its explosive qualities. Volatile salts will also deposite the gold powder, and for a full description of which see our articles on Electro Gilding in former numbers of this paper.

Gold precipitated from acqua regia by copperas (sulphate of iron) has a fine appearance and is bright.

Yellow Color.—Silver preparation is used to produce a yellow enamel. Clovet says that a fine yellow is made by pure oxide of silver painted in a thin coat and fused along with some metallic flux, and another powder for this purpose is to calcine one ounce of the filings of silver to half an ounce of sulphur in a crucible, the sulphur being added after the silver is made red hot.

Green Color.—Copper in enamel painting is used for making both green and red colors, also blue. For green the oxide of chrome is most generally used and is allowed to be the best, but the *ferretto* or the sulphate of copper six times calcined is very fine. The appearance of the powder must be red. If copperas is dissolved in water and pearl ashes added, the precipitate makes a good yellow preparation and if mixed with cobalt makes a cheap green mixture.

Antimony is also used for yellow. Powdered bricks have also been used for compounding yellow colors in enamel, but they act just as ochre does in this respect and require a greater force of flux than the pure ochres or calcined iron. When they are used they should be chosen of the reddest color and of the softest and evenest tenure.

Blue clay fluxed makes a splendid deep and dark color and powdered brick and other fluxes make imitation agate.

Black enamel is made with the peroxide of manganese or peroxide of iron and cobalt.—Clay alone with protoxide of iron gives, according to Clovet, a fine black.

Lead is often used as a flux, but it should be carefully avoided for all ware intended for domestic use, and therefore for those enamels that are intended to stand exposure to acids or the effects of the atmosphere, it should be mixed always with calcined pounded flint or crystal.

A flux for common purposes is composed of red lead one pound, pearlash 6 ounces, and two ounces salt calcined together and afterwards reduced (for using as a flux) to powder.

A flux to vitrify a large portion of cobalt may be made of lead one pound, 6 ounces of pearlash, 4 ounces borax and 1 of arsenic.—This is a soft flux and will glaze with less heat than the preceding one, treated in the same manner.

A white flux is made with 1 pound of powdered flint glass, 6 ounces of pearlash, salt 2 ounces, borax one ounce. This is the flux that should be used along with those substances for making blue, crimson and purple and also for pure transparent white.

To Clean Colored Silks.

Put some white soap into boiling water and heat it until dissolved into a strong lather. At a hand heat put in the article. If strong it may be rubbed as in washing : rinse it quickly in warm water and add oil of vitriol sufficient to give another water a sourish taste, if for bright yellows, crimsons, maroons and scarlets, but for oranges, fawns, browns or other shades, use no acid. For bright scarlet use a solution of tin. Gently squeeze, and then roll it in a coarse sheet and wring it. Hang it in a warm room to dry, and finish it by calendering or mangling.

For pinks, rose colors, and thin shades, &c instead of oil of vitriol, or solution of tin, prefer lemon juice, or white tartar or vinegar.

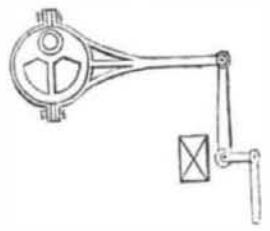
For blues, purples, and their shades, add a small quantity of American perlash ; it will restore the colors. Wash the articles like a linen garment, but instead of wringing, gently squeeze and shake them, and when dry, finish them with fine gum water, or dissolved isinglass, to which add some perlash rubbed on the side ; then pin them out.

Blues of all shades are dyed with archil and afterwards dipped in a vat; twice cleaning with perlash, restores the color. For olive-greens, a small quantity of verdigris dissolved in water or a solution of copper, mixed with the water, will very soon revive the color again.

[The above we have taken from one of our exchanges, it is not for us to say which one it was, as in all probability it might have been copied from some other. But we warn our readers against trying the efficacy of said receipts with anything valuable. It is too common a practice with our newspapers to pick up anything in the shape of receipts and publish them, leading some of their readers to try the experiment to their sad loss. If silks be rubbed on a wash-board their lustre will be spoiled forever. If silk be rubbed between the fingers its surface will be abraided and its fine gloss spoiled. Colored silks can only be washed in cold soap suds and the less they are rubbed the better. In fact colored silks never look well after being washed except they be restored in color by the Dyer. The least warmth of water will discharge the blue color of our common blues. It is only fugitive, made with the sulphate of indigo, and if the least particle of soda or pearlash be used in the water the color will disappear like snow in a thaw. Alum and the muriate of tin are the safest restoratives of colors. Purples, reds and scarlets can be safely treated with the muriate of tin. Blues, greens and yellows with alums. Silks are dressed by stretching them out on copper cylinders heated with steam, or frames full of small teeth, made so as to allow the silk to stretch in the drying. This process restores its shining appearance. It is stiffened with white glue.

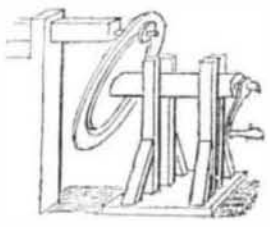
The calendar or the mangle would be a sad end for some silks. Frames called *lappet frames* are the kind that are used for dressing silk pieces.

MECHANICAL MOVEMENTS.



This is an arrangement well known to all who have seen the old and primitive engines as we have, where one of twelve horse power would occupy a whole four story building in height and nearly as many feet in length as it was in height. The plan in the above cut was for working the valve rods. The circular eccentric to the left revolves on the small centre on the upper part whereby the whole combination was moved and the jointed levers traversed at regular intervals to work the valves.

Circular and Traverse Motion.



This is an arrangement which produces an alternate traverse motion in the horizontal shaft to the left. The effect of this will at once be perceived. It is also a cam principle and shows the manner in which a circle may act the part of the cam as well as an eccentric. It is upon this principle also that uneven surfaces to patterns are turned in the lathe and by which patterns of any size can be taken. Thus according to the length of the shaft on the left if there was a pencil on the distant end of it tracing the curvature of the inclined disc, the motion of which produces the motion in the shaft, so will the size of the figure traced be in proportion to the length of the shaft and the only difference between the traverse motion in the shaft of the above cut, and the lever of the profile tracer, is that the first is stiff and the latter flexible —the principle of both is the same.

To Prepare Cocoa.

A cocoa drinker of some years standing, who has tried every description of the article which is sold, recommends all who desire a cheap, good, and unadulterated cup of this delightful beverage, to attend to the following directions :—Purchase at a respectable grocer's shop the bean, remove the outside skin or husk, which can easily be done by the fingers, then crush the nut as can be conveniently done by any hard substance. Let two or three teaspoonsful be put into three pints of water, and allowed to simmer on a slow fire for a couple of hours, and a cup of most delicious cocoa will be the result. Of course sugar, and cream or milk, must be added according to taste. If the cocoa be left on a slow fire at bed-time and warmed in the morning, it will obviate the necessity of occupying the fire for so long a period during the day, and it loses none of its flavor by being warmed a second time. This is decidedly the most economical way of preparing cocoa, for generally a second boiling produces as rich a beverage as the first.

To Varnish Drawings.

Boil some clear parchment cuttings in water, in a glazed earthen vessel till they produce a very clear size; strain it and keep it till wanted, then give the work two coats of the size, passing the brush quickly over the work, so as not to disturb the colors.

Or, mix one ounce of Canada balsam and two ounces of spirits of turpentine together, then size the print or drawing with a solution of isinglass in water and when dry apply the varnish with a camel's-hair brush.

Adulterated Medicine.

Silliman's Journal for January exposes the rascality of medicine, selling for the real simon pure, that is mixed with two-thirds of foreign matter. The most of the medicines referred to are imported from England. Quick silver is adulterated with Prussian blue and sand. Rhubarb with turmeric. The article oxide of zinc, is the carbonate of zinc Sulphur containing 80 per cent of lime. Opium and quinine adulterated two thirds. From the tone of the Journal we infer that there is not a single pure medicine sold here that is brought from Europe—that it is a trade to adulterate and manufacture for our markets. The best remedy is to take none of them.

German Yeast.

The yeast prepared by the Hungarians will keep a whole twelvemonth. During the summer season they boil a quantity of wheaten bran and hops in water ; the decoction is not long in fermenting, and when this has taken place they throw in a sufficient portion of the bran to form the whole into a thick paste, which they work into balls that are afterwards dried by a slow heat. When wanted for use they are broken and boiling water is poured upon them. Having stood a proper time, the fluid is decanted, and is in a fit state for leavening bread.—*Johnson's Eneyclopedia of Agriculture.*

Properties of Zinc.

By being melted and poured into water, has been found to assume new qualities; it becomes very malleable, losing none of its tenacity, but is capable of being spun into the finest wire, pressed into any required form, or rolled into any required thinness. This is a discovery by Prof. Farady, and will prove of very great importance.

Wooden Arm.

We see it stated in our exchanges that an ingenious mechanic of Paris has invented a wooden arm which is said to beat the natural limb itself. Its qualities are a little too highly colored, yet it is not difficult to believe that a very superior invention to the old iron club arms may have been made.