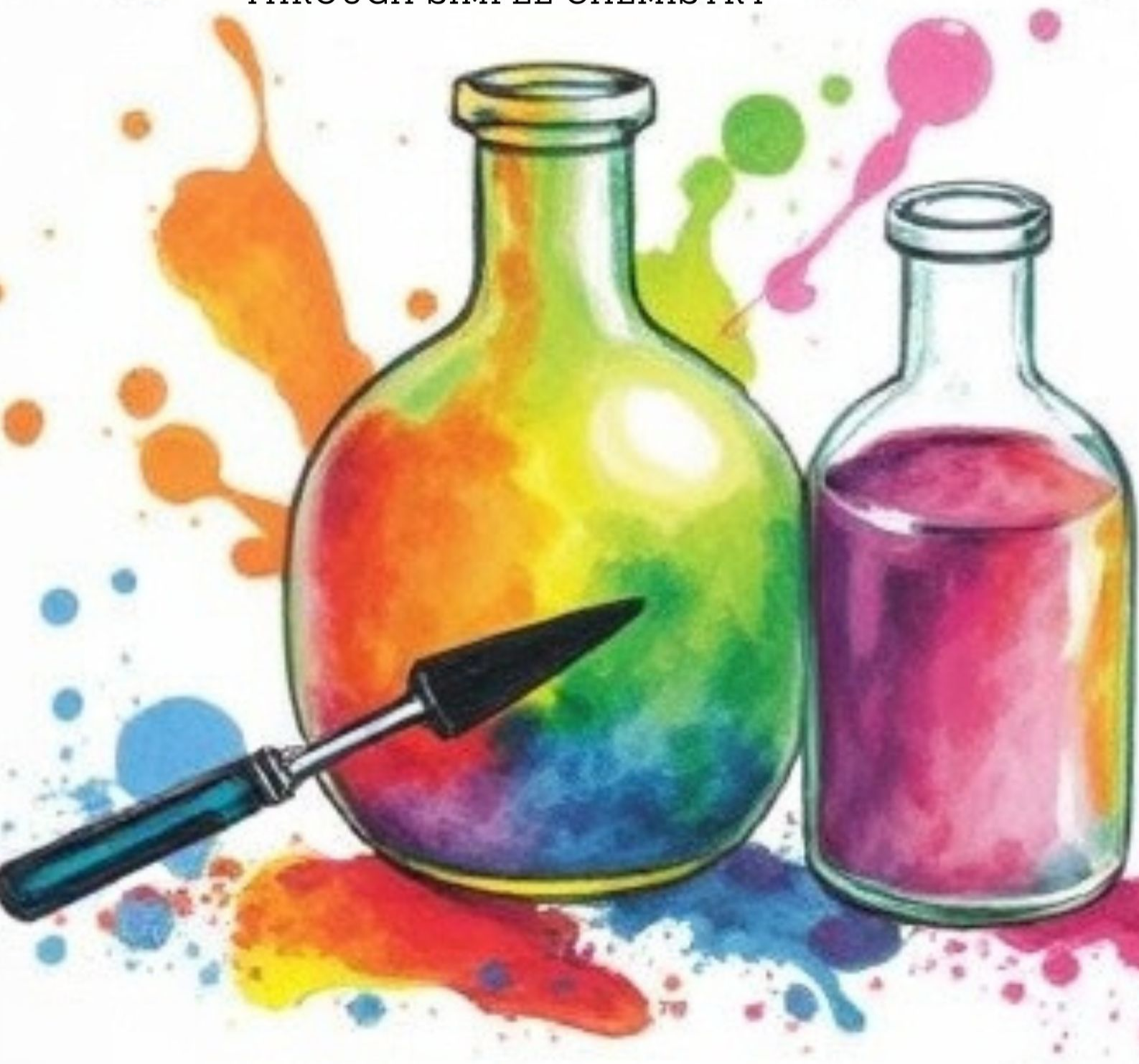
Artisan's Alchemy:

CRAFTING COLORS AND CREATIONS
THROUGH SIMPLE CHEMISTRY



To half a pint of alcohol, in a flask, add one ounce of gum-shellac, and half an ounce of turmeric, both in powder; set the flask in a warm place, frequently shaking it, for twelve hours or more; then filter or strain off the liquor, which may be occasionally diluted with new rum.—If a colour is required resembling dutch gold, a small quantity of dragon's blood may be added, or substituted in the place of turmeric.—When this varnish is used, it must be applied to the work freely and flowing, and must not be brushed or rubbed while it is drying. One or more coats of this varnish (or laquer as it is sometimes called) may be laid on the work, as the colour is required to be deeper or lighter. Note.—To make a rose coloured varnish, proceed as above directed, only substitute one-fourth of an ounce of the best lake, finely ground, in the place of turmeric. A transparent blue varnish may also be made by means of prussian blue; and purple or green, by adding a little blue to the gold, or rose coloured varnishes. These laquers are frequently employed for washing silver bronzed ornaments, to give them the appearance of gold or copper.

To one quart of the best alcohol, add half a pound of the thinnest and most transparent gum-shellac; mix and shake these together, and let them stand in a warm place for two or three days; then strain the varnish through a fine flannel, and bottle it. Shellac varnish is used for japanning lamps, tea trays, &c. Any of the colours commonly used for oil painting, may be ground in this varnish and should be applied to the work with a smooth brush, and in a warm place; and the work to be japanned, should be perfectly dry and warm. Note.—Most of the writers on the subject of japanning, have recommended seed-lac varnish; but it is a fact, though not so generally known as it ought to be, that shellac and seed-lac are the same substance; the only difference is, that shellac is in a more clarified and refined state, than that which is called seed-lac.

Take one pound of gum-copal, and melt in a flask over a brisk fire of charcoal; at the same time in another flask, boil, or heat to the point of boiling, one pint of linseed oil; as soon as the gum is melted, take it from the fire, and add the hot oil in small quantities, at the same time stirring or shaking it till they are thoroughly incorporated. Allow the mixture to cool below the boiling point of water, and then add nearly a quart of spirits of turpentine;—cork the flask slightly, and expose it for a few days to the rays of the sun, which will make it work more smooth and shining. If a larger quantity is to be made, a copper boiler, that is small at the top will answer to melt the gum in. For ordinary or coarse work, a larger proportion of oil and a little rosin may be added. If oil is used in which red lead and litharge (in the proportion of half a pound of each to a gallon of oil) have been previously boiled, the varnish will the sooner dry.

To a pint of alcohol, in a flask, add four ounces of gum-mastic, and one ounce of gumsandarac, both in powder; expose the mixture to a gentle heat, sufficient to produce a slight ebulition for a few minutes, frequently shaking it, and the gums will be dissolved; strain the varnish through a fine flannel, bottle and cork it. Some recommend the addition of venice turpentine, by means of which, a small quantity of gum-copal, finely powdered, may also be dissolved, but as venice turpentine contains a portion of spirits of turpentine, it renders the varnish too penetrating for many purposes; and even the gum-sandarac may be omitted without any essential disadvantage. This varnish should be a little warm when used.

To a pint of spirits of turpentine, in a flask, add one ounce of gum-elastic, cut into very small pieces; put in the cork slightly and set the flask in a warm place, where the heat may not be equal to that of boiling water, till the gum-elastic is dissolved, which may be effected in four or five hours. Then strain the solution through a strong linen or cotton cloth, and add half a pint of boiled linseed oil. Note.—A larger proportion of gum-elastic may be dissolved, and a less quantity of oil added, by which means the varnish will be more elastic, but will not have so smooth and permanent a gloss.

Take a piece of linen, or cotton cambric, rather larger than the map or picture to be varnished, and draw it straight upon a frame of convenient size, and confine it at the edges by small tacks or nails. Lay a thin coat of fine rye flour paste on this, and on the back of the paper that is to be varnished; lay the paper on the cambric and press them together till the paper adheres firmly in every part. When this is dry, give the face of the print two or three coats of a strong solution of gum-arabic in water, allowing each sufficient time to become perfectly dry.

This sizing must be applied with a large smooth brush, and must be spread over the work very quickly, and with as little brushing as possible. Afterwards, give the work one or more coats of the varnish described at Very small prints may not require to be pasted on cambric; and if the paper be very thick, the varnish may be applied without the previous sizing. Ising-glass, (which may be readily dissolved in boiling water) is sometimes added to the gum-arabic, and increases the strength of the sizing, but is somewhat less transparent than pure gum-arabic. A more simple method of varnishing prints, is to size them with a solution of loaf sugar, and finish with a solution of rosin in spirits of turpentine.

Take one pound of gumasphaltum and melt it over a slow fire; then take it from the fire and add spirits of turpentine in small quantities, stirring it briskly till it is of the consistence of varnish. As there is some danger of its taking fire when the spirits of turpentine is added, it may be well to be provided with a piece of wet flannel, to throw over it if that should happen. When it is nearly cold, strain it through a flannel, and bottle it for use. This blacking is used for bordering picture glasses, and is probably the most perfect black in nature. It is water proof and dries very quick.

Dilute venice turpentine with spirits of turpentine till it works freely with a camel-hair pencil; lay a coat of this varnish on any part of a print or picture, observing to keep the pencil within the lines, that the varnish may not spread beyond. Then lay a coat of the varnish on the same part of the back of the paper and lay on a leaf of gold over the varnished part; press down the gold very gently with cotton, and the varnish having rendered the paper transparent, the face of the picture will appear as if those parts were printed in gold. By this varnish (which is less liable to spread in the paper than oil) pictures may be so prepared, that the colours of various parts of them, may be varied and changed at pleasure, by placing pieces of silk or paper of different colours on the back of them.

Perhaps the most simple method of copying the outlines of a picture, is to place the picture against a window, with the paper over it, on which the copy is to be drawn; the principal lines of the picture will be seen through the other paper, and may readily be traced with a lead pencil. But the usual manner of copying, in landscape painting, and which will answer for pictures of any size, is to rub over the back of the picture with plumbago, or red ochre; then lay the picture on the ground that is to receive the copy, and trace the lines with a smooth pointed steel, or piece of hard wood. The ground will thus be very accurately and distinctly marked, by the plumbago or ochre adhering to the ground in the lines that are traced. When several copies are to be taken from the same pattern, (which frequently occurs in ornamental painting,) the outlines of the first copy may be perforated with some pointed instrument, so that being laid on the other grounds that are to receive the copies, and brushed over with a little fine dry whiting, or red ochre, (as the case may require) the whiting or ochre will penetrate the perforated lines of the pattern, and thus mark the ground on which it is laid.

Take two strips of wood, which may be about three feet long, one inch wide, and one-fourth of an inch thick; lay them on a table, parallel to each other, and eighteen inches apart. Across these, lay three other strips, which must be eighteen inches long, that each end of each piece may rest on one of the longer strips. Two of these must lie across the opposite ends of the longer pieces, and the other across the centre, thus forming two squares. Drive a pin through the ends of the short pieces, or confine them by rivets to the others, but not so as to prevent their playing circularly on the rivets. Then drive a pin or pivot through the centre of the middle cross-bar into the table, or board on which the work lies. In one end of one of the long strips (which may project a little over the cross-bar) fix a lead pencil, with the point downward, so that it may bear lightly on the board; and under this pencil, place the paper that is to receive the copy. And in the opposite end of the other piece, fix a smooth iron point, in a manner similar to that of the pencil, and under this point place the picture that is to be copied. Then with the iron point, carefully trace the lines of the picture, and the pencil in the opposite corner will move in a transverse direction, and draw the same picture very accurately on the other paper. If you fix the pencil half way between its former place and the middle cross-bar, and remove the pivot to a point that is directly in a line with the pencil and the iron point, it will give a copy in exact proportion, but only one fourth part as large as the picture that is copied.

Thus the copy may be decreased or increased to any size, and still retain its regular proportions. In this manner, painting on wood or canvas may be copied, which could not readily be done in any other way.

This may be readily effected by laying the paper on a table, and holding a double convex lens (a common sun-glass) over it, and then placing a mirror over the lens, in an oblique position so as to face partly downward, and partly towards the object that is to be represented. The rays of light passing from the object to the mirror, will be reflected downward through the lens, and produce the likeness of the object in full colours on the paper. This experiment may be easily made in the evening, by reflecting the flame of a candle in this manner, which will appear very brilliant on the paper. But in order to render the reflection of an object distinctly visible by day light, it may be requisite to exclude nearly all the light from the paper, except what falls through the lens. In all cases, the lens must be placed at a distance above the paper, according to its focus, or the distance at which it would contract the rays of the sun to the smallest point.

A very convenient camera obscura, for drawing landscapes, or even portraits may be constructed as follows: Make a box of boards, in the form of a regular cube, being one foot in length, breadth and height; bore a hole of one inch diameter, through the centre of the top; and on this, fix a double convex lens, the focus of which must reach the bottom of the box. Make an aperture of about six inches in length, and one in breadth, through one side of the box at the top, by shaving off, or hollowing the edge in such manner that when you put your face to the aperture to look into the box, it will exclude all the light except what falls through the lens. Make a hole through each end of the box, near the bottom, large enough to put in the hands, with paper and pencil. On the top of the box, on the right and left sides of the lens, fix two pieces of boards, which may be about four inches high, eight inches long, and three inches distant from each other.

Between these boards, fix a piece of looking glass, three inches square, and facing from you; the lower edge of the glass, being near the lens, on the side towards you; and the upper edge inclining towards you about thirty degrees from a perpendicular. Directly over, and nearly four inches above the lens, place another mirror, the centre of which must face directly towards the lower edge of the first. Cover the glass-box so as to exclude all the light from the glasses except what falls on them horizontally from objects directly in front of you, and place a sheet of paper on the bottom of the box inside. The rays of light, passing from objects in front, will be reflected from the first mirror to the second, and from the second, through the lens to the paper, where you will have a perfect similitude of the objects in view, in full colours, and true perspective, and may trace them on the paper, with a pencil or pen.

For this purpose, provide a plate of copper, rather larger than the design that is to be engraved, and may be about one sixteenth of an inch thick; planish by rubbing it, first, directly length-wise, and afterwards breadth-wise with a piece of pumice-stone, which may be dipped occasionally in a mixture of one part nitric acid, with six or seven parts water.—Then wash the copper with clear water, and rub it with an oil stone that has a plane surface; and then polish it with a piece of charcoal, that has been ignited to redness and quenched in cold water. Afterwards burnish the copper by rubbing it with polished steel. Lay a piece of transparent paper on the design that is to be engraved, and trace the principal lines with a lead pencil;—then brush over the copy or tracing with dry red ochre, and having rubbed the copper plate with a piece of bees-wax, lay the red side of the tracing on the plate; then with a smooth iron point, trace the same lines again, that they may thus be transferred to the plate by means of the red ochre and wax.

Take up the paper and trace the lines on the plate with a needle, thus scoring the lines slightly on the copper. Then warm the plate and wipe off the wax, or wash it off with spirits of turpentine, and rub the plate with fine dry whiting. The next instrument to proceed with is the graver; consisting of a blade of steel about three inches long, which is fixed in a convenient handle like an awl. The form of the graver should be triangular, or between a triangle and lozenge, having two sides plane and the other round or swelled; and should taper regularly from the handle to the point, or nearly so, but the point must be ground off obliquely so that the edge may extend a little farther than the back; and the edge should rise a little rounding towards the point.

It is very essential that the edge and point of the graver should be kept very sharp. The manner of holding the graver, is to take the handle into the hollow of the hand, pressing it with three fingers, on one side, and the thumb on the other, and extend the fore finger on the back of the blade towards the point.—The edge of the graver must rest on the plate, and its motion when cutting must be endwise in all cases; though there evidently might be a graver constructed, which might, in some cases, be handled in a manner more similar to that of a pen or pencil. A graver of a square form may also be requisite, for cutting large and broad lines occasionally.

In proceeding to engrave the plate, begin with the outlines, observing to press harder or lighter on the graver, as the lines require to be larger or smaller, and finish each line with the same motion if possible, without taking the graver off the plate. Having cut the outlines, proceed to fill up, and shade the work discretionally, according to the design. It may be requisite, after part of the work is engraved, to scrape it lightly with the edge of the graver, to take off any roughness, that may have been formed on the part engraved. If after finishing the design, any part appears to have been improperly executed, such parts may be erased by the burnisher, and may be re-engraved with the requisite amendments.

Melt together two ounces of bees-wax, and one ounce of venice turpentine, and when the wax is melted and boils, add by small quantities, two ounces of gum-asphaltum, stirring the mixture briskly at the same time; and when the mixture is well incorporated, take it from the fire, let it cool a little, and then pour it into warm water, and by working it with the hands, form it into balls of about an inch in diameter, and wrap each of them in a piece of taffety, or thin silk. Then, having prepared and polished a plate of copper, as directed for copper-plate engraving, warm the plate sufficiently to melt the balls of wax varnish, and rub one of them over it, till every part of the polished side is covered with the varnish; then with a ball of cotton, wrapped or tied up in taffety, beat every part of the varnished plate gently, while the varnish is yet flowing, that it may spread the more even and uniformly.

Then hold the plate in a horizontal position, with the varnished side down, and hold the flame of a wax candle under it, or a small roll of paper that has been dipped in melted wax, and thus blacken the varnish while the plate is yet warm enough to keep it in a melted state. When the varnish has become sufficiently and uniformly black, let the plate cool, and having drawn the design on transparent paper, rub over the face of it with chalk; then wipe off most of the chalk with a piece of flannel, lay the chalked side on the varnish, and trace the lines, somewhat minutely, with a smooth round pointed needle. Then take up the paper, and proceed to scoring the lines in the varnish. For this purpose you must be provided with several needles of different sizes, and fixed in handles, which may be about four inches long, and nearly half an inch in diameter, and the needle may project three fourths of an inch from the handle. Some of these may be ground a little flat on one side, and others may be round, but taper more abruptly at the point.

These needles may be held, and managed much the same as a pen. Begin scoring with the out lines, observing to cut completely through the varnish, but it is not requisite to scratch the copper, except in making very heavy lines, when it cannot well be avoided. Having finished scoring the varnish according to the design, fix a border of wax (composed of two parts bees-wax and one of venice turpentine) round the work, on the margin of the plate. This border may be about half an inch high, and must be fixed to the plate while warm. Then pour on as much nitric acid, diluted with an equal quantity of water, as the plate with the border will contain.

In about fifteen minutes pour off the acid, and examine whether it has sufficiently corroded any part of the work; if so, lay a mixture of warm tallow and linseed oil over such parts with a hair pencil, and again pour on the acid. In half an hour more the acid may be poured off, and the plate being warmed, the border may be removed, and the varnish may be wiped off with a piece of linen cloth;—the plate may then be washed with olive oil, and cleansed as before with dry fine whiting. Note—Different artists use a variety of different preparations of varnish for the purpose of etching. In some old recipes, virgin wax, calcined asphaltum, gum mastic, amber, colophony, greek pitch, burgundy pitch, black pitch, resin, shoe makers' wax, &c. &c. are mentioned. But it is believed that the above described varnish, while it is much more simple, will answer equally as well for young practitioners; and it is not expected that any will attempt very nice work, without further information than they could expect to obtain from the sketches in this little collection.

Having prepared a plate of copper, proceed to score it so full of lines, cross-lines and diagonal lines, that when they are filled with ink, the plate may appear quite black. For this purpose an instrument will be requisite that is fashioned similar to a chisel, the round or sloping side being scored or filed near the point, with lines or notches very near to each other, so as to form a set of sharp uniform teeth at the edge; this instrument is called a cradle, and should be a little round at the corners. This cradle must be moved over the plate, in the manner of a graver, scoring the plate uniformly in various directions.

When the scoring is finished, take a scraper, which may be similar to a knife, having two edges, and sloping on each side towards the point; with this, scrape off the roughness of the plate, in such places as is required to be the lightest in the print; such parts as require to be shaded partially, may not be scraped so deep, while the points that are to be the brightest may be burnished quite smooth with the polished end of a piece of steel, about the size of a large nail, and some of the heaviest out-lines may be cut with a graver. Thus any portraits or other figures may be formed on the plate, with due proportion of light and shade, and will, if properly-managed, give an impression on paper, equal in elegance to any that might be produced by other means.

Polish the plate of copper, the same as for engraving; moisten the plate with water and sift on finely powdered rosin and gum-asphaltum, so as to nearly cover the plate; then warm the plate sufficient to make the powder adhere, but not to melt it entirely. Transfer the design to the plate, and cover such parts as are intended to remain white, with a varnish composed of bees wax and linseed oil, which may be coloured a very little with black, and must be applied to the work, while warm, with a camel hair pencil.

Then fix a border of wax round the plate, and pour on diluted nitric acid. In about one minute, pour off the acid, and wash the plate with clear water, but without effecting the varnish;—dry the plate, and apply the varnish to such parts of the design as are intended to have but a faint shade; then apply the acid for a minute or two longer. Thus proceed biting in, and stopping out alternately, till every part of the design has acquired its proper shade. But if any part requires a darker shade than the ground, the powdered rosin may be removed from such parts with a scraper. When the plate has become sufficiently corroded, the varnish may be washed off with oil, or spirits of turpentine, and the plate may be cleansed with whiting.

The paper on which impressions from a copperplate are to be taken, should be moistened, or wet down two or three days previous to printing; this is performed by dipping the sheets in water severally, and then laying them all together under a heavy weight till they are used. When the paper is ready, the copper-plate may be warmed over a chafing dish of coals, and the engraved side completely covered and all the lines filled with common printing ink, or ink made of Frankfort black, finely ground in old linseed oil. This may be done by means of a printing ball, or the ink may be spread on the plate with a smooth stiff brush. The plate may then be wiped with a piece of linen or cotton cloth, and afterward with the hand, being passed slowly but hardly over the plate to take off all the ink except what remains in the lines of the engraving; to accomplish which more effectually, the hand may be rubbed occasionally with dry whiting.

When the plate is thoroughly cleaned of the redundant ink, it may be laid on the table of a rolling press, and having a sheet of the moistened paper laid upon the face of it, and a piece of fine broad-cloth over the paper, the whole may be passed through the press. Then on taking up the paper, it will be found to have received a black impression from the plate, according to the engraving or etching, and the plate may be again carried to the fire, to be blacked again as before. This is the usual manner of printing; but when a rolling press is not at hand, the plate and moistened paper may by other means, be pressed hard and firmly together, and the paper will have received the impression equally as fair. Any of the colours, commonly used in oil painting, being ground very thick in oil may be substituted for ink in copper-plate printing. The plate, after being used, should be wiped clean with a piece of flannel, moistened with olive oil.

Select a piece of glass that is thick and straight, and lay a coat of melted bees-wax on the fairest side; then with a needle, pen-knife, or any other convenient pointed instrument, trace any design, or picture, which being placed under the glass, may be seen through the wax; or form any letters or figures on the glass, carefully cutting or scoring quite through the wax, and making the lines large or small as occasion may require.

Then warm a piece of the wax, so as to form it into a roll, about one fourth of an inch in diameter; lay this roll round the work upon the glass, and press it down so as to make it adhere to the glass, thus forming a border. Then take some finely powdered fluate of lime, and strew it evenly over the glass, on the waxed side, that it may fill all the lines in the wax; and then gently pour upon it, so as not to displace the powder, as much sulphuric acid, diluted with thrice its weight of water, as is sufficient to cover the powdered fluate of lime. Let every thing remain in this state for three hours; then pour off the mixture, and clean the glass by washing it with spirits of turpentine. The figures which were scored in the wax, will be found engraven on the glass; while the parts which the wax covered, will be uncorroded.—This glass plate may be charged with ink, (or any thick oil paint) and impressions may be taken from it on paper, the same as from copper plates, only caution is requisite, that the glass be not broken by the pressure. Note.—The fluoric acid, which is partly absorbed by the water, in the above process, being very corrosive, should not be suffered to touch the hands, nor any valuable vessel whatever.

Take a piece of marble or slate, and form a smooth plane surface on one side, and on this, paint any letters or figures with common oil paint of any colour. When this is dry, wet the stone with water, which will not adhere to the painted figures, especially if the paints were mixed with old linseed oil, that will produce a sharp gloss. Then apply a printer's inkball to the plane surface, by which means the dry painted figures will be covered with the ink, while the bare surface of the stone, being wet, will not be blackened or affected by it. Press the figured surface upon some moistened paper, and it will give a fair impression of the painted figures, on the paper. The block of stone must be then dipped in the water, and again inked as before, Thus many impressions may be taken with a tolerable degree of accuracy.

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 glass 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. It 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.

If the glass is not likely to be exposed to moisture, the pieces may be joined by a solution of equal parts of gum-arabic and loaf sugar in water; or if these are not at hand, the white of an egg may answer nearly as well. But a strong water proof cement that is equally transparent, may be made by digesting finely powdered gum-copal, in thrice its weight of sulphuric ether till it is dissolved. This solution may be applied to the edges of the broken glass, with a camel hair pencil, and the pieces must be put together immediately and pressed close till they adhere.

Heat a piece of chalk to a full red heat in a fire; and while this is heating, take the white of an egg, and mix and beat together with it, one fourth of its weight of pondered or scraped cheese, (such as is most void of cream, or oily matter is preferable) or the curd that is formed by adding vinegar to skimmed milk;—take the chalk from the fire, and before it is cold, reduce it to powder, and add as much of it to the mixture as will form a thick paste, and beat them anew all together, and use the composition immediately. When this is dry, it will resist, in a great measure, either heat or moisture. A semi-transparent cement, suitable for china ware, may be made by gently boiling the flour of rice with water.

Dissolve common glue in water in the usual way, and dip into it some clean paper, sufficient to take up an ounce or more of the glue. When the paper is nearly dry, roll it up, or cut it into strips and put them into a wide mouthed phial or flask, with about four ounces of alcohol; suspend this over a fire so as to boil it gently for an hour, having the cork set in slightly to prevent its taking fire, but not so as to prevent the vapour entirely.