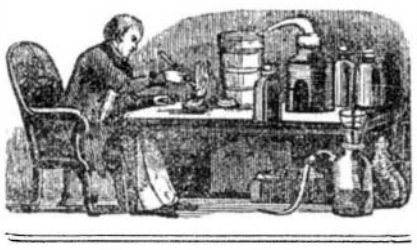


For the Scientific American.

Enamel Fluxes.

Enamel painting differs from all other kinds in the vehicle employed for the colors, and bind them to the ground they are laid upon. This is glass or some vitreous body which being mixed with colors and melted by heat becomes fluid and having incorporated with the colors in that state, forms together with them a hard mass when cold. It answers the same end in enamel that oil or size does in other kinds of painting.

The vitreous body used for this purpose is called a flux, There are two kinds of flux, *soft* and *hard*, the former easier fused than the latter. It is a perfection of a flux to run or melt easily. It is positively necessary that the enamel of the ground should be considerably harder than the mixtures for the colors, for if they both melt with the same degree of heat, they will necessarily run together. The fluxes too should correspond to each other so that there should be corresponding fluidity.

It being required that a body painted in enamel should undergo a heat sufficient to melt soft glass, the matter for such a purpose, are metals, porcelain, hard glass, &c. When the metals are used as a body, and the enamelling to be of various colors, it is necessary that a ground of white should be laid on the metal and which must be of a vitreous nature but harder than the flux for the colors.

A great art in enamelling, is a knowledge of the degrees of heat that are required for the different kinds of burning.

Melting pots for fusing fluxes or colors are made very good from tobacco pipe-clay and fine sand ground to powder, which must be tempered with water and well mixed together. The dimensions must be regulated by the quantity of matter to be fused. They are conical in shape, rather deep than shallow, and made from patterns of wood. When they are formed they must be well dried and thoroughly baked before they are used. Muffles are also necessary as well for the burning of the grounds as the paintings in enamel. The use of muffles is to preserve the enamel from external injury. They are made of the same material as the melting pots. The common muffle is a flat square piece bent into the form of an arch so as to cover the enamel to be burnt. This is moulded by a wooden mould, working it with a flat knife till it is moderately dry and firm. The muffle should have a bottom, but it may be of a separate piece, and having a margin round the upright part of the muffle. An inside muffle is also used into which the work is placed and all closed nicely up when the work is in.

Coffins is another term for larger muffles for burning large quantities, and the shape depends much on the nature of the work to be done and the inside muffles must be so constructed as to be moved easily into and taken out of the outside muffle by tongs with points bent at right angles.

Red lead is used as a fluxing body for grounds of enamel, and also as a compound for some colors. For this purpose it should be pure and to prove the purity it may be known by the brightness of its color, or else if an ounce is put into a crucible with equal bulk of charcoal mixed well together and covered with another crucible, kept in the fire for some time and then taken out, it will be found that the lead is reduced to its metal and will show by its deficiency of weight, by the law of oxidization, the proportion of adulterating matter.

This flux renders the enamel soft and is not fit for many uses.

Borax is a salt of peculiar qualities, it promotes vitrification, and the fusion of any glass even after being vitrified in a greater degree than any other substance known, on which account it is of the greatest consequence for enamel fluxes. It requires to be first calcined for this purpose which can be done by a moderate heat, but before used to mix as a flux it must be well powdered. Borax is perhaps the best workable flux known as it can be used for the softest and hardest colors when proportioned in the mixtures.

Salt is used for a glazing flux. It is of great use, extremely fluid and not liable to crack.

Arsenic and nitre are also used as fluxes,—but red lead, potass, borax and common salt will answer every purpose.

White sand finely powdered, or flint calcined to whiteness and immersed till cold in water, and then powdered, are substances used for forming the body of enamels. Also a kind of stone called by the French *moilou*, but found plenty in America, and forms the *upper crust* of freestone quarries.

Putty, or calcined tin are used for white enamel grounds. The purity of calcined tin is tested by fusing a quantity in a crucible with tallow until the tin regains its metallic state when the grease may be burned away, or made soapy by an alkali, and the impurities thus detected. Calcined tin is often mixed with white earth for common use. But if tin is adulterated with white lead it is not so easily detected, but can be done by fusing the two in a covered crucible and detecting the lead, if there is any, by it becoming, when removed from the fire, a yellowish or brown color. Tin is calcined by submitting equal weights of tin filings and nitre in a melting pot. The tin must be added gradually, as there are small explosions as it is added, and when all are mixed and the explosions have ceased it must be continued to the heat some time and constantly stirred, then poured out, dried, well pounded and bottled up for use. Antimony can be calcined, treated in the same manner as tin, but only 1 part to 3 parts of nitre and the crucible kept red hot. Tin however, is better.

These are substances which may be used commonly for enamel bodies. Arsenic calcined and prepared will also answer, but it is not much used, and the above simple substances will answer both for common and uncommon purposes.

For the Scientific American.

Black Varnishes.

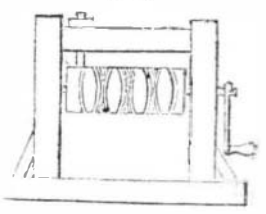
Black Japan.—Set in a pot 48 pounds of asphaltum and as soon as it is melted pour in 10 gallons of linseed oil, raw. Keep a moderate heat. Fuse 8 pounds of gum anima in a gum pot mixed with 2 gallons of hot oil and then pour this into the set pot. Afterwards fuse 10 pounds of dark sea amber in another pot and keep stirring it while fusing with and whenever it appears to be overheating lift off the pot for a few minutes. When this is completely fused mix in 2 gallons of hot oil and pour it into the set pot also and continue the boiling for three hours longer and mix red lead for a drier. Take it off when this is incorporated, let it cool and add turpentine to working consistency.

Brunswick Black.—Put 28 pounds of common pitch and 28 pounds of asphaltum made from gas tar into an iron pot and boil both for 5 or 10 hours to evaporate gas and moisture. Then add gradually to it 10 pounds of litharge and 10 pounds of red lead and boil for three hours until it will roll hard. When it is cool add turpentine to working consistency. This is for engineers and founders and will dry very quick. A better kind is made by putting 45 pounds of good asphaltum in an iron pot over a slow fire for 6 hours. Into another pot boil 6 gallons of boiled linseed oil into which is added slowly 6 pounds of litharge until it feels stringy between the fingers, then pour it gradually into the pot with the asphaltum and let the mixture boil until when taking it out, it will roll hard, when it must be left to cool and then the turpentine may be added to working consistency.

Black Varnish for the iron work of carriages.—Put 48 pounds of native bitumen (asphaltum) in an iron pot and boil 4 hours.—During the first two hours introduce 7 pounds of red lead, 7 pounds of litharge, 3 pounds of dried copperas and add 1 pound of coarse gum and 12 gallons of boiled oil and continue the boiling. Test it like the previous process when in like manner it is prepared for use by the turpentine.

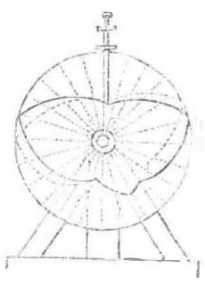
Black varnish for leather, such as that made for boots and shoes and carriage leather is made, by dissolving shellac in alcohol and mixing a proper quantity of ivory black, or lampblack for a coarser kind, and it may be diluted with water to working consistency to be applied with a piece of sponge.

MECHANICAL MOVEMENTS.



This cut represents a horizontal cylinder, having two reverse threads or grooves cut on it, which necessarily intersect twice in every revolution. Under this arrangement a point intersected in the groove will be traversed from end to end at a speed dependent on the revolution of the cylinder.

Eccentric Motion.



This cut represents a plan for producing reciprocating rectilinear motion. The wheel upon the axle turns uniformly in one direction but a rod attached to the tappet piece or cam, will not have a uniform motion but be guided in its motion according to the shape of the tappet, and the velocity will vary from the same cause. Thus if a rod is attached to the curve of the tappet and the rod constructed so as to move perpendicularly in guides, as the wheel revolves the rod will move alternately in opposite directions through the guide with the required velocity, and the velocity will depend, as every person will perceive, on the form of the tappet. The *rose engine* to turn a lathe is constructed on this plan and it is also employed in spinning machinery

To Extract Lamp Oil from a Dress.

If lamp oil is spilled upon a dress that will not be injured by wetting, lay it immediately in a small tub of cold water. A portion of the oil will be seen to rise to the surface; then pour off the water, replace it with fresh and still more oil will be seen floating on the surface. Again pour off the water, and fill the tub anew, repeating the process until no more oil can be discovered on the surface. Then take out the dress, wring it well, and dry and iron. No washing is necessary.

If lamp oil, tar or any other grease is spilled on a white dress, it can be eradicated by washing and boiling in the usual manner.

To take lamp oil out from a silk dress, any that should not be wetted, nothing is better than to turn the gown on the wrong side, and cover the place with powdered Wilmington clay; rub it on with your finger the straight way of the threads, to prevent the silk from fraying. At the end of an hour brush off the clay and put on some fresh. By repeating the application a few times, the oil will disappear.—*Exchange.*

The receipt to take out the oil from the silk dress is good, but soap-stone dust placed upon the oil, or grease spot, covered with a piece of brown paper and a hot iron placed upon this (not too hot) will cause the grease to be absorbed by the dust by a kind of capillary attraction, and thus remove the oil or grease more easily than by the above process. When a gingham dress gets oil on it, wash it in strong cold soap suds. The suds must feel slippery in the hand. No cold water can take out oil, and suds of fine soap, used cold for washing and afterwards well rinsed, instead of injuring good colors, will brighten them. A little alum added to the last rinsing water, will both clear up green and red shades and give the starch a fine crisping hardness. Tar or pitch may be removed by first softening with butter and then washing with soap, no other way excepting using olive oil instead of butter.—Ed

Questions and Answers.

Q. Why does water thrown on a brisk and flaming fire apparent increase the combustion?

A. Because the water is converted into steam, which expanding and mixing with the flame, causes it to spread out into a much larger volume than it otherwise would have occupied.

Q. Why does sunshine extinguish fire?

A. Because the rays engage the oxygen which had hitherto supported the fire.

Q. Why does a fire burn brisk and clear in cold weather?

A. Because the air being more dense, affords more nourishment to the fire.

Cure for the Bite of a Mad Dog.

Take of the root of allacampane one ounce and a half, cut it fine, then boil it in one pint of new milk, down to a half pint; take this in the morning, fasting, and eat no food till four o'clock in the afternoon. This medicine must be taken every other morning; the two last doses must weigh 2 ounces each —*Pennsylvanian.*

The Pennsylvanian says that the above was received from a gentleman who had its virtues proved in many instances.

It is to be hoped that but few will need to try the above experiment yet it is simple and worthy of some consideration, only it would have been well to have stated about the number of times requisite to take the draught to effect a cure.

Experiment with a Tulip.

The bulb of a tulip in every respect resembles buds except in their being produced under ground, and include the leaves and flower in miniature, which are to be expanded in the ensuing spring.—By cautiously cutting in the early spring, the concentric coats of a tulip root, longitudinally from the top to the base, and taking them off successively, the whole flower of the next summer's tulip is beautifully seen by the naked eye, with its petals, pistal, and stamina.