For the Scientific American.

To make Lake.

Boil 4 ounces of cochineal and one half an ounce of pearl ashes and then add a small quantity of the salts of tin and alum and wash them well, and dry on pieces of glass; if annatto is used with the pearlash it will be a good scarlet.

BRAZIL LAKE.

Boil three pounds of Brazil wood one hour in three gallons of salt water and then filter through clean paper while hot, also 5 ounces of alum filtered and 3 ounces pearlash filtered, stir all together hot and a sediment allowed to stand and then dried on glass or earthenware plates.

Another way is to boil 3 pounds of Brazil wood one hour with 3 ounces of salt in 3 gallons of water, and filtered hot, then to a solution of 5 ounces of alum in 3 gallons of water add the colored liquor and then 3 ounces of pearlash in 1 1-2 gallons of water filtered and added gradually to the other mixture and left to precipitate. This is for a water paint, but if half a pound of seedlac be used with the pearlash before filtering and 5 pounds instead of 3, be used of Brazil wood, it will work well with oil. Half an ounce of annatto to the pound of wood will throw it upon the scarlet shade, but it must be dissolved in pearlash, not in salt water.

CINNABAR. VERMILLION.

This is the sulphuret of mercury. Native cinnabar is sometimes found but not so pure as to make it fit always for use. Take of quicksilver 18 pounds, flower of sulphur 6 pounds, melt the sulphur in a pot and add the mercury gradually being gently warmed; stir with an earthen rod. If this takes fire, extinguish with a wet cloth. When this mass is cold powder it so that it all may be well mixed together and then sublime it, when it is to be ground well and washed carefully.

BLEACHING OIL. GILDING.

Pour about as much linseed oil into a shallow earthern vessel as will stand one inch in depth, then pour in six inches of water and let it stand covered with a fine cloth in the sun for a few weeks until the oil gets thick, when it is poured into a phial and submitted to a good heat, after which the clear is to be poured off and strained through a flannel cloth. To prepare wood work for gilding it should first get a coat of drying oil and a little ochre and vermillion mixed, then sized and the gold laid on. This is for gold leaf.

To prepare wood for burnished gilding it must be prepared with parchment size. Take 1 pound of parchment cuttings or white leather used by glovers and boil it in 6 quarts of water till the whole is reduced to 2 quarts, or when taking out a little it will look like a jelly, when it must be strained through a flannel and it will be fit for use. Wood for burnish gilding should be first rubbed with fish skin or some better material, then it must be primed with the size mentioned above mixed with whiting by melting the size and strewing it with the whiting and stirring them well together. A number of coats must be given and each one dried before the other is put on and then when the last coat is dry, it must be moistened with water by a linen rag. Then a composition of pure white soap thickened while dissolved in water to the thickness of cream by glover's size and diluted with water must be spread with a brush over the whole of the work and suffered to dry, and another coat given. After the last coat, the part to be burnished must be rubbed with a soft cloth until it be perfectly even. Some add a little vermillion to the gilding size and some color the work first with yellow and the size, or red lead and vermillion, this is to give the appearance of gilding to the deep parts of carving where the gold cannot be laid on, but it more frequently happens that this work is colored after the gilding is performed by what is called *matting*. The work being thus prepared it is wet with a camel hair pencil and the gold laid on the wet part till it be completely covered, or become too dry to take any more gold, and so on till all the work be covered with the gold that is wanted. Some wet the work with whiskey, but water is about as good. Then the interior, or hollow parts should be matted with ochre or Dutch pink and red lead. Isinglass size will answer well for mixing the colors for matting, or the white of eggs. After the work is perfectly dry it can be burnished with an agate burnisher, or a flint one. But the work must be perfectly dry or it will be spoiled by burnishing.

JAPANNER'S GILDING.

This gilding is performed by means of gold powder, or imitations of it.

Compound gold size is made thus: Gum anima and asphaltum each one ounce, red lead, litharge of gold and umber each one ounce and a half. Reduce the grosser ingredients to a fine powder and having mixed them, put them together with a pound of linseed oil into a proper vessel and boil gently with constant stirring by a glass rod till the whole is well incorporated. Continue the boiling and stirring until on taking out a small quantity it appears like tar as it grows cold. Then strain the mixture through flannel and keep it carefully stopped up in bottle having a wide mouth for use. When it is wanted it must be ground with as much vermillion as will make it an opaque body and also as much turpentine as to make it of a proper thickness for working with the pencil. Another plan and perhaps better, is to take of linseed oil one pound and of gum anima four onnces. Set the oil to boil in a proper vessel and add the gum anima in powder gradually, stirring till the whole is well mixed. Let the whole boil and treat as in the receipt before this, with the litharge, &c. but when applied it must be mixed with vermillion and oil of turpentine as before directed. This gold size may be used on metals, wood or any other ground whatever.

True gold powder is made as follows: Take any quantity of leaf gold and grind it with virgin honey on a stone till the texture of the leaves be perfectly broken and their parts divided in the minutest degree. Then take the mixture of gold and honey from off the stone and put it into a china mortar with water and stir it well about till the honey is melted and the gold freed from it. Let the basin or mortar then stand at rest till the gold subsides, and when it is so pour off the water from it and add fresh quantities till the honey is entirely washed away, after which the gold may be put on paper and dried for use. A gold powder of a more intense yellow, brighter than this may be made by precipitating gold dissolved in aqua regia by means of copperas or sulphate of copper, which can be done by pouring the nitro muriate of gold in water and dropping a solution of copperas or muriate of tin in it, when the gold will fall to the bottom, and then the clear should be poured off and the gold washed and dried on a piece of glass. German gold, which is made from Dutch leaf, if varnished, will answer for common purposes. It is made in the same way as the first directed above.

Aurium Mosaicum, which is tin colored and rendered of a flaky, or pulverine texture, greatly resembles gold powder, and is much used in gilding. Take of tin 1 pound, of flower of sulphur 7 ounces, of sal ammoniac and quicksilver each half a pound. Melt the tin and add the quicksilver to it in that state and when the mixture has become cold powder and grind it with the sal ammonia and sulphur till the whole be thoroughly mixed.—Calcine them in a mattress, and the other ingredients subliming, the tin will be converted into the Aurium Mosaicum and will be found at the bottom of the glass like a mass of flaky gold powder, but if any dark marks appear in it they must be carefully picked out or cut out. The sal ammonia ought to be perfectly white and the quicksilver must be pure. The calcination may be best performed in a coated glass vessel hung in the naked fire and the body be of a long figure that the other ingredients may rise so as to leave the colored tin clear of them. The quicksilver although it be formed into cinnabar along with the sulphur need not be wasted. It can again be revived by distilling it with quick lime.

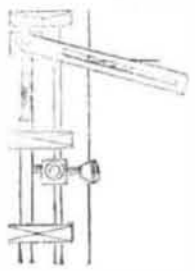
Lead may be detected in quicksilver if adulteration is suspected, by putting a small quantity in a crucible on the fire when the silver will all sublime away and leave the lead behind.

The gilding with japanner's gold may be used on any substance, and there is no other preparation necessary to its being gilt than by just having the surface clean.

The manner of using japanner's size is this. Put a small quantity prepared as above directed and mixed with a due proportion of oil of turpentine and vermillion and put them into the vessel used for colors for painting in varnish. Then either spread it over the work with a brush, where the whole surface is to be gilt, or draw with it by means of a pencil the proper figure desired and let it touch no other part. Then let it rest till it be fit for the gold, which will be known by it being a little clammy and not fluidous. When it is thus dry, the gold powders are used by a piece of wash leather wrapt round the forefinger and dipped in the powder and rubbed lightly over the sized work, or what is better, the powder may be spread by a soft camel hair pencil. The whole being covered it must be left to dry and the loose powder cleared away and collected with the soft brush. When leaf gold is used, the method of sizing must be the same as for the powders, but the point of due dryness is very nice in such a case for the leaves must be laid on while the matter is in a positively correct state, or the whole must be sized and gilt over again. When more gold is mixed with the turpentine than is wanted, it can be immersed under water until it is again wanted, which is a good plan to preserve all kinds of paint or other composition that contains oily substances.

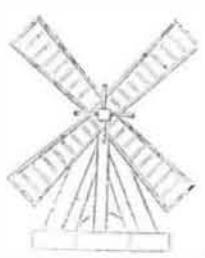
MECHANICAL MOVEMENTS.

Traversing Bar.



This is an arrangement whereby the perpendicular rod will be alternately traversed by the horizontal motion of the zig zag slot of the arm in which the pin is placed, consequently the traverse will assume nearly a perpendicular direction. The working of rods in slots used to be very common in nearly all machines, but as far as possible, it is best not to use them as the friction is very great.

The Windmill.



The Windmill is familiar to every one.—It is of most use in level countries where there are no mountain streams to propel water wheels. For this reason Holland has always been most distinguished for her windmills. At present she employs an immense number continually to pump the water out of her *voes*. Stevinus, a Dutch engineer, was the first who made carriages to travel on the roads by wind. He was a very scientific and skilful man. He lived in the 16th century.—The windmill houses are generally circular.—The shaft is attached to five frames with vanes or sails on them. The surface of the sails are not perpendicular to the axis, but inclined at an angle generally of 72 degrees at the end next to the axle, and at 83 degrees at the end farthest from it. Suppose the axle or main shaft to be placed in the direction of the wind—the wind will then strike the sails obliquely and the force will be resolved into two parts, one of which acting in the direction perpendicular to the action, gives a motion to the rotation of the sails and consequently to the wind shaft, from which it is communicated to the machine. The era of the invention of windmills is buried up in the ages of antiquity, and they are old and familiar to us. We can scarce reconcile ourselves to an old rural landscape, unless the old windmill crowns the brow of some grassy hill.

Substitute for Chloroform.

Professor Hieberg of Christiana, Sweden, has employed the sulphate of carbon as a substitute for chloroform. This gas is prepared by causing the vapor of fused sulphur to pass through charcoal powder heated to redness in an iron tube. When chloroform was first introduced in this country, we exhorted cautiousness in its use. We should not like to apply either ether, chloroform or bisulphate of carbon to a person of a short, thick neck—it would be dangerous.

Heat of the Burning Glass.

Convex lenses and concave mirrors, are frequently used for the production of high temperatures, by converging the rays of the sun, and those for this purpose are called burning glasses. At the focal point, any small object being exposed, its temperature is instantly raised. Few substances can withstand the heat—brick, slate, and other earthy matters instantly boil, metals melt, and even volatise away. Gold and silver melted in this manner throws off a vapor by which other metals may be gilded. The heat attained by the burning glass, far exceeds that of the best constructed furnace.

Echoes.

Echoes are produced by the reflexion of sounds. The distance which a person should be from a perpendicular wall or building in order to produce an echo with the voice, is about 62½ feet. If there are a number of perpendicular objects, at the suitable distance, the sound will be repeated many times Near Milan there is a remarkable echo which repeats a sound thirty times, and at Port Kent, on Lake Champlain, there is also a most beautiful echo

Speaking Trumpets.

The efficiency of the speaking trumpet depends on its length. It is stated that through such an instrument 18 to 24 feet long, a man's voice may be heard at the distance of three miles.

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