THE PAINTERS

ENCYCLOPÆDIA.

THE PAINTERS' ENCYCLOPÆDIA

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PAINTERS' ENCYCLOPÆDIA.

CONTAINING

DEFINITIONS OF ALL IMPORTANT WORDS

IN THE ART OF

PLAIN AND ARTISTIC PAINTING,

WITH DETAILS OF PRACTICE IN

COACH, CARRIAGE, RAILWAY CAR, HOUSE, SIGN AND ORNAMENTAL PAINTING,

INCLUDING

GRAINING, MARBLING, STAINING, VARNISHING, POLISHING, LETTERING, STENCILING, GILDING, BRONZING,

AND VALUABLE HINTS AND HELPS IN

SCENE PAINTING, PORCELAIN PAINTING, PLAIN PAINTING, DISTEMPER PAINTING,

AND ALL WORK IN WHICH A BRUSH, PENCIL OR PALETTE IS USED.

ELABORATELY ILLUSTRATED.

BY

FRANKLIN B. GARDNER,

Author of "The Complete Carriage and Wagon Painter," "Everybody's Paint Book," "How to Paint," etc., etc., etc.

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PREFACE.

The general character of this book is indicated by its title. The several topics are treated with a view to technically instruct those who desire to make a study of the art of painting as practised in the paint-shops and studios of the United States.

Every effort has been made to ensure scientific accuracy in all the statements made. The knowledge acquired during a close connection with the business for thirty-five years is embodied in these pages. The employment of engravings, wherever it was deemed necessary to more fully explain the letter-press, will be found to add greatly to the value of the work as an instructor, while the many extended articles, mostly original, will, it is believed, be interesting even to those who read only for pleasure, or for information on general topics.

Care has been taken to make the book one easy of consultation, virtually, a Dictionary in one alphabet, readily distinguishable from a collection of exhaustive treatises, and as such it is submitted by

THE AUTHOR.

THE

PAINTERS' ENCYCLOPÆDIA.

A is the first letter in almost all alphabets, excepting, perhaps, the Ethiopian where it takes the thirteenth place. The Roman alphabet of which the letter press of this book consists, forms the base of all other alphabets used to express the English language. In fact there are but two alphabets in common use, namely: the Gothic and the Roman.

For many years the formation of the letters of the alphabet, based as they were upon the Roman, remained unchanged by sign writers and engravers; that is, the general features of a letter, whether Roman, Gothic, Antique or one of varieties of ornamental letters, would be used and no endeavors be made to add to or detract therefrom; but of late years there seems to be no end to the shapes given to letters, and in many cases this is so extravagantly carried on, that the original form of the letter is lost, and one is obliged to study a line well before the words can be read. This is due, principally to type founders and letter cutters, who, in order to increase their sales invent "new styles," for which a demand is soon

created, as is the custom of the hatter, with his spring and summer styles. (*See Lettering.*)

Absorbent Ground.—A term given by painters to a water-color mixture, which is laid upon canvas or wood, which at once imbibes the oil of subsequent coats of oil paint, leaving the colors in which the design is made dry and brilliant. Artists who work on silk and satin grounds, spread the oil from their tubes upon blotting paper to allow the oil to be absorbed then mix it upon their palette with spirits of turpentine.

In carriage and car painting, the principal aim is to make the foundation as non-absorptive as possible, so that the oil of subsequent coats will remain and oxidize with pigment as it was applied.

Accidental Colors.—Those colors which depend on the affections of the eye. Thus, if we look for some time upon a piece of yellow cloth, and suddenly turn the eye from it, we will see the color of indigo; red will give green, and so on. (*See Complimentary Colors.*)

Adulteration.—The adulteration of pigments and vehicles for paint is carried on to a great extent by unprincipled dealers, and great care should be taken to purchase only from reliable tradesmen, which, though not a certainty against adulteration, will at least lessen the chances of imposition.

White lead may be adulterated with barytes, the bane of all paints. Lakes, blues, and in short all the stock of the paint shop may be tampered with. It is not supposed that every painter is chemist enough to detect the true from the false,

but where there is doubt he may try the following:

To know when white lead is pure, rub a little of it in the fingers and throw it on a piece of live charcoal; if pure the *whole* of it will turn a yellowish hue, and in a few minutes will take the form of metallic globules; but if adulterated there will be a residue of white earthy matter.

To detect vermilion, place a little on a red-hot iron, if pure it will evaporate entirely; if not, there will be a residue of white earthy matter.

Chrome yellow may be tested by pouring a little nitric acid upon it; if it effervesces, it is adulterated; if it does not, it is pure.

Genuine indigo will burn.

Ultramarine is not affected by nitric acid when adulterated; but if pure it will lose its color completely.

The cost of *genuine* white lead and other colors can readily be obtained by consulting any of the numerous trade journals. The colors desired being determined, one can form an approximate estimate of what they should cost simply ground in pure linseed oil, and any offer of "pure paint" at a price which the cost for raw material precludes should be carefully avoided. Pay a fair price, and then insist upon a pure article.

While it is of great importance that the pigments should be as good and pure as possible, it is even of greater importance that what goes into them should be of the best material and make. The best of paints may, and will, prematurely perish if poor japan or oil is used. A poor paint will wear much longer with good japan and oil, than a good paint with poor japan and oil. The oil and gum used

in making japans and varnishes is the "glue" which holds the particles of paint together, and in proportion as these are well made, and of a good material the paint retains its tenacity a longer or shorter time.

In keeping with the flood of poor paints put upon the market by grinders, the varnish men have been called upon for cheap japans and liquid driers, until it has come to pass that these so-called driers can be bought at a price below the actual cost of raw linseed oil or turpentine, the price of gum not considered. Any painter or consumer of paints that stops to consider a moment must know that inferior materials are being used, and the inference is that they are rosin and benzine.

Aerial Perspective.—An optical term referring to color in the same manner as the term *Linear Perspective* refers to form. Distance diminishes the size of an object, and distorts its form so far as all those lines which run in the direction of vision seem to converge and finally to meet. Thus the two rows of houses forming an avenue are sufficient to make the effect of perspective strikingly felt, as they seem to meet each other in some distant point, though in reality they are perfectly parallel. Distance also weakens the color of an object, and under certain circumstances it completely changes it. Thus the green forest and the gray rocks become, at a certain distance, and under certain circumstances, blue, perspective, linear and aerial, and is therefore the means by which painters represent distance. Linear perspective (*q. v.*) was first fully understood and applied by Michael Angelo in 1475; Aerial perspective by Claude Lorain in 1600.

Affinity.—A chemical term used to denote a kind of attraction by which the particles of different bodies unite. Thus, when an acid and an alkali combine, a new substance is formed called a salt, entirely different in its chemical properties from either an acid or an alkali.

When the ingredients composing paint are put together there is a certain species of affinity existing, but it is not the same affinity known to the chemist. Again there is said to be a certain quality of affinity between coats of varnish or paint applied one over the other, and where this does not exist there will be chipping or flaking of one or more of the coatings, or the whole paint structure may leave the surface over which it was spread.

Alcohol.—Highly rectified spirit extracted by simple distillation from various vegetable juices and infusions of a saccharine nature, which have undergone vinous fermentation. Alcohol is the solvent used in making spirit varnishes, although of late years a similar substance called wood naphtha or wood alcohol has in many cases superseded the pure alcohol.

All-over Patterns.—A design of free growth, repeating horizontally and vertically.

Aluminium Leaf.—Thin sheets of metal used in place of silver leaf, made from aluminium, a metal which resists oxidation in a great degree. This is called by some "nickel leaf", it is inexpensive and durable.

Amaranda Lake.—A color inclining to purple, deriving its name from *amaranth,* a purple flower which when plucked from its stem is a long time

fading or withering. This lake is said to be very durable, but it is more of an artist's color than for general work.

Amaranth.—A color inclining to purple. To make it, tint white with blue and red, then sadden with black.

Amassette.—An instrument similar in shape to a palette-knife (*q.v.*) made of horn or ivory and used by French painters for mixing colors.

Amber.—A fossil resin of trees belonging to an order now extinct. It is found in various colors, but chiefly in orange and yellow tints.

Amber Varnish.—A varnish made with amber as follows: Having finely pulverized amber, put eight ounces in a vessel containing half a pint of best spirits of turpentine, place the vessel over a fire till the amber is melted; then add two ounces of powdered shellac and heat again. Keep stirring till the gum is melted, then add to the whole an ounce of cold-drawn linseed oil. Stir all well together, strain and it is fit for use.

Amber Varnish.—Take of amber gum, one pound; boiled oil (pale), 12 ounces; turpentine, one pint. First, put the amber in an iron vessel and heat it until semi-liquid; then add the oil, mix thoroughly, remove from the fire and when cooled a little, put in the turpentine. This forms an excellent covering for uncolored wood, as holly or pine, being very pale in color and extremely hard when dry.

Amber Varnish (Black).—Amber gum, one pound; boiled oil, one-half pint; asphaltum, 8 ounces; turpentine, one pint. Melt the gum as before directed, then add the asphaltum previously dissolved in

the oil, heat all very hot, then remove from the fire and allow to cool a little, when the turps may be added. Black resin is used in place of the asphaltum by some manufacturers, but the asphaltum is best.

AMBER VARNISH (PALE.)—Take five pounds of the pale transparent gum, melt it and add hot clarified linseed oil, two gallons, boil until it strings—like boiling molasses—then add four gallons of turpentine. Good drying oil may be used, or driers may be added if desired to dry quickly.

AMBER VARNISH (PALE).—Melt 8 ounces of gum, and add one-half gallon of boiled oil, then dilute with turpentine as above mentioned.

American Method of Carriage Painting.—The name given to a system of painting vehicles of any kind wherein certain prepared liquids and paints are used, and certain means adopted for doing the work, by which economy, dispatch, and a uniform excellent quality of results are attained. The system of painting, as here laid down, has received the hearty commendation and adoption of many of the leading carriage and car-builders of both this country and Europe, and we do not hesitate to devote a large amount of space to present our readers with every detail; giving in most part the directions laid down by the Messrs. Valentine & Company, who manufacture the leading articles used in this method. Supplemented with copious notations by the author of this work.

1. THE PRIMING.—The first or priming coat upon wood or iron, is of great importance, for *on the durability of the foundation, the durability of*

the superstructure mainly depends. There are several methods employed for *priming* work, for which various advantages are claimed. Some think the old Engish method the best—consisting of boiled oil and white lead with a little "patent dryer"—but few there are who now depend upon that as a priming, owing to the widespread denunciation of boiled oil in the trade journals. There are but few carriage-builders who could *afford* to follow the method of painting as done by such men as Thomas Goddard, of Boston, a few years ago. Customers nowadays are unwilling to wait from six months to a year for the painting of their carriage, and still less willing to pay the price that must follow such a protracted piece of work.

Carriages are now painted in first-class style and manner in from fourteen to twenty days. The principal reason for this, is the use of a *priming,* which obviates the application of several coats of white lead paint, yet forms a solid but elastic foundation. *Priming* must possess the following qualities in order to insure good and durable work: *Penetrativeness,* that it may enter the pores of the wood and help to fill them; *adhesiveness,* that it will remain firm in the pores, and not chip or flake and fly off; *compactness,* that it may form sufficient body to hold up the subsequent coats, and prevent the absorption of moisture; *elasticity* or toughness, to prevent the chipping, peeling or flaking of after-coats; and *uniform consistency,* that all parts may be done in an easy and uniform manner. Of the many *primings* now in use by the leading carriage painters of this country are permanent wood

filling (of which more anon), and white lead and *raw* oil.

It is claimed, on the one hand, that paint, no matter what the composition may be, simply forms a coating on the surface of wood or iron, and protects only so long as it remains uninjured, which period of time would be shortened were it not for the varnish coats which protect the paint. Now, the oil absorbed from the point is trifling in comparision with the amount required to fill the pore, and prevent further absorption. Beside this, the volatility of turpentine and oil, after they have entered the pores, causes them to evaporate, to some extent, and to leave, under the coating of paint, *empty* and *hungry pores*, which are so often the cause of "chipping" and "flaking"; "striking in" or "loss of luster" in the varnish coats, owing, without doubt, to the absorption of the oil from subsequent coats by this porous under-ground.

2. Linseed Oil as a Primer.—Linseed oil, although classed among the fat oils, possesses the quality of penetration to a very great extent; indeed too much so, to have much value as a priming when used alone. It has been found that when the outer surface of such a priming has thickened, and become partially dry, by the absorption of oxygen, the under part is still soft, and is sucked more or less into the pores of the wood; but having no great body or filling qualities, it does not permanently stop them. It is evident that the presence of turpentine would not help to remedy this defect on the part of the oil, but would only increase it.

3. The Question of Time.—As we have before mentioned, the question of time is one of great impor-

tance nowadays. Now, the method of filling the pores of the wood with numerous coats of white lead and oil paint, will no doubt produce durability, provided that proper care is taken, and plenty of time given for each coat to dry thoroughly before the next is applied. But to do this is difficult where the work is at all done in a hurry; and if one coat is imperfectly dried or preceded or followed by coats of varying elasticity, there is liable to be trouble.

This demand for *speedy work*, coupled with the known difficulty of turning out a quick job in white lead *priming* and *filling* which should be durable, was the means of calling out the modern method of carriage painting, known as the "Piotrowski method," after the inventor of the *Priming*. Walerian Piotrowski; and afterwards christened by the author of this book "*The American Method of Carriage Painting.*" Which we will now briefly describe.

4. Priming Carriage and Car Bodies.—*Permanent Wood Filling*, the universal priming, is supplied by the manufacturers, Messrs. Valentine & Company of New York, in proper condition for immediate use. It is a liquid of about the same consistency as varnish, in two grades of color, "light" and "dark"; the former being almost colorless is used, principally, for work which is to be painted in light colors; the latter being of a black-walnut color is used on any work where color is no object. This is excellent for staining pine and other soft woods to imitate hard wood. The general character of the two are the same, the only difference being in the color. There should be nothing added to the P. W. F. but, if it appears

too thick, in case of very cold weather, it may be turned into a tin vessel and *warmed* in a kettle of hot water. When the body is completed by the wood-worker, the painter gives it a thorough dusting inside and out, and proceeds to "prime it." Pouring from the can a small quantity of P. W. F. (it does not require much to coat a body, as one gallon will, if rightly used, go over a surface of from 800 to 1000 square feet of whitewood or pine), with an ordinary paint brush—perfectly clean, or one kept for the purpose, and not used for paint, he coats over a portion of the body, say: the back, or one side, taking no great pains to spread it evenly, he may daub it on, then, immediately wipe over and *rub in* every part with rags (cheap calico or muslin torn in pieces). This rubbing with rags spreads the priming evenly, and forces it into the pores. Go on in this manner until the whole is done, over wood and iron alike, leaving no *surface coat* as of paint or varnish, the hand should scarcely be soiled or greased if passed over a finished portion of the work. The canvassed parts inside, if any, may be painted with slush paint, for they would absorb a great amount of P. W. F. with no corresponding benefit. It cannot be too strongly impressed upon the mind of the painter desiring to make a successful use of the P. W. F., that it *must be put on sparingly and be well wiped or rubbed into all parts of the work*, and that *only one coat* should be applied.

The body should now be set aside to dry, and forty-eight hours should be given, unless the weather is favorable, when the time may be shortened to 36, and even to 24 hours without detriment. There will be a thin film covering the

hard parts of the wood, and the iron work, and the P. W. F. being composed principally of oil and a gummy or filling substance will have entered the pores and sealed them against the entrance of dampness or the liquids from subsequent coats of paint.

5. Priming the Wheels and Under Parts.—When the wheels, beds, bars, etc., are finished by the wheelwright, and before the grain of the wood is raised by the atmosphere, a coat of P. W. F. is put on over every part in the same manner as the body, wiping it well with rags; being careful to coat the bottom of bars, tread of wheels, etc., for this material is a bar to all dampness, and will thus render the work more durable. This preliminary coat is not properly the *priming*, for it is put on to prevent the grain of the wood from absorbing oil and dirt from the smith's hands, and to prevent the rims or felloes from swelling with the water used in putting on the tires. When the ironing is completed, every part of the wood is sandpapered and filed down until nothing but clean wood and iron are seen, and every trace of P. W. F. is removed from the surface—for the preliminary coat has fulfilled its mission.

The preparation of the gears at this stage, is the main operation, for if they are well done, but little labor remains to be accomplished. The *priming* is now in order, and going over every part with P. W. F. in the same manner as at first, this is soon ready for standing aside to dry. The wood pores are sealed up, the surface of the wood has a thin film covering it as also the iron-work, and a more tenacious coating is not easily found. The time employed so far upon the gears

has been trifling, compared to the old-fashioned method of filling up with with white lead and oil, which we will now describe :

6. White Lead Priming.—White lead, the base or foundation, should be pure, but dealers have many means of adulterating it with sulphate of baryta, or barytes (a native ore), gypsum, or plaster-of-paris and carbonate of lime, or common chalk, all of which are detrimental. Linseed oil, the purest *raw* oil, also, should be used, but this is often adulterated with menhaden (fish) oil, or cotton-seed oil, and who can tell when the materials he uses are pure? Having secured what is supposed to be pure—and that from a well-known responsible maker we will suppose to be, the next requisite is pure black, in order to form a gray or lead color. With these ingredients the *priming* is formed. The white lead is beat up with the raw oil until of a paint-like consistency, then a little of the black is added to form a clean lead color. Some add driers, such as Brown Japan or Japan Gold size, but many prefer to use none whatever. The priming thus made is now spread on the wood, and with a self-satisfactory air the painter runs the job out on the drying shed or other convenient place to dry. The oil of the priming gradually leaves the pigments—white lead and black—and seeks the interior of the wood, sucked in, as it were, by capillary attraction, and the pigments are thus virtually strained and left upon the surface in a semi-dry porous state—while the oil that entered the wood, not being a gummy or filling substance, stains the interior of each little pore only—so much for the priming! Next, a coat of white lead and oil

of similar consistency is put over it. The oil from this coat is drank in by the porous pigments, through which it passes and spreads itself over the stain which the first coat gave to the pores, and the second coat pigments are strained and left porous, so on until possibly (if a *good* job is to be made), five coats of "lead color" is given; by which time the pores may have become filled by the successive layers of oil, and the pigment on the surface too, is finally cemented together or partially so. This is called the *foundation*, and it was the only known way to paint a carriage for many years.

The time consumed was enormous to our modern views; weeks were allowed the coatings to dry, days were passed in sandpapering, and finally, in order to meet the demand for quicker work, the number of coats were lessened with a corresponding decrease in durability, for no matter what is put upon the surface, if of a liquid nature, the wood will absord it, and unless it has power to close those hungry pores, absorption will go on.

ANTI-ABSORPTION is the key-note of the American method of painting.

7. ROUGH-STUFF.—The leveling or rough-stuff coats consist of a coarse mineral paint, designed to level down or fill up all imperfections in the surface of the carriage body (it is not used on gears), such as plane and file marks, brad holes, etc.

The pigment is mixed with oil, japan varnish and turpentine, and although the painter may have a good recipe for this paint, and may mix it himself, he cannot rely upon getting exactly the same amount of elasticity at one time as at another time, if mixed in small quantities. There-

fore the ready-prepared paint, mixed from a formula, which experience and careful tests have proved best, and mixed in large quantities by weight and measure is by far the surest and safest to use. Valentine & Company's ground rough-stuff is thus prepared, and it will also harmonize and assimilate with the priming of P. W. F. best, for it is mixed with the same grade and make of linseed oil. The P. W. F. priming on the body being dry, it only requires a good dusting when it is ready for the rough-stuff. This for the first coat should have a very little raw oil added to make it more in keeping with the elastic priming, and it must not be spread too thick; thick coats are apt to show brush marks, and brush marks in the rough-stuff will show in the finishing varnish. Put the rough-stuff on smoothly and set the body away for 48 hours to harden, or, if preferred, when 24 hours have passed the largest holes may be puttied part full, then give the other 24 hours for drying.

The second, third and fourth coats of rough-stuff may be put on one day apart, then a thin coat of *stain*, to guide the workman while rubbing, say some yellow ochre or other cheap pigment mixed in japan and turpentine, may be added.

Rough-stuff will always give better satisfaction when applied in a medium thin coat. It is entirely against common-sense to plaster on a great mass of this paint, with the desire to level the work quickly—better by far to put on extra coats.

The rubbing of the rough-stuff, being a purely mechanical operation, we will describe under its proper head "Rubbing".

When the work of rubbing is completed, the body should be washed clean, and well dried off with a chamois skin; then set aside for the evaporation of moisture from the porous paint.

This "drying out" is of vital importance, and should never be neglected.

Rough-stuff, providing it is good-rubbing rough-stuff, is necessarily porous, no matter what pigment or vehicle is used, and a portion of the water used in rubbing is absorbed by it; therefore it is essential, after the moisture has all been evaporated, that the pores be closed, in order that the oil of subsequent coats may not be absorbed by them.

It is the aim in this system of painting to form a *non-absorptive* surface, and it will be seen that if the P.W.F. closed up the pores of the wood, it will assuredly close up the pores of the leveling paint; therefore, a coating is applied to the rubbed surface of paint in the same manner as in priming the wood, *i. e.*, wiping off all that will readily leave the surface, thus rendering the paint elastic, yet proof against the entrance of oil from all subsequent coats of color or of varnish.

8. Coloring the Body.—The P. W. F. put on over the rough-stuff having been allowed from 24 to 48 hours for drying; the *coloring* is now in order. The surface must not be disturbed by sandpaper, but a simple dusting off may be necessary. It is customary with some painters to lay on a ground coat of some color corresponding with the color they intend to make the job, but this is more to economize time in making a solid job and to save expensive color, and with the exception of a few extra fine or transparent colors, which are inten-

sified or made more brilliant by application over particular grounds, the color proper may be laid directly on the prepared surface.

For black, either lampblack or Valentine's Royal or coach black may be used for the first coat, having sufficient oil in the mixture to cause an egg-shell gloss, lay it on with a camel's-hair brush and give, say 12 hours for drying.

To better illustrate the painting of a body, we will take, for example, a job to be painted a dark green, which is a standard color and one of the most durable colors used in carriage work, and carry it through to the finish. The panels only are to be put in color, the remainder to be black. Our first duty is to prepare a ground or preparation coat, and the following will be found a good formula:

℞. To produce a dark green ground, mix lampblack and chrome yellow, with Crown coach japan and turpentine to a proper consistency for grinding in the mill—approximating as nearly as possible the desired shade of green. When ground add a tablespoonful of raw oil to a pint of paint, and when well stirred together test its drying qualities by spreading a little on the thumb-nail and blowing upon it to hasten evaporation, if it dries "dead" add a few drops of oil or rubbing varnish, or if too glossy add turpentine until an egg-shell gloss is obtained.

This ground work or preparation coat should be put on with a camel's-hair brush as smoothly as can be, allowing no laps or brush marks to remain visible.

The black portions are next to be done, and this paint may be mixed in the same manner as the

green—of lampblack or ivory black. When all is coated set the job aside to dry until the next day, at which time it should be well inspected and if any scratches or indentations are found, soft dark putty must be used to fill them, then rub over gently with No. 1 sandpaper, partly worn, to prepare it for the color proper—dark green and ivory black. The dark green may be made as follows:

℞. Pulverize, on the stone, some Dutch pink, and mix it with half and half japan gold size and turpentine and grind it fine. Then mix in the same manner some Prussian blue and grind it into another cup. Now, little by little, add the blue to the Dutch pink, stirring it constantly, until the desired shade of green is obtained, and temper the mixture with raw oil in the same manner as explained for the ground coat. Apply with camel's-hair brush. The black parts may now receive another coat of ivory or drop black. If ready-mixed colors are used, instead of mixing them as above, take Valentine's royal green for the green parts, and jet black for the black portions, tempering them as described with oil.

It is the usual custom to make color-and-varnish by adding to a partly filled cup of varnish a little color; but it is considered best by some of the first-class painters to grind the dry pigment directly in varnish, and thus overcome the objection to the oil and turpentine in the color-and-varnish. However, in the work before us, we desire to produce a rich or deep shade of green, and to carry out the plan, we will *glaze* the color, instead of putting on color-and-varnish, in its ordinary mixture. Yellow lake possesses the power, when used for a glazing over green, to increase the intensity or

depth of the color, and many handsome shades are made in that way. It may be mixed as follows:

℞. Pulverize the lumps and mix it in hard-drying body varnish; grind fine, then add a very little of the Dutch pink color. Stir well and apply with badger-hair varnish brushes.

The black parts are now ready for color-and-varnish and we desire—as in the case of the panels—a first-class black; so instead of using ordinary color-and-varnish, we will employ black japan (which see). Three coats of this well rubbed with pulverized pumice between each coat, will give a good, jet-black surface for finishing over.

The glazed panels having been rubbed lightly with pumice-stone, and a coat of hard drying body varnish given, at the time the black japan was applied, the whole is now ready for a final rubbing down and finishing coat of wearing body varnish.

9. The Gears.—We left the gears with the priming of P. W. F., and after 24 hours we may apply either a thin coat of lampblack color, or a thin lead color, the object of which is to see the open grain and imperfection so that putty may be used to plaster over and fill them. The surface of the P. W. F. *must not be rubbed*, the paint should be applied as smoothly as possible, for no great amount of sandpapering is to be done. Putty all imperfections after the paint has dried, which will be perhaps 48 hours, for this first coat over the P. W. F. should be a little more oily than is necessary in any other coatings.

When the putty is dry, gently rub over with fine sandpaper, but don't cut through the paint. When done, dust off, apply the color and color-

and-varnish, as usual, moss down, give a second coat of color-and-varnish, rub this latter with pumice-powder, wash off, stripe, and give a coat of clear elastic leveling varnish, let dry, rub again and finish with elastic gear varnish.

This completes the work of the American method, and we believe any one at all acquainted with painting will readily see the correctness of our theory, regarding *absorption*, and be enabled by our description of how the work is done, to give it practical test in his workshop. We add on opposite page a synopsis of the method showing the time consumed in doing a piece of work.

American Vermilion.—A pigment made from white lead and bichromate of potash. These are boiled together, washed, filtered, pressed, dried and pulverized, either with rollers or with the hand. It must not be rubbed so hard as to break the crystals, or it will lose its color and show what it really is—*orange chrome*. American vermilion is greatly inferior to that known as English vermilion (which see), but for ordinary work such as wagons and trucks it answers a good purpose. It should never be ground in the paint-mill.

Amethyst.—A purple or violet color used by artists in emblazoning the arms of English nobility.

Ammonia.—A volatile alkali, which is a deadly enemy of varnish. It is an important chemical compound in the form of a transparent, colorless and pungent gas. The name was probably derived from the temple of Ammon in Libya, Africa, near which the chloride of ammonium was first made from the soot produced by burning camels' dung.

It is now obtained as a by-product in the distilla-

SYNOPSIS

OF THE

AMERICAN METHOD ON BODIES.

1st day,	Apply P. W. F., and wipe off,	For drying give	48 hours.
3d "	First coat of rough-stuff a little oily,	"	48 "
5th "	2d " " ordinary,	"	24 "
6th "	3d " " "	"	24 "
7th "	4th " " "	"	24 "
8th "	Stain coat over rough-stuff	"	24 "
9th "	Rub down with pumice-stone.		
10th "	P. F. W. rubbed over and well wiped off,	"	24 "
12th "	1st coat of color or lampblack.	"	24 "
13th "	2d " " ivory black,	"	24 "
14th "	1st coat of color-and-varnish or Black Japan,	"	48 "
16th "	2d " " " "	"	48 "
18th "	3d " " " "	"	48 "
20th "	Finishing coat of Wearing Body Varnish.		18 days.

ON GEARS.

1st day,	P. W. F. put on the completed gear and wipe off,	give	48 hours.
2d "	Putty up all open-grained places	"	24 "
4th "	Sandpaper, putty, and put on P.W.F. again,	"	48 "
6th "	Apply color lampblack,	"	24 "
7th "	Apply color-and-varnish, quite strong,	"	48 "
9th "	Rub and give second coat of color-and-varnish,	"	48 "
11th "	Rub down stripe, and ornament,	"	24 "
12th "	Give coat of rubbing varnish,	"	48 "
14th "	Finish with Elastic Gear Varnish.		13 days.

The above time is given as the minimum or shortest possible time to do a first-class job, but as the painter will generally have more time to spare upon the job, he may divide it, giving the extra time for the P. W. F. and the varnish coats to harden.

tion of bituminous coal in making gas, and from refuse animal matter in preparing bone-black, etc.

A solution of this gas in water is used in medicine and is called spirits of hartshorn, or liquid ammonia.

This pungent alkali exists in bituminous coal, whence it is thrown off in form of gas; also in animal life, whence it is thrown off by the respiratory organs; and the atmosphere of large cities is impregnated with it. Spirits of ammonia is used by the painter as a detergent or remover of varnish coats on carriages, and although it effectually destroys the surface and enables the workman to scrape and wash off the varnish or paint, it is not recommended by the experienced painter, except for common work, owing to the liability of injury to the wood and consequent trouble in re-painting.

It is a well-known fact among carriage-makers that the largest share of the work they turn out is ruined by ammonia, and yet it seems impossible for them to educate their customers—carriage owners—up to that point, where judgment in the housing of a carriage is needed. Stables are fitted up with a view to prevent the ammonia from the horses getting into the carriage house, and after all their care in this respect—as they think—communication is made between stable and carriage house by doors, which are frequently ajar. The manure is in some cases carted through the room, and we have known of cases where a drain from the stable carrying off the liquid excresences, passed under the floor of the carriage house, and, connecting with the drain from the washing floor within, sent up unrestrained the very enemy they

had sought to exclude. The odor of ammonia is very strong, and yet there may be a sufficient quantity in the air to affect the varnish, but not sufficient to be readily discovered by the smell. Livery stables are, as a rule, thoroughly impregnated with ammoniacal gas, and here it is that much city work is destroyed, unthought of. The action of the gas is said to be, by an eminent chemist, as follows : The gas rises and having an affinity for almost everything, settles in the form of a powder upon each mite of dust floating in the atmosphere. The dust settles to its resting place, possibly some part of a well-painted carriage, and carries with it the ammonia, which, so long as it remains dry, is inactive, but so soon as the least dampness or moisture strikes it, the enemy begins its work annihilating the life of the varnish—oil. Thus it is where a carriage standing in a poorly contrived house, and used daily (with frequent washing or run out in damp weather), will show the effects of ammonia much quicker than another carriage standing unused in the same room. The effects of ammonia on a varnished surface is, first, a dullness or loss of lustre upon parts exposed to falling dust; those parts, such as the slanting side of the seat; the sides just under the seat skirt, etc., will appear as bright as ever; second, a million fine lines or minute cracks running in every direction, next a dry whitish powder which may be rubbed off with the hand, and finally the utter decay of varnish and possibly paint. Large cracks are seldom caused by ammonia, it is a gradual eating away of the oily portion of the material, leaving the gum to be rubbed or washed away.

Various plans have been tried to arrest the ris-

ing of ammoniacal gas in stables, one of which being the sprinkling of chloride of lime around the floor, and said to form with ammonia, chloride of ammonia or sal ammoniac, which is not volatile, but we have never known of a case where a cure was effected. The sure way is to keep all varnished work, such as carriages, in a separate building, which should be dry and moderately warm, for cold will affect varnish almost as badly as ammonia.

Angle Fitch.—A small, flat brush with the hair or bristles placed at an angle with the handle, used by decorators in running lines or stripes on flat surfaces.

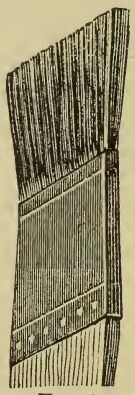


FIG. 1. ANGLE FITCH BRUSH.

Anglo Japanese Work. — Ornamented work done with autumn leaves, fastened by gum or cement to a painted surface. An old workbox or other like article is coated with ivory black, ground in brown japan to dry quickly, after which autumn leaves are laid on and gummed securely in the order desired. When dry the whole is varnished with several coatings of carriage rubbing varnish.

Aniline Black Varnish.—The French have recently brought out a beautiful black varnish made as follows: Dissolve 7 drachms of antique blue, 2 drachms fuchsine, 5 drachms napthaline yellow, in one quart alcohol. One application is sufficient to render any object an ebony black.

Aniline Colors.—Aniline was discovered in 1826 by Unverdorben, as a product of the distillation of

indigo. It attracted immediate attention from chemists, was made the subject of many researches, which contributed greatly to enlarge the facts and theories of modern chemistry. But it did not acquire any commercial importance till 1856, when W. H. Perkins prepared from it the beautiful purple dye *mauve*.

The brilliancy and intensity of this color attracted the attention of chemists and dyers, and in a short time an entirely new series of colors was discovered by which the art of dyeing has been almost revolutionized. Attempts have been made to introduce colors made for the painter from analine, but so far they have proved extremely fugitive.

Antimony Yellow.—Yellow pigments formed by a compound of the oxides of lead and antimony. The principal one of these yellows is Naples yellow, a soft shade of canary color, and one frequently used for panel colors on carriages and sleighs. It is extremely hard to grind either upon the stone or in a mill, and resort is had by some painters to soften the lumps by placing the pigment in a tin vessel having holes in the bottom and pouring water upon it. The water is absorbed, and when the superabundant water has drained through the holes, the pigment is placed upon a board or table to dry; after which it is found to crush and grind easily.

There are many other pigments which may be treated in a similar manner, but in every case care should be taken that all moisture has evaporated before mixing the pigment for paint.

Antique Painting.—A name frequently used in the place of *transferring* (which see).

Antwerp Blue.—Also called, Haarlem, Berlin, or Mineral blue. A pigment similar to Prussian blue, but of a lighter color and brighter. Tube color of this blue is preferred by artists to Prussian blue on account of its durability. Prussian blue is a fugitive color, in artists' work.

Antwerp Brown.—A mixture of asphaltum and drying oils which is less liable to the troubles, such as cracking, chipping, etc., than the ordinary asphaltum of the dealer. Bituminous coal and bituminous ochres, peat or bog earth afford similar browns, and these too are often added to the asphaltum solution. It is seldom used on carriage work.

Arabesque.—A peculiar kind of fantastic decoration as its name implies—*after the Arabian* manner—commonly employed in architecture, and which Spanish Moors are supposed to have introduced into modern Europe. Arabesque consists usually of combinations of plants, birds and animals of all kinds, including the human figure, and embracing not only every natural variety, but stepping without hesitation beyond the bounds of nature. Raphael's arabesques which adorned the Vatican, are said to be the most beautiful and the most famous which the modern world has produced. Many of the designs sold as transfers or decalcomanie are of this order, and there could scarcely be anything more appropriate for sleighs and wagon work.

Architrave.—Moldings enclosing door or window, and also next beneath a frieze.

Armenian Blue.—The ancients employed a species of ultramarine, and called also by them Cyanus,

which was extremely durable and of an expensive character. The blue now labeled American, is simply an imitation.

Arsenical Green.—A pigment similar to Scheele's green, Mitis green, Paris green, etc., all being, simply, the arsenite of copper.

Arsenic Yellow.—A pigment prepared from arsenic fluxed with litharge and then powdered. It is similar to orpiment (*q. v.*) in color, but not being affected by lead it is not so liable to change in tint. All tints, however, of white lead are destroyed by arsenic colors.

Asphaltum.—Called also bitumen, mineral pitch, Jews' pitch. It is found in a natural state upon the shores of the Dead sea, and from which that expanse of water takes the name of Asphaltic Lake; and is also found as a residue in the distillation of various resins and bituminous matters, in preparing essential oils. Asphaltum is principally dissolved in spirits of turpentine and is sold by the retailer at a low price. Its fine brown transparency lures to its free use in shading on gold, notwithstanding the rapid destruction which awaits the work on which it is much employed, owing to its disposition to crack by changes of temperature and the atmosphere, but for which it would be a most beautiful pigment.

For shading gold scrolling, it is best to add one-third burnt sienna tube color, which lends a warmer hue to the shade, and adds durability. The manner of working the asphaltum shading, may here be mentioned. The gilding being completed, give it a coat of rubbing varnish, for if the shade be put upon unvarnished gold, a portion

will be absorbed and the work will appear cloudy or "muddy," a feature which the varnish prevents; beside, when the gold has been varnished over there will be no trouble in wiping off any of the shade that is not correct or desirable.

The varnish coat being dry, remove the gloss by rubbing with pumice-stone and water, or curled hair, then with the asphaltum and sienna mixture (as before stated) thinned so it is very transparent —simply a glazing with turpentine and liquid drier or japan. Begin the laying on, using a rather short-haired camel's-hair pencil, putting the shade only where it is required to be darkest; let it dry, then go over it again and blend off to the light shades, and repeat until the shade is dark enough —do not seek to make it too dark a shade. There are movements or "sweeps" of the pencil that cannot be described, one must see the work done to be proficient. Never make an attempt to retouch a spot, or laps will occur and spoil the work.

Black japan as used by the carriage-maker is composed principally of asphaltum gum. And the baking japans of the japanner are also prepared from it.

Asphaltum forms a good stain for changing oak-grained work to black walnut. Simply dilute the asphaltum with rubbing varnish until a glazing is produced, then apply an even coat with varnish brushes. Asphaltum was, and may be still, used by glass sign painters to back up their gold leaf, but its certainty to peel off by atmospheric changes, no matter how it may be mixed, should discourage its use entirely. Asphaltum is a useful paint or lacquer in every carriage

paint shop for glazing over "touched up" places on black, before varnishing, and especially is this the case where the ground was made with black japan.

Auburn.—A brownish red, made by adding red to raw umber.

Aureolin Yellow.—An excellent pigment, not acted upon by lime or potash and therefore extensively used for fresco and silicious painting. It is extremely permanent, and is not affected by admixture with other colors.

B

B.—The second letter of the English alphabet, consisting of a vertical bar joined to two semi-circles. The lower circle of the letter is made a trifle larger than the top circle, although this is not so noticeable when the letter is in proper position, as it is when it is turned over or "upside down." This is done to give a perfect balance to the letter, for if the upper and lower semi-circles were alike, the letter would appear as if it could easily be pushed over. As it is, it stands firmly and presents a bold appearance.

Back-ground.—That part of a picture which represents the extreme distance, or the space behind a group of figures.

Backing.—In painting or gilding on glass, that which is to appear on the front of the glass is, when dry coated upon the back, called backing or "backing up". It was the practice some years ago to back up gold letters with asphaltum, owing to its quick drying and glossy properties, but experience has proved that this is a very bad proceeding, the asphaltum being extremely fugitive. A mixture of lamp-black and varnish with some oil added is far superior as a backing—in fact any oil paint will answer a good purpose.

Badger.—An animal very similar to a bear, inhabiting most parts of Europe, Asia and North

America; one species found in this country is called the ground hog. The hairs or bristles of this animal are made into brushes for painters.

A large proportion of the so-called badger-hair brushes are made with a mixture of white skunk and hog hair. Even in the badger-hair there is a difference in quality; the winter killed animals produce the best hair, and that which grows down the back is decidedly the best and liveliest, and makes a brush that will give perfect satisfaction and outwear those made of inferior stock. These brushes, preferred by the best workmen for varnishing on carriage bodies to the fitch-hair (*q. v.*) brush, from the fact that they hold or carry more varnish, possess more spring or elasticity, and the hair is not apt to break and give annoyance in varnishing as is the case with the fitch.

Badger Softener.—A brush made of badger-hair, for use in softening or blending the marks made in graining various woods.

Baking Japan.—A composition of asphaltum or Jews' pitch (*q. v.*), used for giving color and a gloss at the same time to any surface capable of withstanding a strong heat, as hardware tools, machinery, etc. A baking japan should be made with a view to certain adaptions, as for example, a japan exactly suited for tinware and goods of that description which requires a temperature of say 120 degrees Fah. to properly bake, would be entirely inappropriate for grates and fenders and other iron goods which are to be exposed to rough usage, or, perhaps, to a considerable degree of heat while in use. The latter work needs an oven at about 500 degrees Fah., in which it will harden

in about twenty minutes, if the work is well prepared, while at the temperature requisite for the other class of goods, it will not harden and become durable though baked for days. On the other hand, the japan exactly suitable for the lighter goods would be burned and irretrievably injured at this high heat. Consumers will learn from this hint, if they have not already learned from experience, that it is of the utmost importance for them to let the varnish manufacturer or dealer know exactly what uses his japans are required for, in order to be supplied with the kind adapted to the particular work in hand. Much vexation would be saved if japanners would follow the rule of procuring different and suitable brands of japan for their different kinds of work, and much vexation will be caused if they neglect to do so; and persist in the common habit of coating lunch boxes with the same coating they apply to piano plates and sewing machines. Another cause of bad results is the tendency on the part of the employes and even of the boss himself, no matter how intelligent, to tamper with the composition of the best adapted stock by thinning, thus rendering it entirely unfit for the use intended or indeed for any other. A good japan for cast-iron work, we will say, is composed of certain ingredients in certain proportions, these ingredients always bearing the same relation to each other, and each being as necessary as the others to perfect the mass. Among these ingredients, glutinous matters form no inconsiderable part. Now, when a japan exactly adapted to its use in this way is applied to a piece of iron and afterward submitted to an appropriate degree of heat, to the mind of the uneducated artisan it ap-

pears to simply dry and form a glossy and enduring coating on the surface of the metal. Really, however, the process is a much more complicated one. In the first place the heat applied to the metal opens the pores of that metal, at the same time rarifying and expelling the air contained in those pores. Then the coating applied, rendered more than ordinarily fluid by the same heat sinks into and fills up the apertures thus opened and rendered vacant, and the consequence is that the japan not only sticks to the surface of the iron, as it is said to do in common parlance, but it is absolutely rooted thereto by myriads of invisible but tenacious roots which extend down into its very body.

Next comes the cooling process in which the pores return to their former size, gripping these roots more firmly as they contract until the film on its exterior is held to the metal almost as rigidly as though it were a part and parcel thereof.

The case viewed in this light, it will not be difficult for anyone to comprehend what the result will be where the character of the japan is altered by the unguarded addition of turpentine or oil.

The question at once arises, how should our japans be liquified when of too firm a consistency? Precluded from the use of turpentine, our standard resort, and also of oil, what shall be used for thinning? We answer, use baking copal varnish which has properties which not only render it the best thinner at present known, but which has other properties which fit it to properly anchor the japan to the metal. Having prepared the japan for use, the next necessity—also a very important one—is to have the surface of the metal in a pro-

per state; particularly to have it cleaned from all substances which will prevent the coating from taking hold, such as animal oils, coal oil, or other extraneous matters.

In regard to the number of coats necessary to the production of good work, a great deal depends upon the nature of the metal to be covered. Lead, and some compositions, for example, require a priming of lamp-black and oil, while others can be effectively manipulated without extra labor by one application and one heat. Where more than one application of japan is requisite, let the first be thinner than those to succeed it, in order that it may properly sink in and clinch and form a bed for the others. It should also be baked at a higher temperature than the others, as there should be no material softening of this coat when once fixed. This will also avoid the expulsion, on the second baking, of any vapors from it through the other, thereby preventing bubbling, blistering, cracking and porousness of the outer layer. There was a time when it was considered absolutely necessary to forestall all japans with a priming of the nature of that above mentioned, but happily the developments incident to experience and progress have enabled varnish manufacturers to so improve upon ancient modes of manufacture that they are enabled now to furnish the tradesman with a stock which will produce the desired effect, except upon the substances alluded to, without the necessity of this double or treble outlay of time.

Banner Work.—Painting on canvas and muslin is sometimes a difficult job, but if the paint be properly mixed and the material to be worked on properly prepared there is less difficulty. Stretch

the canvas upon a partition or upon the floor, and tack it fast, then lay out the lettering with white chalk, or very lightly with charcoal, now dash over the whole a plentiful supply of clean water, and with paint mixed with japan and turpentine (no oil) proceed with the work; a flat bristle pencil is excellent for outlining, filling in with a larger brush. A good plan for large letters is to use a strip of tin in the manner of a stencil to form the edge of a letter, then fill in with a large brush. For fine muslin the work may be done with ordinary lettering pencils. Oil color is apt to work badly; the oil leaves the paint and saturates the canvas around the letters, but japan color will not do so. Some prefer to fill the canvas with starch or flour paste, before lettering, and there are no objections to it that we know of except the loss of time, waiting for the paste to dry.

Stencils may be used to advantage on muslin and canvas work, and we know of painters who have large stencils of letters cut out in pasteboard, which they use for the purpose. Silk and satin require a different mode of operations. Stretch the material upon a wall and secure it well by tacks. Lay out the general plan, as ribbons, border, picture ground, etc., and go over all within the boundaries with size, using a short stiff bristle brush, or a small sponge may be used to advantage, using care not to drop any of the size on parts of the material not to be painted. The size may be made of gelatine, two ounces to a pint of water—when the gelatine is dissolved, strain it through coarse muslin, and apply it while still hot. Some prefer to size the silk all over, but it is

best to do only that which is to be painted. When the size is dry lay on a coat of white paint to all within the lines, going to within one-sixteenth of an inch from the edge of the sizing with the brush. When the white is dry the work is ready for picture, lettering or gilding as desired. The white of an egg is used by some artists for sizing, while others use coach japan and turpentine.

Baryta White.—(Sometimes called constant or permanent white.)—A pigment made from "heavy spar", or in other words the sulphate of barium. It is a good white for fresco and water color painting.

Baryta Yellow.—The true Lemon Yellow, made of chromic acid and barium, and sometimes called Yellow Ultramarine.

Bate.—The marks in wood, *i. e.*, the grain, knots, eyes, curls, etc., of wood, as in graining, to imitate various woods.

Bay.—One division of a series of panels and pilasters.

Bed-Moldings.—Members of a cornice next above the frieze.

Bell of a Capital.—The shaft as seen behind the leaves.

Belt or Border.—Ornamental stripes put around or through a panel, more particularly used on sleighs. Ornamental belts and borders are supplied in transfer or decalcomanie, and they will be found excellent for hurried work. Many feet of which can be put on in a few minutes more uniform and perfect than any hand-work.

Bice.—A light blue color prepared from smalts. By mixing it with yellow orpiment *bice green* is formed.

Binary Colors.—Compound colors. Those colors which are produced by mixing the primary colors in pairs; as *orange*, produced by mixing red and yellow; *green*, from yellow and blue; *violet*, from blue and red.

Binding.—The cohesion given to particles of paint by liquids; such as oil, varnish, japan, etc. When the quality known as binding is gone from paint, the pigment will rub off in a fine dust, and this loss of binding when the paint was properly mixed, is generally due to absorption of the liquids by a porous foundation. (*See American Method of Carriage Painting.*) If dry pigment be mixed with spirits of turpentine alone, there will be no *binding*, and as soon as the turpentine has evaporated the color may be brushed off. Oil oxidizes and forms a sort of resin which binds the particles of pigment, but it does not follow that oil (linseed oil) must be used in all cases. Varnish, japan, liquid-drier, all of which contain oil as a base, may be used to advantage, and thus the paint be made to dry in a short time. For stains, where water is the medium, a little sugar, molasses, white of an egg, etc., may be added as a binding, while ale beer is preferred as a vehicle by many.

Bird's-eye View.—A phrase used among artists to designate the picture of any machine, building, etc., where the spectator is supposed to look from above. The plan of such a picture is parallel to the horizon.

Bismarck Brown.—A mixture of burnt sienna chrome yellow and lake. (*See Brown.*)

Bistre.—This is a brown color used in water-color painting. It is prepared from the root of beech-wood. All the insoluble residue, after a thorough washing, is mixed with gum water and formed into cakes.

Bitumen.—A resinous substance rendered brown by the action of fire. (*See Asphaltum.*)

Black.—The total absorption of all the rays of light constitute black; on the same principle that *white*, also an absence of color, is produced by the reflection of all the light. White is pure light, not broken into colors; black is darkness in which all colors are absorbed. There are several pigments which supply us a black, as lamp-black, ivory-black, bone-black, etc., which see.

Black-Board Paint.—The paint for a black-board on which to use chalk, should be composed of material that gives a good black color, has a slight roughness, and from which the chalk marks may be easily removed. Common oil paint is unfitted for the purpose.

Take one quart of shellac dissolved in alcohol to a thin varnish consistency, or else procure from the dealer, shellac varnish ready prepared. Add three ounces of pulverized pumice-stone, two ounces pulverized rotten-stone, four ounces of lamp-black; mix the last three ingredients together, moisten a portion at a time with shellac varnish, and grind as thoroughly as possible with a knife or spatula upon a marble slab or glass; after which pour in the remainder of the varnish—sufficient to form a paint—stirring often to prevent setting.

One quart will furnish two coats for eight square feet of board not previously painted.

It is quick drying, and the board may be used in a short time. A preparation for black-boards, under the name of "Silicate slate paint" is now in market, and it is highly recommended by those who have used it.

The draft-boards of a carriage factory should be coated with the above paint at least once a month to keep them in good order.

Black Chalk.—A kind of black clay containing a large quantity of carbon, found in various parts of Europe. The finer sorts are made into artists' crayons. The black chalk most commonly seen is charcoal made of willow wood. Great care is taken in burning the twigs of the willow tree to charcoal, for if not thoroughly charred the stick will be hard, and if too much burned it will crumble easily.

Black Color-and-Varnish.—The carriage painter uses such a quantity of this material that varnish manufacturers thought it best to prepare it for them, and thus it is that we find in market, cans of the material bearing that name. It is simply the best quality ivory-black, ground-fine in rubbing varnish. Being mixed in large quantities it is far more uniform than that mixed by the painter, and it is also much more convenient. Though not as black as black japan, it is said to be more durable.

Black for Fine Painting.—When camphor gum is burned and the soot collected by means of a paper funnel or a saucer inverted over it, the result mixed with gum-arabic will be found far superior to the best ivory-black.

Black Lead.—*Plumbago* or *Graphite*, is a native carburet of iron or oxide of carbon, found in many countries, but particularly in Borrodale, in Cumberland and Russia, where there are mines of it, from which a good quality is obtained, and it is consumed in large quantities in the formation of crayons and black-lead pencils which are in universal use. In oil it is useful as it possesses remarkably the property of covering, forms very pure *gray* tints, dries quickly, injures no color chemically, and endures forever.

The carriage striper will find it a very useful pigment or bronze (as it is used the same as bronze). He first prepares the ground for striping, in the same manner as if about to apply gold bronze, lays on the size, etc., but instead of using bronze, the black-lead is rubbed over the size, this gives a sort of metallic lustre to the stripe, and when it is glazed over with very thin carmine or blue, it produces a very fine effect.

Black Japan.—A composition of asphaltum and oil. This article was introduced into the carriage shops of the United States many years ago under the name of "English Black Japan," and was employed almost exclusively at that time for blacking the iron work on bodies; but its advantages over the ordinary black color-and-varnish (*q. v.*) upon all portions colored black on bodies was soon discovered and its employment adopted by many first-class builders. However, there were comparatively few who achieved success with it, and its importation decreased until Messrs. Valentine & Co. began its manufacture under the name of "Black Body Varnish," since which time it has been in use in many of the best shops, and

its superiority over all other mixtures for black surfaces is fully established. Black japan is a liquid of about the same consistency as varnish, of a jet-black color, although of a brownish tint when applied over a light color, or on tin or glass. Furthermore, while ordinary blacks have a greenish hue when varnished, this article will retain its jet color. It has no *grains* as a mixture of pigment and varnish, and its flowing qualities are good. Many err in supposing that it will cover at once, and thus take the place of color, and furnish with two or three applications a perfect surface over any ground; but this is not the case. It was never intended for such a purpose; it is semi-transparent, and when put upon a white ground produces a brownish tint or glaze.

The manner of use by the best painters is: first, having the body (it is seldom used on gears) colored and color-and-varnished, then well rubbed down with pumice-stone and water, the body is turned upon its side, and the upper portion is coated with japan, applied with varnish brushes, and worked over as quickly as possible, for the japan sets quickly. In a few minutes the japan will have flowed down level and have set, so that the body may be turned over and the other parts done in the same manner. Of course the material can be put on while the body is resting on a trestle in a natural position, but there being a liability of runs and flows in the surface, it is best to turn the body so that the the work may be done on the horizontal parts.

Black japan should be given plenty of time for drying before another coat, or coat of varnish is

put over it, else it is apt to turn green; but if well dried it is ever a perfect jet-black.

Black japan varnish is made by putting in the jet pot 48 pounds of Naples or other foreign asphaltum, except the Egyptian, and as soon as it is melted pouring in ten gallons of raw linseed oil, using a moderate fire. Then fuse 8 pounds of dark gum animi in the gum pot, mix with two gallons of hot oil and pour it into the jet pot. Afterwards fuse two gallons of dark or sea amber in a ten-gallon iron pot; keep stirring while fusing, and whenever it appears to be overheated and rising too high, lift it from the fire for a few minutes. When it appears completely fused mix in two gallons of hot oil and pour the mixture into the jet pot. Continue the boiling for three hours longer, and in that time introduce the proper quantity of driers; draw out the fire, letting the preparation remain over-night. Then boil it until it rolls hard; let it cool and afterwards mix it with turpentine.

Black Sable.—The hair used in pencils for striping and ornamenting is obtained from the tip of the tail only of the Sable Martin, an animal common to both hemispheres, but there is so small an amount which can be used for making pencils that the price is extremely high, a simple tail bringing as high as $3.00 to $5.00. For lettering and scrolling there is no pencil that equals the sable. (*See Pencils.*)

Blanc D'Argent.—*Or silver white.*—These are false appellations of a white lead, called also French white. It is brought from Paris in the form of drops, is pure white, but of less body than flake white, and has all the properties of the best white leads.

Blaze-Stick.—A tool used in graining to imitate various woods. It consists of a piece of wood three inches long and one inch wide, shaved down very thin. A paper card is sometimes used instead. Its purpose is to make the bright blazes in the centre of a branch or crotch of a tree by a dexterous twist of the tool, or sliding it up and bearing it round to the right or left.

Blender.—A brush used to blend or intimately mingle certain parts of work by artists and grainers, so that it cannot be told where one shade of color begins, or where another leaves off—to soften the marks made by graining comb and wiping cloth and thus make a better imitation of hard woods.

Blending.—The method of laying different tints so that they may mingle together while wet, and render it impossible to discover where one color begins and another ends. A variety of tints of nearly the same tone, employed on the same object and on the same part, gives a richness and mellowness to the effect, while the outline, insensibly melting into the back-ground, blends the objects together and preserves them in unison.

Blistering.—One of the "deviltries" of varnish and paint. The swelling out of parts of a varnished or painted surface into bubbles or blisters, similar to that produced by the action of heat. Blistering of a varnished surface after the varnish has had proper time to harden, is due to the evaporation of moisture which lies confined under the shell of varnish.

This evaporation is caused by heat, and it is seldom, if ever, a blister will rise upon a varnished surface, without the temperature is raised to an

extreme degree, near to that which the varnish received in its manufacture.

The accumulation of moisture *under* the varnish may be brought about in several ways; the most particular one being in the closing in of moisture in the rough-stuff. During the rubbing of the rough-stuff the water used is partly absorbed, and unless due care is taken to give ample time for "drying out" before the application of subsequent coats a great amount of moisture will be confined within the cells of the porous paint. Boiled oil contains moisture or volatile properties, and when steam is used to express the oil from the seed the percentage is increased. Turpentine, an extremly volatile liquid, also forms an evaporating substance which slight heat renders active, and in its haste to reach the air it disturbs the outer surface, either lifting an elastic coating into bubbles or blisters, or bursting open a hard and inelastic one into cracks. The primary cause, then, of blistering is moisture, either in the form of wet moisture, or of evaporating liquids. The wood may have been painted before it had been seasoned, or it may have been steamed or wet in course of preparation. Paint may have been applied before the rough-stuff was free from dampness, either of which would have caused disastrous results.

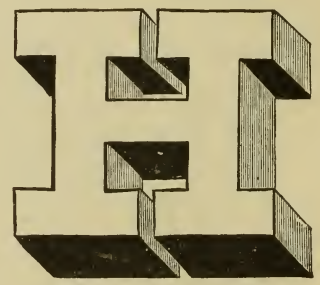


FIG. 2.—BLOCK LETTER.

Dry blistering is simply the hasty absorption of

the liquids from outer coats by paint or putty which is extremely porous, depriving the coatings of the requisite amount of binding and adhesiveness.

Block Letter.—The name given to a style of letter whose parts are of one width or nearly so. The letter H shown in Fig. 2 fully illustrating this particular feature. There are several kinds of such letters, known as "Full Block," "Half Block," etc. (which see).

Blood-Red.—The color of blood. Carmine (*q. v.*) is the pigment which gives this color.

Blue.—One of the primary colors. A color that cannot be composed by mixture of other colors. The paucity of blue pigments, in comparison with those of yellow and red, is amply compensated by their value and perfection; nor is the palette without novelty, nor deficient in pigments of this color, of which the following comprise some of those of most importance to the painter: Ultramarine, cobalt blue, smalt, Prussian blue, royal blue, Antwerp blue, etc. (which see under their respective heads).

Blue Ashes.—A pigment made by combining lime with a weak solution of nitrate of copper.

Blue Black.—A well burned charcoal, made by burning wine lees (the refuse in making grape wine). Seldom found in modern paint shops.

Blue Carmine.—A pigment which is very little known. It is said to be of a beautiful blue color, and durable in strong light, but is subject to change in hue, by other substances, and is blackened by foul air. For these reasons it is of but little value.

Blue for Walls and Ceilings.—To 3 pints of water add ½ pound of whiting and 1 pound of blue vitriol, and boil slowly for several hours, stir frequently, and when it has become quite cold, pour off the liquid and mix the cake of color with good glue size and use it the same as white-wash.

Blueing and Greening.—Terms applied to the change in the color of finished vehicles, caused by the exclusion of light or the presence of impure air, such as gas from a coal fire; the effect being to turn blacks, blues, and kindred colors *greenish*, while in connection with dampness, varnish will become *bluish* or *smoky*. The effect may be removed by washing, but when the body of the varnish has changed color, the only cure consists in rubbing down and re-varnishing. Accidental and very satisfactory exceptions may now and then occur. As for instance: A gentleman returning from Europe, sent his carriage to the coach-builder to be painted green; it had originally been black, but was found to have changed to a deep green, by reason of long storage in a dark, close stable, and so uniformly, that by simply blacking the moldings, and re-varnishing, it was returned to the owner with a bill as if re-painted to order. The blueing of varnish may be frequently noticed during a heavy rain storm. And as all high grade varnishes will thus turn blue, there appears to be no remedy, although some varnishes will turn more readily than others. The sun removes the blue appearance.

Blue Orchre.—A mineral color of rare occurrence, found in Cornwall, Eng., and in North America. What Indian red is to the color red, and Oxford

orchre to yellow, this is to other blue colors. It is admirable rather for its modesty and solidity, than for the brilliancy of its color.

Blue Tint.—In coloring, this tint is made of ultramarine and white, mixed to a light azure color. It follows the yellows, and with them makes greens, and with reds it produces purples.

Blue Verditer.—A beautiful light blue color, obtained from the waste nitrate of copper by adding to it a quantity of chalk. It is little affected by light; but time, damp and impure air, turn it green and ultimately blacken it—changes which ensue even more rapidly in oil than in water. It is therefore used principally for distemper painting, though it has been found to stand well many years in water-color drawings, when kept dry.

Body.—A thick consistency of color. The quality of opaqueness or covering power. The quality of *thickness* as opposed to fluidity in varnish and other liquids. We say a paint has no body when it does not cover the ground over which it is spread, though it may appear thick, and we say a paint has a good body when it covers well, even when applied very thinly; as a good ivory-black over white china completely hides the surface of the china.

Body Colors.—In heraldic painting there are parts when the color must be laid right on in such a manner that it may form a thick, uniform coating on which the outline is traced, and this paint is called body color. It is also applied to any finely ground color to be used on a carriage body.

Body Green.—Called also a "Nile Green," a dark green best made by repeated coatings as described

herewith. First coat the work with a mixture of Prussian blue, Milori green and black, as near the desired shade possible, then glaze (*q. v.*) with yellow lake or Dutch pink.

Body Rest.—A sort of bench or rest for carriage bodies when they are turned upon the side or end, for convenience in rubbing, and to prevent the bruising of that part which comes in contact with the rest or floor. It consists of two pieces of board; say, one foot square, and one-and-a-half inches thick, nailed together, as shown in the engraving, the edge of the upright piece being well padded and covered with leather.

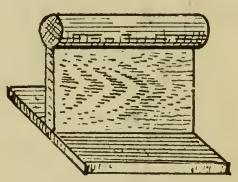


FIG. 3.—BODY REST.

Body Stand.—For resting carriage bodies upon when painting. A great variety of *stands* are to be seen. Some utilize barrels, boxes, and kegs, while others employ the patent *body rests or jack,* this is a contrivance for sustaining light carriage bodies, in almost any position while being painted or varnished; this "jack" is provided with an eccentric clamp which "bites" the bottom strip of a light body—or an extra strip screwed on—and so fitted with a segmental gear and interlocking pawls that the body may be turned to suit the convenience of the workman. It may be also used in painting wheels. (*See also Jack.*)

Body Varnish.—A superior quality of copal varnish, made from the best materials from formulas which a long experience and the most careful and costly tests have proved the best. Most body varnishes bear a name which distinguishes the quality; as,

"Wearing Body," "Medium Drying Body," "Hard Drying Body," etc. (*See Varnish.*)

Boiled Oil.—Linseed oil (raw) becomes slowly converted by the action of the air into a tough semi-transparent mass; but this property is possessed in a far higher degree by the so-called boiled oil, that is to say—an oil which has been brought by the action of heat and of oxidizing materials into a state of greater activity, in fact—into a state of incipient slow oxidation, the result of which is the formation of the substance termed linoxine, which in many of its properties corresponds to caoutchouc. The substances with which linseed oil is boiled are litharge, oxide of zinc, and peroxide of manganese. It is certainly preferable to carry the operation of boiling upon a water bath, or at least with vessels provided with steam jackets. The oxides are employed in coarse powders, which are suspended in a linen bag in the oil. In practice, 1 part of oxide of zinc or litharge is taken to 16 parts of raw oil; and of the manganese 1 part to 10 of oil; the oxides become partly dissolved in the oil, while they aid in converting the palmitine, etc. (not linoleine), into plaster (lead or zinc soap). Boiled linseed oil usually contains from 2.5 to 3 per cent of litharge dissolved. Neither the addition of sulphate of zinc, nor such absurdly added substances as onions, bread crust or beet root have any result whatever. The lower the temperature at which linseed oil is boiled the brighter its color. Mulder found that when raw linseed oil, especially if old, was kept from 12 to 18 hours at a temperature of 100 degrees, it acquired the property of boiled oil. Sometimes after boiling, linseed oil is bleached by exposing it in

shallow trays made of sheet-lead and covered with sheets of glass to the action of strong summer sunlight.

Bone-Black.—A pigment obtained by heating animal bones to redness in a retort or closed vessel.

It is deprived of the phosphate of lime with which it is blended by the action of hydrochloric (muriatic) acid, when it yields one of the most valuable forms of animal charcoal. It is often palmed off for ivory-black (*q. v.*) which is greatly superior to it in color and durabilty. Many know this pigment under the names of patent black, drop black, etc. For animal black any animal matter serves, the heat dissipating the oily and resinous elements. For bone-black, the bones are placed in a crucible and subjected to great heat. In cooling, the gases of heavy oil, mixed with tarry matter and ammonia are condensed. Bone-black, the residue, is separated by dilute hydrochloric acid. Excellent charcoal black is that produced by inclosing wood in a cast-iron cylinder, wholly excluding from the action of the air, and placing it over a strong fire. The cylinder is allowed to get red-hot. The whole of the gaseous ingredients being then disengaged, the fire is extinguished, and the charcoal allowed to cool in the cylinder. The woods that furnish the best charcoal for painters are the beech and vine, the former yielding a black of a bluish, and the latter one of a grayish cast. Wine lees, after being calcined, washed several times in boiling water, and ground to a fine powder, yield a fine velvety black, which, however, is chiefly used by copper-plate painters. Peach-stones burned in a close vessel, yield charcoal which, after being ground, may be successfully used for that kind of

black generally known by the name of raven gray. A very pure charcoal is also made by exposing white sugar candy in a earthenware retort. When charcoal, obtained from any of these sources, is employed in priming, it should be mixed with a very small portion of white-lead and made up for use with drying oils.

The best of all blacks, used by artists on canvas, is made from ivory shavings, in a crucible closely stopped, and afterwards ground very fine. It may be freed from every possible impurity by washing it in muriatic acid or weak aqua fortis, and is then an extremely rich and intense color; but being costly, it is not employed in ordinary work. The water-color called China ink, is merely ivory-black perfectly pure, mixed with a solution.

Bottle Green or Yellow Lake Green.—A very useful and at this time a very fashionable color for gears or bodies. It is produced in the following manner: First prepare a ground, as solidly as possible, *i. e.*, free from streaks and spots, with color made of lemon chrome yellow and black; the proportions cannot be definitely stated, and the eye of the workman must tell the moment to stop adding one ingredient to the other, owing to the varying strength of the pigments used; however, the shade of green best suited is that of bottle glass. The chrome yellow and black both having been mixed and ground separately in japan, there will be no trouble experienced in adding one to the other until the desired shade is obtained. This being done, take a small quantity of Dutch pink and Prussian blue—ground in japan—and mix them to a rich shade of bottle green. *This forms the color proper.* The groundwork

of yellow and black being smooth and well dusted off, apply the "Dutch pink green" smoothly with a camel's-hair brush, having first thinned the paint to a milk-like consistency. One coat should be sufficient, and if care is exercised, the surface will be in good order to receive the *glazing*.

Having at hand some yellow lake, mix it with hard drying body varnish—instead of japan, and run it through the mill, next add about two tablespoonfuls of the Dutch pink color to each pint of the yellow lake glazing, and when the *color* on the job is dry, dust off, and lay the yellow lake in the same manner as if it was color-and-varnish. This gives a rich, deep green and one that can be made in no other way. Care should be taken that no yellow, such as lemon or orange chrome be mixed with the Dutch pink or the yellow lake, but a drop of red, such as vermilion or carmine will improve it by giving it a warmer hue.

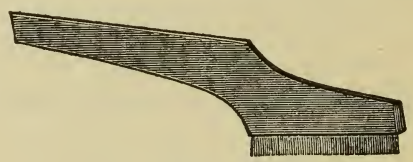


FIG. 4.—BRICK HEADER.

The tone of the color may be changed so as to be suitable for both body and gears. By simply glazing the *color proper* with pure yellow lake the tone will be more yellow. By adding a drop or two of blue to the glazing a bluish green will result; and a little vermilion and blue will give it an olive hue.

Break.—An ornament put in parts of a long line or stripe to break up or destroy the unpleasant appearance of an unbroken line, or the monotony of a continuous stripe.

Brick Header.—A brush shaped, as shown in engraving, of short, stiff bristles, used for putting the lines on brick and stone work.

Brick Red.—The color of bricks. Venetian red used alone makes a very fair brick color, although some prefer to darken it with Spanish brown or to lighten it with orange mineral.

Bridle.—An extra binding of cord or other material put upon a new brush to confine the bristles until they are partly worn down. (*See Brushes.*)

Bringing Out Grain.—The application of several coats of varnish, oil or other liquid in order to cause the grain of the wood to appear plainly. Permanent wood filling (*q. v.*) is an excellent coating for hard-wood to bring out the grain, or for staining soft-wood to imitate hard-wood. One application of this liquid is applied with a brush and then rubbed over with rags to work it into the wood, then, if a dead oil finish is desired, a second coat is applied—after 48 hours for drying—in the same manner. If a gloss is desired, one or two coats of varnish may be put on instead of a second coat of P. W. F.

Broad Stripe.—A stripe over one-half inch in width. (*See Striping.*)

Brocades.—Large and rich, but somewhat erratic, damask patterns of oriental origin.

Broken Colors.—Pure colors mixed with black from the lightest to the deepest tone. For example, if blue be mixed with red yellow, a little black is produced which reduces or breaks the orange.

Bronze.—A metallic powder, made by reducing the metals, gold, silver, copper, etc., to powder by grinding upon a marble slab while held in a pasty mass, by the addition of honey. When sufficiently levigated the honey is washed away with water and the sediment, when dried, becomes the bronze of commerce. There are many qualities and shades of color. The best way to use bronze is to put it on *dry* over gilding size (*q. v.*) using a piece of chamois skin or plush as a rubber; this gives a metallic lustre not obtained when the bronze is mixed as paint. Bronze, however, does not equal foliated metals in reflecting light, and consequently is far less brilliant than gold, silver or copper *leaf*. Bronze may be obtained of the following colors: white, silver, flesh, light and dark gold, rich gold, lemon, orange, fire, copper, carmine, crimson, lilac, violet, brown, and light and dark greens; and for hurried or cheap ornamenting the painter may manipulate them sometimes to good advantage. The universal complaint against gold bronze is that it soon blackens or changes color. The remedy, in so far as a remedy can be given—consists in buying *pure* gold bronze, made from gold leaf. Inferior gold bronze is made from leaf that contains silver or copper, and when these metals are present they soon oxydize or blacken. The writer has ever had success in the use of gold bronze by following these simple directions, viz.: First be certain that the gilding size is in a proper condition, *i. e.*, slightly "tacky," for if otherwise the bronze will be "drowned" or sink into the size and be partially covered by it. Then when the bronze has been applied and well rubbed over with chamois skin, apply a very thin

coating of French shellac varnish (*q. v.*) with a camel's-hair pencil. This coating will dry in a few minutes and its principle purpose is to protect the metallic powder from the acid which is present in finishing varnishes and which is almost certain to form verdigris when put directly upon the bronze, and this tends to blacken it. We have seen some beautiful work done in scrolling with colored bronzes, proving that they may in skillful hands be made to produce very pleasing color effects.

Application of Bronze Colors.—Bronze powders, whatever the colors they have been made to assume by heat or acids, may be applied so thinly as to be partly transparent, and so very attractive effects are induced by the use of a colored varnish, or wash, to the surface before applying the powder. Thus different shades of one color may be produced by mixing with the alcoholic solution that prepares the surface for the reception of the powder, certain proportions of ivory-black, burnt umber, or other volatile pigments, which dry readily, but leave their stain. The most pleasing effects of bronzing are produced by the manipulations of the artist workman. Applying it as taste demands, he employs the softest of brushes. Where the original tint is to remain, the surface is wiped with silk floss, or rabbit's foot. Where prominences should show bodily, the protuberances are carefully burnished with queerly shaped implements of agate, flint, or of hardened steel or blood-stone, these hand tools being ground to curves, angles, and edges to fit the sinuosities of the work. They require practice and use, as well as taste, in working.

CHOCOLATE COLOR BRONZING.—For producing chocolate bronze effects on chandeliers, gas-fittings and other metal surfaces, the following method may be adopted: The body pigment is to be made up of white lead ground in varnish, thinned with turpentine and tinted with a mixture of Spanish brown, Venetian red and vegetable black. The proportions of these pigments must be regulated by trial and taste, the red predominating if a bright chocolate is required or the black if a dull, deep tint is desired. This must be put on a surface free from grease, oil, dust, dirt, rust or patches of old paint. When dry, go over the surface lightly with a coat of gold size and when this has become tacky, dust on the bronze powder with a pad of cotton wool evenly on the surface, and then cover the article to protect it from the dust. When quite dry sweep off loose particles of bronze powder with a feather broom and coat the whole with copal varnish. The article is finally heated in the oven of a stove, the temperature not exceeding 300° Fahrenheit. The same process, without the heating, will do for wood.

Bronze Green.— A mixture of five parts chrome green, two parts umber, and one part of black. This color is excellent for iron railings, and other such work, where gold bronze can be used advantageously in lightening up the prominent parts to make it ornamental.

Brought-Forward.—Plain painting prepared for decoration.

Brown.—Most people are mistaken in the classification of browns, and many colors which rightly claim the name of brown are known by another

name, while there are many colors called brown, which are simply dark red and maroon colors. Brown, rightly speaking, is a warm broken color, of which yellow is one of its principal constituents, and under which classification we find *umber, sienna,* and several other earthy pigments. Red and black mixed form what many call brown; but until the black predominates in the mixture, or a little yellow is added, it is really a *dark red* and not a *brown.* Spanish brown is not, correctly speaking, a brown, but a dark red. Many varieties of dark red are formed by the painter, and called brown, which lead us astray sometimes in our comprehension of what brown really is, and it is quite impossible to form a correct idea of the color by its name. We may class *brown* under two divisions; first, those which rightly come under that, as umber, Vandyke brown, manganese brown, cappagh brown, asphaltum, and all grades descending from black to olive; and second, those which are called brown by the painters, but which do not properly belong under that term, as defined by scientists. Umber and sienna, both the "burnt" and "raw," are useful, and often called into requisition in matching shades of color. The browns made with umber for a base and called "umber browns," are in demand on fine carriage panels or gears; and these glazed with yellow lake give a variety of shades, the yellow lake giving a great depth of color, and a yellowish hue, while the same ground glazed with lake or carmine (lightly) gives a reddish tint of great beauty. By adding one part of lemon yellow to three parts of burnt umber a beautiful color is formed called "olive brown."

This is one of the yellowish browns verging on to olive, and the shade may be varied by a change in the proportion of ingredients. Japan brown is a beautiful color when properly mixed, and is made by adding a very little Indian red (*q. v.*) to black japan. This method of forming a brown is an excellent one where old work is to be re-colored, the japan laying over an old varnish surface without the danger of cracking so often experienced. A color known as "Bismarck brown" may be made as follows: First make a ground of two parts burnt umber to one of white lead; put over this two coats of burnt sienna, and glaze with a mixture of one ounce carmine, one-half ounce of English crimson lake, and one ounce of best gold bronze. When a light color is required use a ground of English vermilion (*q.v.*) and glaze as above.

Brown Japan.—A composition of shellac gum and oil, used as a drier in the mixing of paints. Some painters use the simple word *Japan* to express the above, while others (the manufacturers) give it the name of "Crown Coach Japan."

There is a great difference in japans put upon the market, and in order to ensure good work, care should be exercised in the selection of this useful article. A good japan should assimilate with raw linseed oil, otherwise the paint containing the two ingredients will be apt to thicken up or curdle before it can be applied.

The best way to test japan is to add a few drops to a small quantity of raw linseed oil, stirring the mass for a moment, and thus ascertain whether a smooth liquid is formed, or a curdled mass the

result. The latter being sufficent proof to condemn it.

Brown Pink.—A vegetable lake, made from French berries and dye woods. It is a fine, rich, transparent color, but inclines more toward a citrine, or an orange color, than to a brown. It is a very fugitive color.

Brown Stain.—For staining woods a brown color, sulphuric acid, more or less diluted, according to the intensity of the color to be produced, is applied with a rag or brush to the wood, previously cleaned and dried. A lighter or darker brown stain is obtained, according to the strength of the acid. When the acid has acted sufficiently, its further action is arrested by the application of ammonia. Tincture of iodine yields a fine brown coloration, which, however, is not permanent unless the air is excluded by a thick coating of varnish. Nitric acid gives a fine permanent yellow, which is converted into a dark brown by the subsequent application of tincture of iodine.

Brunswick Green.—A pigment obtained by exposing metallic copper to the action of muriate of ammonia. It is a chloride and oxide of copper. It is also generated by the action of sea-water upon copper, and it may be said to be, virtually, verdigris.

Brushes.—Are made of bristles and of hair, bound to a handle by cord, wire, metal stamped to imitate wire, tin, copper and brass. The *oval* and *round* paint and varnish brushes are generally bound with cord, wire or its imitations, and copper and brass. The flat bristle, fitch, badger,

bear and camel's-hair brushes with tin. The ordinary paint brushes contain the inferior or coarser grades of bristles; the varnish brushes the selected or finer qualities. The oval and round brushes are numbered by the brush-maker to designate sizes, from No. 6 down to No. 1, thence from one 0 (naught) to 6 naughts (thus, 000,000). For carriage painting the sizes between one and four naughts are considered best—the smaller ones may be used, but it is advantageous to use as large a brush as possible on most of the work. Small brushes called "tools" are numbered from 1 up to 10, the latter being the largest. Brushes are generally used in sets, as, for example, in painting a body or gear, we would use a large brush for laying the paint, and a small "tool" for "cleaning up" around the moldings, nuts and bolt-heads. It would be an almost endless task to illustrate and describe all of the many varieties of paint and varnish brushes, and a few of the principal ones only will receive attention here. Russia is the great bristle growing country, and her exports reach as high as 5,000 tons of this commodity every year. Hogs in countless herds roam the deep Muscovite forests, where the oak, the pine, the beech, larch and other nut bearing trees cover the ground with acorns and nuts to the depth of a foot or more. But these swine are not all of value for their bristles. The perfect bristle is found only on a special race, and that race fattened in a certain way. On the frontiers of civilization all over the Muscovite territory are the government tallow factories, where animals reared too far from the habitation of men to be consumed for human food are boiled down for the

sake of their fat. The swine are fed on the refuse of these tallow factories at certain seasons, and become in prime condition after a few months feeding. It is from these animals that the bristles of commerce mainly come. When the swine are fattened, and their bristles in fine order, they are driven in kraals so thickly that they can scarcely stand—irritated and goaded by the herdsmen till they are sullen with rage—kicking striving, struggling and scrambling together in feverish rage, they are seized one by one, by the kak koffs —a class of laborers educated to plucking swine— and their bristles pulled out by the roots. The perspiration into which the poor creatures are thrown by their exercise causes their bristles to yield easily. The process is pleasant neither to the eye nor the ear. The hog strenously resists with loud outcries, and vehement opposition. It does no good. Once seized, he is instantly divested of his clothing and then immediately released, goes grunting off to the woods.

The so-called "French bristles" are principally from Russia stock, cleaned and bleached to render them white and exceedingly elastic, yet soft as an infant's hair. From these are made the fine pencils of the artist. Length, elasticity, firmness and color are elements that constitute their excellence, and the bristle expert can readily assort them for their special uses.

The ordinary paint brush for general work is made either from selected Russia bristles, or with an inferior gray centre, inclosed by fine white bristles. Carriage and wagon painters usually select the best, *i. e.*, Russia bristles, and the size known as four naught (0000) is used for rough-stuff

and foundation coats, while the house painter would choose a larger one possibly. A new brush of this description will not work well unless "bridled," *i. e.*, having an extra binding added, and this may be done in several ways.

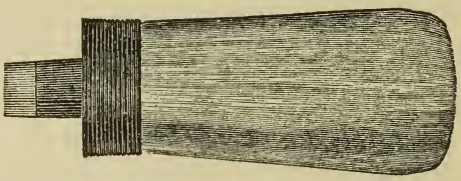


Fig. 5.—The Ordinary Paint Brush, Four Naught Size.

1. By winding a strong cord around the bristles to about the middle of the same, or, as far from the original binding as desired. 2. By covering a portion of the bristles with leather stitched on tightly. 3. By wrapping a piece of muslin around the brush, then tying a cord at the centre of the bristles turn the muslin back and tie it securely to

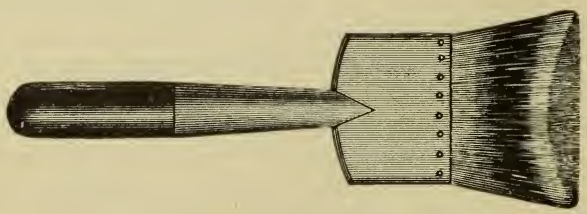


Fig. 6.—Badger-Hair Varnish Brush.

the handle. 4. By using the patent metallic band or binder, and by other means, the object being to shorten the exposed bristles until the brush is partly worn down, when the extra binding may be removed.

Badger-Hair Varnish Brush.—The badger-hair brush is next in importance. It is well bound in tin, hair set in glue, handle nicely japanned, and chisel-pointed. For varnishing small panels or parts of a body it has no equal. The best badger-hair is imported on the skin from Germany and Russia.

Camel's-Hair Brush.—For laying fine color no better brush can be had than the camel's-hair brush—called by some "mottlers," by others "blenders," and again by others "spalters," each term, however, is foreign to the American carriage painter, and the "Camel's-hair brush" is

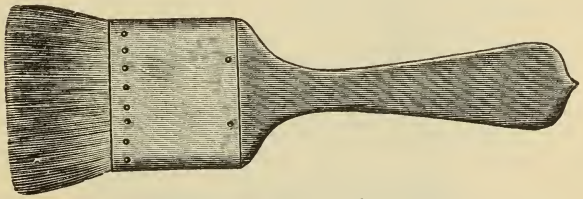


Fig. 7.—Camel's-Hair Brush.

by far the most appropriate, and most commonly used. The hair used in these brushes, however, is not all taken from the camel, much of it being from the tail of the Russian brown squirrel. The hair is first cut from the tail with scissors, the wool or under fur combed out, and then tied in bunches ready to be straightened. This requires skill and practice. The hair is placed in metal cups having a thick, loaded bottom, and by a quick motion of the hand, drummed on the bench for a considerable time, until the pointed or fine ends are all even with each other. In the process of cutting and cupping the lengths are kept sepa-

rate as far as possible. The hair is now ready for the brush-maker, who cups and combs it out, weighs the quantity required, and places it into the ferrules or tin bands. It requires skill to handle the short, slippery hair and keep it in shape. It is not many years, when work of this kind was all done abroad. Now, it is claimed by experts that the American manufacture of most kinds of brushes excels the foreign goods. The chiseled camel's-hair brush, as made by Miles

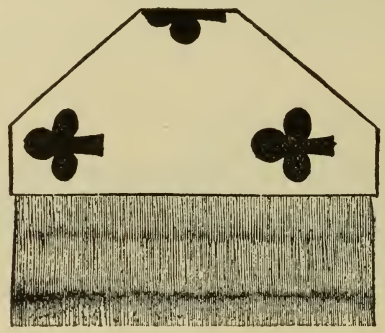


Fig. 8.—Gilder's Camel's Hair Tip.

Bros. & Co., of New York, is something entirely new, and is certainly a very fine brush and well calculated to do smooth, particular work. Another class of these goods made by the same firm, are made extra thick and from picked camel's-hair, the binding of brass having its edge turned under, which gives additional security to the hair and prevents cutting the hair on the edge of the binding, which too frequently happens.

Camel's-Hair Tool. — Small brushes, called tools, made of camel's-hair are used for black-

ing irons, lacquering, and other work of like nature. The next brush to be considered is the camel's-hair DUSTER, a tool used mostly by gilders in removing the loose gold leaf from their work when gilding. These are bound in split quill and fastened with wire. The next to claim attention is the gilder's camel's-hair tip. This is made by laying a thin layer of hair between two pieces of card-board and gluing the whole firmly together, as shown, it is used to lift and carry to the work the pieces of gold leaf. A slight moisture or

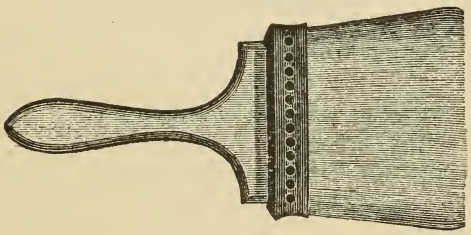


FIG. 9.—WALL BRUSH.

stickiness is given the hairs by simply passing them over the face or hair of the head, and then the gold leaf can be easily lifted from the cushion on which it has been cut and dexterously laid upon the gilding size.

For painting walls a large flat bristle brush is used—see cut—made of all white bristles, bound in copper, brass or galvanized iron. It has always been a difficult task to make a wall brush to stand the hard usage it generally receives, but now that machinery of the most approved pattern has been introduced in the brush factory these brushes are made under warrantee.

Blenders, mottlers, stipplers, top grainers, and several other classes of brushes together, with *pencils*, etc., will be noticed under their respective heads.

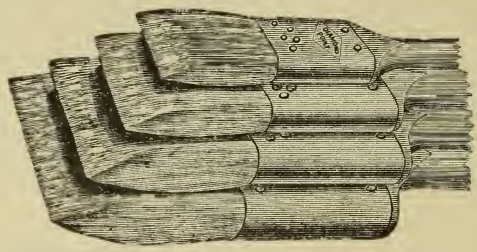


FIG. 10.—THE FLAT, BRISTLE VARNISH BRUSH.

FLAT BRISTLE VARNISH BRUSH.—These are made of the best white bristles, set with glue, doubled nailed, soft yet very elastic, with chiseled points. They are considered the best brush made by many of the best varnishers. They are put up in sets, as shown in the engraving, from one inch in width to three inches, the price being about $3.50 per set. These brushes, if used with care, will wear a long time.

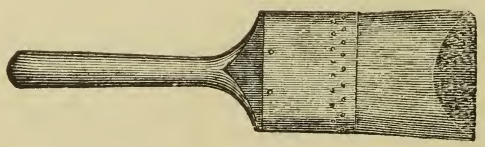


FIG. 11.—A FLAT, CHISELED BRUSH.

FLAT, CHISELED BRUSH.—Flat paint brushes are preferred by some. These are chiseled or ground off on the sides to form a thin edge. They are bound in tin or rubber and are graded in size by their width.

Flattened Round Tool (Chiseled).—This is superior to the "sash tool" for cleaning between the spokes, and for finishing around the various parts of the gear. This brush is tin-bound, well riveted, and the bristles are set in glue, which is insoluble in turpentine and oil, and therefore supe-

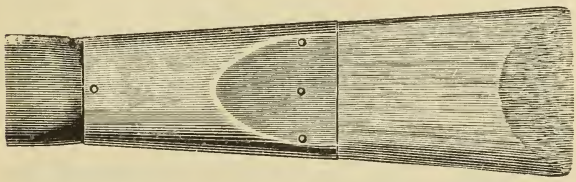


Fig. 12.—Flattened Round Tool, Chiseled.

rior to the cement used by some brush-makers. The size best suited for the carriage painter is about one and a quarter inches in width. This is also an excellent tool for varnishing, in trimming up around moldings, etc.

Fitch-Hair Brush.—This brush was formerly in extensive demand as a varnish brush but of late years the badger has supplanted it, owing, in a degree, to the numerous imitations in the market,

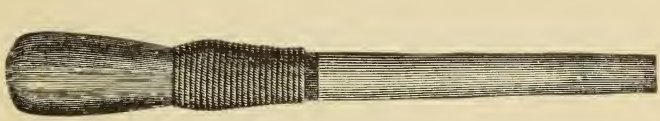


Fig. 13.—Sash Tool.

and also to the liability of the rotting away or breaking of the hairs when in use. The hair is mostly from the tail of the skunk.

Sash Tool.—A sash tool, or small brush, shaped as shown in cut, is necessary as an auxillary to the large brush, for cleaning up in corners, etc.

Oval Varnish or Paint Brush.—As the under parts of a carriage are not rubbed with lump pumice-stone, the same as the body, the paint must be applied with greater care, and the 000 oval brush will work best, laying the paint smoothly and leaving but few, if any, brush marks. The "chiseled" brush should always have preference over a partly worn one, as the bristles are as a rule softer upon their extreme ends. The companion of the oval brush is the flattened tool here shown.

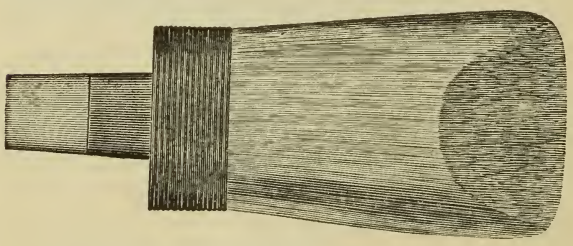


Fig. 14.—Oval Varnish Brush, Chiseled.

Brush-Keeper.—There are several plans in use for keeping brushes in good condition, a few of these we illustrate. Many varnish rooms are provided with a large tin box having two compartments, one for the best, the other for common varnish brushes; but this plan is not a good one, for the large quantity of varnish required—provided the brushes are suspended in varnish—presents a large surface to the air when the box is opened, and the varnish soon becomes thickened and useless. Small cans are the best. The brushes are suspended from wires which run through a hole in the handles, and the brushes are allowed to hang just deep enough to cover one-half the binding.

Varnish, as a general thing, is delicate in its choice of company; a little turpentine, a little oil, or a *little* of anything, except its own kind, will make it liable to pit, or crawl, or flake, or cut up some caper, and that dangerous *little* is frequently supplied by putting into the varnish-cup a brush fresh from a bath of another liquid.

In an experience of thirty years, the writer has found no liquid so well adapted for filling the brush-keeper, as the best *finishing varnish made*

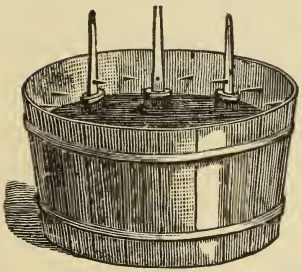


FIG. 15.—DEVICE FOR PRESERVING PAINT BRUSHES.

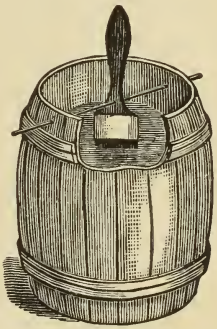


FIG. 16.—ANOTHER METHOD OF PRESERVING BRUSHES.

without driers (expressly for the purpose). This material is not in the market and to procure it, one must order it from a varnish-maker. Such a liquid will last for years without skining over, if care is taken to wipe out the varnish from the brush before suspending it in the keeper.

For keeping paint brushes, it is only necessary to suspend them in water. A good plan being to drive nails through the staves of a tub or pail on which to affix the brushes. The water should be allowed to just cover the bristles or hair, for if it

covered the binding, the parts swell and burst the binding.

Buff Color.—A color made by a mixture of white, yellow and red pigments.

Burgundy Lake.—A name given to a preparation of lake color which has the muddy or dirty red hue of Burgundy wine. It may be made by adding asphaltum to any bright lake.

Burning Off.—When it is desired to remove old paint from any surface, in order to re-paint, burning off is resorted to where no better means are at hand. This is done in several ways; one of which is to heat a large block or bar of iron to a red heat, then, holding it a few inches from the paint, the latter will rise in blisters and soften so that it may be easily scraped from the surface. Another plan is to use a furnace made of sheet iron, and so formed that its front can be presented to all parts of the work in hand, such as sharp corners, etc. Another plan is to employ a rubber hose from a gas-jet, a burner being fitted to the end of the hose, and this has been improved upon by an inventive Yankee, in making a burner which admits to the flame atmospheric air, giving an increased degree of heat with the same amount of gas. Lamps of various shapes and kinds have been in use, some burning alcohol, some gasoline, all very good where gas and better means for getting heat to the paint are not at hand.

Burnishing.—The gloss or lustre of a metallic surface, as of gold leaf, made by rubbing it with a smooth hard substance, such as a dog's tooth fitted into a handle, or a piece of agate, and other hard stones. When burnishing gold leaf, a piece of

India paper is put between the metal and burnishing tool to prevent tearing it from the surface. Frame gilders are the principal burnishers of gold leaf, it being scarcely ever thought of in the carriage shop.

Burnt Carmine. — Madder carmine or cochineal carmine partially charred by fire until it assumes a rich purple hue. Used principally by protrait painters for drapery, etc.

Burnt Sienna.—Crude or raw sienna heated to a red heat acquires a deep reddish brown hue, and is known as burnt sienna. It is in great demand in the paint shop, being useful as a color by itself or mixed with other pigments, and also for imitating the grain of woods. It makes a beautiful tint with white, and for striping on fine work it is used extensively. It is a rich semi-transparent brown orange, and when properly mixed and applied it is a very durable color.

Burnt Umber.—Umber is a natural ochre abounding with decayed vegetable matter, of the nature of peat.

This pigment when burnt or roasted gives a beautiful dark brown shade, frequently seen on carriage panels. It is a very durable color, and when a trifling amount of red and black are added to it it is called umber brown, a favorite color in some localities. Umber is a natural drier, holding in its parts a large share of manganese, and it will therefore dry well, though mixed with a larger share of oil than almost any other pigment. However, this addition should be made judiciously. Burnt umber being semi-transparent the ground should be a similar but darker color, as

Indian red, lamp-black and a little yellow. It is an excellent stain for pine wood to make a black-walnut color; simply wet the pigment with water, or, better, with old ale, and rub it over the wood, let dry, then varnish over it.

Burnt Verdigris.—Verdigris roasted until it assumes an olive shade. Many of the greens may thus be changed in hue by heating them on a shovel over the fire.

C

Cadmium Red.—A pigment which approaches an orange scarlet color—an artist's color.

Cadmium Yellow.—A pigment made by passing a stream of sulphurated hydrogen through a solution of nitrate or sulphate of cadmium. It is a warm, yellow pigment, which passes readily into tints with white lead, appears to endure light and remains unchanged in impure air. The metal cadmium being hitherto scarce, it has been but little employed in the arts, except in water colors.

Camel's-Hair.—Hair from the animal of that name, used for making brushes and fine pencils. (*See Brushes.*)

Canada Balsam.—A kind of turpentine obtained from the Balm of Gilead Fir, a native of Canada and the upper part of the United States. It is a transparent liquid, almost colorless, with an agreeable odor and an acrid taste. It pours readily out of a vessel or bottle and shortly dries up and becomes solid. When fresh it is of the consistence of thin honey. It is used as an ingredient in varnishes, in mounting objects for the microscope, etc. To make a varnish for drawings, prints, maps, etc., take Canada balsam one ounce ; spirits of turpentine two ounces ; mix together. The drawing should first be put upon a stretcher and

sized with a thin solution of isinglass, and dried, then varnish with a soft brush—a badger.

Canary Color.—The color of a canary bird, made by mixing lemon yellow, or the pigment known as patent yellow with white lead.

Cane Work.—The imitation of cane by striping. To lay out cane work, first provide a thin wooden ruler, say $\frac{3}{8}$ of an inch wide. The width of ruler

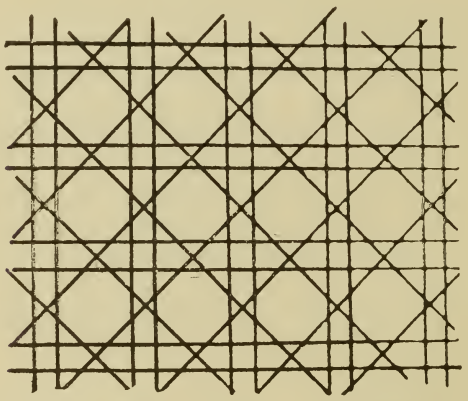


FIG. 17.—SHOWING THE LINES FOR MAKING IMITATION CANE-WORK.

will govern the size of opening in the cane. The ruler must be perfectly true, so that a line drawn on either side the space between the lines shall present no variation. The marker used should be so formed that it will follow closely on the edge of the ruler. On a flat surface a rigid or stiff ruler may be used. Vertical lines are first marked, then by the aid of a square the horizontal lines may be marked off at right angles. Then the diagonal lines may be added. If the work is properly laid

out each hole of the cane work is an octagon or nearly so. The paint for cane work may be made by mixing to white a little yellow ochre and a little sienna, until the desired shade is reached. It is well to allow one course of lines dry before laying others across them. Cane work may be purchased in sheets of transfer or decalcomanie, or upon paper ready to be glued or fastened to the panel.

The best imitation cane is made under Barry's patent, composed of flexible paint. It is to be had in sheets ready for cutting to size and pasting on the work. Brewster & Co. of Broome street, and many other leading carriage-builders employ this in preference to any other, which certainly recommends it.

Cappagh Brown.—A pigment composed principally of bog-earth or peat, mixed or mineralized by manganese in various proportions. That in which the peat most abounds is the most transparent, deep and rich in color and dries promptly in oil. It is similar to a mixture of superior Vandyke brown and asphaltum in appearance.

Car-body Color.—A color much used on railway cars. Composed of yellow, white and a little red.

Carmelite Brown.—A mixture of black and Vandyke brown—a very dark brown of French origin.

Carmilion.—A sort of carmine, made by a secret process, in which the coloring properties are never brought to a dry state, as ordinary pigments. It appears to answer a good purpose on some descriptions of work, and is not so expensive as carmine.

Carmine.—A beautiful red pigment made from cochineal. The color is so extensively used by carriage-painters and is at the same time so expensive, compared with ordinary pigments, that it seems worthy unlimited space in its description, and from one of the best sources of information we have gathered the following:

The cochineal insects feed upon the leaves of the *Quercus coccifera*, a low evergreen oak with prickly leaves, and on other plants of a similar nature. The females fix themselves firmly on the plant, which serves them as a habitation, and never quit this spot. Each insect lays several thousand eggs, which proceed from the body through an aperture placed at the extremity of the abdomen, and pass under the belly to be hatched. Death then insues; the body of the mother dries up; its two membranes become flat, and form a sort of shell or cocoon, in which the eggs are enclosed, and from whence the little cohineals soon proceed. When the insects are in proper state they are brushed off the cactus plant with a squirrel's tail, and killed by immersing them in hot water, they are afterward dried in the heat of the sun, or in the warmth of a stove. The finest cochineals, however, are killed by dry heat and not by immersion. Three harvests are made annually; the first being the best. It has been estimated that 70,000 dried insects are required, on a average to form a pound weight of cochineal. Cochineal is wrinkled with parallel furrows across its back, which are intersected in the middle by a longitudinal one—by this the true cochineal is distinguished from any fictitious preparation. The coloring matter is obtained in the following man-

ner, in a state of purity. Ground cochineal is boiled for about twenty minutes in fifty times its weight of water, the strained decoction, after being allowed to subside for a quarter of an hour, is decanted off and precipitated with a solution of acetate of protoxide of lead, acidulated with acetic acid. There are several methods employed in the preparation of carmine; that described by Dr. Pereira, is perhaps the most approved. A decoction of the insect is made in water. To this is added a precipitant, generally bichloride of tin. It is then put in a large shallow vessel, and allowed to rest. Slowly a deposit takes place, which adheres to the side of the vessel, and the liquid being poured off it is dried, this dry precipitate is *carmine*. The German method consists in pouring a certain quantity of a solution of alum into the decoction of cochineal.

There are some remarkable peculiarities about the production of carmine: the shade and character of color is altered by slight, very slight, differences in the temperature at which it is prepared; and with every variation in the circumstances of illumination a change is discovered in the color. Sir Humphrey Davy relates the following anecdote in illustration of this: "A manufacturer of carmine, who was aware of the superiority of the French color, went to Lyons for the purpose of improving his process, and bargained with the most celebrated manufacturer of that city for the acquisition of his secret, for which he was to pay £1,000 ($5,000). He saw all the process, and a beautiful color was produced, but he found not the least difference in the French method and that which had been adopted by himself. He appealed

to his instructor, and insisted that he must keep something concealed. The man assured him that he had not, and invited him to inspect the process the second time. He minutely examined the water and the materials, which were in every respect similar to his own, and then, very much surprised he said, 'I have lost both labor and my money, for the air of England does not admit us to make good carmine.' 'Stay,' said the Frenchman; 'don't deceive yourself. What kind of weather is it now?' 'A bright sunny day,' replied the Englishman. 'And such are the days,' said the Frenchman, 'upon which I make my color: were I to attempt to manufacture on a dark and cloudy day, my results would be the same as yours. Let me advise you to make your carmine on sunny days!'"

Six drachms of carmine may be obtained from one pound cochineal. Rouge for the face is made by mixing half a pound of levigated French chalk with two ounces of freshly-prepared carmine. The grade of carmine known as "French No. 40" is most extensively used by carriage-painters, it being a bright and handsome shade. The ground over which carmine is put must be made to suit the requirement of the case, for it is seldom applied as a solid color, and glazing is resorted to to economize, as well as to produce various shades. The names given to the different shades of carmine, —made by changes in the ground employed—are "bright," "medium," "dark." When we speak generally of a carmine job, we mean a deep English vermilion ground, lightly glazed with carmine. When we speak of a "bright" carmine, we mean a ground of light English vermilion, glazed in the same manner. For a "medium"

job, we make the ground a little darker with Indian red; and for a "dark carmine" we add more Indian red, which gives us the color known in New York shops as "French red." To mix carmine we prefer to use any light colored rubbing varnish, mixing and grinding it quite thick at first, then adding more varnish to form the glazing, run it through the mill the second time.

Carmine is of great service to the ornamenter, enabling him to produce delicate shades of red or pink by repeated glazings or by admixture with white. Mixed with asphaltum, verdigris, delicate greens, olives, drabs, etc., it imparts a warm tinge without injuring the color; washed over green it gives a warm shade.

Carmine Lake.—This pigment is made from the second washings in making carmine. It is one of the most serviceable lake colors on the list, owing to the various shades which can be produced by simply changing the shade of the ground-work.

Carnation.—The natural color of flesh, or a sort of delicate pink, made by mixing three parts lake and one part white.

Carriage Painting.—The painting of a carriage so as to secure a mirror-like surface, free from blemishes of every kind, is an art which requires a high grade of genius and intelligence; and yet, the tendency of the times is to fill the paint-shops with a class of workmen who, from inferiority of intellect and education, are considered unable to learn other branches of the trade. It is true that anybody can do a part of the work in a paint-shop and do it well, but it does not follow that because

a boy can sandpaper off a job, he can apply a coat of paint, and yet a very large proportion of the foundation coats are laid by boys or men with no skill or judgment, and to this cause more than any other may be attributed the large number of poorly painted carriages in the country. It requires practice to make a painter, but it also requires study. The nature of paints aud oils, the effects of mixing vegetable and mineral pigments, all require study, and no matter how skillful a man may be with the brush, he can never become a good painter without combining theory with practice. The harmonizing of colors and the effects of lights and shades are of as much importance to the coach-painter as to the artist engaged on landscapes; but the coach-painter must go further. He must produce a perfect surface, and in such a manner as to ensure durability, though exposed to sun and storm. He must also study how to stripe and ornament, not merely how to draw a line of a different color, but where that line should be drawn to produce the best effect. Many a carriage body that looked well in the wood-shop has been made to look ungainly after the painter has drawn his lines upon it. The importance of correct taste in this respect cannot be over estimated, and every boy who enters the shop to learn the painter's trade should make it a leading study. The eye must be constantly practiced on colors, as it is by practice only that a true discrimination in shades can be attained. When painters learn their trade in this manner, we hope to see an end to the miserable compounding and blending of colors so noticeable at the present time.

Cassel Earth.—A pigment of the ochre family, of a russet brown hue — very similar to Vandyke brown (*q. v.*).

Celestial Blue.—A pigment made by the mixture of yellow prussiate of potassa, chloride of barium, perchchloride of iron and sulphate of ammonia—not extensively used.

Cerulean or Egyptian Blue.—A pigment used in water and fresco painting, made of carbonate of soda, powdered flint and copper.

Ceruse.—The name given to an extra fine quality of white lead.

Chamois-Skin.—The skin used by the painter for drying off water, and called a "shammy," derives its name from the chamois, an animal of the antelope kind, whose hide was, and may occasionally be found in a carriage paint-shop. Those most in use being nothing more than alum-dressed sheep-skins. The best are known as "French oil-dressed" which are warranted to remain soft after washing, costing from $8.00 to $16.00 per dozen. The best quality are thin, though compact and soft, care should be taken to keep them free from dirt, grease, soap, etc., which would tend to injure the work. Never use a chamois for drying the hands and face when washing.

Chamoline.—A color similar to that of a chamois skin when wet; made by mixing white, yellow ochre and a small quantity of red.

Changeable Colors.—Colors that appear to be of a different hue when viewed in different angles of light. Prussian blue is one of this class, by mixing the color to dry "dead" it will appear reddish

in one light, and dark blue in another. Clear varnish should be put over the dead color, as color-and-varnish takes away that feature. Dichroism is the scientific term used to denote this peculiarity.

Changeable Sign.—A sign which shows three different readings—made in the following manner: Make a wooden sign-board in the usual manner, and have a projecting molding around it. Next cut thin grooves—a saw-scarf—in the molding one inch apart, allowing each cut to reach the surface of the sign-board. In each of these grooves insert strips of tin or other thin metal one inch wide, and long enough to reach across the sign-board from the upper to the lower molding. When all arranged, take out the tin strips and paint them the desired color of the sign-board, doing the board at the same time. Next, put the letters on to the board as usual, then laying the strips of tin edge to edge, letter other words on each side, then slip the tins into the grooves in their regular order. This will give you a sign reading three different ways, as viewed from the three positions—front, right and left.

Charcoal Black.—A black pigment made of burnt peach stones, white sugar and other substances.

Cherry Brown.—A color made by glazing a ground of Vandyke brown, with a thin carmine glaze.

Chestnut Color.—A color made by the mixture of two parts red, two parts yellow, and one part black.

Chiaro-Oscuro (pronounced *Ke-ar-o-Os-ku-ro*).—That branch of painting which has for its object the combination and arrangement of the light and

shadow of a picture to the best advantage. Relief and depth, and what is generally called the *effect* of a picture, are produced by Chiaro-Oscuro.

China White.—A pure white pigment, made by the assorting of the purest flakes of zinc white.

Chinese Lake.—A name sometimes given to scarlet lake.

Chinese Vermilion.—A pigment of a bright red color made by the Chinese and with whom its manufacture is a secret. It was for many years the only vermilion used in this country. It came wrapped in papers containing one ounce each, and so expensive that but little was used. Vermilion is now used in enormous quantities and the English make has almost completely run the Chinese brand out of the market.

Chinese Yellow.—A pigment made by the Chinese consisting of very bright sulphuret of arsenic.

Chipping.—The breaking or flying off of a coating or coatings of paint and varnish from the surface on which it was spread. The prime cause being unelastic mixtures of paint, *i. e.*, paint which was mixed to dry too quickly and consequently devoid of oil or other elastic vehicle.

Chisel-Point.—A term applied to those brushes having the hair or bristles coming down to a point or "chisel-edge." Brushes were formerly made with the bristles of equal length and the painter was compelled to "wear down" a brush on coarse work until he obtained the requisite shape. The brush-maker inserts the desired quantity of bristles for a brush into a tin receiver, and they are by that means brought to a point, with the flag-end

of the bristle left on, the upper end or butt is then cut off square and the handle affixed thereto. This is better than to grind off the bristles or to "wear down" as some do, as it leaves the brush soft yet elastic upon its extreme point.

Chloride of Zinc.—Once used to advantage as a cement, is now highly recommended as a paint. A convenient application for this purpose is made by stirring a mixture of oxide and chloride of zinc in cream of tartar, adding starch enough to bring it to the proper consistency, then boiling the whole and allowing it to cool. If the paint is to be colored in any way a pigment of the desired shade is introduced before boiling with the starch. In course of half an hour the paint becomes dry and hard. This paint does not become darkened in the air, and is without smell; and even in winter, in consequence of its quick drying, will admit a second and third coat in the space of a few hours. It can be cleaned with soap and water, like an oil paint, and its action, in consequence of containing the chloride of zinc, is as a preservative of wood, rendering it almost incombustible, a peculiarity which can be increased by adding a small quantity of borax.

Chocolate Color.—Add a small quantity of lake or carmine to burnt umber; or take Indian red and black and add a very little yellow. Chocolate brown is but another name for this mixture.

Chrome Green.—This pigment is known to chemists as the sesquioxide of chromium, and it is prepared by several processes, one of which is as follows: A mixture of three parts of neutral chromate of potassa and two of sal ammoniac is heated in a

crucible. The two salts are decomposed, and there is formed an oxide of chromium mixed with chloride of potassium. The latter salt is removed by several washings of hot water, the product is then calcined to increase its brightness. In painting with chrome green, it is best to have a well made ground work of lead color, then in most cases, one coat of the color will cover it solidly, and it should always be borne in mind that no more color should be applied than is sufficient to cover the ground, for too many coats will make a porous foundation for the varnish coats, and loss of lustre or cracking will result. Where more than two coats are required to cover, the third coat should contain a good proportion of varnish. Chrome Green is well adapted for sleighs, light trotting wagons, or for machinery. It is seldom used in its purity upon carriage work, except for striping and ornamenting. With white it forms beautiful light green tints which are extremely durable. It covers well and dries in a short space of time when properly mixed.

Chrome Orange.—Dichromate of lead, which is a splendid orange color, is obtained by adding to a solution of nitrate of lead a solution of chromate of potash, to which an equivalent of hydrate of potash has been added. It is also obtained by fusing together five parts of nitre and one part chromate of lead. Chromate of potash and dichromate of lead are formed, and the former salt is removed by washing. Chrome Orange holding a large share of red in its composition, cannot be successfully used in making greens with blue, or tints of bright yellow. The principle should always be kept in mind—to use a color or

pigment which contains the least of any objectionable tint, as, for instance, in making a green color, we seek the purest yellow, one which has but little, if any, red in its composition, to add to the blue; or in preparing an olive color, we choose a reddish or orange yellow to add to black. This color finds favor with the ornamenter and letterer, and the striper generally prefers the ready mixed orange to one made of yellow and red.

Chrome Yellow.—Chemistry and the arts are indebted to Vauquelin for the discovery of chromium, a peculiar metal which he found in 1797, in a sample of Siberian red lead (chromate of lead). Vauquelin distinguished in the new metal the remarkable coloring power of its combinations; indeed the name he chose means color. Among the combinations of chromium, the most employed in the arts are the chromate of lead, lime and baryta. The neutral chromate of lead is of a very fine and bright yellow, and is known as lemon chrome by a majority of painters.

Cinnaber.—Vermilion (which see).

Citrine.—The first of the tertiary class of colors or ultimate compounds of the three primaries—yellow, red and blue, in which yellow is the predominating color, and blue the extreme subordinate. Citrine being an immediate compound of the secondaries, orange and green, of both of which yellow is a constituent, the latter color is of doubtful occurrence therein, while the other two primaries enter singly into the composition of *citrine*. There is also a species of brown pink dye called citrine lake, prepared from quercitron bark.

Claret Color.—A deep red, taking its name from claret wine. Some of the lakes and carmine will give this color; or, mix red and black, or blue and carmine. There are many shades of claret wine, as deep, pale, etc., and it is rather an unsatisfactory term to use in expressing a color.

Clay Drab.—A color made by mixing equal parts of raw sienna, raw umber and white lead, then tinted with a few drops of chrome green.

Cleaning Paint.—Soiled paint, whether on woodwork or canvas, may, it is said, be cleaned perfectly by first dipping a rag in finely powdered and well-sifted Spanish white, and then rubbing the surface in question, gently with it, thereby removing dust, grease, etc., from the colors. The surface is then to be washed in fresh water by means of a sponge, and dried with a soft chamois skin. The colors appear as fresh as new, and the whole process has many advantages over the use of soap.

Clearcole.—A mixture of thin size and whiting spread over old painted parts in houses to cover grease spots and dirt, and aid in the drying of subsequent coats of oil paint. It is also used by some painters as a priming for new wood. To a certain extent the size stops the absorbent powers of the wood or plaster, but it prevents the proper adhesion of the oil paint, which soon cracks and peels off.

Clouding.—The same as *smoky*, "foggy." These terms are self-explanatory when used by the painter, and are synonymous with the English expression "blooming," which still more aptly describes that the brilliancy of a varnished surface is

obscured by a "bloom" as on a plum or cucumber. When clouding occurs on finished work, as it frequently does, where the carriage is exposed in a repository impregnated with the sulphur fumes of the smith's forge, it may be removed by washing with cold water, and allowing the job to stand in the sun and open air for a while. The want of ventilation, and dampness will cause a smoky appearance of the varnish. The technical explanation of this trouble is "moisture condensing on the surface and leaving a residue of carbonic acid combined with other impurities."

Cobalt Blue.—A pigment prepared from the metal cobalt, much used in scene painting.

Cobalt Green.—A pigment prepared from cobalt, with the addition of oxide of zinc or iron. It is of a pure but not very powerful green color, quite durable. *Rinmann's Green* is the same thing.

Colcothar.—A pigment made by the calcination of the green sulphate of iron (copperas) upon plates until it has lost its combined water and become white. It is then pulverized, heated and submitted to the action of sulphurous acid.

Cologne Earth.—A brown earthy pigment found in the neighborhood of Cologne, on the river Rhine.

Color.—In art, means either the pigment employed to produce a certain effect to the eye, or the effect thus produced. Color must be regarded by the artist not so much the result of application of one or more pigments separately as of their use in the innumerable combinations of which they admit. The primary colors as they are called—*red*, *blue* and *yellow*—if compounded in various proportions,

either in twos, or all three together, produce every hue in nature or in art, every tint that is physically possible. First when combined in twos, they produce the three *secondary* colors—that is to say, blue and red make purple or violet; yellow and red, orange; blue and yellow, green. The grays and browns, again, are compounded of all three of the primaries in unequal or varying proportions.

Color Blindness.—A term introduced to denominate a defect of vision, owing to which some persons are either unable to discern a single color, such as red; or to distinguish between two colors, such as red and green. This defect is called *chromatopseudopsis.*

Color for Graining Ground.—For light wainscot oak, take white lead and yellow ochre, mixed to the required tint. Some grainers prefer a perfectly white ground for very light oak for inside work, but it is always difficult for any but a perfect master of the art to proceed satisfactorily on a white ground, and the work, when completed, is apt to have a chalky effect, even though a dark varnish be used.

For a darker wainscot oak, mix white lead, medium chrome yellow and yellow ochre.

For dark oak, mix white lead, Venetian red and yellow ochre.

For very dark oak, mix white lead, raw sienna, burnt umber and Venetian red.

These colors, mixed in different proportions, will produce a multiplicity of tints suitable to receive the graining color, their strength being of course determined by the greater or lesser quantity of white lead.

For Mahogany, some prefer a ground of yellowish cast, while others choose one approaching a bright red. The reds and yellows used are Venetian red, red lead, vermilion, raw sienna, burnt sienna, orange chrome, etc. These colors can be mixed to the tint required, an addition of white lead being made in each case, as the positive reds and yellows are too powerful unless diluted. Venetian red, orange chrome and white lead are the colors most generally used and these colors will, according to their predominance or subordination, make such a variety of tints that the most fastidious grainer need have no misgiving as to results.

For Rosewood, use Venetian red, vermilion and white lead. Scarlet lake is sometimes added for best work, and some mix with the reds a small quantity of raw sienna or chrome yellow.

For Bird's-eye maple and satin wood, use pure white grounds, and it is of the utmost importance to have the grounds painted with finely strained colors and perfectly smooth.

Colorless Varnish.—A colorless varnish suitable for prints, oil paintings and hard white wood, may be made by dissolving 2.5 ounces of shellac in a pint of rectified spirits of wine. To this must be added about five ounces of well-burnt animal charcoal that has been recently heated, and the whole boiled for a few minutes. If on filtering a small portion of the mixture through blotting paper it is not found to be perfectly colorless, more charcoal must be added until the desired result is obtained. When this has been achieved, the mixture must be strained through a piece of silk and filtered through blotting paper.

Colorone.—A substitute for oil, japan and varnish in color mixing.

Complementary Colors.—The color required with another color to form white light, is called the complementary of that color; thus, red is the complementary of green, and *vice versa;* blue is the complementary of orange, and *vice versa;* yellow is the complementary of violet, and *vice versa;* because blue and orange, red and green, yellow and violet each make the full complement of rays necessary to form white light.

Contrast.—The laying in of colors to a picture or other ornamental design so that one gives greater effect to the other. All art is a system of contrasts; lights should contrast with shadows, members with members, groups with groups. It is this which gives life, soul and motion to a composition.

Copal Gum.—Although commonly called a *gum* scientific research has demonstrated that it is a misnomer from the fact that true gums are soluble in water, while copal gum is dissolved only in oil of turpentine. If it were a gum, distilled water would, of course, dissolve it to a certain degree; if it were a resin, it would be easily dissolved in alcohol; if it were a gum-resin, both menstrua would have some effect upon it, and as they have none, this proves that the substance belongs to another class than the gums and resins. We may explain what appears to be an error in terminology, by conceiving of true copal as being a fossil gum—a substance that was *once a true gum*, soluble in water, and having the other essential qualities of a gum, but whose characteristics have

been so changed, by the action of outward influences, that the ordinary tests of its identity are no longer available.

There are many varieties of copal gum, which differ greatly from each other in appearance and chemical properties. The great bulk of copal comes from different parts of Africa, and it forms a very important feature of the export trade of that country.

We shall direct our remarks mainly to the Zanzibar copal, that variety being the less in quality, and therefore the one most used in varnishes of the highest grade, and it is the kind about which we have the most direct and definite information.

It is generally supposed that Zanzibar copal is found on the island of Zanzibar, but this is not the case. A very little only, and that of an inferior quality, is found on this island. However, the port of Zanzibar occupies the position of trading post at which the copal is collected and shipped by the merchants who are there established. In seasons of ordinary activity the shipments of copal from Zanzibar to the United States far exceed the shipments made to any other country. Considerable of the copal is found lying upon the surface of the grounds, which, in commerce, is called "surface gum," but this is not so valuable as that which lies deeper in the sand. Usually the copal is found at a depth of from a few inches to three or four feet, and it is seldom that the native diggers go deeper than this, but there is a reason to believe that the gum would be found at a much greater depth, and perhaps in much larger quantities. The greater the depth at which

it is found the greater the purity and value of the gum. Copal dug before the rains is always more impure than that which comes afterward, because it is more of a surface gum. But during the rainy season, when the soil is moist and soft, the natives dig deeper, and the copal comes in larger pieces and of better quality. The first operation after the gum is collected, is to pass it through coarse sieves to separate the small from the large pieces, the latter being called by those in the business "pandy-pandy." The remainder of the gum, which has passed through the first sieve, is then passed through a finer one, and all that runs through is "refuse," consisting of dirt and small pieces of gum, that are not saleable, and this is thrown into the sea. The gum having been assorted into two sizes, is now cleansed by being placed in a solution of weak potash water. This does not always remove the adhering dirt, and it becomes necessary to scrape each piece separately, but as labor is cheap in Africa this is not an expensive operation. Having been cleansed, and classified by the merchants of Zanzibar, the copal is ready for shipment in the first vessel that arrives. The gum-room of a well organized varnish factory is generally a busy place. Here we see oblong boxes of gum coming in from "over the sea." Here it is assorted by boys, who from constant practice, have become experts in dividing the bright, crystal-like pieces from the dark brown, spotted or discolored ones; and here the several grades are sorted, weighed and wheeled to the melting room.

Copal, To Dissolve in Alcohol.—Dissolve one ounce of camphor in a quart of alcohol, put it

into a circulating glass, and add eight ounces of copal gum in small pieces; set it on a sand heat, so regulated that the bubbles may be counted as they rise from the bottom, and continue the same heat till the solution is completed. This process will dissolve more copal than the menstruum will retain when cold, and it will be economical to set the vessel aside for a few days to settle, then pour off the clear varnish, leaving the residue for future operation. This solution will be found excellent as a varnish for pictures, it being exceedingly clear and bright.

Copper Color.—The color of the metal copper, made with two parts of yellow, one of red, and one of black. Copper bronze is frequently used to produce this color.

Copper Greens.—A class of pigments having the metal copper for a base, among which may be mentioned, verdigris, mineral green, green lake, emerald green, French green, marine green, etc. These greens are generally bright in color and well suited for house-painting and work of like character, but not so well adapted for the fine arts.

Cracking.—The breaking up of the painted surface into parts more or less minute, as of a looking-glass when fractured. The principal causes of which are: 1st, Putting too much *oil* in the under coats. 2d, Quick painting over oil painting; and it must be borne in mind that the filling up process on carriage bodies is of the nature of "Presto painting," for which reason the priming coats have to be united with considerable caution and practical knowledge. By no means must they dry glossy, which is evidence of *too much oil.*

3d. By destruction of the oily properties of the varnish through exposure to atmospheric or solar influences. 4th, By the action of ammonia or other alkalies. 5th, By reason of unsuitable driers in the varnish, or added thereto after its manufacture. 6th, Springing of the wood or rupture of the ground work of the painting by severe jars. The drying of oily color is often so slow that it does not crack the subsequent coats until the work has been varnished and run out.

Crawling.—A term applied to paint or varnish which, after being spread, its surface presents portions which have contracted. The remedy for this difficulty is generally found in wiping over the surface on which the paint or varnish is to be laid with a damp cloth, or by throwing water in small quantities upon the paint while brushing it.

Crayon.—The name given to pieces of charcoal, white and red chalk of convenient size and shape, which are used for drawing on various kinds of paper, and for sketching cartoons, or the outlining of paintings of considerable size on canvas. Crayons of various colors and tints, are also made by mixing vegetable and mineral coloring matters with pipe clay or chalk and giving consistency and adhesiveness to the mass by the addition of gum-water, soap, wax or some similar substance.

Crayon Conte.—The name given to a kind of crayon made of lamp-black and a very fine clay, said by artists to be an excellent quality of crayon. The ingredients are baked, and any desired degree of hardness is given by allowing it to remain in the oven a certain length of time. It derives its name from the inventor, a French chemist.

Cream Color.—A color made of five parts white, two parts yellow, and one of red.

Crems or Kremnitz White.—A white carbonate of lead sometimes called Vienna white, being brought from Vienna in cakes of cubical form. Though highly reputed it has no superiority over the best white lead made in this country.

Creosote Wood Stains.—The creosote stains take their name from one of their most important ingredients—Cresol, or "Creosote"—which is a well-known preservative of all vegetable tissues. This substance unites with the albuminous or sappy part of the wood, which is naturally the first to decay, and forms with it a compound which resists all change from water or the variations of climate. It also is said to protect the wood against the ravages of insects—notably the white ant of the South.

These stains are made in a great variety of colors suitable for exterior uses; and their effect upon the pretty shingled villas and cottages now so much in vogue is extremely picturesque and beautiful.

Crest.—A device worn upon a helmet and represented above a shield of arms. Crests are not borne above the arms of ladies, except the Queen.

Crinkling Up.—A term applied to varnish when it assumes a wrinkled appearance. It may be caused by varnish which is too new; but more frequently to inexperienced workmanship, in putting on the varnish in uneven patches and not brushing it equally, and when this superabundance exists on the surface, the excess of varnish must crinkle up for obvious reasons.

Cross (Her).—An ordinary, formed by lines drawn palewise and fesswise, enclosing one-fifth of the shield, or one-third if charged. A *cross gules* is termed the *cross of St. George*. A plain *cross* is one of which the extremities do not reach to the circumference of the escutcheon, but are *couped*. A *cross crosslet* is one crossed on each arm. A *cross flory* has three points at each end. A *maltese cross* has arms increasing in breath toward the end, with double points. The *cross of St. Andrew*, is in form of an X. There are numerous styles of crosses, but the above are the principal ones.

Crystal Varnish.—This varnish is excellent for maps, drawings, etc., and may be made as follows: Take Canada balsam, 1 oz.; spirits of turpentine, 2 oz.; mix together. Before applying this varnish to a drawing or colored print, the paper should be placed on a stretcher, and sized with a thin solution of isinglass in water, and dried. Apply with a soft camel's-hair brush.

Cup.—A small tin vessel, round and with a flat bottom; having a handle on one side, and open at the top. Ordinary tin cups may be used for holding paint, but cups used in varnishing should have a *flat side* made on the top edge that one may wipe the brushes over without fear of rounding them. There should be, at least, three cups used for work on a heavy body, in order to keep the varnish from the particularly difficult or prominent parts, perfectly clean, and free from air bubbles. Varnish cups are also made with double bottom between which sand is put, to make the cup heavy and not liable to be overturned when

wiping out a brush; and in some instance the sand is heated to render the varnish more limpid. Varnish cups should be left in a bath of strong potash lye until every particle of varnish is eaten off, then rinsed in clean water and dried before use. Clean varnishing can never be done if the cup used is covered both inside and out with gummy and partially dried varnish.

Curdling.—A term applied to paint which thickens or curdles; due in most cases to the use of poor japan. If a poorly made japan be added to linseed oil, the mass will *curdle*, not mix together; but when the japan is of a good quality a perfect assimilation of the two ingredients will result.

Curled Maple Graining.—Imitation of this wood may be made as follows: Prepare a light cream color for the ground, by mixing chrome yellow and white lead, and burnt sienna or Venetian red to tinge it. Paint the work with this and when dry prepare the graining mixture by mixing in equal proportions, raw sienna and Vandyke brown (dry) in old ale; spread the graining mixture (called "rubbing in") over the cream colored paint—doing a little at a time—then draw a piece of cork over across the work to form the grains which run across the wood. This will dry in a few minutes when it should be varnished. To grain maple in oil for outside work, prepare a rich cream ground as before. Then for the graining color, grind equal parts of raw sienna and umber in boiled oil and turpentine, adding a small quantity of beeswax dissolved in turpentine to *hold* the grain in place. Spread this over the ground work, make the lights by rubbing off the graining

mixture with a piece of leather or a rag, soften the edges slightly by rubbing over a blender, and when dry put on the top grain with burnt umber and raw sienna, ground in ale with the white of an egg added. When dry, varnish with hard drying body varnish.

Cutch.—A number of pieces of parchment or animal skins, between which gold is placed to be beaten out into sheets.

Cutting Down.—This term is applied to the rubbing of rough-stuff coatings with lump pumice-stone; and to the rubbing of paint on bodies or gears, with sand-paper; also to the rubbing of varnish with pulverized pumice-stone.

Cutting In.—Applied to the application of color around a letter or stripe. In the case of letters, the *ground* is put on around the letter instead of putting the letter upon the ground.

D

Damar.—A gum obtained from certain species of pine trees; it is hard, brittle and similar to copal, largely used in making varnishes. Damar varnish is almost colorless, being of a milky hue and mixed with zinc white it forms what is known as "china gloss." It is not durable when exposed to the weather, but for inside work and for some of the purposes of the artist it is excellent.

Damask.—The name given to textile fabrics in which figures of flowers, prints, or others not of geometrical regularity are woven. Painting in imitation of such fabrics is fashionable and certainly very pleasing, while at the same time the work is done in an easy and inexpensive manner upon the side walls of a room.

The wall needs no preparation if it be hard-finish, and none, other than that given to all kalsomined walls (sizing) if kalsomined. First draw a design of flowers, leaves, or whatever fancy dictates, and make a perforated pattern. Dust this upon the wall with a pounce-bag (*q. v.*) filled with Venetian red or black. Next proceed to mark the red lines with a soft black crayon. When the plan is thus all laid out, mix whiting and carriage rubbing varnish, or furniture varnish, to form a medium thick paint, add a little dissolved borax (say $\frac{1}{4}$ lb to a quart of turpentine) and stir all well together. If the mixture be too

thick to spread nicely and it *covers* the marks of the crayon completely, thin it with turpentine until it does not do so, for the crayon marks must be seen through the paint. When properly prepared, paint over the whole side wall, and let it stand a while to set. Now with a very coarse graining comb (*q. v.*) comb it over, running the lines of the comb from ceiling to floor at an angle of say 45 degrees; then cross comb it directly at right angles—this gives the appearance of woven fabric. The combing done, take a flattened stick and smooth out the combings which are within the boundary of the design, leaving all outside of the figure untouched and let all dry hard. When dry, give a thin coat of glue-size and kalsomine the wall with a bluish or greenish tint. The combings will show out splendidly and the figures will be quite smooth, so that the appearance of damask will deceive many. This work may be done with oil paint in a similar manner.

Damp Blue.—Or, as called by some, *Brunswick Blue* and *Celestial Blue,* is made by precipitating the alumina from a solution of alum by carbonate of soda, and adding sulphate of baryta; sulphate of iron; yellow prussiate of potash and some bichromate of potash. When dried it is known as Brunswick Blue, but when not dried it is called Damp Blue.

Dark Lead Color.—White lead and lamp-black mixed to suit; any shade may be made.

Dark Rich Brown.—A color much admired for panels or for gears on carriages, made of Indian red five parts, Prussian blue one part; mix and grind in brown japan and turpentine equal parts,

add a very little raw linseed oil, say, a tablespoonful to a pint of paint. By changing the proportions of the pigments the color can be made light or dark. Vermilion and ivory-black will make a good brown, but all browns made with red and black are improved or softened by the addition of yellow. Umber brown, Vandyke brown, sienna brown, etc., are all pigments of the brown order, but require the addition of other pigments to lighten or darken or give richness. Umber brown without a drop or two of red is a cold, raw color, unless placed in juxtaposition to the required reddish paint.

Daub.—To paint in a rough manner. A workman who does not fully understand his trade is sometimes called a *daub* or *dauber*.

Dead Black Paint.—In the *Locomotive*, issued monthly by the Hartford Steam Boiler and Inspection Company, is a recipe for painting brass tubes, optical instruments, etc., a dead black. The writer claims that after trying numberless unsatisfactory recipes, he has at last found one which is perfection in every respect. Take two grains of lamp-black, put it into any smooth, shallow dish, such as a saucer or small butter plate, add a little gold size, and thoroughly mix the two together. Just enough gold size should be used to hold the lamp-black together. About three drops of such size as may be had by dipping the point of a lead-pencil about half an inch into the gold size, will be found right for the above quantity of lamp-black; it should be added a drop at a time, however. After the lamp-black and size are thoroughly mixed and worked, add twenty-four

drops of turpentine, and again mix and work. It is then ready for use. Apply it thin with a camel's-hair brush, and when it is thoroughly dry the articles will have as fine a dead black as they did when they came from the optician's hands.

Dead Color.—A term given to paint that dries without gloss. This is brought about by the use of more turpentine than oil, japan, or varnish. House-painters generally use the word "flat" to convey the same meaning.

Deadening.—A term together with, "*perishing*," "*sinking in*," "*withering*," "*grain showing*," "*sadding down*," "*striking in*" and "*going sleepy*," applied to one very serious *deviltry* on the part of varnish, it loses its brilliant mirror-like surface and becomes dull or lustreless. The common causes for which are: First, from unseasoned timber. Second, from imperfectly dried undercoats. Third, from absorption of the oils of the varnish. Fourth, the failure to allow the escape of gas from the can before applying it. Absorption is the principal agent. (*See American Method.*)

Dead Finish.—A lustreless surface. A term applied to the finish produced by rubbing the gloss from varnish with pulverized pumice-stone and oil, the surface being left in a semi-lustrous state by omitting the polishing process. Much of this work is done on furniture with shellac varnishes rather than with copal owing to its quick and hard drying properties. Dead finish is given to painting in houses, by mixing the paint with turpentine principally, and is called "flatting" by the house-painter.

Decalcomanie.—The art of transferring pictures or designs printed or painted upon prepared paper to other surfaces. (*See Transfer Ornaments.*)

Deep Buff.—A mixture of white, yellow and red, forms a color known as buff, and by increasing the quantity of red and yellow a deep buff is produced.

Deepen.—To darken, as to deepen the shadows of a picture thereby making them more intense by adding a stronger or darker color to the already dark parts.

Detergent.—A chemical preparation, which when spread on a painted surface, softens the paint so that it can be easily removed by scraping. Some of these chemical preparations are self-destroying, and one ingredient neutralizes the effects of the others, yet the composition is not active without that ingredient, and therefore as the detergent cannot be kept for any length of time it must be mixed in small quantities as required. Lime, potash, soap, soda, are among the principal ingredients of detergent.

Deviltries.—A term used by coach-painters to indicate the detestable action of paint and varnish at various times. The subject is indeed an extensive one, and we prefer to note the many "deviltries" under their respective heads than to extend this article to so great a length. The deviltries of paint and varnish we find in adulteration of materials. Fading, darkening, greening, cracking, chipping, peeling, being gritty, fatty, greasy, curdling, pitting, clouding, blistering, etc., which see under their proper headings.

Dexter.—Right, as opposed to left, or sinister (*Her*). The right hand side of a shield.

Diaper.—An exceedingly pretty style of ornament consists of the application of a "diaper" in colors to the lower portions of the pilaster, as shown in Fig. 18. The term "diaper" as applied to decora-

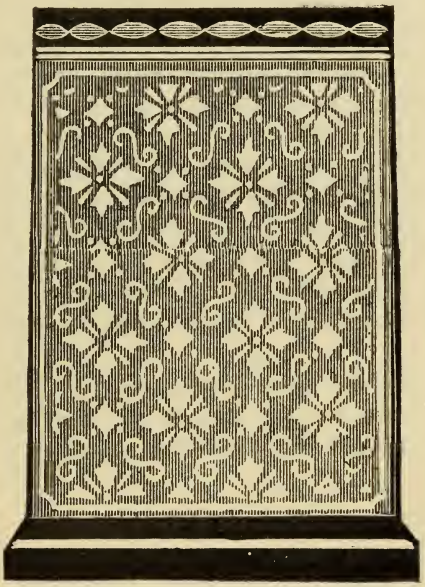


FIG. 18.—DIAPER WORK.

tion may require probably some little explanation. "Among early decorators several kinds of diaper are met with, the most common extending itself over large surfaces in a running or geometrical pattern, executed in a darker shade of the ground color. Sometimes it was used for exterior decoration as a series of red devices arranged upon an

uncolored ground, or more properly, a ground possessing no other color than the prevailing tint of the building."

Diaper is most useful to supply the place of middle tints, the introduction of which might destroy the brilliancy and interfere with the keeping of polychromatic painting. In addition to this valuable property, and its especial peculiarity as a series of repetitions of a single design, this system of mural embellishment possesses a yet stronger recommendation on the score of its extreme simplicity.

This fact alone should be sufficiently obvious to popularize the modern revival of an ancient practice, which was, in one period of art history, not only to be found upon the walls of dwelling-houses. but formed an important feature in the magnificently illuminated manuscripts of the mediæval era.

The colors most suited to the production of diaper ornaments and other similar decorative purposes are the following recognized combinations:

White ornaments on yellow ground.
Yellow on white.
Yellow on red. Red on yellow.
Black on red. Red on black.
Salmon tint on brown. Brown on gray.
Gray on brown. Yellow on gray.
Brown on green. Green on stone color.
Gray on black. Red on gray.
Red and gray alternating on stone color.
Red and black alternating on stone color.
Black, white and red alternating on stone color.

Distanced Lines.—In striping, when a broad stripe is drawn with fine lines on each side of it and at a short distance from it, the lines are said to be *distanced*. As "a broad stripe of red with *distanced lines* of cream color."

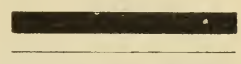


FIG. 19.—DISTANCED LINES.

Distemper Painting.—A coarse kind of painting, in which the colors—of a commoner kind than those usually employed for artistic purposes—are mixed in a watery glue, such as size and whiting. The chief purposes for which distemper is now used are the coloring of walls, scene-painting, and in staining paper for walls. The so-called *fresco painting* (*q.v.*) of to-day is principally *distemper*. The whitening or coloring of walls and ceilings commonly called "Kalsomining" is simply a common kind of Distemper and fresco work. The base of *Distemper* is either whiting, or Spanish white, the latter being purer, and this mixed to a cream-like consistency with warm glue water forms the *white*, while a coloring of any tint may be had by simply adding other pigments in small quantities.

Plaster of Paris is often added to whiting and the whole mixed with clear water, the plaster acting as a binder, and it is certainly far more cleanly, as there is no liability of its being affected by damp as in the case of animal size.

Comminuted or finely powdered glue has of late years become an article of commerce, and its adaptability for mixing with whiting in proper proportions to form Distemper or Kalsomine when wet with boiling water, has been taken advantage of, and now one may purchase almost any desired tint of prepared or "dry kalsomine" at a village

store. A good wall brush (*see Brushes*) should be used to apply distemper colors to a large surface, a common white-wash brush being unfit for the purpose.

Dotter.—A tool used in graining, made by rolling a piece of cloth saturated with graining color until a point is formed; this point must, however, be open like the aperture of a funnel, but semicircular in shape, and with this the dots or eyes of maple wood are imitated.

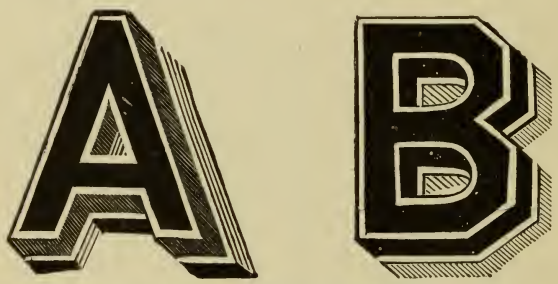


FIG. 20.—DOUBLE SHADED LETTERS.

Double Shade.—In lettering or scrolling the *double shade* is frequently used. It consists of an additional width in the ordinary shade (or properly, thickness) of a letter added in some other color, as for example: a black shade upon a red ground would be double shaded by another of same width in carmine, or a glazing of asphaltum. The idea being to blend the intense contrasting shade to the ground color. (*See Lettering.*)

Dragon's Blood.—A resinous substance from the juice of a plant found in the East Indies. There are two sorts, but that in drops is the best. It is

used to color varnishes, lacquers and stains, and is of no use otherwise to the painter.

Dressing.—A term used to express the laying or leveling of varnish upon a surface. The varnish is spread over a surface, and the brush is passed over it in various ways to cause it to lie uniform, and this is called "Dressing" the varnish.

Drying.—A term applied to the solidification of paints and varnishes, but improperly, as it signifies that a body moistened by a liquid loses that liquid by evaporation. Although the spirits of turpentine that is generally used to diminish the viscidity of the oil in paints, and to enable the mixture to flow better, evaporates, there is left a fluid coat thicker than before, but by no means dry, being in the condition called "set"; and from this point in the hardening process, far from losing anything by evaporation, *the coat hardens by absorbing oxygen from the air.*

A panel of wood painted or varnished, dries more quickly in a jar of oxygen than in the air, and does not dry at all in a jar filled with carbonic acid gas. A freshly painted surface may be kept for a long time under water without drying, not because it wets like a cloth, but because the water keeps it from the oxygen of the air.

Other things being equal, paint and varnish dries more quickly at a temperature of 80° than below. This explains why in practice the proportions of driers should vary in summer and winter, in mixing paint for outside work, and it shows also why paint shops should be kept at a summer temperature.

All the fixed oils have an attraction for oxygen,

and by exposure to the air they either become hard and resinous or sour and rancid. Those which exhibit the first property in a marked degree, as linseed oil, poppy oil, rape and seed oil etc., are called *drying* oils, and are used as vehicles for colors. The drying quality is greatly increased by boiling, either alone, or with litharge, sugar of lead, etc., when the product forms the boiled oil or drying oil of commerce.

Colorless Drying Oil.—Heat 5 gallons of water to the boiling point in a vessel holding 15 gallons, when boiling add 5 gallons linseed oil and 1 pound red lead, keep it constantly stirred and boil for 2 hours, then remove it from the fire and let settle.

Dark Colored Boiled Oil.—A good drying oil for use in house painting is made by boiling, with constant stirring, 1 gallon of linseed oil with ¾ pound of powdered litharge, until a skin forms, then remove the scum, and when cold and settled decant the clear portions.

Driers for Dark Colored Paints.—Grind the best litharge with drying oil. A small portion added to paint will cause it to dry quickly.

For light colored paint, sulphate of zinc or sugar of lead may be substituted for the litharge.

Pale Boiled Oil.—Boil 1 quart linseed oil and 2 ounces white vitriol (sulphate of zinc) with one quart of water until the water has all evaporated, then allow it to settle.

Dusting Off.—The thorough cleaning from dust of a surface to be varnished is something that has puzzled the painter for years. The tenacity with which the little bits of lint adhere to a panel, and

the unsightly appearance they give to the varnish if left on the work is a source of trouble. There are several ways to remove these specks.

One painter in preparing a body for varnish, oils his duster, that is, he applies a few drops of sweet oil to one hand then rubs the two palms together until the oil is well distributed ; he then rubs the tip of his bristle duster lightly over the palm until it has taken up a little oil. With this duster he then goes lightly over the panel and the oil helps to take up any remaining particles of dust or lint. This is fairly effective. Another, substitutes varnish for oil, and with this prepares his duster in the same manner. This is preferable to the oil method, for the varnish is more adhesive. The third uses instead of a regular duster a flat bristle varnish brush—for instance, the one with which he has just varnished a roof or arch—this he passes lightly over the panel, after it has been well scraped out and allowed a little time to get sticky. This is one of best plans we know of, for it takes off every speck. The use of silk, etc., for cleaning a job is now obsolete.

Dutch Metal.—An imitation of gold leaf, made of very inferior metal—used in scene painting.

Dutch Pink.—A pigment of a dark leather color, similar in appearance to yellow lake, made by impregnating common whiting with vegetable yellow tinctures. It is not a durable pigment, except when glazed with yellow lake.

Dutch Ultramarine.—Same as Cobalt Blue.

E

Easel.—A frame on which a painter supports his canvas or sign-board while working. It is so contrived that the work may be raised or lowered at will, or be thrown forward or back as desired. The common easel consists simply of three strips of wood hinged together at the top, and supplied with a series of holes in which pegs are inserted on which to rest the canvas or other work.

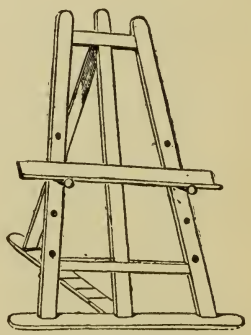


Fig. 21.—An Easel.

Eastlake Ornamentation.—A modern idea of architecture and decoration, originating with Mr. Chas. E. Eastlake of England, a full account of which may be found in a work published by him, entitled "Hints on Household Tastes." Unfortunately it is simply a "style"—not a classified "order" with defined principles of treatment and uses of application and delineation. Delineated with taste and judgment, it may be made pleasing to the eye; but the excessive gaudery indulged in by a class of reckless adventurers who abuse the integrity of this new idea by extravagant, unsightly and ill-conceived creations of their own, is calculated to render it offensive

and repulsive to those enjoying a fair degree of refinement in the æsthetics of ornamentation; this may cause its rejection even as a "style" except by a limited number who prefer oddities, or, who, being devoid of skill in the art, wish to palm off "monstrosities" as works of art.

Ebonizing Soft Woods.—1. Into a quart of boiling water put one-and-one-half ounces of copperas and two ounces of logwood chips. Lay on hot. When dry, wet the surface again with a solution formed of two ounces of steel filings dissolved in half a pint of vinegar.

2. Wash the wood with a concentrated aqueous solution of acetate of iron of fourteen degrees Baume. Repeat this until a deep black is produced.

3. Brush with a strong decoction of logwood chips several times, then give it a coat of vinegar in which rusty nails have been laid.

4. Boil in four quarts of water one pound of logwood, add a couple of handfuls of walnut shells (or pods). Boil again, and take out the refuse, add a pint of vinegar, and apply boiling. Afterwards dissolve one ounce of green copperas in a quart of boiling water, and apply hot.

5. Boil one-half pound of chip logwood in two quarts of water, add one ounce of pearlash, and apply hot. Now, boil one-half pound of logwood in a couple of quarts of water, as before, and add one-half ounce of verdigris and one-half ounce of copperas, strain and put in one-half pound of rusty steel filings. With this go over the work a second time.

6. One gallon of vinegar, one-half pound of green copperas, one-quarter pound of China blue,

two ounces of nut-galls, two pounds of extract of logwood. Boil over a slow fire, then add a pint of iron rust. Wash the wood with this.

7. First sponge the wood with a solution of chlorhydrate of aniline in water, to which a little copper chloride has been added. When dry, repeat with a solution of potassium, bichromate. Do this two or three times.

8. Make a solution of sulphate of iron, by dissolving two ounces of sulphate in a pint of hot water. Paint the wood repeatedly with this. When dry, apply a hot decoction of logwood and gall-nuts two or three times. When this has dried also, clean with a wet sponge before polishing.

9. Infuse gall-nuts in vinegar in which rusty nails or steel filings have soaked, and paint the wood in this.

Of course when the work has become dry again, sandpaper down the grain, and get a smooth face, and as work to be ebonized must be quite free from holes, oil and fill in any of these with powdered drop-black mixed in a filler. Then give all a coat of quick-drying varnish, and rub down with finely pulverized pumice-stone and linseed oil until a good surface is acquired.

You may get a good, varnish for ebonized work by dissolving black wax in spirits of wine. (*See Staining Woods.*)

Edging.—A fine stripe or line drawn upon the edge of a letter. Upon gold lettering this line, either a light color or a dark one, is invariably used to form a perfect edge to the metallic letter or to give it prominence. Edging is sometimes put all around a letter and sometimes only upon the edge

opposite to the shade; the object then being to give to the work the appearance of strong light upon that edge, and this called by some "high light" or "high lighting a letter." For letters under four inches in height the line is usually made the size of a stout line of striping; except for very small letters when an exceedingly fine line is used. For large letters the edging will be from $\frac{1}{8}$ of an inch upward.

Edging when well done, *i. e.*, all the lines straight, of uniform size, and the corners well made, gives a finish to a letter superior to any other. Painted letters are seldom edged or lighted. The color used for gold lettering, is generally a light cream color, however, much depends upon the color of the ground. Upon a light ground, as white, yellow, etc.; the edging may be black, red, blue, green or any color that will be prominent, may be employed, and in some case one color will be used on the shade side and another on the light side.

Egg-Shell Gloss.—A term frequently used by painters, meaning that the surface of paint, when dry, presents a similar gloss as that upon an egg-shell, subdued, not full and lustrous, showing that the quantity of oil or varnish in the mixture is not in excess.

Elastic Gear Varnish.—The name given to a varnish designed more particularly for the wheels and under parts of carriages, and although possessing a large share of elasticity, will dry sufficiently hard for handling in from eight to ten hours. One coat of this varnish over a well made foundation will give extreme durability. It is

pale, limpid, and works easily under the brush. The painter will be able to flow it over a wheel before giving it the final "dressing" or laying off.

Elastic Leveling Varnish.—The name given to a varnish, designed for under coats on carriage bodies or gears. It is a medium between Hard-Drying Body varnish and Quick leveling varnish, in nearly all its qualities. It is limpid, yet will thicken while being applied, and rubs nicely owing to its hard drying quality, yet as its name implies it is sufficiently elastic to please the most fastidious.

Ellipse, How to Draw.—To lay out a perfect oval is very simple providing you know how. Suppose we want an oval to fill a given space, say fifteen inches long and eight inches wide, we first draw a horizontal line through the centre of our space, which on the accompanying cut is marked N N. Then across its centre we draw the vertical line H H. Next measure, from the centre M, seven and a half inches each way on the line N, and four inches each way on the line H, which gives us the exact space that our oval must fill. Now take the compasses (or dividers), and putting one leg on the centre M, place the other leg at the point seven and a half inches off, on line N; lift the compasses, being careful not to displace them, and set one leg on spot H, four inches from centre, and turn the other leg down until it strikes line N, which it will do about two inches from the spot N, and that spot is marked A on our cut. Then turn it the other side of centre M, and mark the other spot O on line N. Now stick a pin or tack into the points O and O, and a pin or tack in

point H at the top. Next take a piece of string and tie it around the two pins quite tight, then remove the pin at point H, and put in its place the point of a pencil, as shown in the engraving, and, keeping the string taut, move the pencil along. You will find that the string directs the course of the pencil point, and the result will be a perfect oval, or properly, ellipse. The ellipse may be made any size or shape, *i. e.*, long and narrow, or broad and short, etc., by simply laying out the

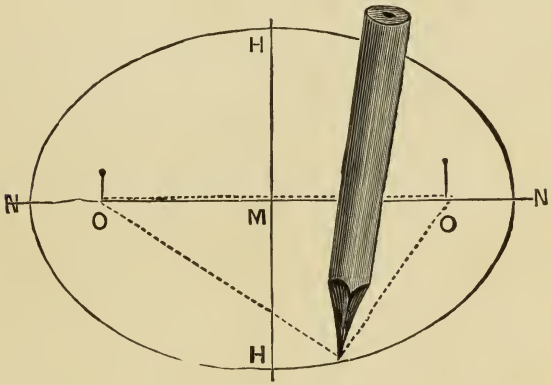


FIG. 22.—METHOD OF LAYING OUT AN ELLIPSE.

measurements on the lines H and N: for instance, if we measure twenty-two inches on line N, and four inches on line H, the oval will be very long and slim, but nevertheless a perfect ellipse. This may be done with the compass alone, but it can not be done so well or so correctly as by the above method.

Emerald Green.—The name of a copper green pigment. It is the most vivid of this class of colors, being rather opaque and powerfully reflective of

light. Its hue is not common in nature, but well suited for brilliant works. It works well in water, but with difficulty in oil and dries badly therein. The only true emerald green is, however, that of chrome, with which metal nature gives the green color to the emerald.

Enamel Blue.—A name often given to blue smalt (which see).

Enameled Leather Varnish.—A preparation for giving leather that appearance it had when new. We append the Messrs. Valentine's directions for use. "First clean the leather thoroughly with soap and water, and when dry, if soft and pliable, put on at once a thin coating of the E. L. V., using a medium-sized bristle brush. Should the leather be very hard, old and stiff, apply first, a coating of our Permanent Wood Filling with a brush or sponge, and *wipe well with rags* so as to leave no P. W. F. on the surface. Let it stand over night to dry; then apply a coat of the E. L. Varnish, which will dry in a hour or so ready for use. This varnish may also be used for staining oak-grained wood-work in houses, to give a black-walnut appearance to the same.

The patent-leather of America takes the lead of all others, and its preparation and use is so closely allied to carriage painting, we give space to a description of the process of coloring it. There are three distinct operations: 1st, preparation of the surface; 2d, varnishing; 3d, drying. The object of the first operation is to close, as much as possible, the pores of the skins; a ground is thus obtained ready to receive the varnish. The mixture used is linseed oil, white lead and litharge,

in the following proportions: 20 lbs. of lead, 20 lbs. of litharge and 27 gallons of oil. They are boiled together until reduced to the consistence of a syrup.

This composition is united with chalk, or ochre, according to the circumstances, then spread on the skin with a steel tool. The first coating is allowed to dry, and two more coats are applied in like manner, when the surface is rubbed with lump pumice-stone, several more coatings are applied, until perfect uniformity prevails, then the pumice-stone is applied the second time; a sufficient thickness must be obtained to prevent the varnish from penetrating the leather, and rendering it hard and brittle. This can be easily understood, as the oil penetrating too far into the pores, they would become hard during the heating, and thus cause small holes over the entire surface. After this is finished, three to five layers of oil without ochre, but colored with ivory-black and enough spirits of turpentine to enable it to flow evenly over the entire surface, are applied. The object of this last operation is to make a black ground, very black and of a high polish ready to receive the varnish. After each layer, the leather is dried in the drying room. Frequently the surface receives a polish by rubbing it over with fine tripoli, or pumice-stone, with a piece of woolen rag.

A good varnish is composed of 20 lbs. of spirits of turpentine, 10 lbs. thick copal varnish, 1 lb. asphaltum and 20 lbs. of oil prepared as above.

The asphaltum can be replaced by an equal quantity of Prussian blue, or ivory-black, according to the article desired, the one giving a reddish and the other a blackish tint. The temperature

of the drying room is about 170 degrees. The patent-leather varnish is left there for about 15 to 20 days before being applied to the surface. In order that these operations be successful, it is necessary that the tanning and currying of the leather be done with great care. The leathers are manufactured in all colors, white, red, blue, yellow, etc., and copal varnish used in nearly every case.

English.—A prefix denoting the origin of various articles, as, English vermilion, English varnish, English rubbing stone, etc., all coming from England.

English Red.—A name often given to Venetian red (which see).

Escutcheon (*Her*).—A shield on which armorial bearings are depicted.

Express Wagon Painting.—The painting of express or business wagons may be performed in three different ways as follows:

1st. Lead Priming Method.—The body being ready, apply a coat of pure keg-lead and raw linseed oil, having the paint mixed very thin, *i. e.*, a little lead in a large quantity of oil—and set the job aside for a week, to dry. Then sandpaper well, and apply a clean-looking lead color, using a little japan dryer, and give two or three days to dry. Next putty up all the imperfections, give one day more, then cut down with sandpaper, and put on the third coat of lead paint, having more drier in it, or less oil. Give another careful look over and a close puttying, and when dry, it will be ready for the final sandpapering, preparatory to

laying the color. The color may be dark green, made by mixing Prussian blue with chrome green, or better still, use deep Milori green, add sufficient oil to agree with the under coats of lead. Two coats of color and one of color-and-varnish will generally be sufficient in getting the job ready for striping and ornamenting.

2d. The Knifing or Putty Method.—When the priming coat is dry (and this may be lead priming, or wood filling), mix keg-lead with turpentine and japan drier, add a very little lamp-black and apply to a portion of the work; in a few minutes the paint will assume a dull appearance, when it must be scraped over with a broad, flat, putty-knife, in the same manner as if plastering with putty. This process rubs the lead paint, which has lost much of its turpentine by evaporation, into the pores of the wood. Every part of the body; ribs, panels, top-strip, sill, etc., must be knifed over, and any superfluous paint be nicely cleaned off. Then allow a day for drying, give it a good sandpapering and apply color as usual.

3d. Wood Filling and Rough-Stuff Process.—The body being completed no further than the frame work, it receives a priming of P. W. F. (*q. v.*) The chamfers and faces of the rails or ribs are plastered with putty and sandpapered when dry. They are now ready for color, which may be ivory-black. The panels are sawed out and smoothed by the woodworker, being left from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch wider than necessary to fit the frame-work to allow for shrinkage. These then receive a priming coat of Permanent Wood Filling, which is put on freely and well rubbed in with rags, until no surface coating is left, it having

been nearly all absorbed by the wood. Give 48 hours for drying, unless the weather is very favorable, as in summer, and then apply to the face side of the panels, rough-stuff, which may either be ready ground, or shop mixed as follows: 3 parts English filling, or mineral paint; 2 parts of white lead, with brown japan two parts, and rubbing varnish one part, dilute with turpentine. For the first coat add a very little oil, because that which comes next to the priming must be a little more elastic than the subsequent coats need be. 48 hours should be given for the first coat of rough-stuff to dry, after which, two coats, with no oil in the mixture may be applied, one coat each day. Stain the panels, and rub down with pumice-stone as usual; give plenty of time for the moisture to dry out of the porous rough-stuff, then with a rag filled with P. W. F. rub over the surface to close the pores and give it a binding or adhesive property. The body-maker may now fit the panels and screw them fast from the inside, and the outside of the body will be found in good condition. Some prefer to color and prepare the ribs and the panels before they are put together, but it is not a good plan. The rough-stuffing of the panels we commend, inasmuch as that part of the wood between the panel and rib or frame is thus well painted, allowing no chance of injury by water entering at those places; and besides it makes a smoother job.

The Gears.—These having been similarly primed with P. W. F., and the smith having completed the iron-work, the first operation is a good cutting down with sandpaper, which prepares the work for a second coat of P. W. F., put on in the same

manner as before, *i. e.*, well wiped or rubbed in. When this is dry, putty up all imperfections, such as open-grained places. Sandpaper, and apply a coat of flesh color—white and red mixed, as a preparation for vermilion. Next, mix English vermilion, light shade, and apply that as the color; color-and-varnish next, then moss off and stripe. The body having been colored with green and black, is also ready for striping.

The style of striping on this work and ground will be a black panel stripe $\frac{3}{8}$ of an inch in width, with fine lines of white twisted up in various shapes to fill the centres of the panels or blank spaces. The body has the ribs black with fine lines of white or cream color on the faces of the ribs. No striping on the panels. The inside of the body may have two coats of pea green and one of color-and-varnish, which finishes that part.

If the panels are lettered in gold, it will be well to give a coat of rubbing varnish, then rub down with pulverized pumice-stone and finish with some good quality of finishing varnish.

It has been demonstrated by repeated experiment that gold lettering and ornamenting will wear longer when the size is put upon *dead color*, instead of on a rubbed surface of varnish, but, as it is a little more difficult for the workman to lay his size thus, there are but few who recommend it.

F

Facing.—The careful rubbing of a surface, are the final touches given to a surface of rough-stuff by gently rubbing with pumice-stone.

Facing Coat.—The coat of Permanent Wood Filling put upon a rubbed rough-stuff surface, in the place of *facing lead*, to answer the same purpose, as well as to hermetically seal the pores of the paint and thereby add durability to the whole paint structure.

Facing Lead.—A coating of dry white lead and lamp-black—preferably *dry lead* to prevent the use of oil—put over the rubbed surface of rough-stuff, to enable the workman to see any imperfections in the surface, such as scratches, dents, etc. When dry, it is carefully rubbed smooth with pumice-stone.

Fat Oil.—Linseed oil that has become thickened by age, or by heating, is used for size in gilding, and is called fat oil size, for others, see oils.

Fatty.—Paint having too much oil in it will become "fatty" if allowed to stand exposed to the air. It is a partial oxidation of the oil.

Fawn Color.—Color of the young deer, made of 8 parts of white, one of vermilion, two of yellow, and one of umber.

Felt.—A stuff of wool and fur made by rolling and pressing, used by painters in connection with pulverized pumice-stone to rub varnished surfaces. The words "Felting down" is used in Europe in place of the word "rubbing."

Festooning.—A term applied to varnish which has run down from moldings, etc., in waves, *festoons* or curtains. The varnish may be too new, and thin, or it may have been thinned or mixed with oil, or by being put on with a brush having no elasticity it was left thick in some places and thin in others. A slow drying and durable varnish is more liable to run into festoons than a hard and quick drying one. When this is the case, and the painter cannot prevent the running in any other way, he may add a little hard drying body varnish.

Field (*Heraldry*).—The field is divided into nine points: A, the dexter chief point; B, the middle chief; C, the sinister chief point; D, the honor or collar point; E, the fess point; F, the nombril or navel point; G, the dexter base; H, the middle base; I, the sinister base point. It will be observed that the dexter (right) and sinister (left) sides of the shield are so-called from their position in relation to the supposed bearer of the shield, and not to the eye of the spectator.

Field's Carmine.—The name frequently given to madder carmine, or lake.

Filling.—Any material used for filling the pores or grain of wood, as starch, whiting, putty of various kinds, preparatory to varnishing or painting.

Filling (*Arch*).—The wall surface between the dado and the frieze or cornice; also the ground of a panel.

Finisher.—Among carriage-painters, the one who puts on the last coat of varnish, usually designated the finishing coat. The finishing is the most delicate part of carriage painting, and is becoming a distinct and separate branch of the trade.

Fire Checks.—A species of cracking, of a painted or varnished surface—the cracks are very small, running in every direction, forming squares, triangles and circles, but seldom visible until a fine lustre is obtained with the varnish coats. The cause of "fire checks" (a name derived from that of overheated pottery) is solely attributable to the application of one coat of paint being put on a surface of paint not thoroughly hardened. Though similar checks may be seen in a varnish coat where turpentine has been used to clean the surface, or been mixed with the varnish, also where glue-water has been left to dry upon the varnish.

Fire-Proof Paint.—An oxide of iron pigment, sometimes called Ohio paint, Grafton paint, Mineral paint, etc. It is generally of a dark red color, very inexpensive, and used extensively on bridges, freight cars, etc.

Firing Off.—A term used by painters for the use of fire or hot irons, or a gas-jet in removing paint and varnish from a surface. (*See Burning Off, Detergent and Ammonia.*)

Fitch.—A small brush made of bristles and used more particularly for such work as lettering on

canvas or muslin, and by artists on large work, such as pictures on show wagons or in scene painting. (*See Brushes.*)

Flaking.—Denotes the separation of one coat of color or varnish from another, or of the entire body of paint from the ground, in scales or flakes. "Peeling" is a similar difficulty, the paint leaving the ground in soft particles, as the bark from a stick. The cause of which may be attributed to: 1st, oil colors laid upon a part of the work where a joint was not properly sealed up, so as to exclude wet. 2d, because the previous coat of color had not been mossed or paired off to flatten it properly. 3d, because the work had been done on a too much *polished* surface, especially on the rounded surfaces and sharp edges of the wheels and under parts. 4th, because the color was non-adhesive, or non-elastic, rendered so probably by the adulteration of the oil or pigments of which it was composed; or because it was intentionally made quick drying. 5th, because the wood was not thoroughly dry. 6th, varnish will chip or flake off, when the surface has been washed with hot water in winter, or when sleet or rain has frozen upon it in a thin sheet, and allowed to remain for a time, also when glue water has been applied over it.

Flake White.—White lead in the form of scales or plates, sometimes gray on the surface. It takes its name from its figure, is equal or sometimes superior to Cremz white (*q. v.*) and is an oxidized carbonate of lead. Flake white is prepared by exposing this lead to the action of vinegar in beds of fermented tan. It is blacked

by sulphuretted hydrogen, hydro-sulphate of ammonia, and consequently needs a drying and protecting vehicle. It has no injurious action on vegetable or other colors. When free from pipe clay or sulphate of barytes it is soluble in diluted nitric acid or acetate acid. It is the best white extant for oil or resin, particularly when pure, which is generally evidenced by exceeding whiteness and opacity. However, it is usually adulterated with sulphate of barytes, chalk, and pipe clay, all which trashy substances cause it to darken when blended with unctuous or resinous particles. There are other whites of lead varying in body and brilliancy, and even obnoxious to the action of mephitic vapors, as Roman and Venetian whites and sulphate of lead. The whites of bismuth, pearl and antimony are injured by light as well as by mephitic vapors.

Flatting.—When it is desired that paint when dry shall present a flat or dull appearance without any gloss. Carriage-painters usually substitute the word "dead" for flat.

Special care is necessary in laying all the coats which precede the flatting; they must be evenly spread, and be smoothened with sandpaper in order that they may be perfectly level, otherwise the smallest irregularities will appear in the finished surface.

The paint used by house-painters for flattening consists of white lead, with which of course the necessary coloring matter is mixed, turpentine alone being used as the medium with which the paint is thinned. The color should be rather lighter than is required, as it darkens a little whilst drying.

Japan gold size is sometimes used instead of patent driers to assist or hasten drying.

When the paint is spread as usual, brushes called stipplers are used to dab against the wet paint, producing a level grain over the whole surface, something like the tooth on drawing paper.

Some painters use extra care in spreading the color and do not stipple it afterwards, but as a general thing the stippling plan is best.

Flockings.—A fine lint or dust from a woven woolen fabric of various colors, used principally by sign-painters. The lettering having been gilded, all the ground outside of the letters is painted over with a tenacious varnish or oil paint of similar color to the flockings to be used, then, while still wet, the flockings are sifted upon the work, and the board being left in a horizontal position for a time, the flockings adhere to the ground, when dry, the superflous flockings are brushed off, and the sign then has the appearance of velvet or cloth.

Flogger.—A sort of whip used for dusting away charcoal after a sketch is completed by scene-painters. It is made with several odd strips of canvas two feet in length bound tightly on a stick, or old broom handle.

Flowing Quality.—One of the essentials of good varnish. By *flowing*, all the marks of the brush are obliterated and a glass-like surface is obtained. In early days this feature was not recognized, and resort was had to polish carriage bodies, by rubbing with pulverized stone, oil, etc., but now, a varnish that will not *flow* out and give a smooth glassy surface is looked upon as unfit for use.

Fluidity.—The quality of being limpid, thin, as opposed to gummy, an important feature in good varnish.

Fork.—An iron rod formed like the letter Y and having its three ends sharpened to a point. Used in carriage shops as a prop for a body or sleigh when turned on its side or end.

Frankfort Black.—A sort of lamp-black made by burning grape-vine twigs and cuttings, principally used in making printers' ink.

French.—A prefix denoting the origin of various pigments ; as, French chalk, French green, etc.

French Gray. — Simply white, tinted with ivory-black.

French Red.—A local name given in New York for a color made by mixing vermilion with Indian red, then glazing with carmine when the ground is dry.

French Ultramarine.—An inferior quality of ultramarine, of which there are several varieties, but as none of them are valuable acquisitions to the paint bench we leave them unnoticed.

French White.—(*See Blanc D'Argent.*)

Fresco Painting.—The term applied to painting executed upon plaster while it is still wet or fresh. Many celebrated artists and well-known writers have maintained that fresco is the only way in which the highest efforts in art should be embodied. A very large proportion of the best works of the Italian schools, particularly those of Rome and Florence, are done in this manner; and many of the chief paintings of the German school are

executed in fresco. The colors used are mostly earths or minerals, as few others will stand the action of lime ; these are ground and applied with pure water. The ground to be painted on is the last or smooth coating of plaster. As much only as can be painted in one day is spread on immediately before the painter begins to work, and all that he does not paint over that day is scraped off. The next day the plasterer joins closely another portion of plaster for the painter to work upon.

The *fresco painting* in the United States is simply distemper painting (which see).

Frise Green.—A pigment made of sulphate of copper and salammoniac.

Frosting.—By some called "Diamond dust," is made by blowing glass very thin and then breaking it or crumbling it to dust or small pieces. It is sprinkled upon a ground of white, sized or made tacky by the addition of oil or varnish to the paint.

Fuller's Earth.—A mineral consisting chiefly of silica, alumina and water, with a little magnesia, lime and peroxide of iron. It has a remarkable power of absorbing oil or grease, and is often used as a *detergent* for removing varnish from paintings ; applied wet with water, and plastered on to the thickness of an inch and let to dry.

G

Camboge.—A gum resin, from a species of trees found in Cambodia, it is of a bright yellow color, opaque, brittle, and soluble in alcohol. It is a very useful water-color pigment, but will not work in oil.

Cellert's Green.—A pigment made by mixing cobalt blue, flowers of zinc and chrome yellow.

Cibson.—A small three-sided rest or bench for sustaining a carriage body in an inclined position while undergoing painting or rubbing.

Cilder's Cushion.—A padded palette used for spreading and cutting gold leaf. It is generally about eight inches by five in size, and is made by stretching a piece of chamois skin over a piece of board previously covered with baize.

Cilder's Knife.—A tool for cutting gold leaf. It is shaped similar to a table knife, with a long and flexible blade; the edge must be perfectly even and not sharp.

Cilder's Tip.—A sort of flat brush for lifting and placing gold leaf. It is made by placing a very thin layer of camel's-hair between two pieces of card-board and glueing all together. It is generally from three-and-a-half to four inches in width.

Gilding.—Before passing on to notice the methods of gilding generally adopted by sign writers, it may be here pointed out that an inferior kind of metal, in imitation of gold leaf, is procurable at a lower price. This, however, is an article which is hardly worth attention. It can only be adopted for temporary announcements, as its properties are evanescent and it ought not on any account to be

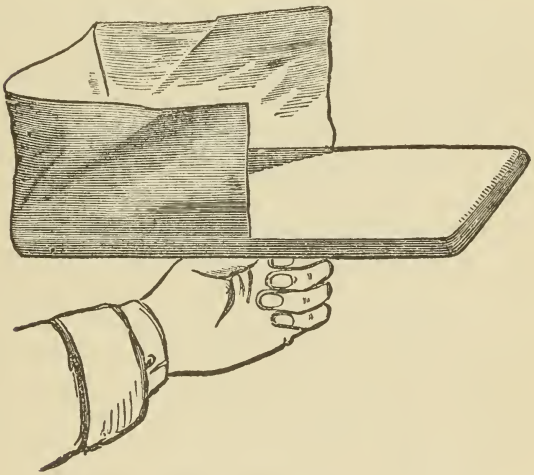


Fig. 23.—Gilder's Cushion or Palette.

used for work subjected to close inspection, because it always presents a tawdry, "Cheap Jack" appearance, however dexterously it may be laid on. Indeed, it never approaches pure gold leaf in its effects. The difference between the two is just that between a gold sovereign and a counterfeit one, and can be detected by any experienced person. Like the common tinsel, known as "Dutch metal," which can be bought at a still

lower rate, the inferior quality of gold leaf is chiefly used for theatrical scenery, where a temporary brilliancy is required and durability is not an object. Dutch metal is extensively used by shopkeepers for "gilding" laurel and other leaves, holly berries and so forth for Christmas displays, and formerly designs in gingerbread covered with this article were quite an "institution" at all kinds of fairs, to no small amazement of rustics and children. For this and kindred purposes, Dutch metal is quite as effective as the best gold leaf, and owing to its greater thickness it is much less difficult to handle. Indeed, anyone unaccustomed to the use of gold leaf could not hope to succeed in performing with it the apparently easy task of gilding even gingerbread.

The metal is beaten out to such a degree of tenuity that it requires a steady and skillful hand to manage it satisfactorily, and this can only be acquired as the result of repeated trials and many vexatious failures. Dutch metal, on the contrary, is so thick as to be manageable (in so far as it is capable of management) by any person however inexperienced. Were it not for an extreme thinness of gold leaf, it would not be possible to prevent the multitudinous joinings from showing. If executed by an unskilled workman, the joinings of the gold are sometimes perceptible and numerous fractures caused by breaking the gold leaf, technically called "spider legs," are here and there apparent. But if the gilding be skillfully and properly performed, no matter how numerous the pieces of gold leaf employed, it will appear as if it were done by a single leaf, instead of an

aggregation of small pieces, often of irregular sizes and various shapes.

For the purpose of gilding, the tools necessary are a cushion, cutting knife, and a "tip," each of which calls for a few words of explanation.

A gilder's cushion is a flat piece of wood, measuring about 8 inches by 5, covered first with baize and then with soft wash leather, which is drawn tightly over it. An edge of skirting of about 3 inches in height protects three of the sides, and is intended to keep the gold leaves from flying off the cushion, for the merest draft is enough to scatter them in all directions. A loop is then placed under the cushion for the insertion of the thumb of the left hand to hold it by while in use, the loop answering the same purpose as the thumb hole of a palette; and sometimes there is a second loop for the cutting knife. This knife is used for cutting the gold leaf upon the cushion. It has a long and flexible blade, with a perfectly straight and smooth edge and must be kept very clean, or, instead of cutting the gold, it will merely tear it and crumble it up rendering its use a matter of difficulty. A "tip" is a sort of flat brush, made of a thin layer of some soft hair, and held together between two pieces of pasteboard. This brush can be obtained of different widths, and of various lengths of hair. It is used for removing the gold leaf from the cushion to the part to be gilded. The tip should be drawn lightly across the face or hair, and then placed upon the gold, when the moisture on the brush derived from the face, slight though it be, will cause the gold to adhere to it sufficiently to enable the workman to lift it up and deposit on the sur-

face prepared for its reception. If a leaf of gold has been cut in a dozen pieces by the cutting knife, each piece may be placed in its position by means of the tip.

Some sign writers adopt this plan, which is that most commonly practised by experienced gilders for outside work. They shake out about a dozen leaves of gold upon the cushion, put them on one side against the parchment screen, then lift one leaf with the cutting knife to the middle of the cushion, and when it has been flattened by a slight puff of the breath, it is cut to the desired dimensions, and lifted and placed in position with the tip. (There is required in this gentle puff of breath a something which will at first greatly perplex the beginner. We can only define it as "knack," to be acquired by experience. When performed by a skillful workman, it is apparently the simplest thing in the world, but a great many of the puffs at the outside will result in disappointment and loss of the leaves of gold. There is no royal road to the acquisition of this art, which is apt to deceive the uninitiated by its apparent simplicity; but the beginner must expect to pay the usual forfeit demanded of inexperience, before he becomes a proficient gilder from the cushion.) Of course piece after piece is placed on the parts to be gilded, in the same way, until the whole space is covered. The leaf is then rubbed over gently or rather pressed against the gold-size, with a pad of cotton wool, by which means the superfluous pieces of gold are removed and the jagged edges smoothed. Other sign writers, again, when gilding out of doors, prefer to take the gold leaf from the book without cutting it at all. They turn back the

paper leaves, and place the gold leaf direct against the surface, which has been prepared for it, By following this plan, however, a great portion of the gold leaf is wasted, and, as it seems, without any corresponding advantage. The slighest draft or current of air renders it a matter of no small difficulty to proceed in the manner here indicated, and, indeed, it would be impossible to do so if there were the least wind, unless the workman was carefully sheltered from it by some kind of awning or close covering. The same applies also to the method of gilding out of doors with tip and cushion, already described, (In speaking of the covering under which gilders in exposed situations work, it may be remarked that many persons have an idea that the object is to keep their art a secret, whereas, in reality, it is a matter of necessity.)

There is, however, another method of gilding which has only of late years become known to and adopted by the sign writer, and it possesses so many advantages, and is so easy of application, that, for all practical purposes, it is most preferable for the sign writer, who is almost invariably called upon to gild on a flat surface. If it were not so the method about to be explained would be valueless, because it cannot be applied advantageously to carved or moulded work.

The writer should procure a clean sheet of silver or tissue paper, of not too great a body, and rub it over on one side only with a piece of white wax candle, or even beeswax will do as well as anything. This should be held between the thumb and forefinger of the right hand, and rubbed rather briskly over the surface of the tissue paper, which should be placed upon a book

or something flat, so that the wax is spread evenly throughout. The paper which has thus been rubbed will, when held sideways to the light, be seen to have a glossy surface, and will possess a certain "tackiness" or sticky quality, scarcely perceptible to the touch, but sufficient to cause the gold leaf to adhere to it. After a whole sheet of paper has been waxed as described, it should be cut into squares a little larger than the leaves of the book of gold. This having been done, the gold leaf book should be carefully opened, and the waxed side of the tissue paper gently pressed against the gold with the hand. On removing the paper the gold leaf will be found attached to it. Each leaf of gold should be taken out in the same way until the whole book is emptied. The gold leaf, being thus secured upon the tissue paper is ready for use. It must be evident that the difficulty experienced through the extraordinary thinness of the gold, is by this means to a great extent overcome. The tissue paper with the gold attached can be handled by any person, however inexperienced, and may be used over and over again.

Let it be supposed that the letters to be gilded have been written in the most suitable material, and that they are ready to receive the gold leaf. All that the writer has to do is to take up the tissue paper with his left hand, and to place it with the gilded side to the letters, and having rubbed the back lightly with the right hand, the gold will come off the paper and adhere firmly to the mordant with which the lettering has been written. Besides the simplicity of this method of gilding, another great advantage it possesses is

the small amount of waste that takes place. The tissue paper being semi-transparent, the gold leaf shows through it, and the operator can see where any portion of the gold adheres to the paper, and can accordingly place it on such portions of the work as it will best fit, without an undue number of joinings, though by this process if the gold leaf be good, not the slightest trace of any joinings is discernible. It will readily be understood that every particle of the gold can be made use of.

In addition to these advantages, this method of gilding possesses other recommendations which are deserving of mention.

In the first place, the labor of affixing the gold leaf to the tissue paper, and subsequently to the lettering, can be performed by an apprentice, or anyone who would utterly fail if called upon to use it in either of the ways previously described. Then, again, as already intimated, gilding from the tip or cushion, or from the book without cutting, cannot be effected out of doors if there happens to be any force of wind. Indeed, the ordinary draft or current of air which frequently passes through a street is a serious hindrance to the operations of the gilder by either of these two processes, which even now may be called the "common processes"; for the plan recommended, simple as it is, has not long been discovered, and some of the old school of workmen still adopt these cumbrous and wasteful methods of working. In either of the foregoing methods the gold leaf should be gently dabbed over with a pad of cotton wool, which will smooth the surface of the gold, and remove all superfluous pieces of gold leaf.

There is one thing preliminary to the process of laying on the gold which has not yet been noticed. A newly painted surface is, of course sticky, or what is technically called "tacky"; and if the gold leaf were to be applied to such a surface, it would adhere, or "hang" as it is called, to parts of the ground color where the mordant had not touched, and where the gold was not required. It is needful therefore, before the writing is even marked out that the newly painted surface should be "pounced"—that is, dabbed over lightly with dry whiting; but care should be taken that the loose particles are dusted off carefully. If the ground be a dark one, this pouncing (which is best done by placing the whiting in a linen bag and making a kind of pad or ball, which should be dabbed over the work) will so far lighten it that the writer will be able to distinguish any lines that he may make with the sable pencil charged with size, and the size will restore the ground to its original color. But, if the ground be a light one, the pouncing will not have this effect, and hence it becomes necessary to mix some kind of color with the size to enable the workman to make certain that he has thoroughly covered the portion to be gilded. The whiting is removed from the ground, after the gold leaf is applied, by means of a damp chamois leather.

The mordants used for gilding are of different kinds. Picture-frame gilders generally make use of what is technically called gilders' size, made of fat oil, in which yellow ochre has been ground. This is, under certain circumstances a good material for the purpose of the sign writer, but it is too thick for general adoption, especially in cold

weather, when it is unmanageable with the sable pencil. In hot weather it may be used to advantage. The leaf must not be applied to this size for at least 24 hours after its application, and it will remain tacky for two or three days.

When work has to be done quickly, a size may be made from one of the following formulas:

First—Size which will be ready for the gold in two hours: one pint permanent wood filling, half-pint crown coach japan, or one-quarter pint japan gold-size.

Second—Size to let set over-night before applying the gold: one pint permanent wood filling, one-quarter pint crown coach japan, or one-eighth pint japan gold-size.

Third—Size for quick work or jobbing: one part permanent wood filling, and three parts of japan gold-size, or a little less of brown japan, if preferred.

Fourth—Size for ordinary work, moderately quick drying: half-pint wearing body varnish, and one pint crown coach japan.

Fifth—Size for extra-durable work, not to be varnished: take boiled linseed oil in a saucepan, and heat it until it catches fire; allow it to burn a minute, then smother the blaze and let cool; it is now ready for use.

Sixth—Size for almost immediate gilding: one part quick leveling varnish, and two parts touching-up glazing.

Gilding on Glass.—The process of gilding upon this material is as follows: Draw out upon a sheet of white paper the letters or ornament required, and fill in the sketch so made with black paint, so that the pattern is visible upon both sides

of the paper. Reverse the paper and fix it by its edges to the back of the glass with paste. Thoroughly clean the glass upon its face with wet whiting and a silk handkerchief, place it in a slanting position if possible, and commence to gild. The mordant used for fixing the gold leaf to the glass is made thus: Take some fine isinglass (as much as will cover a sixpence) and put it in a teacup, fill the cup half full with boiling water, and stir; pour in while the water is still warm enough alcohol to fill up the cup, and then strain the mixture through a clean silk handkerchief. Wash on this mixture upon the parts to be gilded with a camel's-hair brush, wait until the surface is sticky, and then apply the gold leaf as in all gilding. Cut the gold leaf to the size of the gilding before applying, unless the surface to be gilded is not wider and higher than three inches or four inches; when so small as this lay on the gold in squares without troubling about the shapes of the ornaments and letters. Gild from the top of the glass, placing the first piece of gold at the highest part of the design, and be careful each succeeding sheet overlaps the one last laid. Any gaps left in the putting on of the gold leaf will show when the work is finished, and, therefore, the worker must put on plenty of gold leaf and see that no space, however small, is left undecorated.

Press the gold leaf gently to the glass with a cotton wool pad, and leave the glass in a dry and warm room until the gilding is dry, which is known by its looking burnished and no longer crinkly and dead. Rub it in this state with cotton wool to increase its burnished appearance, and to remove the loose pieces of gold leaf between the

letters and ornament. The gilding will now show many imperfections, and the various joints where the gold leaf has been cut will be visible. These will require to be manipulated. Re-size the whole of the gilding with the isinglass mordant, putting that on with great care, so as not to remove the gold leaf, and, when it is "tacky," re-gild the whole, following out the process of the first gilding in every detail. When the gold is quite dry, put on from two to four coats of size (letting one dry before applying another), in order to increase the brilliancy of the gold. The longer the gold leaf is left in this stage upon the glass the more firmly will it adhere. A damp sponge will remove it the first day, but after two months the alcohol will have caused it to adhere so firmly that it will be most difficult to detach it. A week should be allowed to elapse between the gilding and the painting. The outline of the ornament, etc., must be transferred to the gold surface as the next stage. To do this rub dry whiting over the front side of the paper pattern, place this face downward upon the gilding, and go over every outline with a pointed and hard pencil. The whiting will stick to the gold where it has been pressed down by the pencil, and upon removing the pattern and blowing off the loose whiting clear white lines will remain upon the gilding.

The next process is to paint the back of the gold over with japan black, such as is used by coach builders. For this purpose use a sable writing pencil, and keep the paint within the white outlines, and quite up to them. If on looking on the right side of the glass the black paint should show through the gilding another coat of size must be

put on before the black paint is applied, as these size coats prevent the paint from penetrating through the gilding. When the black paint has thoroughly dried wash off all the gold leaf not required with a sponge and warm water. The ornaments and letters gilded upon the glass can be straightened and rendered sharp at their edges, if they look ragged, by being scraped with a knife or sharp chisel, after the black paint is dry. Colored painting, such as broad shadows to letters or additional foliage to ornaments, paint on the glass after the black background to the gilding is dry; use ordinary oil colors thinned with oil and a very little turpentine for these, and keep the edges of the shadows straight and clear by the help of a straight-edge and a pointed stick, cutting the edge sharp with these while the color is wet and wiping away with a rag the superfluous color. Paint backgrounds on the same glass in oil colors, using a large brush when the ornamentation is dry. Mix varnish with the colors or buy them ready prepared.

Gilding Porcelain.—Dissolve in linseed oil an equal weight of copal; add as much turpentine as will enable you to apply the size as thin as possible to the parts to be gilded. Place the article in a stove oven until it will almost burn the fingers, then the size becomes adhesive, and the gold leaf laid upon it will stick. When cool, brush off the superfluous gold, and burnish with a steel or dog's tooth burnisher, taking care to interpose a piece of India paper between the gold and the burnisher.

Glass Paper.—The name given to fine sandpaper by decorators. 2. A fine quality of rubbing paper

made of pulverized glass in place of sand; the same as emery paper is made with emery powder, etc.

Glass Frame Holders.—A convenience for holding frames of a carriage while painting or varnishing them, consisting of two uprights of hard wood framed into foot pieces, and a tie piece. The uprights should be at least 4 inches wide and 2 inches thick, tapering at the top to 2 inches square,

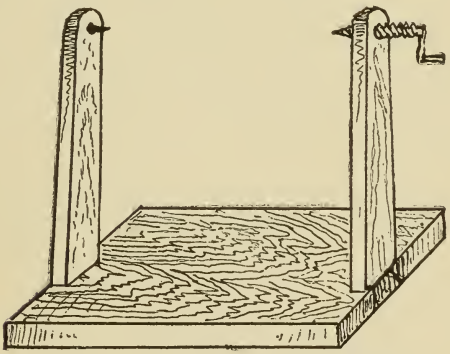


FIG. 24.—GLASS FRAME HOLDER.

framed 30 inches apart, the whole 4 feet high. On one upright a sharpened pin is inserted, and on the other a cranked screw with sharpened point, is fitted. Then, the frame or other object placed upon the point, and pressed by the screw is held in such a way that it may be turned upon either side to varnish or paint it. Our engraving so well illustrates this contrivance that further description is unnecessary.

Glazing.—The word glazing seems to be a triplet in the painter's vocabulary. When a pane of glass is put in place it is called glazing. When soft putty is forced into the pores of wood, or any

rough place is filled with putty, it is also called glazing, and when the transparent coating of color is put upon the painted surface, it is also called glazing, and unless one is conversant with the art of painting he will be unable to know which of these is meant when he hears the word. The glazing of color is an art that but few acquire in perfection, owing perhaps to wrong ideas in mixing the glazing. Carmine is an expensive pigment, and for that reason glazing is resorted to, while on the other hand Yellow lake is inexpensive, and is used as a glazing to enrich the ground color. Blue also is made richer by glazing than when the pure ultramarine is used as a body color.

The most beautiful lake colors are made by glazing dark reds with carmine, and this is done not so much to make a nice color as to make a durable one.

The peculiarities of glazing are that it be mixed to set slowly, to dry hard like rubbing varnish, and to flow smoothly without heavy flows or clouds. To make a nice carmine job, first paint a smooth ground of vermilion, the deep English vermilion being preferable, although it does not cover so well as the light or pale grade of same. The color being on and dry, add to the vermilion color-and-varnish a little carmine to deepen and enrich it, and apply. When dry rub the surface smooth, for in glazing any imperfections will be multiplied and made to appear as a mountain from a molehill. Pulverized pumice-stone and water cannot be used successfully after the glazing is done; therefore great care must be taken to have the surface smooth before the glazing is at-

tempted. Mix the dry carmine—a lump as large as a walnut, will be sufficient for a light buggy gear—with some good rubbing varnish, and grind it as fine as possible, then add more finishing varnish until the color is simply a colored varnish; if too strong in color it will be streaked. Now add a few drops of raw oil to prevent its setting too quickly; use a flat badger-hair brush, and do but a small part of the work at once, that is on a buggy gear; flow it on to say one-half a wheel, and lay it off quickly, then do the other half, and make as few movements of the brush as possible, and never after it begins to set. Clean up every part as you go along, being sure to rub the brush around every nut, end of spokes, etc., and proceed thus till all is done, keeping the wheels turning all the time slowly until the varnish is set. Experience only can tell one how to do glazing. One will flow it on one spoke only; another can do the whole wheel before laying it off, and so on. Yellow lake is used in a similar way. Over a dark bottle green it gives a beautiful tone or hue, over yellow it gives a beautiful greenish yellow. The Nile greens and rich bottle greens seen on many carriage panels are made by glazing with yellow lake. Bright blue is made by glazing with Prussian blue ground with ultramarine.

Glazing, when applied to colors by the carriage-painter, signifies the act of laying transparent colors over a previously prepared groundwork. Carmine, the various colored lakes, and verdigris have not sufficient covering power or body to produce a solid piece of painting, therefore they require a foundation suited to their respec-

tive colors. All painting of this kind is called glazing.

In the Eastern States painters speak of glazing with putty; by this they mean the act of puttying a surface all over, so as to speedily fill the grain and pores of the wood. In the Western States this puttying process is called "plastering."

Gloss.—A mixture of zinc white and white damar varnish, used as a sort of color-and-varnish over white paint in houses, also by painters on stages and car interiors. Carriage-painters use zinc white mixed with a light colored varnish—hard drying body—for painting white work. The ground being formed of white lead, the zinc color-and-varnish is put on to the number of three coats sometimes and then the gloss is removed by rubbing with pumice powder until an egg-shell gloss is produced. If striping or ornamenting is put on this ground, the stripes and ornaments are pencil varnished—the durability of the ground is said to be greater than if the lustre was left upon it. Zinc white is not apt to turn yellow as quickly as white lead, and therefore finds favor with carriage-painters, for all white work, hearses, and sleighs particularly. House-painters use zinc gloss for a finish of white on parlors and fine work, laying a coat over a ground of white lead.

Glossy.—A paint-ground that shows, when dry, too great a gloss, and denotes that too much oil or varnish was used in the mixture. The effect of which is to cause the subsequent coat to crack or crawl or give trouble in some other way.

Gold Color.—Yellow ochre, burnt sienna, raw umber, and white, may be mixed so near the color of

gold in half shadow, that a gold pattern upon it will not show in some lights.

Gold Lacquer.—A varnish used by gilt molding-makers to color silver leaf so that it will have every appearance of gold; made as follows:

℞. Seed lac 3 oz.; turmeric, 1 oz.; dragon's blood, ¼ oz.; alcohol, 1 pint; digest together for a week with frequent shaking, decant and filter. It is customary to dissolve the resins (pale lac or sandarac) and the coloring matters separately, so that at any time a lacquer of a given tint may be produced by their mixture. The solution of coloring matter should be concentrated.

Gold Leaf.—Gold rolled and beaten into thin sheets. Upon entering a gold-beating establishment the vistor's attention is first attracted by the din of numerous hammers weighing from eight to eighteen pounds apiece, falling under the skillful grasp of the sturdy pounders, on the packs in which is the precious metal. The men resemble so many blacksmiths at the anvil, except that the blows are less rapid and the strokes more measured and regular, and there is more rebound to the hammers. Then, too, without changing the monotony of the strike, the gold-beater shifts his hammer from one hand to the other, and turns the little bunch of skin on which it descends first to one side and then to the opposite one, and then back again, for he cannot pound steadily in one place; his packet must be kept in motion. The first tool used to break down the gold is called a "cutch," three-and-a-half inches square, made of vellum or a straw-colored vegetable parchment containing 180 sheets; and a second tool used (called *shoder*), composed of 700 sheets of gold-

beater's skin, made of a thin elastic skin, a membrane taken from an ox. After this tool (*shoder*) has been used about 200 times as a mould, and as the third and finishing tool, and when no longer fit for the finishing part of the work, is cut down to four-and-a-half inches square, and used for the second reduction in substance of the gold. The third tool, are moulds containing 850 to 900 sheets of skin five-and-a-quater inches square, and are of very fragile nature, easily torn and extremely sensitive to changes in the atmosphere.

The brime, or talc, used by gold-beaters to cleanse the skins before working, is a marine deposit found, it is believed, only in French Flanders.

In addition to the before named working materials employed in the manufacture of gold leaf are crucibles, acids, pearl ashes, salt, saltpetre, borax, gum, mercury, and Malacca cane.

The metal being alloyed, is melted, poured into an ingot, flatted between steel rollers, till it attains the shape of a ribbon of the thickness of stout wrapping paper. Two ounces and ten pennyweights, troy, is then given to the workmen to produce 2,000 leaves of gold three and three-eights inches square and return 33 dwt. debris.

Having annealed the gold the beater proceeds to divide it in pieces averaging seven grains each, making about 165 or 170 pieces—these are placed separately between the leaves of the "cutch;" care being taken to place them in the centre, two bands of parchment are then placed around the cutch and a sixteen or eighteen pound hammer is used to beat it until the gold covers the entire square; this hammering occupies fifteen or twenty

minutes. The gold is then taken out with wooden pincers and twelve sheets placed on a cushion (made of calf-skin) evenly on each other they are folded over a knife, cut, turned again and cut, dividing each leaf into four equal quarters, and so on till all are cut; the 165 pieces are now 660 pieces or quarters. Having dried in hot presses the "shoder," these quarters are placed in the centre of the shoder, one piece of gold between each skin, and beat with a twelve-pound hammer until the gold has covered the skin. Here the workmen reduces the weight, so as to correct any irregularity which may have arisen in dividing the gold, by beating the leaf out of the edges of the shoder, the same being rubbed off with a sponge, is placed away till the whole piece is completed. The beating of the shoder occupies two hours. The moulds are prepared for work by beating them in plains (composed of stout old hand-made paper, each skin being placed separately) for one hour with an eighteen-pound hammer. The mould is then dried in hot presses, rubbing each skin eight times with a hare's foot and some brime calcined and reduced to a fine powder. When pressed again they are ready for the gold. A reed of Malacca cane made in the shape and size of a table-knife is used to divide the leaf into four equal parts, the 660 pieces or quarters from the shoder making 2,840 pieces or quarters, and beat again making the above number of leaves. These quarters are now placed in the mould and beaten, then heated, cooled, and beaten again for twelve hours with a seven-pound hammer. The moulds being beat, the leaves are taken out one at a time, placed on a cushion, cut by a machine which trims off the edges, leaving

the leaf three-and-three-eighth inches square. These are placed in books carefully dried, 25 leaves in each book. Young girls are generally employed to put the leaf in books; the workwoman opens the mould and with a pair of wooden pincers trims and patches any imperfect leaves, then places it in the little paper book, the leaves of which have been rubbed over with red ochre to prevent the adhesion of the gold. She fills these books for two-and-a-half cents each, and a fair day's work is sixty books. There are several colors of gold leaf, the palest, generally known as "pure virgin," but a few degrees removed from white, approximating to silver, while the "deep," as it is technically called, approaches a copper color, being alloyed with a large admixture of that metal. There is then the "medium" or "yellow" color, and for all practical purposes, this is most generally useful, inasmuch as it is not so apt to become stained by the varnish which, in sign writing, is nearly always coated over gilt work. If the medium color be left unvarnished it is more durable than either of the other colors. It possesses sufficient depth to prevent it from appearing silvery, as "pure virgin" does when left unvarnished, and it has not that coppery hue which distinguishes the "deep" gold. Moreover the "medium" is not so liable as the other colors to be acted upon by the atmosphere when used on outside work.

In exposed situations out of doors, pale gold leaf should always be varnished over, or, in the course of a few months, it will become tarnished. Deep gold will also tarnish if exposed, if left unvarnished. Wagon and carriage-painters, however, will

seldom be troubled with tarnishing, for *all* their work it varnished over.

Too much care cannot be bestowed upon the selection of gold leaf, as the dearness of gold offers a great inducement for the employment of metals of less value in its manufacture. Pure gold being too ductile to be worked between the gold-beater's skin, a certain amount of alloy is always added, varying from three to twelve grains to the ounce. Generally there is about six grains to the ounce or, one-eightieth part. The alloy consists of silver or copper, and sometimes both, and this accounts to some extent for the difference in color of the gold leaf. It sometimes happens that the gold leaf is kept exposed to a damp or uncongenial atmosphere. In this case it will be found to adhere partly to the paper leaves of the book, and it will be impossible to remove it without tearing it in pieces, when it is almost if not entirely worthless. Gold leaf should fall freely from the book, on the leaves being opened without any particle sticking to the paper. Some painters place the book before the fire for an hour or so previous to use, in order to dry the gold leaf and render it more manageable.

Owing to the great expense of gilding, in consequence of the thickness of the leaf, various substitutes for gold were formerly used. The Italians invented a method of overlaying with silver leaf or some cheap white metal those parts which they wished should have the appearance of gold, and then, by applying a yellow transparent varnish the white metal was made to assume the required color, and at the same time to present a metallic splendor. This is done at the present day by

picture-frame and molding gilders, the varnish or lacquer being made as follows:

DEEP GOLD COLORED LACQUER.—℞. Seed lac, 3 oz.; tumeric, 1 oz.; dragon's blood, ¼ oz; alcohol, 1 pint; digest for a week, frequently shaking; decant and filter.

MEDIUM GOLD LACQUER.—Put into a clean four gallon tin, 1 pound of ground tumeric, 1½ ounces of gamboge, 3½ ounces powdered gum sandrac, ¾ pound of shellac, and 2 gallons of spirits of wine. When shaken, dissolved, and strained, add 1 pint of turpentine varnish (*q. v.*) and mix all together.

"Double gilding" was at one time resorted to by some sign writers, with the view of giving the work additional brilliancy and permanence. Now, however, so far as the sign writer is concerned, this plan is never resorted to (except in the case of gilding on glass, which is a totally different branch of the art (*See Glass Gilding*), the advantage derivable from it being disproportionate to the cost of the metal and the extra cost of putting it on.

Gold Paint.—A mixture of gold bronze and some light, limpid varnish. This is excellent for use where pouncing cannot be resorted to, to prevent sticking, as in putting on a monogram or ornament to a finished panel. It does not prove so durable, however, as gold laid over size.

Grafton Paint.—A coarse earth, called by various names, as fire-proof paint, mineral paint, roofing paint, etc. It is found in various shades of color from light gray to reddish brown, and is used extensively in the preparation of rough-stuff for carriage work.

Graining.—The imitation of the natural veining, curl, etc., of woods, and is performed in the first case by laying an opaque ground in strong oil paint of the general color of the wood to be imitated, but lighter, and when dry, covering this with a coat of transparent color, of the proper hue and full depth, prepared either with turpentine or water color.

The operations—of which there are many—are performed with common brushes, and as soon as the ground is dry the process called *over-graining* is commenced. This is executed by a variety of tools, consisting of broad, flat, and thin brushes, used either spread, turning the hand, or edgewise—hair pencils of various sizes, combs, and rubbers, which as occasion requires are drawn over the paint so as to leave the streaky grains, curls and knots, according to the skill of the grainer. Rags are used to wipe off some of the graining color, as desired, and various lines, eyes, veins, knots, etc., are touched and re-touched until the desired effect is obtained, the work being subsequently varnished.

In graining work that is paneled, the lights and shades of the panel should be stronger than on the rest of surface. The rails and stiles of doors should be more simple than the panels in the imitation of dark decorated woods, as rosewood. If cross rails are full of work, make the upright stiles plain, for their appearance is changed by their position with regard to light. Perhaps the greatest triumph in staining is imitating successfully the curls of mahogany. Graining in maple woods is suitable for dining-rooms; the color of maple varies very much, and

therefore it is necessary to select a choice piece of imitation. Pollard oak graining suits well for a dining-room with its warm color and rich effect, the color varying from the lightness of maple to the darkness of mahogany, so affording a range of choice. Oak color is adapted to all styles of wainscot, harmonizing with warm colors on wall space, whether this be prepared or painted, and making pleasing contrasts with cold ones. It also looks well on the ceiling cornices of lobbies. In wainscot graining the lights and shades on the panels should be the strongest. If the prevalent color of a room be warm, the graining of the woodwork should respond; if crimson, maple, satin wood or oak graining may be employed; if green, some cool toned and light colored wood. Smoothness of surface is important in the grained imitation of woods, as well as the rendering of deep transparent and shadowy half tints. The grainer should not revel, as we have seen some do, in knots, which, indeed, should be left out, as well as the representation of cross-grained stuff, which the architects would avoid in real wood, whether for stiles, rails, or panels. Where wood has been previously painted, the grainer should examine it closely to see that it is not liable to peel off, and so spoil his work. Where marble has to be imitated, in order to secure a transparent effect the best polished copal should be used with colors, never turpentine.

Graining Comb.—Tool used to mark the grain in imitating various woods or graining. They are made of steel, iron, leather, etc., and are generally supplied in sets of from six to eight, varying in coarseness, the best being of American make of

polished metal put up in tin cases. Those made of leather are sold by the inch, the American make having 20 inches in a set at 75 cents. French, 48 inches in a set, $3.00. The steel combs vary from 1 inch to 6 inches in width.

FIG. 25.—A GRAINING COMB.

Graphite.—Plumbago, most generally known as *Black Lead*, though a very unfortunate name, as no lead enters into the composition of the mineral. It is of a grayish black color, with somewhat of a metallic lustre, and is perfectly opaque. It is sometimes used as a pigment.

Grass Green.—A color made by adding three parts of chrome yellow to one of Prussian blue.

Gray.—A color formed of black and white, ash color. French gray is simply white and black with the addition of a very little yellow and red.

Grecian Border.—A meandering stripe composed entirely of horizontal and vertical lines; frequently used in striping sleighs and for body belts.

Greening.—The term greening is applied to the color change in black, and the cause may be laid to: First, the action of ammonia when a carriage is kept standing where this volatile gas is plentiful; Second, when dark colored and consequently poor varnish is used in finishing; Third, with black-japan surface, when a coat of black-japan or varnish is put on before the under surface of black-japan is thoroughly dry. A carriage kept constantly covered, or in a dark room will frequently be found with black portions changed to a dark green color. This change of color is sometimes taken advantage of by the painter, and he is enabled thereby to turn out some beautiful jobs with dark green (a shade which it would be impossible for him to make with ordinary pigments). He simply blacks off the moldings, or runs a black stripe around a panel, leaving the greened black as the body color and the bright fresh black throws out the green color in all its beauty.

Green.—One of the prismatic colors, produced by a combination of blue and yellow rays, is very common in the vegetable kingdom, but rare in the mineral. There is only one metal, copper, which affords in its combinations the various shades of green in general use.

Green pigments are prepared also by the mixture of *yellow* and *blue*, and is most perfect when in the proportion of 3 parts yellow to 8 of blue, of equal intensity. Greens are also made in shade or richness, by glazings over certain green grounds. There are many varieties of greens, many of which bearing a local name only we will not notice. The following list embraces the principal ones,

each of which may be found under its appropriate head :

Arsenical green.
Brunswick green.
Chrome green.
Cobalt green.
Copper green.
Emerald green.
Frise green.
Gellert's green.
Holly green.
Invisible green.
Mineral green.
Moulin's green.
Mountain green.
Native green.
Olive green.
Paris green.
Quaker green.
Sap green.
Schweinfurth's green.
Varley's green.

Grit.—Degree of hardness or texture, as hard, soft, or coarse grit, as applied to rough-stuff or rubbing-stone.

Gritty.—Paint which is not ground fine is said to be gritty. Any coarse appearance of paint.

Ground.—Called by many painters "preparation." The first layer of color, on which other colors are laid. For most all opaque colors a clean lead-colored ground is suitable, but for those colors which are in the least transparent, a color similar to them must first be applied to make the coating solid or free from streaks, clouds, etc.

H

Haerlem Blue.—A pigment similar to Antwerp Blue (which see).

Hairing Off.—See mossing off.

Hamburgh Lake.—The same as Scarlet Lake (*q.v.*).

Hard Drying Body Varnish.—The finest quality of rubbing or leveling varnish made. It is fully equal to finishing varnishes in paleness, fullness, and lustre, and is frequently used for finishing hurried work. It works well enough under the brush, and in 48 hours may be rubbed with pulverized pumice-stone and water preparatory to receiving a finishing coat. Although intended for carriage bodies, it is one of the best ingredients for color-and-varnish on either bodies or gears, and for use in some paints or for glazings, particularly for white work.

Harmony.—The general accordance of the objects in a picture with one another, and their subordination to the principal object, so that all unite to constitute a pleasing whole. It is effected by a due combination of lights and shades, or by such contracts as are sufficient to relieve the distant groups.

Heraldry.—Heraldry takes its name from *herald*, which meant in olden times an officer in princely

courts, whose duty was, among others, to settle disputes arising on the question of ancestry and lineage and the subject of coats-of-arms. The shield and the helmet make up the essential part of a coat of arms. On carriages they are painted either in relief or in their proper colors, the latter being indicated in the design by a variation of tinting or shading in conventional lines, of which more below. Almost every coat-of-arms is composed of three distinct parts: first, the colors; second, the field or fields on the shield; and third the figures on the same. The colors are either of the following: Gold or yellow as a substitute; silver or white; red for the loud color; blue, green, purple, or purple on white; and black for the color of iron. All these colors have a symbolic meaning, namely:

Gold is nobility, virtue, greatness.
Silver for justice, purity, innocence.
Red—courage.
Blue—fidelity, consistency, science.
Green—mildness.
Purple—royalty.
Black—danger.

As stated before, all colors are expressed on black drawings, engravings, and even on reliefs on stone, by customary lines which are still the same as they were in the seventeenth century. We illustrate this by the small cuts on page 167: Fig. 26 represents a shield filled with *dots* which express *gold*; Fig. 27 shows a *blank* field indicating *silver*; Fig. 28 is tinted with *vertical lines*, meaning *red*; Fig. 29 is shaded in *horizontal lines* for *blue*; Fig. 30 is filled with *diagonal lines*

running from the top of the shield to the bottom and in the direction from right to left, indicating *green*. (We here remark that in Heraldry the *right* side of the shield is that which is *left* when looking at it on the paper, for the reason that it is imagined that you are carrying the shield before you.) In Fig. 31 the *diagonal lines* run from top to bottom, but in the opposite direction, namely, from *left* to *right*, representing *purple*. A *black* field is expressed by *horizontal and vertical* lines crossing each other at right angles as shown on Fig. 32.

A rule in the building of coats-of-arms is, that metals never be placed over metals, and color on top of color, or the coat is either not genuine or at least was given on a particular and important occasion. Modern heraldry is very strict in the composition of colors, which during the middle ages were of less importance and rather optional. This is the reason why the colors of the oldest coat-of-arms in existence cannot be defined with absolute certainty. The shield or field can be single or compound. In the first instance it has a single color; in the second it can have a variety of colors. A line from the left of the shield on top to the right on bottom is said to cut it *left*; a line in the opposite direction cuts the shield *right*. A vertical line *divides* the shield, and a horizontal line *splits* the same. The division and splitting can be repeated, and will produce on the shield what are termed *spaces* or *fields*, if filled with figures. Fig. 33 shows a shield divided in spaces, which again have their separate denominations. *A B C* is called the head of the shield; *D E F* the belt, or

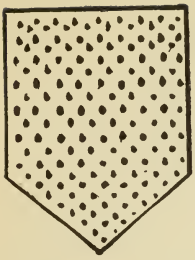


FIG. 26.—GOLD.

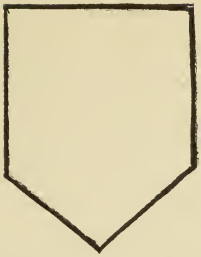


FIG. 27.—SILVER.

FIG. 28.—RED.

FIG. 29.—BLUE.

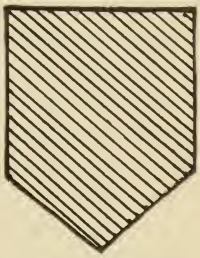


FIG. 30.—GREEN.

FIG. 31.—PURPLE.

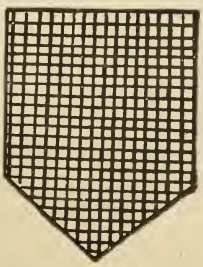


FIG. 32.—BLACK.

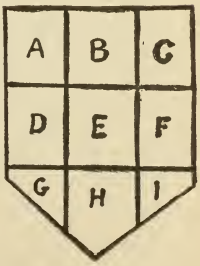


FIG. 33.

centre, or road; *G H I* the foot; *A D G* the right side; *B E H* the field of battle; *C F I* the left side; *E*, the heart; *B*, the centre of head; *H*, the centre of foot. The position of figures, if there are more than two of them, is exactly prescribed. If there are three figures, they are to be placed in spaces *A*, *C*, *H*; four *A*, *C*, *G*, *I*; five in *B*, *E*, *H*, *D*, *F*. The figures on coats-of-arms are either natural or imaginary. The former are mostly animals, plants, stars, the sun and moon, and the elements, water, fire and earth. Lions and leopards are very common, and the position in which they are represented is again guided by certain principles. In the thirteenth, fourteenth and fifteenth centuries, animals were painted in a conventional style, without regard to their being life-like, and only since the sixteenth century the execution is more natural, and thus lost its marked heraldic character. Besides mythical animals we also find on coats-of-arms artistic figures consisting of weapons, clothing, common utensils, buildings, rivers, castles, bridges, ships, tools and instruments.

The form of shields has varied in almost every century: the oldest on record being of a very queer shape. Married ladies used to have *two* coat-of-arms—that of their parents and their husbands. The helmet is an attribute of importance to coats-of-arms; it is mostly painted in gold, and is found with or without a shield. The open helmet is the property of the nobility, and citizens have it shut. Shield bearers on coats-of-arms originated at the time of the tournaments, and mythical animals; negroes for bearers are quite common. The painting of coats-of-arms, crests, monograms, etc., has

not been cultivated to a great extent in this country, owing no doubt to the facility offered to carriage-makers to buy ready-made ornaments—or transfers. This is to be regretted, because this work is always in demand by private parties, independent of the superior transfer ornaments to be had in the trade. The colors used for heraldic painting are those put up in collapsible tubes, of which there are about ninety different kinds. Winsor & Newton's being considered by many artists to be the best, but it will be found that American colors are equally in demand.

The following list of finely-prepared oil colors for artists will give the reader an idea of the large number of fine colors that are supplied in tubes. Although few painters may ever be called upon to use all of the colors on the list, still it should be a satisfaction to know them by name:

American vermilion.
Antimony yellow.
Antwerp blue.
Asphaltum.
Bistre.
Bitumen.
Blue black.
Blue verditer.
Bone brown.
Brilliant yellow.
Brown madder.
Brown ochre.
Brown pink.
Burnt carmine.
Burnt lake.
Burnt Roman ochre.
Burnt sienna.
Burnt terra verte.
Burnt umber.
Cadmium, lemon.
Cadmium, light.
" deep.
" orange
" yellow.
Caledonian brown.
Cappah brown.
Carmine lake.
Cassel earth.
Capucine madder.
Cerulean blue.
Chinese blue.
Chinese green.
Chinese vermilion.
China white.
Chrome green, No. 1, light.
" " 2, med.
" " 3, deep.
Chrome orange.
Chrome red.
Chrome yellow, No. 1, light.

Chrome yellow, No. 2, med.
" " 3, deep.
Citron yellow.
Cobalt blue.
Cobalt green.
Cologne earth.
Copal megilp.
Cork black.
Cremnitz white.
Crimson lake.
English vermilion.
Emerald green.
Emeraude green.
Extract of gamboge.
Extract of vermilion.
Flake white.
Flesh ochre.
French carmine.
French green.
French Naples yellow.
French vermilion.
Gamboge.
Gaude lake.
Green lake.
Gold ochre.
Imperial orange.
Indian lake.
Indian red.
Indian yellow.
Indigo.
Italian pink.
Ivory black.
King's yellow.
Lamp black.
Lemon yellow.
Light red.
Light red sienna.
Madder carmine.
Madder lake.
Madder lake, deep.
Malachite green.
Mars brown.
Mars orange.
Mars red.
Mars violet.
Mars yellow.
Mauve lake.
Megilp.
Mummy.
Naples yellow, No. 1, light.
" " 2, med.
" " 3, deep.
Neutral tint.
New blue.
Olive lake.
Olive tint.
Orpiment.
Oxford ochre.
Orange vermilion.
Oxide of chromium.
Paris blue.
Paris green.
Paul veronese green.
Payne's gray.
Perfect yellow.
Permanent blue.
Permanent white.
Permanent green.
Persian red.
Pink madder.
Prussian blue.
Prussian brown.
Prussian green.
Purple lake
Purple madder.
Raw sienna.
Raw umber.
Reuben's madder.
Robert's lake.
Robert's lake, No. 1.
" " 2.
" " 3.

Robert's lake, No. 4.
" " 5.
" " 6.
" " 7.
" " 8.
Roman ochre.
Rose lake.
Rose madder.
Rose pink.
Scarlet lake.
Scarlet madder.
Scarlet vermilion.
Sepia.
Silver white.
Sugar of lead.
Terra rosa.
Terra verte.
Transparent gold ochre.
Transparent oxide of chromium.
Ultramarine.
Ultramarine ash.
Vandyke brown.
Venetian red.
Verdigris.
Verona brown.
Veronese green.
Violet carmine.
Yellow lake.
Yellow madder.
Yellow ochre.
Zinc white.
Zinnober green, light.
" medium.
" deep.

These colors cost from $1.50 to $12.00 per dozen tubes.

In addition to these procure small bottles of copal or mastic varnish, turpentine and japan gold-size (*q. v.*) a square or oval palette, a palette-knife and a few red-sable pencils, from the finest to those the size of a goose-quill.

For working, the colors should be arranged on the palette in the following order: White in the centre, the colors which cover to the right, and transparent ones to the left. In this way you avoid the useless mixing up of the latter kinds. Use a mahl-stick to rest the hand upon, and it is a good plan to have a wet shammy laid over the spot touched by the end of the stick.

The design is first drawn on paper and its outline pricked full of holes with a fine needle. The paper is then laid on the panel and tipped with a small bag made of flannel or muslin and filled with pulverized chalk or whiting. After removing line

the contours with thin color. The parts to be gilded are then sized, and when dry so as to be "tacky" the gold-leaf is put on. (*See Gilding.*) Imitation of gold is made by mixing Cremnitz white, cadmium yellow, burnt sienna, and raw umber. Genuine silver-leaf is seldom if ever used, as it soons turns black, and the imitation—pure white—is preferred. Gold is shaded with burnt sienna, or asphaltum. The red plush often seen on coat-of-arms is made with crimson lake and vermilion, shaded with brown ochre and lightened with vermilion. The light should in all cases be laid on bold and bodily; the shades, on the contrary, as smooth as possible.

Holiday.—A term applied to a missed spot in painting or varnishing—a part not painted.

Holly Green.—An ochre, same as Terre-verte (*q. v.*).

Hooker's Green.—A water color paint.

House Painting.—There are many methods employed by house-painters in arriving at the same result, namely: a finished job; and it may be thought by some that the directions we give for painting a house are not correct, but to these we simply point to the preface of our book, and go on with explanations or description of the process generally followed from the commencement to the conclusion.

Before beginning to paint *new work*, all projections, such as lumps of glue, etc., must be cleared away with the putty-knife and duster. Then all knots in the wood must be killed with *knotting* (*q. v.*) to prevent the pitch or turpentine in the knots from oozing out and spoiling the appearance of the painting when finished. After the knotting

is dry and hard, which it does quickly, the *priming*, or first coat is put on. This is made of white lead thinned with oil and having a little *drier* (*q. v.*) to harden it. Sometimes new wood has a coat of *clear-cole* (*q. v.*) applied to it, but this is better on old and dirty wood which has never been painted than on new smooth work.

As soon as the priming is dry, all nail-holes, cracks, etc., must be stopped with putty. It is useless to do this before the priming has been applied, because putty will not adhere to wood unless painted.

After this has been done the *second coat* may be applied, and for new work this should be made up chiefly of oil, because oil is most efficient in stopping the action of the wood; then the *third*, and even a *fourth coat* my be applied. In laying on the color, the brush should be passed backwards and forwards and in every direction, to spread the color evenly and work it well into the wood, in the earlier coats. Finally, the brush should be drawn up and down, or backwards and forwards, as the case may be, in the direction of the grain of the wood, taking care to leave no marks of the hairs of the brush. In painting a door, or any nice piece of work in which part is sunk and part raised, the moldings or bead-work should be painted first with a sash tool, and then the panels, styles, and rails with a brush. No coat should be laid on a previous coat until that coat shall be perfectly dry and hard; and before beginning to paint any piece of work, whatever may be the number of the coat, every particle of dust that may have settled on it should be carefully removed with the dusting brush.

Such is the method of painting new work. In painting old work the process is somewhat different. All surfaces should be looked over and cleaned from grease, and it is a good plan to wash the worst or greasy spots over with turpentine. The first coat after priming in new work should be paint in which oil predominates; but for old work more turpentine is best.

To Remove Old Paint from Woodwork.—(1) Make a very strong solution of common washing soda, and apply it until the paint can be easily scraped away. (2) Apply naptha until the paint is softened, and can be scraped off with a knife. (3) Slake 3 pounds stone lime in water, and add 1 pound pearlash, and sufficient water to make it into a thick mush-like consistency, apply it with a brush and leave it on the paint from eighteen to twenty-four hours, when the paint may be easily scraped off. (4) Burn off by use of lamps, furnace, torch, gas, etc.

A greater number of coats are required on plaster than on wood, because plaster will absorb more oil than wood will. Thus if three coats are sufficient for wood, four and sometimes five will be wanted for plaster.

In painting plaster, the first coat should consist of white lead well thinned with oil, and plenty of liquid drier, or litharge to ensure drying quickly. The plaster will be saturated with oil to some depth and the second and third coats may have a goodly share of turpentine, and some of the color with which the walls are to be tinted when finished. The fourth coat should consist of a darker shade of color than that to be used for the finishing coat, mixed with equal quantities of

oil and turpentine. The last coat should be mixed with spirits of turpentine only, and a little gold-size to harden it. This coat, which is called the "flatting" (*q. v.*) should be somewhat lighter than the selected tint, because it will dry darker. In painting plaster, every coat should be allowed to dry thoroughly and remain for four or five days before the next is put on ; the last coat but one, however, should not be allowed to stand more than two days before the finishing coat is laid over it.

The compositions of priming for new work, have been described ; the proportions of the ingredients used for second and following coats for old and new work, and the meaning of certain expressions used in painting to imply combinations of a certain number of coats, will now be laid down as follows :

(1) Second Coat for New Work, or oil second color.—White lead thinned with oil and a little turpentine, with some driers. In winter more driers must be used than in summer.

(2) Second Coat for Old Work, or turpentine second color.—White lead thinned with about three parts of turpentine to one of oil, with a little driers. When much turpentine is used less driers are required.

(3) Turpentine Color.—Color thinned almost entirely with turpentine, and used only when the work is to be finished in oil, so that the last coat may have a better gloss.

(4) Third, or Ground Color.—Color thinned with two parts oil and one part turpentine, and tinted in shade darker than the finishing color.

(5) Finishing Oil Color.—Thin with a little more oil than turpentine, and tint to desired color.

(6) Flatting, or finishing turpentine color, is thinned with turpentine and has no shine.

(7) Bastard Flat is thinned with turpentine and a little oil, which renders it more durable than perfect flatting. To procure a good flat, it is necessary to have a perfectly even glossy ground, and it should be of the same tint; but a little darker than the finishing tint.

The terms for certain combinations of coats in painting, and the various kinds of coats that each term implies, are as follows:

(1) Clear-cole and Finish.—Stop defects with putty, clear-cole, and finish with oil finishing color as directed.

(2) Two Coats in Oil.—Turpentine second color, and finishing oil color.

(3) Two Coats in Oil and Flat.—Turpentine second color, third color, and flat.

(4) Three Coats in Oil.—Turpentine second color, turpentine color, and finishing oil color.

(5) Three Coats in Oil and Flat.—Turpentine second turpentine color, third or ground color, and flatting.

(6) Four Coats in Oil (New work).—Oil priming, oil second color, turpentine color and oil finishing color.

(7) Four Coats in Oil and Flat (New work).—Oil priming, oil second color, turpentine color, third or ground color and flatting.

Suggestions in Regard to Desirable Shades and Trimmings.—For dwellings in elevated or exposed situations—grays, drabs, olives and other dark colors are most desirable. For dwellings not so

situated or which are surrounded by shade trees, the yellow and lighter tints are preferable.

When the molding, cornice or other ornamental work is heavy, *i. e.*, presents a large surface, the lighter trimming shades should be used, and where the ornamental work is light and graceful in design, the darker trimming shades are more effective.

When any shade of green is used on blinds, use any of the red shades for sashes, beading, etc.

When two colors are used on large plain surfaces, a dividing line of some darker color, or black, should be drawn between them.

For cottages, villas, sea-side and summer hotels, etc., very rich effects are produced by using a different body color on two or three stories.

It is a well known fact that the average cost of applying paint is from two to four times as much as the cost of the paint itself, but probably not more than one in a hundred purchasers stop to think of the questionable economy of expending from fifty to one hundred dollars for labor, in applying twenty-five or thirty dollars' worth of inferior paint, which, after a year or so, affords neither protection nor ornament, when the use of a strictly first-class paint (costing twenty per cent, or say five or six dollars more for sufficient to paint a small house), would insure a serviceable and always pleasing result for at least two or three times as long.

Another important fact—which no intelligent, honest painter will deny—should also be more generally known, viz.: that a gallon of paint composed of the best materials, thoroughly combined

will, in consequence of its superior "body" and capacity, "cover" from twenty to twenty-five per cent more surface than a gallon of such paints as are commonly sold.

Regarded from an art point of view, there are but three colors, namely: blue, red and yellow.

Blue, red and yellow have been termed primary colors; they cannot be formed by the admixture of any other colors. All colors other than blue, red and yellow result from the admixture of the primary colors.

By the admixture of blue and red, purple is formed; by the admixture of red and yellow, orange is formed; and by the admixture of yellow and blue, green is formed.

Colors resulting from the admixture of two primary colors are termed secondary; hence purple, orange and green are secondary colors.

By the admixture of two secondary colors a tertiary color is formed; thus, purple and orange produce russet (the red tertiary); orange and green produce citrine (the yellow tertiary); and green and purple, olive (the blue tertiary); russet, citrine and olive are the three tertiary colors.

When a light color is juxtaposed to a dark color, the light color appears lighter than it is and the dark color darker.

When colors are juxtaposed, they become influenced as to their hue. Thus, when red and green are placed side by side, the red appears redder than it actually is, and the green greener; and when blue and black are juxtaposed, the blue manifests but little alteration, while the black assumes an orange tint or becomes "rusty."

No one color can be viewed by the eye without

another being created. Thus, if red be viewed, the eye creates for itself green, and this green is cast upon whatever is near. If it views green, red is in like manner created and cast upon adjacent objects; thus, if red and green are juxtaposed, each creates the other in the eye, and the red created by the green is cast upon the red, and the green created by the red cast upon the green; and the red and the green become improved by being juxtaposed. The eye also demands the presence of the three primary colors, either in their purity or in combination; and if these are not present, whatever is deficient will be created in the eye, and this induced color will be cast upon whatever is near. Thus, when we view blue, orange, which is a mixture of red and yellow, is created in the eye, and this color is cast upon whatever is near; if black is in juxtaposition with the blue, this orange is cast upon it, and gives to it an orange tint, thus causing it to look "rusty."

In like manner, if we look upon red, green is formed in the eye, and is cast upon adjacent colors; or if we look upon yellow, purple is formed.

Harmony results from an agreeable contrast.

Colors which perfectly harmonize improve one another to the utmost.

In order to perfect harmony, the three colors are necessary, either in their purity or in combination.

Red and green combine to yield a harmony. Red is a primary color, and green, which is a secondary color, consists of blue and yellow—the other two primary colors. Blue and orange also produce a harmony, and yellow and purple, for in each case the three primary colors are present.

It has been found that the primary colors in perfect purity produce exact harmonies in the proportions of 8 parts of blue, 5 of red, and 3 of yellow; that the secondary colors harmonize in the proportions of 13 of purple, 11 of green, and 8 of orange; and that the tertiary colors harmonize in the proportions of olive 24, russet 21, and citrine 19.

There are, however, subtleties of harmony which it is difficult to understand.

The rarest harmonies frequently lie close on the verge of discord.

Harmony of color is, in many respects, analogous to harmony of musical sonuds.

Blue is a cold color and appears to recede from the eye.

Red is a warm color, and is exciting; it remains stationary as to distance.

Yellow is the color most nearly allied to light; it appears to advance toward the spectator.

At twilight blue appears much lighter than it is, red much darker, and yellow slightly darker. By ordinary gas-light blue becomes darker, red brighter, and yellow lighter. By this artificial light a pure yellow appears lighter than white itself when viewed in contrast with certain other colors.

By certain combinations, color may make glad or depress, convey the idea of purity, richness or poverty, or may affect the mind in any desired manner, as does music.

When color is placed on a gold ground, it should be outlined with a darker shade of its own color.

When a gold ornament falls on a colored ground, it should be outlined with black.

When an ornament falls on a ground which is in direct harmony with it, it must be outlined with a lighter tint of its own color. Thus, when a red ornament falls on a green ground, the ornament must be outlined with a lighter red.

When the ornament and the ground are in two tints of the same color, if the ornament is darker than the ground, it will require outlining with a still darker tint of the same color; but if lighter than the ground no outline will be required.

Hue.—The terms "tint," shade," "hue" and "color," are very often used incorrectly even by persons who ought to know better. The first three are confounded one with the other, or used indiscriminately, even by painters and others who are in the habit of handling paints and colors. Every compound of the three primary colors is a *hue*. For example green being a mixture of blue and yellow may vary *in hue* from the yellowist to the bluest; orange, being a mixture of yellow and red may vary *in hue* from the yellowist to the reddest.

A great number of *hues* may be made by a combination of the three primaries, the name of the *hue* being the same as that of the predominatting primary. A color mixed with white forms a tint, and one in which black is introduced gives us a shade.

Hungary Blue.—A name often given to Cobalt Blue.

Hungary Green.—A carbonate of copper, found in a natural state in the mountains of Saxony and Hungary, mixed with earthy matters.

Hunting Horn. (*Her.*)—A horn used to cheer the hounds in pursuit of game. It is a frequent bearing in Heraldry. When adorned with rings it is said to be *garnished.*

Hurst. (*Her.*)—A charge representing a small group of trees borne upon a mount or base.

I

Icicling.—A term applied to the appearance of little tears or icicles on a varnished surface, caused by the varnish sagging down in small streaks from any little nibs or specks of dust, also, if varnish be rubbed before perfectly hard, the nibs or lumps will sweat out, and when varnish is put on these, it will cause every one of these nibs to form drops or icicles. To avoid this, the job must be rubbed immediately before applying the varnish with pumice rag and then washing clean.

Imbrued. (*Her.*)—Signifies bloody, or dropping with blood. Weapons thus blazoned are drawn with drops of blood falling from them.

Indian Ink.—A composition of lamp-black and glue or size. The Chinese use vegetable juices which renders it more brilliant and lasting. It is used for designs in black and white.

Indian Red.—A very rich iron ore, hematite, or peroxide of iron. It is an anomalous red, of a purple-russet hue, of good body, and valued when fine for its pureness and laky tone of its tints. In a crude state it is a coarse powder, full of extremely hard and brittle particles of a dark appearance, sometimes magnetic, and is greatly improved by grinding and washing over. Its chemical tendency is to deepen, nevertheless it is very perma-

nent; neither light, impure air, mixture with other pigments, time, nor fire, effecting in general any sensible change in it. This pigment varies considerably in its hues; that which is most rosy being esteemed the best, and affording the purest tints. Inferior red ochres have been formerly substituted for it, and have given it a variable character, but can now be abundantly obtained pure from respectable color-men.

Persian-Red is another name for this pigment.

Indian Yellow.—A coloring matter highly esteemed by painters. It is imported from India in the form of balls, each weighing three or four ounces. These are of a dark brown color externally, but of a bright yellow in the interior. It is of a fetid odor and supposed to be a urinary sediment of the camel or buffalo after the animal has fed on decayed and yellow mango leaves. It is used more extensively in water-color painting.

Indigo.—An extract from the plant *indigofera*, found in America, Egypt, and the East Indies. The purest only is used for oil painting, that of an inferior quality may be used in distemper painting. —A preparation from the leaves of the *anillo* is sometimes fraudulently substituted for indigo, but may be at once detected by throwing a piece into the fire, *as genuine indigo will not burn.*

Indorsed. (*Her.*)—Applied to two animals placed back to back. Two keys, two wings, etc., may also be indorsed, and a pelican is always drawn with its wings endorsed.

Infamed or Defamed. (*Her.*)—An epithet applied to a lion or other animal which has lost its tail, the loss being supposed to disgrace it.

Ingress.—A name given to a grade or quality of paper used for sketching upon, and having its surface roughened in such a manner by machinery, that the marks made by a pencil or crayon appear to be small dots.

Initial.—The first letter of a word, frequently placed on the door panels of a coach instead of a monogram or heraldic design.

Inherent Colors.—All material colors, more properly called pigments and dies; *Transient* colors are the colors of light and the eye, such as the rainbow, etc.

Inside Coach Finishing Varnish.—The name given to a varnish intended for finishing car interiors, and where great dispatch is necessary one coat over a surface made by *Inside Rubbing Varnish* will answer well; but it is recommended in ordinary cases to flow on two coats in the following manner: When the first coat is dry, do not rub it, but simply wash it well and shammy it dry, then flow on the second coat, before the surface has time to sweat. A car finished with this varnish will only require a single coat of the same annually to preserve it for years.

If desired to leave the work with an egg-shell gloss, the lustre may be taken off with pulverized pumice-stone, and a finish given by rubbing slightly with rotten-stone and water.

Iodine Scarlet.—A new pigment, far exceeding the brilliancy of vermilion, it is the *Iodide of Mercury*. It has strong body, but if mixed with a metal palette-knife it is apt to change the color, ivory or bone knives must be used. With all its

beauty it is fugitive and therefore is not extensively used.

Isochromatic.—Having the same color.

Isinglass.—A kind of gelatine prepared from the air bladder of sturgeons, used in making sizing for gilding on glass (which see).

Italian Pink.—A pigment made by impregnating whiting with vegetable yellow tinctures in the same manner as Dutch pink.

Iron Brown.—A pigment belonging to a class in which are brown ochre, Prussian brown, etc.

Ivory Brown.—See bone brown.

Ivory-Black.—The charcoal of ivory. Ivory chippings from the ivory-workers is placed in a closely covered crucible and heated to a red heat, then when cooled, the contents are ground in water. Ivory-black is extremely hard to grind fine in ordinary mills, but color-makers prepare it for use ground to the last degree of fineness, and it is now considered more economical to purchase and use the ready prepared black.

J

Jack.—A name applied to various machines for holding bodies in the proper position while being painted or varnished; also, a contrivance for raising

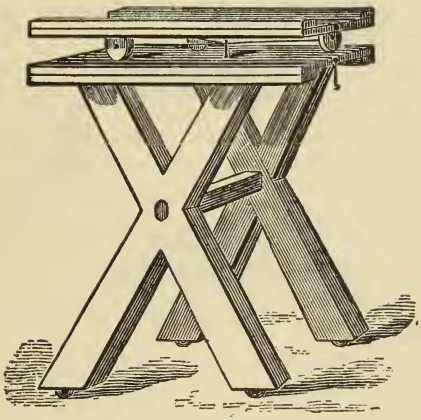


Fig. 34.—Jack for Carriage Bodies.

and lowering the wheels of a vehicle to enable the same to be turned as desired while washing, painting, etc. (*See Body Jack.*)

Japan.—A drier for paints, generally made by dissolving shellac gums in boiling linseed oil. (*See Brown Japan, Black Japan, and Crown Coach Japan.*)

Japan Gold-Size.—A drier for paints, made in a different manner from ordinary japan, and posses-

sing double the power of the latter; being of a light color it is well adapted for use in all light colors.

Japan Brown.—A beautiful shade of brown made by mixing to black japan any red pigment, vermilion, Indian red, etc. The paint when mixed is similar in appearance and consistency to color-and-varnish, and should be applied in a similar manner; *i. e.*, with varnish brushes. It is excellent

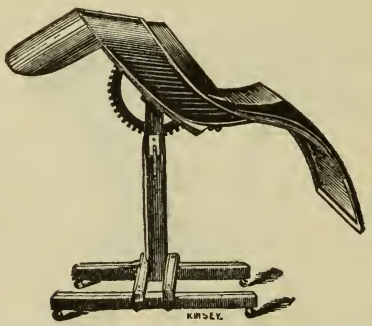


FIG. 35.—AUTOMATIC JACK, OR BODY AND WHEEL REST.

for re-painting a carriage; in which case rub down the old varnish to remove the gloss, and apply the japan brown directly to the work, two coats will generally make a good job, and by its use, no fear of cracking need be entertained, for the coatings will be elastic and quite unlike dead color.

Jet-Black.—The very deepest black; the color of the mineral, jet.

Jonquil Yellow.—A color used mostly by fresco-painters, and is made by mixing flake white and chrome yellow, to which is added a very little vermilion or carmine.

K

Kalsomine.—A mixture of size and pigment, used as a coating for walls and ceilings. To make it, take zinc white or Paris white (the former is best) 6 pounds, light colored glue ½ pound. Soak the glue in a vessel containing about three pints of warm water until it is jellied; then add a pint of water and heat the whole until it becomes fully dissolved and quite thin. Put the Paris white into a large pail, pour on hot water and stir it until the liquid appears like thick milk. Now mingle the glue liquid with the white, stir it thoroughly, and stand the pail in a cool place. When it has become semi-jellied, that is, neither a limpid liquid nor a strong mass of jelly it is in proper condition to apply, and this peculiar state will be readily discovered by a little experience, for when as it should be, it will spread easily with the brush without spattering and it can be worked over the wall smoothly and without leaving brush-marks. The regular kalsomine brush is best for use, notwithstanding the advice given in some publications to use a common white-wash brush, good work cannot be done with them. The brush must be moved over the work in short strokes in every directions, not as in painting or whitewashing in straight lines, and care must be taken to apply the kalsomine in squares not

too large, and each one to blend into the other without time for the edges to dry and show the lap or connections. This forms a white kalsomine, which may be improved by the addition of a few drops of blue. Any color or tint may be made by simply wetting up some dry pigment, as umber, sienna, yellow, green, etc., with warm water, and adding it little by little to the white. To prepare the wall for kalsomining wash off all old coloring with a sponge and water else it will be apt to rub up with the new kalsomine and cause streaks, or a coating of glue size may be spread on the work, a quarter pound of dissolved glue in a pail of water laid on with the kalsomine brush and allowed to dry hard will make the work of kalsomining quite easy, when two coats of kalsomine are necessary to make a good job, but it must not be forgotten that a coat of glue size is necessary before the second is applied.

Keg Lead.—A common term for white-lead ground in oil and put up in small kegs—*tub-lead* is also used in the same sense.

Kermes.—A small insect, similar to the cochineal insect, from which is obtained a brilliant and durable color.

Key.—A guide mark made in stencil plates by which correctness of position is secured when one stencil plate is to be used in stenciling over the marks made by a preceding stencil plate. It consists in the cutting of a small portion of the first stencil in the one to be used over it; then when these openings are placed upon their proper places the stencil plate will be in the right place for painting over.

King's Yellow.—A pigment. The sulphuretted oxide of arsenic; same as yellow orpiment, or auripigmentum.

Knotting.—Shellac varnish is said to be the best coating to put over knots in wood before painting it, to prevent the sap from striking through. A mixture of glue size and red-lead is sometimes used, gutta-percha dissolved in ether is also a good knotting. Some painters, where extra care is requisite, lay on gilding size and put a leaf of gold, silver or nickel upon each knot.

Kowrie or Kauri.—A species of resin or gum produced by the kauri-pine, a native of New Zealand. It is sometimes found in pieces as large as a child's head, of a dull amber color, where forests of these trees have formerly grown, and is obtained by digging. It is also collected from the trees from which it has newly exuded, and is then of a whitish color. It is used in making varnishes.

Kremnitz White.—White carbonate of lead.

L

Label. (*Her.*)—A figure consisting of a horizontal stripe or fillet, with three points dependent from it. A number of changes are made in the label, some having five points and others extending across the whole shield. Like other marks of cadency, labels are sometimes borne as permanent distinctions by a particular branch of the family.

Lac-Lake.—A pigment prepared from a resin which exudes from the branches of several tropical trees. It is a deep, rich, transparent color, less brilliant and more durable than the color extracted from cochineal and kermes, but inferior to madder in both these respects.

Lacquer.—A varnish or glaze for coating polished metals, wood, etc., to impart the appearance of gold or to prevent the sudden oxidation of the metal. *For Brass*—mix 8 ounces shellac, 2 ounces annotto, 2 ounces sandarac, $\frac{1}{4}$ ounce of dragon's blood, 1 gallon spirits of wine. Heat the article to be lacquered, and apply the mixture with a camel's-hair brush. *For Tin*—mix turmeric, 4 drachms; dragon's blood, 4 scruples; red saunders, 1 scruple; shellac, 1 ounce; gum mastic, 5 drachms; Canada balsam, 2 drachms; alcohol, 8 ounces; spirits of turpentine, 80 drops.

Most of the gilt-molding we see is made to look

like gold by lacquering over silver-leaf, tin-foil,etc., the lacquer used being made of gums dissolved in naphtha, spirits of wine, or other volatile oil, with various coloring substances, as dragon's blood, saffron, etc.

Lake.—The name given to certain pigments, many of which are a deep red or maroon color. Yet several of other colors are included under this name as green lake, yellow lake, etc. The lakes are numerous, both from variety of appellations and the substances from which they are prepared. The coloring matter of common red lake is Brazil wood, which affords a very fugitive color. Superior red lakes are prepared from cochineal, lac and kermes; but the best of all is prepared from the root of the madder plant. All lakes ground in linseed oil are disposed to become livery or thick, but ground in poppy oil they keep better—a hint some of the prepared-color makers may utilize. The adulteration of lakes, particularly of madder lake, is carried on to a great extent by the manufacturers, but we have at command various processes by which we may determine their purity. Every lake with alumnia for a base, is soluble in muriatic acid, or in vinegar to which a few drops of the acid have been added. After the lake has been dissolved ether is added and the whole well shaken. If the lake has been adulterated with Pernambuca, japan or Brazil wood lakes, the ether will be colored a bright gold color. If adulterated with Brazil wood, an effervescence will occur, and a small quantity of iodine dropped in will color the solution *blue*.

Water *is not colored* with madder lakes, while *it is colored* with carmine lakes.

Violet lake will turn to a dirty orange color if moistened with muriatic acid, when adulterated. Madder lake adulterated with Prussian blue is changed to green by the acid.

Scarlet lake is prepared from cochineal; it is a beautiful transparent color, of excellent body, working well in both water and oil. When mixed with whites to form tints it is not permanent, and it also soon fades if laid on as a glazing. In the manufacture of lakes, the coloring matter is extracted, and then to precipitate the solution alum or alkali is thrown in, and this falling to the bottom and becoming intimately intermixed with the sediment which is dried and ground into dry lake powder, gives the painter very often serious trouble. He finds that in some cases his paint chips or flakes, or the varnish put over it does so, while the same varnish on other colors does not. He also finds that the color "livers up" and "works tough" and of all the paint in the shop none will give him so much difficulty to make a good job. So great is the trouble with lakes, that many painters have discarded them entirely, and now depend solely upon carmine to form the desired color; which is done by making the ground either light or dark red, then glazing with carmine.

Lamp-Black.—Pure carbon. First on the list of black pigments is lamp-black; and although of late years its use has been limited owing to its oleaginous nature, it still has a place in many carriage paint shops, and proves to be a very useful pigment. It is made in the following manner: The first requisite is a receiver to hold the smoke generated from a large lamp, in which oil or other fatty substance is burned, or it may be produced

from a kettle of burning resin; but the oil-lamp produces the best lamp-black, and the best vegetable oil gives the finest color and quality of pigment. A large cone-topped building, similar to our gas-receivers, is fitted with a movable interior roof, which just fits the inside of the building and is raised and lowered by a rope and pulley from the top. The smoke from the burning resin or oil is allowed to enter near the bottom, and there is a hole in the roof affording a certain amount of draft and allowing the escape of the lighter portions of smoke.

When a quantity of soot is formed in the receiver the lamp or fire is extinguished, and the movable roof is lowered from the outside to the bottom. This scrapes down the large black flakes which have adhered to the sides of the receiver, and which—after purification by burning and sifting to remove what oily substance still remains—becomes the lamp-black of the painter.

Laps.—In laying a coat of paint or varnish it sometimes happens that one part will dry or set before the part next adjoining is touched with the brush, then when that part *is* touched the paint or varnish will lap over and cause a sort of ridge to be formed—called a lap.

Lavender.—A grayish blue color, made by adding Prussian blue to dark lead color.

Lead.—(*See White Lead.*)

Lead Color.—The color of the metal lead, made by mixing eight parts of white, one black, and one of blue.

Lemon Color.—The color of the lemon, made by

mixing five parts of lemon yellow, and two parts of white.

Lemon Yellow.—A beautiful light and vivid color. It is not liable to change by damp or impure air, or by the action of light, or by the steel palette-knife, or by mixture with other pigments either in water or oil. Though possessing the name, it is not the true color of the lemon. (*See Baryta Yellow.*)

Lead Poisoning.—A disease which attacks those who are constantly handling white-lead, or those who have for a long time been using water charged with lead salt. It assumes four phases: Lead colic, lead rheumatism, lead palsy, disease of the brain.

The first mentioned is by far the most frequent, and is characterized by sharp continuous abdominal pains which are usually diminished on pressure; by hardness and depression of the abdominal walls; slowness of the pulse and general disturbance of the whole system. The blue line on the gums serves at once to distinguish it from other colic.

Persons exposed from their occupation to the risk of lead-poisoning should be especially attentive to cleanliness; and if they combine the frequent application of the bath with the use of sulphuric lemonade as a drink they may escape the effects of metallic poison.

Lettering.—The painting of letters on wagons, cars, and stages, is one of the finest branches of the trade, and it is made a specialty by many, particularly in large cities. The work is much finer than the work of a sign writer, and the style of

letters used are in most cases entirely different. The wagon letter work is invariably varnished, while the sign-painter's work is seldom coated over; the former doing his work with quick-drying colors or size, and the latter with slow-drying

FIG. 34.—NEW YORK STYLE OF ROMAN LETTER.

oil-colors and oil-size. It is not our intention to give a lengthy treatise on the art of lettering, but sufficient to notice the principal points thereof. Taking the Roman letter for a base, we find that almost every section of the country or large city

FIG. 35.—BOSTON ROMAN LETTER.

has a peculiar style of letter as, for example, the New York and Boston Roman are widely different in general form, as shown in the engravings, and it is difficult to lay out an alphabet which will be pronounced perfect by people in different places.

The New York Roman is considered *the* handsomest by those living in that city and vicinity, and just so with Boston, Chicago, etc., each think their style the best. There is one thing that may be said of New York, and that is, there is such a conglomeration of styles to be seen, that one can scarcely tell what is local and what has been taken from some other city. This is owing to the influx of letterers from all parts of the world, and particularly from Paris. The French letterers have made sad havoc with our lettering business, and although in some cases improvement is seen, as a rule, the standard is far below that recognized as

FIG. 36.—FULL BLOCK LETTERS.

national. The letters on a vehicle should be bold; that is, as free from fantastic twists and turns as possible, so that the hurried reader may comprehend at once its import. If one is obliged to stop a car to study out the lines of letters, before risking himself on a unknown journey, the "headway" of the road would be seriously interfered with. Therefore on such work the Gothic letter is extensively used. The painter knows this style better by the name of "Block," and he has the "Full Block" and "Half Block," plain or ornamented, to choose from. Then there is another style, called also by some "block," but the proper name of

which is "Antique." These forms of letters have, of late years, been twisted into every conceivable shape so that their identity is almost lost.

So great a number of styles present themselves that we forego all thought of illustrating them and will leave the reader to choose a style from the myriads of examples, while we describe how the work is done.

The tools necessary for doing lettering are not numerous, and the whole outfit may be carried in the pocket, if need be. A palette (*q. v.*) may be made which folds together in halves, as shown in the engraving, by simply adding a pair of small

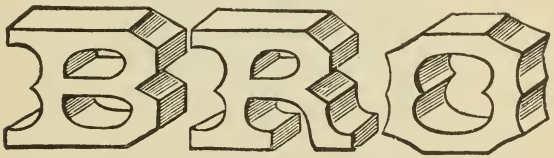


FIG. 37.—CONCORD STYLE OF LETTERING FOR EXPRESS WAGONS.

brass hinges and a wooden button after the palette has been cut through its centre. A rest-stick may be made in sections, using the brass ferrules of a fishing-pole. A pair of dividers, and a box containing pencils is all that will be necessary to carry from place to place. The pencils for lettering should be of the best quality, and always be kept well greased and straight when not in use. Sable-hair pencils are decidedly the best for either paint or gold-size, and these are described under their appropriate head.

The paint used should be well ground, and, although it is desirable to have it dry quickly, a few drops of raw oil will cause it to work better under

the pencil, and not delay the drying to any great extent. Tube colors are not so well adapted for lettering as those freshly mixed on the stone, though some prefer them. They are too "short," *i. e.*, they will not flow down nicely and pencil marks are thus made which are unsightly. The palette cup should be well supplied with turpentine,

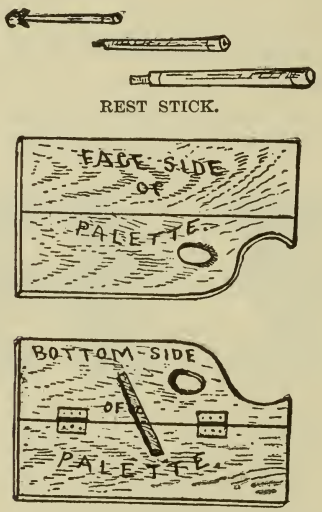


FIG. 38.—PALETTE AND REST STICK.

and the paint be thinned and well worked with the pencil, before putting it on the work.

To put on gold or silver leaf size must be used, and the panels must be prepared to prevent the leaf from adhering to any part not sized. To do this, just rub the panel with pulverized pumice-stone and water, wash off, and dry well with a chamois. Then with a bag of whiting, pounce over every part of the panel, leaving a thin film of dust upon

it; gently dust this over with a soft duster to remove all superfluous whiting, then begin the laying out of the letters. If it be the sides of a top wagon, where a circular line is desired, stick a tack, or an awl into the floor or other place, in line of the centre, and tie a string to it, then with a piece of chalk, allowing the string to hold the hand within the desired boundary, strike the lines. It is not considered good taste to make two circular lines follow each other, there should be a straight line, an ornament, or stripe immediately below the circle, as shown in the engraving.

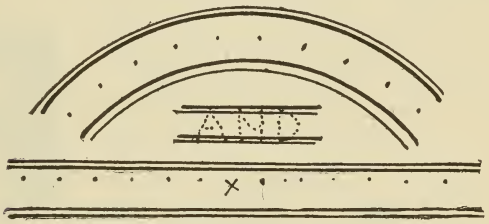


FIG. 39.—LAYING OUT LETTERING.

The lines being drawn for the extreme boundary of the letters at the top and bottom, it may be well, as some do, to mark lines for the top and bottom bars of the letters. Spell out the words to be put on, and make a dot of chalk for the space of each letter, and also for the space between the words and mark these spaces with a cross. Many professionals mark out very carefully each letter with chalk or pencil, before they begin the painting, but this is like the telegraph operator who reads from a printed ribbon; another who reads by sound can do better. Just so with the letterer who learns to paint the letters directly with the

pencil, he will produce work which seems freer, not so stiff and mechanical, as that done by the one who follows the chalk mark.

For lettering to be in gold, a medium setting size should be used, and care should be taken that it is so mixed that it will flow nicely, and not set with bubbles or heavy flows in it. Under the heading "size" or "gilding size" the readers will find full directions for making several qualities. For sign work oil-size only should be used.

The shading of a letter gives it prominence, or, as the saying is, throws it out, and it is of as much importance to learn to shade well as it is to make a letter. The word *shade* is used by most painters to designate the *thickness*, while a shade proper is called "cast shadow." If a letter be cut out of an inch-board and placed in position, the idea of a shade will be at once given—the thickness—while, if the light be allowed to fall upon the letter as it stands, so as to clearly define its outline, we have the "cast shadow." Shading on painted letters is seldom allowed to touch the letter (see engraving) a distance of at least one-eighth of an inch is allowed, which prevents the clumsy appearance otherwise given. Gold or silver on the other hand is always shaded close to the letter. A shade should not be heavier than the bar close to the letters, except when it is made double (as shown in cut) or more, even made into a perspective letter, where the shade forms the bulk of the whole—the face of the letter being but a trifling affair, com-

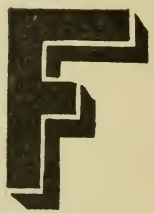


FIG. 40.—SHADING OF PAINTED LETTER.

pared with it. There is no law or even custom to govern the width, form or color of a shade, so long as one keeps within the bounds of harmony of contrast or analogy. A blue letter upon a red ground or *vice versa,* will invariably cause difficulty to decipher, or pain, to an educated eye, simply because the harmony of contrast is overridden, but by simply adding to the edge of the letter a white line, the difficulty will be overcome. The addition to such a letter of a green shade, and we outstep the pale of harmony altogether; as before said, so long as the painter keeps within a reasonable degree of harmonic color, he need not worry about the width of his shading.

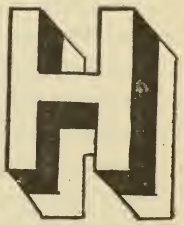


FIG. 41.—DOUBLE SHADE OF LETTER.

Lightning Gilder.—A contrivance for laying gold-leaf on stripes, consisting of rubber wheels of various widths, fitted to a handle. The proper width being chosen, the book of gold is opened and the wheel is rolled over the gold, which adheres to it and it is then transferred to the part of the work which has been sized.

For rapidity, economy of gold, etc., it seems to answer a very good purpose. It is a patented article.

Light Red.—An ochre of a russet-orange color.

Light Buff.—A color formed of 5 parts of white and 3 parts yellow ochre.

Lilac.—The color of lilac flowers; made by mixing white, carmine and ultramarine blue.

Line.—A fine or narrow mark made with a striping pencil or pen. Lines are always less than one-sixteenth of an inch in width; if wider marks are made they are called stripes. (*See Striping.*)

London Smoke.—A color made by mixing two parts burnt umber with one of red and one of white.

Lime Water.—The clear water found standing upon slaked lime may be used to advantage by the painter in preventing the deposit of pigment from vehicle. It readily assimilates with oil, and when added to white-lead and oil it forms a sort of cement which is very durable. Some manufacturers of prepared paints use it extensively in their preparations in order to keep the pigment in suspension, or, in other words, to prevent settling of heavy pigment in the can or package.

Livering Up.—A term applied to paint which, owing to the mixture of improper or inferior ingredients, will coagulate, thicken, or, as better expressed, "liver up." A poor quality of japan will sometimes cause paint to thus liver up, and again it may cause a chemical action of heat. We have repeatedly seen paint become so hot as to prevent the handling of the cup without a cloth holder, and others testify that paint has even blazed within the cup, due to chemical disagreement of the ingredients of the paint.

Locomotive Varnish.—A varnish intended more particularly for locomotives which, being varnished more frequently than cars, and the varnish on them being protected somewhat by the oil from the "waste" used in cleaning them, do not re-

quire so durable an article as *railway coach finishing*, and usually sufficient time cannot be given for drying, we therefore commend *locomotive finishing* in place of it. The dispensing with a quicker drying varnish for under coats is just as desirable on the inside as on the outside of cars, and because of the increased durability, we recommend the use of locomotive finishing for all coats on locomotives and tenders, when time can be taken ; but when *dispatch* is indispensible or of more importance than durability many use inside coach rubbing and locomotive rubbing for the under coats.

Luminous Colors.—Yellow, red, orange, light green and the light tones of blue and white.

M

Madder.—The root of a plant (*Rubia*) found in the tropical parts of both the old and new world; the finest quality, however, comes to us from the government of Baku on the Caspian sea. Many rich colors are prepared from madder root —which see.

Madder Carmine.—A pigment prepared from madder, and differing from the rose lakes of madder principally in texture, and in the greater richness, depth and transparency of its color, which is of various hues, from rose color to crimson.

Madder Lake.—A pigment made from madder, by boiling it in a solution of alum, then filtering the liquid and adding sufficient carbonate of soda to cause precipitation of the red coloring matter of the madder, which alone has been dissolved by the boiling solution of alum. This lake is used in both oil and water painting.

Madder Orange.—A madder lake of an orange hue, varying from yellow to rose-colored brown.

Madder Purple.—A very rich deep carmine, prepared from madder. Though not a brilliant purple, its richness, durability, transparency and superiority of color, have given it the preference to the purple of gold-purple, and to burnt carmine.

Madder Yellow.—A pigment made from madder root, a reddish yellow hue.

Magenta.—A red or crimson color extracted from aniline, used principally as a dye.

Magenta Lake.—A pigment of a dark purple shade, imitating the color of magenta dyes.

Magilp.—A composition of linseed oil, mastic varnish and turpentine, used by artists as a vehicle for their glazes.

Mahl-Stick.—A stick upon which a painter leans his hand when at work ; sometimes called a rest-stick. Those which are fitted with joints as a fishing-pole are very convenient to carry in the pocket. Mahl-sticks are made from three to four feet in length.

Malachite. (*Hungary or Mountain Green.*)—An expensive pigment made from a mineral found in the Ural Mountains. It is a beautiful shade of green.

Manganese.—A metal the oxides of which are used as siccatives or driers for oil, etc., also a pigment of considerable body.

Mantling or Lambrequin. (*Her.*)—An ornament depicted as hanging down from the helmet, and behind the escutcheon.

Marbling.—In painting the imitation of various kinds of marble, general directions for which follow:

To Imitate Black and Gold Marble.—First color the surface to be marbled with ivory-black; second, coat with black japan. Then for the veining, mix white, yellow ochre and a very little vermilion to form a gold color; dip a pencil in

this color and daub on the ground with great freedom some large patches, from which small threads must be drawn in various directions. In the deepest parts of the black a white vein is run with a large number of fine scraggly lines attached to it, but care must be taken that these lines are connected with and run in a similar direction to the main vein. This work may be done either with oil or distemper colors. One or two coats of varnish completes the work.

Jasper Marble.—The ground should be bluish white; then put on patches of rich reds or rose pink, leaving spaces of white; then partly cover these spaces with various browns to form fossils; in some places run in veins; then put in a few white spots to the centre of some of the red patches, and leave in places masses of the ground nearly white; varnish.

Sienna Marble.—Prepare a smooth light buff ground. Then mix for the veining a variety of tints, with ivory-black and Indian red; by adding a little white to this, other shades are formed. Also mix some tints from Indian red and Prussian blue, with white. Now give the surface a thin coat of the buff ground color and while wet, take a large feather, dip it into turpentine, then into the darkest vein color, and form a leading vein right across the work, giving it a broken or irregular appearance; run a few straggling veins from this; now use the feather in the neutral tints and put in some smaller veins, breaking it into small irregular pieces on, or springing from the leading vein. Next wipe over the whole with a badger brush until it appears soft and mellow; when dry, slightly grease the surface with linseed oil,

then with a feather dipped in very thin white make irregular touches in and about the large veins; blend softly with the badger; then go over and glaze patches here and there, using yellow ochre and raw sienna, or a little crimson lake. Touch up the leading vein with a little ivory-black, let dry and varnish.

Black Bardella Marble.—Ground color, a very light lead color. With a feather and black, figure all over in lines running into each other, very close in places, some very fine with short lines or strokes crossing them, soften with the badger brush, then glaze over with thin white, stronger in some places than others; touch up the lines with fine lines of black.

Italian Pink Marble.—Over a white ground apply a coat of white paint, compound tints of ultramarine and white-lead, and vermilion and white-lead, each being mixed with equal quantities of oil and turpentine, and with these dab patches on the white paint while yet wet, and with a brush well soften the patches together. On the palette place some Indian red, and with a small feather dipped in turpentine, and some of the Indian red, work the pattern and well soften. When this is dry, mix some white-lead, mixed rather thinly with turpentine, and flat the whole of the work, then with a feather dipped in turpentine scumble over the work, and subsequently put in whites with white-lead and turpentine. When the work is perfectly hard it is to be varnished.

Verde Antique.—Is either black or dark green, the marbling colors being dark brown and green. Scumble over the work with these, then with Bruns-

wick green and white-lead scumble over again, and soften with a badger ; next with a fitch paint masses of white of various shapes—squares, irregular triangles, etc.—and similar masses of black. The student may here be reminded of the difference between *scumbling* and *glazing*; in the latter the colors are thinly *mixed* so as to be transparent ; in the former, the color is mixed thick, and thinly *spread* or *rubbed* on it with a hard brush.

Egyptian Green Marble.—This marble in color closely resembles Verde Antique ; it is a superior serpentine ; and there are several sorts, which are called by different names, which would be of little service to the painter, as they are all for his purposes comprehended under one title. Egyptian green differs from Verde Antique in the form of the veins, which run in a more horizontal direction, having a greater quantity of small fossil substances mixed with it, and the dark veins frequently running in streaks, which often appear as if broken by violence.

White Veined Marble.—The ground is white, and the veins may be made with a marbling crayon or camel's-hair brush while the ground is wet.

Florentine Marble.—The ground is white, Indian red and black, mixed to form a very light reddish neutral tint. The veins are umber or burnt sienna ; they are laid on very irregular, while the ground is wet; sometimes they are very close together, and then seem to break suddenly into forms of rocks or ruins—an effect which must be studied from natural specimens, and be imitated by hand.

Black and Gold Marble.—The ground is black : paint the large spots from which the fibrous veins

are to run with yellow ochre and white, the bright tone of which must be heightened by the addition of vermilion. These masses must be dabbed with freedom upon the ground with a brush full of color, and while quite wet, threads must be drawn from them in all directions, some of course being larger and thicker than others.

A white vein is sometimes seen running in the deepest parts of the black, with small threads attached to it, crossing each other and the yellow veins in all directions.

Another way, is to paint the ground a deep ivory-black; put on the veins in white, yellow ochre and burnt and raw sienna, using a camel's-hair brush; glaze the spaces between the veins with a thin coat of gray or white, over which pass a few white veins. The veins may also be put in with gold leaf.

Porphyry Marble.—Mix the ground color of Venetain red with a little vermilion and white, until it is of the tint required. The first layer of spots is produced by sprinkling in the following manner: Mix some of the ground color with a large quantity of white in a paint-pot, and use a large brush which has been well worked in the color; hold the palette-knife over the edge, so that as much as possible of the color may be forced out of it; then, taking the handle of the brush between the palms of the hands, roll it to and fro with rapid motion, the ends of the hairs being below the level of the paint-pot, but not touching the paint—this is called "wringing out" the brush—and a further quantity of the paint will be thus discharged; now hold the handle of the brush against it; the color that still remains in it will thus fall on the sur-

face in a variety of small dots. Great care is necessary at this stage, to distribute the spots equally; otherwise while one part of the work will be left only partially spotted, others may be so thickly covered that the drops will run one into the other and make a blotch.

When the work is dry, the sprinkling may be repeated by dipping the brush into a color rather deeper than the ground; it may be Indian red with sufficient white to give it a body. The sprinkling with this color must be done very sparingly, and rather more in some parts than others.

The last sprinkling is to be done with a clean small tool dipped in white paint only, and the spots are to be very fine. The stick should be held at some distance from the work, as the farther away the finer will be the dots. In some specimens, after the three spatterings being done, a narrow opaque white vein is run among the spots, and transparent threads drawn in various directions.

Marine Green.—The color of the sea; a shade of green.

Marking on Glass.—To mark out letters, etc., first coat the glass over with whiting mixed with water; let dry, then with a sharpened stick mark the desired letters or whatever upon the whitened surface, and then paint or gild the letters on the reverse side of the glass. The amateur will find this an excellent plan, and, too, he may nicely outline the letters after they are thus marked, with a fine line of black, then when the outline is dry proceed with the gilding.

Maroon Color.—A color made by a mixture of three parts carmine and two parts yellow.

Maroon Lake.—A reddish brown pigment.

Massicot.—A mineral occurring in shapeless masses of a yellow color, brittle, with earthy fractures. A protoxide of lead, used as a pigment. Yellow protoxide of lead. The dross of melted lead roasted until of a uniform yellow color.

Mastic.—A species of gum-resin, used in making an almost colorless varnish, for maps, prints, etc. It is imported chiefly from Morocco. The name "mastic" is also given to certain cements, composed of litharge and burned clay reduced to powder then mixed to a paste with linseed oil.

Matching.—Making any piece or pieces of wood of which any piece of furniture is made up, match or correspond, so that they may be of a uniform color. It will therefore be understood that some parts may require lightening and others darkening. For the first, make a strong solution of oxalic acid in hot water, and add a few drops of spirits of nitre, and wash this carefully over the parts to be lightened ; when quite dry, the surface should have two or three coats of white polish. (2) Give the parts to be lightened a wash of a clean white stain and another of white varnish ; give the intermediate parts a coat of common varnish, and oil the untouched white parts ; bring all up to an equal tint by a darkening stain, if necessary.

Darkening.—The darkeners generally used are logwood, lime, brown soft-soap, dyed oil, and various chemicals, such as aquafortis, sulphate of iron, nitrate of silver, etc.

Mauve Paste.—A scenic paint, the same color its name implies.

Menhaden Oil.—Oil obtained from the fish known as *menhaden* or *moss-bunker*, one of the herring family. It is used as an adulterant, and a substitute for linseed oil.

Milori Green.—A sort of green lake, made by mixing in certain proportion ferrocyanide of potassium, sulphate of iron, acetate of lead and chromate of potassa. It far surpasses chrome green in richness, possesses a good body, covers well, and when mixed with white in varying proportions it forms a brilliant pea-green.

Mineral Black.—A native impure oxide of carbon of a soft texture found in Wales. It is not so black as ivory-black, and on account of its solid body it makes a good preparation for black of a better color. *Russian black* is the same.

Mineral Brown.—A bright, transparent brown, something like sienna, made by mixing equal parts of sulphate of copper and prussiate of potash in water, then evaporating the water.

Mineral Green.—Carbonate of copper, obtained by precipitating a hot solution of sulphate of copper by carbonate of soda.

Mineral Yellow.—A compound of oxide and chloride of lead, obtained by digesting powdered litharge in a solution of common salt, then washing, drying and fusing the product.

Mittis Green.—An arseniate of copper made by mixing a solution of acetate or sulphate of copper with arsenite of potash. It is, in fact, *Scheele's green.*

Mixing Colors.—In mixing colors, it is the custom of some painters to lay out upon the stone the requisite quantity of various pigments, and then mix and grind the mass in the mill, but by this means dull or "lifeless" colors are produced. To do this properly the required pigments for a given color should be mixed and ground separately, then the proper proportions may be put together and thoroughly mixed. By this means all the freshness of the color will be retained, a more perfect commingling of the particles will be insured, and there will be less liability of separation in the cup, or settling of one heavy pigment from the others, which is sure to destroy the uniformity of coloring.

Mordant.—Any sticky matter employed to make gold leaf or bronze adhere—a size.

Mossing Off.—Rubbing a varnished or painted surface with moss (trimmer's stuffing material), to remove the gloss or to smooth the surface. Rubbing with curled hair is called "hairing off."

Mottler.—A flat camel's-hair brush. (*See Brushes.*)

Monochrome.—A painting executed in a single color, but relieved by light and shade. A drawing in chiaro-oscuro (*q. v.*) is a monochrome, whether in black and white or in any other color and white. The silhouette is not a monochrome though executed in a single color.

Monogram.—A character composed of two or more letters of the alphabet, often interlaced with other lines and used as a cipher or abbreviation of a name. A perfect monogram is one in which all the letters of the word are to be traced. Painters and engravers in Germany and Italy have used monograms

to a large extent as a means of distinguishing their works. In these the initial letters of their names were often interwoven with figures of a symbolical character, so as to form a rebus of the artist's name. Monograms are the ruling fashion as ornaments on carriage panels, and an American considers a handsome monogram of his name with a feeling not altogether unlike that pride with

T.S. English.

T.S. Louis XV.

T.S. Modern.

T.S. Florentine.

Fig. 42.—Monograms.

which a European nobleman considers his coat-of-arms. It is his symbol. If anyone should spit on it, he would feel it a personal insult. But the main office of a monogram is and must be that of a trade-mark. A striking trade-mark, capable of catching the attention and impressing the memory, sells more goods than the smartest traveler ever

did. In order to fill this office, it is necessary for the letters to be arranged in the design so that they both tell the name in a plain and absolutely

FIG. 43.—MONOGRAM AND CREST.

FIG. 44.—MONOGRAM AND CORONET.

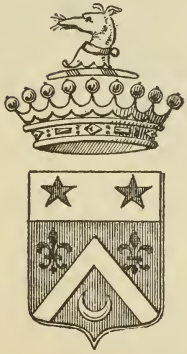


FIG. 45.—COAT-OF-ARMS.

FIG. 46.—GARTER, MONOGRAM AND CROWN.

unequivocal manner, and impress it on the memory either by the beauty of the design or by awakening ideas which easily and properly associate the name with the business. But to invent such a

monogram requires a sort of talent. Some people have quite a knack for contrivances of the kind, while others are unable to make even the slightest device. The carriage-painter, however, will often be asked to invent a monogram whether he has talent for the business or not. In such a case, he is likely to go to a monogram-book for support. J. Sabin & Sons, of New York, publish such a book, containing about one thousand designs, of which several are very good and only a few absolutely

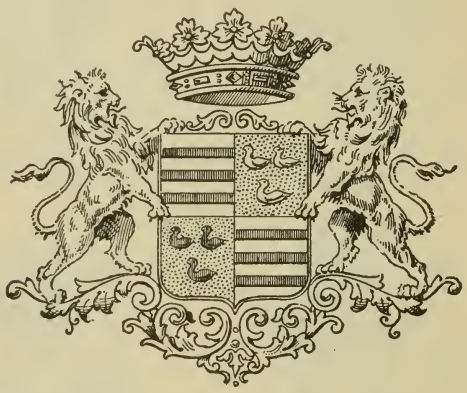


Fig. 47.—Coat-of-Arms, with Supporters.

bad. We could illustrate this article on monograms by hundreds of cuts, but it might be a hundred years before a single one of the combinations of letters would be called for.

The designing and proper execution of monograms is often one of the most puzzling tasks which a painter has to undertake, and the following suggestions, printed in "*Coach, Harness and Saddlery*," by the author of this book, will be found useful to many of our readers.

To lay out or design a monogram, first procure some well-calendered letter or note paper, some tissue paper—or, what is better, transparent drawing paper or muslin—and two or three lead pencils of different degrees of hardness: say, one quite hard, another medium, and another soft. Next decide upon the style of monogram best suited to your wants, and (supposing you have no printed samples to work by) lightly sketch the prominent letter on the paper, erasing with a piece of rubber any imperfect marks, and carefully correcting until you are satisfied with the drawing. Next, go over the lines with soft pencil to make them blacker. Now lay over the drawing a piece of tissue paper, and re-draw the lines. This is simply to preserve the letter you have perfected. Remove the tissue paper, and proceed with the hard pencil to lightly sketch the other required letter, paying no attention to interlacing them at this time, but keeping the object constantly in view. Rub out and correct faults in the outlines until you are satisfied, remembering that you need have no fear of destroying the letter first drawn, as you have a duplicate. When the second letter is drawn to please you, blacken the lines as before, and work the crossings or interlacings. Now lay the tissue paper over the drawing and mark the second letter in its correct place. Proceed in like manner if more than two letters are to be combined. When all the single letters are prepared, lay the tissue paper upon a piece of writing paper; secure it by pinning so that it cannot move, and with a fine needle pick the outlines carefully. You now have a "pounce pattern," with which you can transfer the outlines to the panel, and a tissue paper draw-

ing by which you are guided in making the crossings and interlacings. These form a guide for future work.

Whenever a specimen book of monograms is at the disposal of the designer the work may be greatly simplified. In this case, after a choice of single letters has been made, lay the tissue paper over one of these; sketch this out in detail, and then, by placing the sketch over the other letters, one by one, and turning and twisting it until it "comes right," sketch in the others, shade up the crossings or the leafing, and the pattern will then be ready for the needle holes. It may be mentioned here that, in case the design is symmetrical—that is, uniform on each side of the centre, as in the Florentine style—the drawing should be made as follows: Fold and crease a piece of writing paper; open it out flat and draw one-half of the design, allowing the crease in the paper to form the centre. Blacken the lines with soft pencil, then fold the paper again as before, and, after laying it on some hard surface, rub it over with an ivory or bone paper-folder (or the handle of a tooth brush) to transfer the pencil marks from one side to the other, when, upon unfolding the sheet, the complete design will be found accurately marked out. This plan may be changed if preferred, by first folding and marking the paper as before, and then turning the marked side out, when you may proceed to pick with a needle through both thicknesses of paper.

The pattern and colors now being ready, the next thing in order is the tools. The pencils should be of red sable hair, bound in tin, with long handles of red cedar. The finest pencils made are

about the size of a knitting needle, but if these cannot be obtained it is an easy matter to cut others down to the proper size. The hair should be one-quarter of an inch in length. A small palette knife, with which to mix colors on the palette, together with a rest stick, pounce bag, and small bottles of Japan and turpentine, will then complete the outfit.

To begin the painting of a monogram the first requirement is to know what color the gears are to be striped, as the colors used in striping almost invariably govern the color or colors used in the ornament. Exceptions sometimes occur, as in the case before alluded to of coats-of-arms; in this case the colors are arbitrary and the monogram should be painted in the predominating color, if in relief, or in the color of the coat of arms. When painting in relief—that is, in one color with its tints and shades—it is a good plan to first lay the whole design in with a medium shade of the color, which gives an opportunity to lay in the shades with the dark shades of that color, and then the lights with tints of the same color made by the addition of white. Many first lay in thew hole design in gold or silver, and then glaze one letter with carmine, another with blue, another with verdigris, and so on. Where there are three letters, two may be colored, say Indian red glazed with carmine, and the prominent letter with vermilion, "cut up" with dark red and high-lighted with vermilion and white. Asphaltum is extensively used as a glaze over gold letter. Carmine letters may be shaded with asphaltum and high-lighted with yellow or canary color. It will be discovered by a very little practice that the strength or tone of a high-light

may be greatly improved by simply changing the tint of white by a drop of another color; as, if a vermilion ground is to be high-lighted, a drop of red in the white will show better than when the pure white is used, and, as such "points" are better learned by experience, we leave them here.

Mountain Blue.—Carbonate of copper, though used as a pigment; it is not durable, turning green in a short time.

Mountain Green.—A native carbonate of copper, combined with white earth, and often striated with veins of mountain-blue, to which it bears the same relation that green verditer does to blue verditer; nor does it differ from these in any property essential to the painter.

Mud Spotting.—A trouble experienced by owners of carriages when mud, particularly city street mud (containing ammonia) or the mud of lime districts, is allowed to dry upon a varnished surface. So long as it remains moist there is but little danger of spotting, for it is the suction or capillary attraction of the dry mud which extracts the oil from the varnish. Most all varnishes are acted on in similar manner. Washing and sunning generally returns the gloss to the varnish.

Muller.—A block of stone or glass used to crush and grind pigment. It is used in connection with a slab of marble, or a thick plate of glass.

Mummy.—A substance similar to asphaltum combined with animal remains, found in the catacombs of Egypt.

Munich Lake.—A pigment made from Brazil wood, often used in place of carmine on cheap work.

N

Naples Yellow.—A pigment compounded of the oxides of lead and antimony, anciently prepared at Naples, under the name *grallolina*. It is not so vivid a color as patent yellow, but it is of a pleasing light, warm, golden-yellow tint. Like most other yellows, it is opaque, and in this sense is of good body. It is not affected by the light of the sun, and may be safely used in oil or varnish. It is, however, liable to change, even to blackness by damp and impure air, when used as a water color, or unprotected by oil or varnish.

Native Green.—A true chrome green, the coloring matter of which is the pure oxide of chrome which, being free from lead, is durable, both against the action of sunlight and impure air.

Native Manganese Brown.—A bog earth or peat, the same as cappagh brown (which see).

Neutral Colors.—Those colors in which the hue is broken by partaking of the reflected colors of the objects which surround them. There are three *neutral* colors, namely, white, black and gray.

Normal Colors.—The colors of the spectrum, blue, red, yellow, orange, green and violet.

Nowed. (*Her.*)—Tied in a knot. Usually applied to a snake or the tail of a dragon.

Nut Brown.—The color of the hazel-nut, made by a mixture of burnt sienna, burnt umber and white.

Nut Oil.—An oil expressed from various nuts and used as a vehicle by artists; poppy oil, however, being a better drier, has superseded it of late years.

O

Oak Color.—The color of oak wood, made by mixing eight parts of white with two of yellow ochre.

Ochre.—A name applied to certain metallic oxides occurring in an earthy or pulverant form, especially to such as are used for pigments; as red ochre, yellow ochre, etc. Golden ochre is a choice variety of native ochre, and is also manufactured similarly to chrome yellow.

Offer Up.—The act of trying the effect of a design, or of a color in its intended position.

Oils.—Oily bodies are generally divided into two classes, fixed or fat oils, and essential or volatile oils; but they are entirely dissimilar, both in proportion and composition, except in the one common property of greasiness. The two classes may be readily distinguished, the essential oils emitting at ordinary temperatures an intensely odorous and penetrating vapor, and, when placed on paper, not producing a permanent greasy spot, while the stain of a fixed oil does not disappear by exposure, or even when subjected to a gentle heat.

Drying-oils, or siccatives, vary from the non-drying by becoming gradually converted into solid masses by exposure to the atmosphere. Their principal use is in the preparation of varnish and paints; and the more quickly they become hard

by exposure, the more valuable are they for these purposes. Their siccative or drying properties may be increased by adding litharge and heating the oil until it acquires a reddish hue. Oxide of manganese, oxide and sulphate of zinc, and magnesia, will produce a similar effect.

Such is *boiled-oil* which was once universally employed, but it has many disadvantages, and is now but little used in painting carriages and railway cars—for house painting it is still employed to a large extent. Freshly made oil will not dry so well as old ; and it is possible that one or more of the foreign matters present retard the absorption. The oil being purified, it is brought more freely in contact with oxygen. In making varnish—the best quality—linseed oil is purified of all the substances which go towards preventing the absorption of oxygen or cause it to be greasy or mucilaginous. Liebig devised a method of removing this latter impurity by precipitating at the ordinary temperature, and produced a superior and less colored drying oil, by agitating it for some time with a mixture of water, litharge, and sub-acetate of lead, without the application of heat.

In extracting linseed oil, the seeds are first bruised or crushed, then ground, and afterwards subjected to pressure in a hydraulic press or a screw press, sometimes without heat, and sometimes with the aid of steam heat at about 200° F. Linseed oil is usually amber colored, but when perfectly pure it is colorless. It has a peculiar and rather disagreeable odor and taste. That made without heat (cold drawn) is purer, and less apt to become rancid than that in which heat is

applied in making. By cold expression it yields from 18 to 20 per cent, and with heat from 22 to 27 per cent, of oil.

Oil Painting.—Painting in which the medium for using the colors consists partly of oil.

Oil of Spike.—A volatile oil, at one time much used as a vehicle for paints, but owing to its impurity by adulteration it is now but seldom used.

Oil of Lavender.—An oil used principally by enamelers, to whom it is particularly valuable from its consistency being such as to prevent the colors that are mixed with it from running. It drys well and more uniformly than any other oil, and is excellent for artists' use.

Oil of Poppies.—A perfectly colorless oil, used principally in very delicate artists' work. Being very fat, it is liable, unless very old, to be insufferably long in drying.

Oil of Turpentine.—(*See Spirits of Turpentine.*)

Olive.—The color of the olive, made by mixing green and violet, or eight parts of yellow, one of blue, and one of black.

Olive Brown.—A color formed of three parts burnt umber and one part of chrome yellow.

Olive Green.—Similar to Quaker green (which see).

Or. (*Her.*)—One of the metals employed in blazoning. Gold.

Orange.—The color of an orange—a deep rich yellow. This color having a large share of red in its composition, cannot be successfully used in making greens or tints of light yellow. The principle

should always be kept in mind—to use a color or pigment, when mixing colors, which contains the least of any objectionable tint, as, for instance, in making a green color, we seek the purest yellow, one which has but little, if any, red in its composition, to add to blue; or in preparing an olive color we choose a reddish or orange yellow to add to black.

Orange Lead.—The same as orange mineral.

Orange Mineral.—The same as red lead, a pure oxide of lead; produced by exposing metallic lead to the action of heat, taking care not to fuse it. It is mostly employed as a pigment in painting iron vessels and iron-work generally. It has an affinity for the latter metal, and serves admirably in protecting it from corrosion. One description of orange mineral is produced by the slow calcination of white lead in iron trays. This form is not used as a pigment.

Orange Ochre.—A bright yellow ochre, burnt, which gives it warmth, color, transparency and depth. Called also *Spanish ochre*.

Ornament.—That which adorns or embellishes; that which added to another thing makes it more beautiful to the eye.

Ornamenting.—The application of ornamental designs, heraldic coats-of-arms, monograms, fancy stripes, borders, etc. Carriages are generally finished with a small ornament, monogram or cipher on the door panel, or the centre of the side in buggies, and a short description of such work demands our attention.

First, THE TOOLS.—The smallest sizes of red sa-

ble pencils, bound in tin (*see Pencils*), are required, a full set of tube colors—say two dozen—embracing all the principal colors, a palette, rest-stick, small bottles of oil, varnish and turpentine (all of which may be found noticed under their respective heads).

Second, THE DESIGN.—A knowledge of drawing is an indispensable acquisition to one who desires

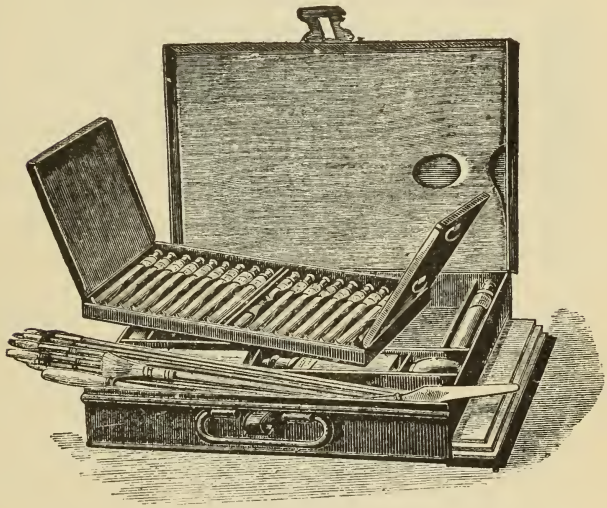


FIG. 48.—ORNAMENTER'S BOX OF TOOLS, ETC.

to make progress in this branch of the art; however, he may copy designs and in some cases do very well. To get a working copy of such ornaments, take tissue paper, or other transparent paper, lay it over the design and draw the outlines, then, place the drawing on to a piece of writing paper, laid upon a soft pine board, and prick the lines with a fine needle, to form a pounce

pattern. Then with a little whiting tied up in a piece of coarse muslin to form a pounce bag, lay the pattern upon the place desired and gently pat it over with the bag. A little of the whiting will pass through the needle-holes and thus distinctly mark the pattern upon the surface.

Next, prepare the palette by squeezing out of the tubes a small quantity of each color that is to be employed, and proceed to paint the ornament. It is a good plan to coat the whole figure inside the outlines, first with quick-drying light color, then to put in the desired colors; by that means there is no danger of any portion of the design being obliterated. Several pencils should be employed, as it not only injures the pencil to wash it often in turpentine, but clean colors cannot be so easily made.

The general fashion now is to put all such ornamental designs "in relief" or monochrome, all one color with its shades and tints.

Orpiment.—Commonly called *Yellow Arsenic*. It is a compound of fifty-eight parts of arsenic and forty-two of sulphur. It is good in the production of straw colors, but being exceedingly hard to grind is not in common use.

Over-Graining.—Sundry short markings in lights and shades dashed across the grain, or sprinkled in the larger lights in pleasing confusion; and certain mottled appearances irregularly disposed throughout the grain are termed over-graining, which is, as its name implies, the application of a graining color over the grain already made on the wood. The over-graining color in general use for oak is made up of Vandyke brown ground up in

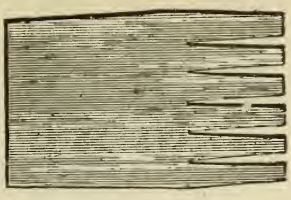


FIG. 49.—LEATHER GRAINING COMB.

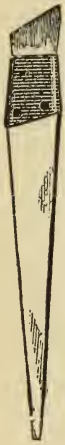


FIG. 50.—LINING TOOL.

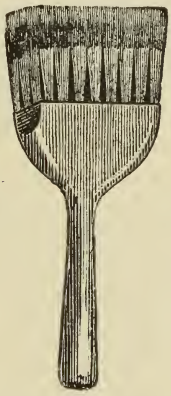


FIG. 51.—BADGER SOFTENER.

FIG. 52.—VEINING FITCH.

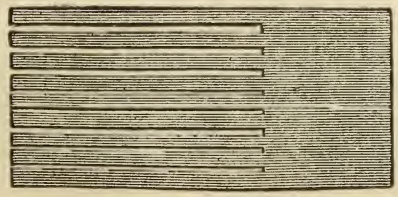


FIG. 53.—STEEL GRAINING-COMB.

water. The method of applying it is as follows: Pour enough of the water color above mentioned on a dinner plate to thinly cover it, have by the side of it a basin filled with stale beer; dip the pencil over-grainer in the beer, then dip the tips of the hairs into the water color, and draw the tips lightly from top to bottom of the panel in straight lines over the combings; then with the mottler, and put in the mottled appearance seen near the broader veins and knots; then while the color is still wet, soften down all the hard lines and rough edges with the badger softener. Over-graining should not be commenced until the graining is dry and hard, nor should it be delayed longer than necessary. If this should be unavoidable, the grain may "ciss" at the water color. To prevent "cissing" go over all the grain with a sponge dipped in a thin paste of whiting or fuller's earth. A few minutes spent at watching a grainer at work will be time well spent in learning the practical part of the art. The conventional method of oak-graining is as follows: Apply the graining color with a pound brush to panel and rails, with a sash tool, to stiles; then go over all the color with a coarse leather comb drawn in straight lines lengthwise of the intended grain, then go over this again with a finer comb, giving a wavy appearance to the grain by short tremblings of the hand and accidental slippings to right or left; then go over some parts toward the edges of panels, stiles and rails with a fine steel comb, and thus put in the finer grain on those parts. Next wipe out the graining color with a view to produce a pretty effect in parts rather than to imitate the natural grain of the wood, putting in

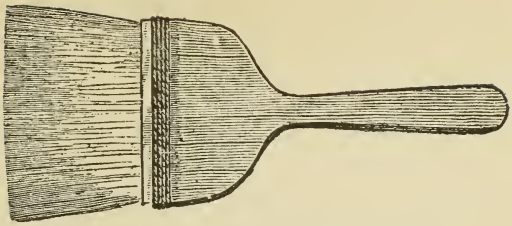


FIG. 54.—OAK OVER-GRAINER.

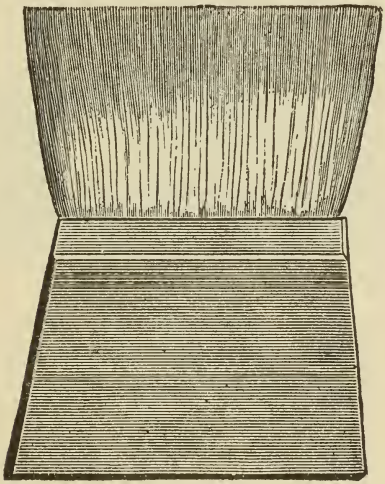


FIG. 55.—MOTTLER.

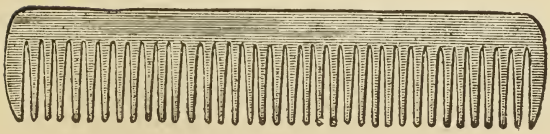


FIG. 56.—COMB FOR DIVIDING OVER-GRAINER.

a curly knot here and there in the panels together with an occasional wavy, or zigzag light across the grain; then put in a few broad lights to imitate heart wood here and there in the rails, and tone off to the sides. Wipe out only a few lights on the stiles across the grain, and thus leave the appearance of the panels and rails being framed with a darker and closer grained wood, the lighter and more open grain being seen on the rails. In this style of graining the imagination of the workman conceives veinings and markings, such as could not possibly be found in a well made oaken door, some of them, although of an oaken character, taking the form of grotesque letters and words. The over-graining, too, is frequently put on to produce a pretty effect instead of copying nature. But the continuation of this article seems superfluous when graining can be done quite satisfactorily by mechanical means, as rollers, stencil plates, etc. (*See Graining Plates.*)

Graining Plates.—Strong, thin, flexible, and finely tempered metal plates, designed and cut from choice, natural and artistic specimens from natural wood into stencils. The surface of these plates are corrugated by a peculiar process to admit of air, and prevent the wet rubbed-in graining color on the work from being marred or injured with the plates, while being laid thereon to wipe out the figures or designs of the plates, which would otherwise suck off the color if not thus corrugated.

Fig. 57 shows Plate 6 in actual use. Any plate in set can be thus slid along over the wet color in one hand, while wiping out with wide fine steel comb (teeth lapped in a piece of graining cloth) with the other hand. There is no cloth

over the comb shown in engraving, simply to show the position of the comb, which is held *almost flat while wiping quickly over the plate,* as *the plate* moves slowly along in straight or graceful curves over the wet color, producing graining in an almost endless and ever-changing variety of designs, and *suitable for the grain of almost any wood desired to be grained,* by changing grounds and graining colors to suit the wood to be imitated. Sliding the plate in the opposite direction *makes the graining work smaller and finer if so desired.*

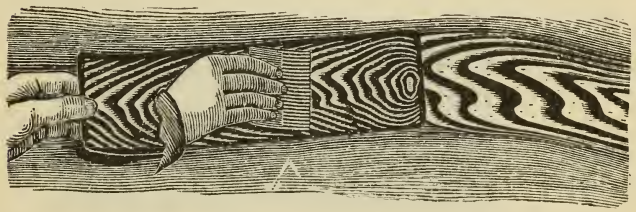


FIG. 57.—GRAINING-PLATE IN USE.

The coarse steel comb, shown at *A*, is a common two-inch comb that had once nine teeth in all, but every alternate tooth is purposely broken out, leaving but five teeth in all. Such are easily made from old coarse steel combs. In using, a piece of cloth is put over the teeth, which is all that is needed to comb or continue out the sides of the heart work into plain combing to any width of heart desired. The small pores or checks as shown in the work are put in after with the check stippler. The entire work is then well blended against the heart points or grain of the hearts, which gives the softened or feather edge to the work, and is then completed.

The engraving below shows a panel of oak lights done with Plate 24, matched or joined edge to edge, and also end to end, which shows a wide double width finished panel, with all the work in the centre of the panel, instead of just one edge, and balance combed as is usually done. With the Oak Light plate, sliding movement, *as per No. 6 Heart Plate, like sliding sample shown in the engraving below*, the oak lights in any of the plates are expanded, enlarged or scattered more separate and further apart, and making, if desired, less than one-half the amount of dappled work ap-

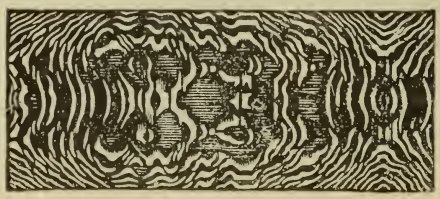


FIG. 58.—PANEL OF OAK.

pear on the door, or work to be grained, than is in the plate itself when held steady and wiped without sliding it. Thus are great and beautiful varieties obtained, and excellent work accomplished in the most rapid and easy manner, even by the most inexperienced grainer.

Over-glaze Painting on Porcelain.—The materials and appliances which the painter will find it necessary, or at some time or other advisable, to use are as follows:

1. Earthenware or porcelain articles, either white or of one uniform color.
2. Brushes—Camel's-hair and sable.
3. Medium or vehicles.

4. Vitrifiable pigments or enamel colors.
5. Palette and receptacle for mixed color.
6. Palette knives, steel and ivory.
7. Pieces of linen rag free from lint.
8. A painting table.
9. Slab and muller.
10. Pointers or scrapers.
11. Rest for arm and hand.
12. Horizontal wheel.
13. Easel.
14. Burnishers.

ESSENTIALS.—It is essential that the articles numbered from 1 to 8 should be sufficiently represented at the outset in the beginner's stock, the others may be obtained as the need for them arises. It will amply suffice to start with a single plate or tile, two or three brushes, two mediums, a couple of colors, a palette, a palette-knife, and a piece of rag. There is further a great advantage in having a limited stock in hand, for the beginner is thereby saved the temptation, too often irresistible, to enter upon work for which he is not yet qualified.

WARE.—Earthenware, as a class, is softer than porcelain, and will not in general stand the repeated firings required by elaborate work, and for such work the best and most perfect porcelain procurable will not be too good.

TILES.—The most serviceable articles to practice upon are the thick earthenware tiles glazed on one side, and these are at the same time most generally obtainable, and from their fair quality, good glaze, and extreme cheapness, most acceptable. They are ordinarily made square in sizes from four inches up-

wards. These square tiles are best adapted for stoves and mantle-pieces, or for walls, the painting on each tile either being a design complete in itself or forming part of a large picture.

Plaques or Slabs.—There are also thin, oblong, or square, or round, or oval slabs or plaques glazed on one of the sides or on both. These are finer and more suited for inlaying in cabinets, sideboards, thick book covers, such as the covers of albums or of books for, say, a collection of photographs of choice works of art, and generally where comparative lightness is an object. For practice, tiles that are glazed on both sides are particularly serviceable, as they may be painted on both sides.

Dishes and Plates.—These may be had in all sizes, and either round or oval. The plates may be had in flat, convex and concave shapes, and the oval ones are rather better for landscapes, etc.

Defects.—The ware must be free from defects of all kinds, even ware having the glaze scratched should be avoided.

Brushes.—The brushes will be made of either camel's-hair or sable, and we illustrate those which will fill every requirement. Whatever kind may be selected the best only of that kind should be used. It is impossible to produce a highly-finished work with bad tools. In a good brush, when dry, the body is perfectly elastic, and the hairs have a perfect spring and lie equally together.

A brush should not be purchased without being tested. Always test your brushes in cold water, never by drawing them between the lips and wetting them with spittle, for the warm spittle invariably crinkles the hairs and ruins the brush. If

the seller will not proffer a glass of water, ask for it, and if not produced do not buy. The water forthcoming, dip the hairs in it so that they become fully charged. Then holding the handle tightly between the ends of the thumb and second finger, suddenly depress the latter, retaining the

FIG. 59.—DESIGN FOR PAINTING ON PORCELAIN.

brush between the thumb and first finger. This jerk will send off the superfluous water, and then the brush, if good, will at its end present, if a round or small flat one, a fine point; if a large flat one, a fine, straight, or slightly curved line, to which in either case the body has *regularly* de-

creased. If a round brush should, after this test, have protruding hairs in the body, or free hairs at the end, or a flat one have some parts of its line thicker than others or depressed, or the terminating point or line be not led up gradually, reject

FIG. 60.—DESIGN FOR PAINTING ON PORCELAIN.

it, without further consideration—it is not a good brush.

SKIES, WATER, AND GROUNDING.—For skies and water in which there is a pretty large sheet of color, either of one intensity or graduated, and to be left as laid, or to have the clouds or lights picked

out, a flat brush, as shown in Fig. 64, is generally best; but in smaller or somewhat irregular work, that shown in Fig. 65, which is often called a sky-brush, is perhaps most serviceable. The size should be such as to allow of enough paint being

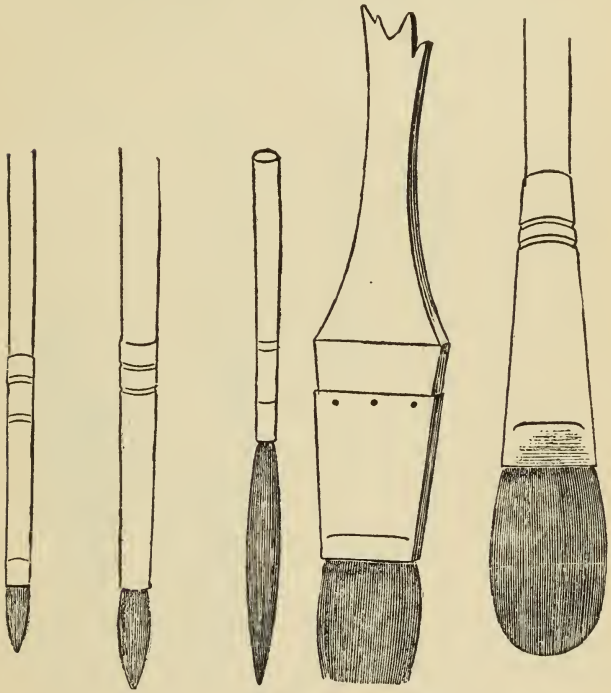


FIG. 61. FIG. 62. FIG. 63. FIG. 64. FIG. 65.

FIG. 61.—FLAT SHORT SABLE. FIG. 62.—ROUND ORDINARY SABLE. FIG. 63.—FOR LINING OR TRACING. FIGS. 64, 65.—WATER OR SKY, WASHING-IN OR GROUNDING COLORS.

taken up to give a complete line of full width. Fig. 65 is also well suited for washing in large

masses of foliage. Either brush answers well for back-grounds or ground-laying.

For General Use.—The brushes or pencils depicted in Figs. 61, 62, 66 to 69, and 77, will be found serviceable, the sizes varying according to the size of the work in hand. Fig. 66, an extremely fine sable, is for the most delicate work in the

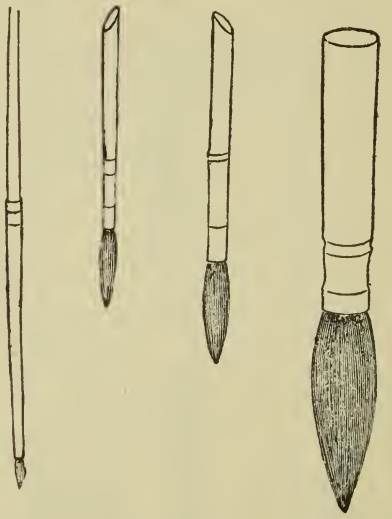


Fig. 66. Fig. 67. Fig. 68. Fig. 69.

Fig. 66.—00 Miniature Sable. Fig. 67.—Small Finisher, Camel-hair. Fig. 68.—Small Rose, Camel-hair. Fig. 69.—Large Shader.

features of small faces, such as nostrils, lips, the iris, etc.; Figs. 67, 68, and 77, in quills, are specially made for this work. Fig. 69, and a size or two smaller than that represented, are useful in large shading, such as broad drap-

eries in big paintings, and in foregrounds. Fig. 61 is a short, flat sable, highly used in giving crisp touches with paint rather stiffer than usual. Fig. 62 is an ordinary round sable. Both of these last are in metal settings. With regard to the difference between round and flat brushes, it

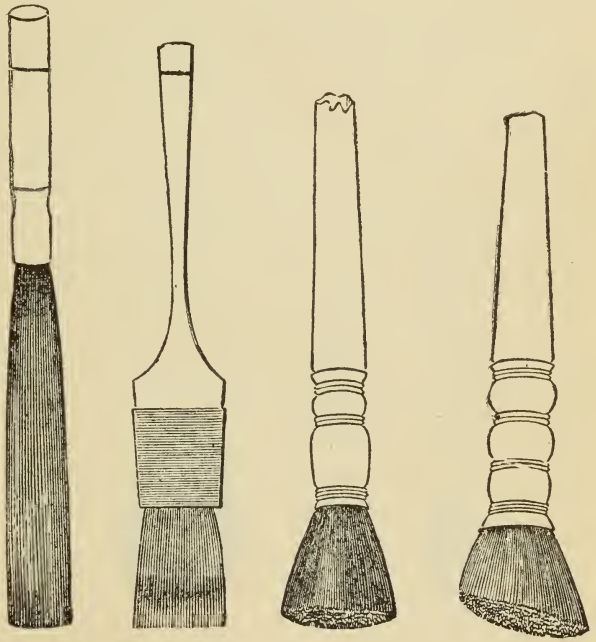


Fig. 70. Fig. 71. Fig. 72. Fig. 73.

Fig. 70.—Bander. Fig. 71.—Softener. Fig. 72.—Dabber, Flat Top. Fig. 73.—Dabber, Skew Top.

may be stated that the latter are often a little more useful in a skilled hand, as a greater variety of stroke and touch can be given with them. Both

sable and camel's-hair may be obtained in quills or set in metal or albata.

Liners, Tracers and Banders.—Fig. 63 represents a brush known as a liner. This has very long hair, and is a fine and very supple brush, capable of holding, for its diameter, a very large quantity of paint. It is used for drawing circular lines round plates or vases, and may be had in three or four sizes. Fig. 70 also comes into use in circular

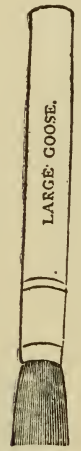


Fig. 74.

Fig. 75.

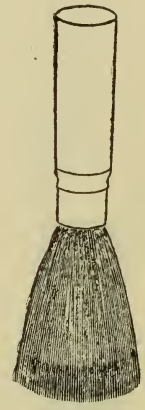


Fig. 76.

Fig. 77.

Figs. 74, 75.—Superfine Fitch-hair Brushes. Fig. 76.—Softener. Fig. 77.—Special Rose, Camel-hair.

work, and with it bands of color are described. The possession of it is not, however, an absolute necessity, as with experience a large liner can be made to do its work.

DABBERS.—The foregoing are brushes used in actually laying the paint on the ware. There are others required for distributing it *when such an operation is necessary.* These are fitch brushes or dabbers and softeners (see Figs. 71 to 75). The former are employed to render even a coat of paint which is perhaps impossible, owing to irregularities in the surface of the ware or from some other cause, to lay quite flat with the painting.

SOFTENERS are brushes with very fine and soft hair, and are used in softening tints and rendering them more delicate, and for toning down the edges of clouds are excellent.

All brushes should be well rinsed in turpentine after use, and before the paint has time to dry in among the hairs. *Spirits of wine,* which is sometimes recommended for cleaning brushes, should never under any circumstances be used.

MEDIUMS.—These are requisites, and upon the kind used and upon their quality depends, to an extent greater than is generally supposed, the appearance of the finished work. The mediums are, as their other general name of vehicles indicates, the carriers of the paint, the means by which it may be spread. The mediums in general use and which give every satisfaction are of two kinds—a spirit and an oil; the latter being the vehicle proper, the former, the thinning agent to render practicable the spreading of the mixed oil and paint in a coat of any desired depth or thickness. The spirit and the oil are both either of turpentine or of tar—spirit and oil of turpentine being used together, and spirit and oil of tar.

TURPENTINE.—The ordinary turpentine of the house-painter will answer the purpose, but it will be

FIG. 78.—THE ROSE. DESIGN FOR PORCELAIN PAINTING.

found best to procure rectified spirits of turpentine as sold by the druggist, which is as clear as the proverbial crystal, and as limpid as the purest water. The common turpentine may be used for washing brushes. The oil of turpentine is also known as fat oil. It is viscid, much of the consistency of golden syrup, and has something of the color of clouded amber. This may be purchased for a few cents a small bottle, but it may be prepared from spirits of turpentine by any one, thus: Into a flat saucer pour a little spirits of turpentine, say a tablespoonful, according to the size of the saucer, and over the saucer place a layer of muslin, sufficiently close in texture to prevent dust getting to the turpentine, and yet not so close as to prevent evaporation. The saucer with the muslin drawn tight over it should now be put in a place where evaporation will be free, but not over the fire or stove so as to hasten evaporation, or the heat might dissipate the whole. When the spirituous part of the liquid has passed off there will be found left the oil at the bottom of the saucer. Fresh spirit may be added, and the process repeated untill there is enough oil to pour off.

TAR.—The spirit of tar is in two shades—one a rich amber, the other a dark brown, but both are alike in nature. The oil of tar corresponds to it in the same way as the oil of turpentine does to the spirit of turpentine. The spirits of oil of tar are of similar use to the other spirit and oil, and are employed principally by those who object to the vapor of the turpentine as causing headache or affecting the throat. The spirits of turpentine and of tar are extremely volatile, the former being somewhat more so than the latter; and during the working,

sufficient may pass off to render the paint somewhat troublesome to deal with. This difficulty is, however, only a slight one, and is easily overcome by the use of a little

Oil of Lavender, or oil of spike, as it is sometimes called. This is a perfectly volatile and fluid oil, but very much less volatile than either of the above mentioned spirits, and a small quantity is added to the other mediums used when it is desired to keep the work open, that is—to counteract its drying or fattening through loss of spirit.

The Mediums should be kept in bottles with closely fitting stoppers, especially the spirits, as otherwise these would quickly become "fat" by evaporation.

Paint.—The colors used in painting upon china or earthenware are, for the most part, oxides of certain metals. A few colors, however, such as the deep transparent blues, and yellows from one source, are really, to a certain extent, stained glass, the glass having more or less completely dissolved the coloring matter. China or enamel colors then, from their containing, as an essential constituent, a glass or flux of vitrifiable composition, are called *vitrifiable pigments*.

Complete Palette.—The following list of colors in dry powder will serve our purpose :

BLACK.
Soft.
Deep.

BLUE.
Azure.
" Deep.

BLUE.
Old Tile.
Turquoise Outremer.
" Soft.
Schwartzenburgh.

FIG. 79.—THE CROCUS. DESIGN FOR PORCELAIN PAINTING.

BROWN.
Austrian.
Brunswick.
Chestnut.
Chocolate.
Fawn.
German.
Golden.
Olive.
Sepia.
Vandyke.

CARMINE.
Carmine.
Pink.
Rose Coral.
" DuBarry.
" Ordinary.
" Strong.

GRAY.
Black.
Pearl.
White Shadow.

GREEN.
Celadon.
" Hard.
Deep.
Dover.
Emerald.
Gordon.
Rose-leaf.
Sevres.
" Light.
Shading.

ORANGE.
Dark,
Light.
Opaque.
Strong Deep.

PURPLE.
Ordinary.
Royal.
Ruby d'Or.

RED.
Flesh, Nos. 1 and 2.
" Shadow.
Ordinary.
Salmon.
Scarlet.

SILVER.
Prepared.

VIOLET.
Lilac, 1, 2 and 3.
Mauve.
Violet.

WHITE.
Hard.
Medium.
Soft.

YELLOW.
Buff.
Ivory.
Light.
Opaque.
Persian.
" Hard.

MOIST OIL-COLORS.—These, as well as *moist water-colors* prepared expressly for this kind of painting, can be purchased at most any large city paint-dealer's store.

PROCESSES.—Having all the general requisites at hand we are ready to begin work. Before, how-

FIG. 80.—THE PRIMROSE. DESIGN FOR PORCELAIN PAINTING.

ever, we bring out our brushes and mix our colors, we must decide where the color is to go when it is mixed. The first concern is the design, and this whether we intend to have a background or not. Therefore, our first operations will be directed toward producing

THE OUTLINE.—*Material.*—According to the method which may be adopted for sketching the outline, there will be required a black lead-pencil, HB or B, lithographic crayon, a tracing point, tracing paper, transfer paper, a pounce, Indian ink, rose pink, or lamp-black, and gummed paper or modelling wax.

Lithographic crayon may be made by mixing 32 parts bees-wax, 4 parts purified tallow, 24 parts soap, 1 part nitrate of potassium, dissolved in 8 parts water, 6 parts lamp-black.

The surface of the ware having been thoroughly cleaned by washing, and dried, the design may be marked on by either of the following plans: 1, By marking with lithographic crayon; 2, black lead-pencil; 3, pricked stencil pattern and pounce-bag; 4, copying or transfer paper. The design being drawn on the ware we proceed to mix the color with the mediums. Different pigments require different proportions of medium, and the same pigment requires varying proportions, according to the end sought. It may be said generally that the ordinary blues, rose, and purple take most "fat" and the yellows the least. More fat, again, is required when it is desired to lay color flat, as in backgrounds, either with the brush, or when the use of the dabber is contemplated; or to have the color flow to a very slight extent as in delicate shading; or to lay a very thin tint.

General Rule for Oil and Spirit.—*Powder Color:* In mixing powder color, the orthodox direction is to lay a little powder on the slab, and add to it just so much oil as will make it into a thick paste, to be subsequently reduced to the requisite thinness by spirit. The grinding is done on the slab with the muller, and when ground to a thick cream consistency it is called *prepared* color.

Moist Oil-Color.—Those who adopt moist oil-color in tubes, will find that the color when fresh, contains exactly the right quantity of oil. The color only requires thinning to be fit for use.

Moist Water-Colors.—Require no grinding, simply dilution, but it must be remembered water-colors cannot be used where the outlines are made with lithographic crayons, for these being greasy would grease the brush, and the water-color instead of laying flat, would ridge and spot.

Firing.—The ware being painted the next step is to make the work imperishable by fire; and this part of the process need not be done by the amateur or the painter, for the maintenance to a nicety of different definite degrees of heat in furnaces of special adaptation are not to be found united except in factories devoted to the business. It is not surprising to find it assumed in some books on the subject that the work has been successful, and gone bravely through its fiery ordeal. Such a result is of course gratifying, but it is not always forthcoming. If the painting has gone to the kiln with too much oil in it, it is certain that the color will blister. If it comes back with a dry powdery look, with the color

scarcely adhering, it shows that the color was over-diluted with turpentine.

The remedy for dryness is simply repainting, using more oil. The remedy for blistering is simply chipping off the blisters, and then rubbing down the irregularities.

FIG. 81.—LILIES OF THE VALLEY, FORGET-ME-NOT, AND PELARGONIUM.

We give a few hints on the painting of monochrome (one color) work, and a study of lilies of the valley, forget-me-not, and pelargonium.

PAINTING THE LEAVES.—The lily leaves will be done

with full strokes of the brush, well filled. The strokes should be taken from point to stem, observing the central line and the curve of the edges. In this case, the lines of the leaf are to be left by the brush marks, sc there is no process to be observed for producing a flat tint, which would be absurd. The flowers will be painted over. If the outline has been properly done and dried, it will rub up in the painting, and will show through sufficiently. In doing the pelargonium leaf, no care need be taken to keep within the crenated edge or the part touching the flower. Paint freely and before the paint is dry, remove what lies beyond the edge with a piece of rag, which may or may not be dampened with spirits of turpentine. This removal must be effected from the edge outward, and not along the edge, as this would leave a fine line of deeper tint. In this leaf there are light veins. These may be made out in two ways. First, the leaf may have a light coat first, then, with a stick point, take off the paint right down to the ware, which shows up its glaze, and then, when this first coat is dry, go over the whole again with the tint or tints proper to give the required depths, covering the lines first taken out. Second, the veins may be gone over with a fine brush, just *dampened*, not wet, with spirit. This lightens the first-laid coat exactly on the lines of the veins, but it requires more care than the other way. The forget-me-not leaves are simple, and take the plain brush stroke.

THE FLOWERS.—Those of the lily and forget-me-not over the leaves are to be taken out. This may be done with a rag while the paint is moist, or with

a scraper after it has dried. The former operation is the easier. The lights of the lily flowers will be the white glaze of the ware unpainted. In painting the shadows on these flowers, a little extra fat will be advisable, and the shadows must be very delicate and well-toned. The greatest care must be taken so to tone as to preserve the roundness of the flower. The pelargonium petals have a decided tint which, on the plain ones, covers only half the petal—the half next the edge. The remainder is very faint, the faintest next the throat. This effect may easily be produced thus—paint the well-toned half, then with a dry brush carry the coloring from the inner edge of that half down to the centre. The color must be a little oily for this, and a dry brush will spread enough color. The forget-me-not petals will have, for the most part, flattish tints, and only require a little careful treatment. Do not overload the brush with color. If too much color has been used it may easily be removed with a rag, but care must be taken to do this gently, so as not to raise the outline.

The tile, when dry, may be sent to be fired, and if the foregoing directions have been successfully followed, the painting will return ready for framing.

Paint, in view of utility, is employed as a protective covering to a body against the injurious influences of the air, water, and other destructive agencies. Wood and common metals are especially attacked by oxygen contained in the atmosphere, of which it constitutes about 21 per cent, being the $\frac{21}{100}$ part of the whole atmosphere. It is also a component part of water, forming nearly $\frac{88}{100}$ of its whole weight. Although its presence is ab-

solutely necessary to the continuance of animal life, yet metals exposed to the air are consumed by the oxygen as if in a fire. The utility, therefore, of paint a sa protector is so apparent that any study of its composition and properties, which will tend to improve it in any degree, is of great importance.

Paint is understood to be a mixture of a liquid and a solid in powder. The desirable physical conditions of these are that the liquid should have a certain amount of viscidity in order to maintain the powder in suspension, and that the powder should be as fine as possible, and nearly of the same specific gravity as the liquid. Linseed oil is undoubtedly the best mixture for paints that are to be exposed to the weather, unprotected by varnish. It absorbs oxygen and becomes solid and waterproof, and yet it always possesses some elasticity which prevents it from cracking. Theory and the almost united voice of practical painters, after centuries of experience, have decided that, in view of its inherent properties and its cost, nothing at present known can take its place. There may be special uses of paint where some other article may be substituted with advantage, yet we cannot reasonably look beyond the class of substances known as drying oils for a substitute. Volatile oils, such as resin oils, which oxydize into brittle resins, are altogether out of the question. Nor will any solution of India-rubber or gutta-percha take the place of linseed oil, by reason of expense as well as their inferior properties. Linseed oil, therefore, is the very best liquid for paint. Paint which is to be used for the coloring, only, of carriage panels or gears, need not to be made dura-

ble by oil in the paint, for the several coatings of varnish—of which oil is the principal constituent—renders the work as durable as desired to be, taking into consideration the time to be spent upon such work. The composition of paint is varied, according to the purpose to which it is put.

WHITE HOUSE-PAINT may be made as follows: Two quarts of skim-milk, 8 ounces of fresh slaked lime, 6 ounces of linseed oil, 2 ounces of white Burgundy pitch, and 3 pounds of Spanish white. The lime must be slaked in water, exposed to the air, mixed in about one-quarter of the milk; the oil in which the pitch is previously dissolved must be added gradually, then the rest of the milk, and afterwards the Spanish white. This quantity is sufficient for 27 square yards, and the cost is trifling.

To make a *cheap paint impervious to the weather:* Dissolve eight pounds of glue (comminuted or ground glue is best) in boiling water, and with this slake a bushel of quicklime until it becomes of the usual consistence of paint. Lay on three coats of this mixture with a paint brush, taking care that each coat is dry before another is applied; over the third coat—before it is dry—dust sand or gray-stone dust from a dredger. By mixing a colored pigment with this paint any color may be had. A *substitute for oil paint* is made by pouring a gallon of boiling water upon a pound of quicklime and two ounces of sugar-of-lead. When the lime has become completely slaked, the mixture is to be stirred, and it is then fit for use. Coloring ingredients may be added if desired.

The outside of houses should be painted during

autumn or winter. Hot weather injures the paint by driving the oil into the wood, causing the pigment to become dry and crumbling, but when it is laid on in colder weather it hardens upon the surface and is far more durable.

Paint Cup.—A vessel for holding paint, generally of tin and containing one pint. Those vessels which are used by the house-painter are called paint-tubs, pots, or buckets.

Paint-Mill.—A mill used for grinding paints. The most popular paint-mill for shop use is that known as the "Harris mill," but the advent of ready-prepared paints has caused a partial disuse of this once useful implement. Many prepared colors are ground to a fine degree in mills through which a stream of cold water passes to prevent the heating of the bearing surfaces. These mills turn out the paint as near perfection as can be, and quite rapidly.

Paint Mixed with Petroleum.—Petroleum penetrates wood and excludes air and moisture by filling the pores. Old buildings may be much improved by a coat of crude petroleum and pigment (any color) put on with unsparing hand with a whitewash brush, for the greater the amount put on within reason, the better. The pure oil without coloring is excellent for the preservation of sills and timbers of a barn or outbuilding.

Paint, to Reduce with Water.—Mix gum shellac, 1 pound; sal soda, ½ pound; water sufficient to cover; boil all together till dissolved; when cool bottle for use. Then to a quart of oil paint mixed as usual add ½ pint of the shellac mixture, which

will thicken it, and water may be added to thin to a working consistency.

Paint Stone.—A flat stone or slab of marble on which colors are mixed or ground. The slab should be at least two inches thick, to ensure against breaking when crushing hard pigments or pounding putty to a stiff dough. A plate of glass fastened to a board with putty or thick paint, forms an excellent "paint stone."

Paint Skins.—The skins that dry upon the top of paint left standing for any length of time may be made fit for use again by simply soaking them in strong sal soda water for a few days, then mixing with oil and straining.

Painters' Colic.—A disease to which painters more than any other class of men are subject. It is caused by the presence of lead in the system, absorbed through the skin by contact with paints containing that metal, especially those known as white and red lead. The disease is considered serious, being, usually, a mild form of paralysis (*see Lead Poisoning*).

Painters' Cream.—A composition used by artists to cover oil paintings in progress, when they leave off their work; it prevents drying and consequent showing of lines where new work is begun. It consists of six parts of fine nut oil and one part of gum mastic. The mastic is dissolved in the oil, and then is added a quarter part of acetate, or sugar of lead. When well incorporated with the dissolved mastic, water must be added and thoroughly mixed until the whole has the consistency of cream. It is applied with a

soft brush and is easily removed with water and a sponge.

Painters' Stand.—A bench on which the painter, when varnishing, places his cups and brushes. The brushes, of which he uses several when varnishing a heavy body, are rested by inserting the point of the handle in holes bored through the upright back, as shown in the cut; this prevents

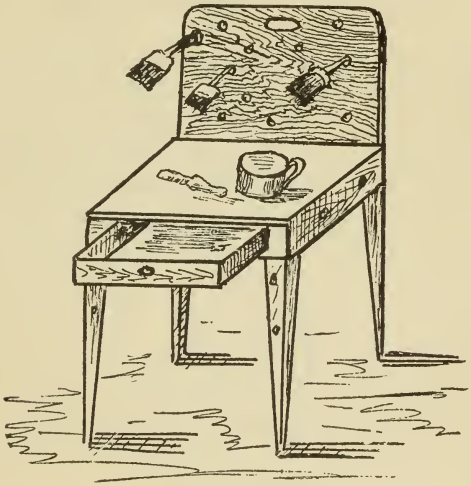


FIG. 82.—PAINTER'S STAND.

the bristles or hairs from coming in contact with any substance which might leave lint or dust upon them. A drawer is fitted to the stand in which he may keep "pickers" and such like aids to his work. The stand is made of pine wood so as to be light, and easily moved from place to place around the room.

Painting.—The art of representing objects to the eye on a flat surface, by means of lines and color,

with a view to convey ideas and awaken emotions. It is done by means of light, shade, and color. Also the application of a mixture of pigment and a medium or vehicle to any surface, for the purpose of preserving or beautifying it. Also, the act of working with paints, etc.

In the compilation of this book it was not intended to enter the field of *fine arts* any more than could possibly be avoided, and our attention was given more particularly to the useful arts, of which the painting of carriages, houses, etc., belongs, but it will not be amiss, now that we find ourselves so closely allied to fine art to give a brief description of the various branches of work coming under the head of fine art painting. It is but a few years since the principal modes of painting could be counted upon the finger ends, while now we find the number legion. Water-color, crayon, miniature, oil painting, encaustic, fresco, elydoric, enamel, glass painting, etc.

WATER-COLOR.—Sometimes called limning, in which style the colors are prepared with gum or size, and applied with water. The characteristics are clearness and transparency of tint.

CRAYON.—In which the colors are ground in gum and water, and formed into small cylinders. When skilfully used, they give a soft and pleasing effect.

MINIATURE.—Small portraits on ivory or vellum. Water-colors are used in this style; the colors are applied in minute dots, which gives great softness to the gradations of tint.

OIL PAINTING.—Colors ground in oils are not only more enduring but more forcible in their effects.

FRESCO.—The colors in this method are laid on a wall newly plastered, with which they become incorporated.

ENCAUSTIC.—Is performed with colors mixed with wax and varnish or water; the word implies executed by fire, and heat is employed in the application of the colors, which are clear and brilliant.

ENAMEL.—A mode of painting with vitrified colors on gold, copper, silver, etc. The operation is performed by fire.

ELYDORIC painting is that in which water and oil are both used in applying the colors. Its principal advantages are that the artist is able to add the freshness of water-colors and the high finishing of miniature, to the mellowness of oil painting, in such a manner that the work appears like a stereoscopic view when seen through concave lens.

MOSAIC.—Is a kind of painting executed with small pieces of glass, or wood, pebbles, enamel, etc., fixed upon any substance with mastic. When an artist commences a work in mosaic, he cuts on a stone plate a certain space which he encircles with bands of iron. This space is covered with thick mastic, on which are laid conformably to the particular design, the various substances intended to be used. Fifteen thousand different shades of color are employed. The art is attributed to the Greeks.

GLASS PAINTING.—In painting on this material, the paints are mixed with water and turpentine, and being laid on the glass are allowed to dry; the outline is then corrected with a sharp instrument. The glass is then put into a furnace and the colors are fused into it.

Palette.—An oval board, or piece of porcelain or wedgewood, on which an artist places his colors for immediate use. Some palettes are made square or oblong, others are cut through the centre and supplied with hinges, and a button to fasten them open. These can be conveniently carried in the pocket.

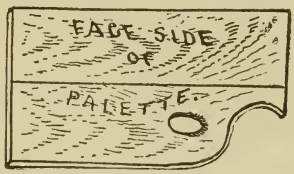


FIG. 83.—PALETTE.

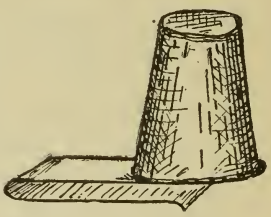


FIG. 84.—PALETTE-CUP.

Palette-Cup.—A small cup made of tin, used in connection with the palette, for holding liquids: either thinners or dryers. Twin cups of this sort may be purchased, and these are considered best, as it is frequently the case that two liquids are to be used in the work.

Palette-Knife.—A flat, thin knife, rounded at the end, as shown in Fig. 85, used by painters to mix colors on the paint stone or grinding slab. A

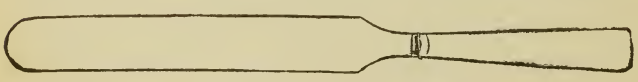


FIG. 85.—PALETTE-KNIFE.

good knife should possess a fair degree of flexibility, but if too flexible good work cannot be done with it.

Panel Stripe.—A striping in which two stripes are connected at one or both ends by a cross stripe, forming a square or panel.

Pantograph—An instrument devised for the purpose of copying drawings, so that the copy may be either similar to or larger or smaller than the original.

Parti-Colored.—Colored with various hues or variegated with divers colors.

Paris Green.—An arsenite of copper, and a rank poison. It contains about three parts copper to seven parts of arsenic. It is sometimes known as Scheele's Green, but is in fact different. (*See Mittis Green.*) It is a beautiful light green, but owing to the trouble in spreading it, and its extremely poisonous character, it is not much used at the present day.

Pasticcio.—A work of art, of original conception as to design, but a direct copy of the style and manner of some other painter.

Patent Yellow.—A pigment made with sea-salt and litharge. Turner's patent consists in decomposing sea-salt, by mixing two parts salt with one of litharge, moistening them and leaving them together 24 hours. The product is then washed, filtered, and evaporated by which soda is obtained. A white substance is left undissolved, which, when heated changes its color and forms Patent or Turner's Yellow. This pigment is highly prized by coach-painters, making delicate canary color, with white, but it is a very hard substance to grind in ordinary mills, and lemon chrome is often substituted for it.

Patent Graining Roller.—An implement used by painters to mark the grain in imitating various woods, the roller being first run over a flat surface of fresh paint, and then transferred to the

work. A similar roller, as shown in Fig. 87, is also used for marking the over-grain of oak.

Peach Color.—The pale, red color of the peach blossom, made by mixing seven parts white to one part each red, blue and yellow. This color forms an excellent ground for vermilion.

Pea-Green.—A light shade of green approximating that of the pea, made by mixing five parts of white with one of chrome green, or milori green.

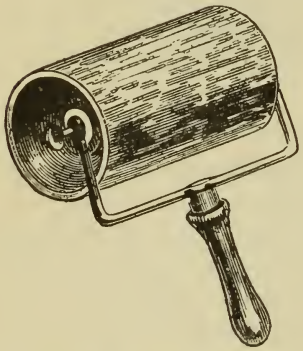


FIG. 86.—PATENT GRAINING ROLLER.

FIG. 87.—COMBING ROLLER.

Pean. (*Her.*)—One of the furs in heraldry, differing from ermine only in the tinctures; the ground being sable and the spots gold.

Pearl White.—A denomination applied to two pigments; one falsely so called, prepared from bismuth, which turns black in sulphuretted hydrogen gas or any impure air, and is used as a cosmetic; the other prepared from the waste of pearls and mother-of-pearl, which is exquisitely white and of good body in water, but of little force in oil or var-

nish; it combines, however, with all other colors without injuring them, and is itself perfectly permanent and innoxious.

Pediment. (*Arch.*)—A triangular, segmental or decorative crowning to a doorway.

Pendant.—A cluster of hanging fruit, flowers or foliage.

Pencil.—A name applied to instruments for writing, drawing, or painting, and differing as much in their construction as in the use to which they are put. The class generally known as *hair pencils* are much used by all painters, especially for decorative work. They are really a variety of small brushes, and are made of hog's bristles, camel's-hair, fitch-hair, sable-hair, ox-hair, etc., bound in quills and metal. These pencils are known by different names according to their use, or shape and size, such as dagger pencils, sword pencils, lettering pencils, striping pencils, ornamenting pencils, etc. In making pencils great care must be taken to so arrange the hairs that the ends may be made to converge to a fine point when dipped in turpentine. (Here let us remark: It is a bad practice to put a hair pencil in the mouth, moisten it with spittle and draw it between the lips to form a point, and thus be enabled to judge of its shape, for the warm spittle is certain to cause the hairs to "crinkle" or become crooked, and it also destroys the prime feature of a good pencil—its elasticity.) The hairs are fastened in quills, by first boiling the quills to swell and soften them, then, when the hairs are drawn in, the quill cools and shrinks tightly around the hairs. The extreme end of a pencil

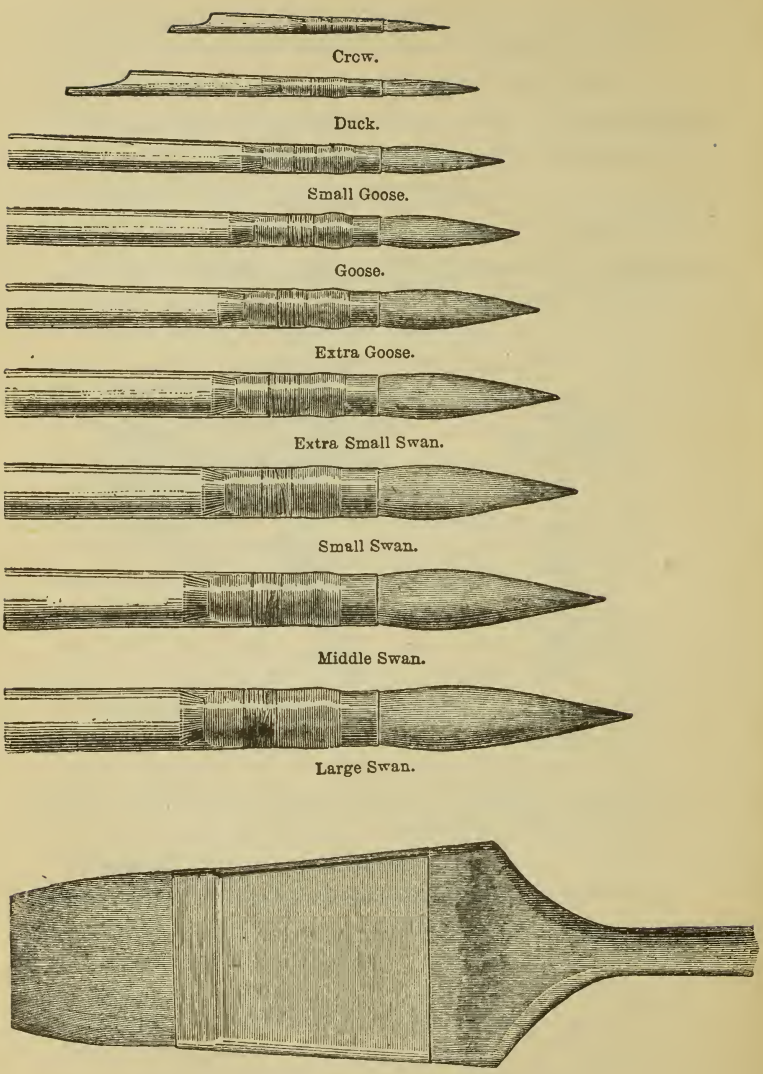


FIG. 88.—SHOWING THE SIZES OF PENCILS.

should never be cut, as the cutting tends to make the end blunt and no pencil will then work well. Sable lettering pencils are seldom in good condition until they have been used for a time and partly worn. Pencils should be kept in a covered box when not in use, well greased with tallow to keep them from drying hard. Striping pencils may be cemented down to glass or tin with tallow; the others simply laid carefully away.

A pencil is a brush, but not every brush is a pencil.

The painter invariably says *lead* pencil and *slate* pencil, but seldom, if ever, says hair pencil.

He will say fine-line pencil, broad-line pencil, lettering pencil, cutting up pencil, scrolling pencil, ornamenting pencil; and it is understood that they are made from some kind of hair, either red or brown sable, camel-hair, squirrel-tail, or Siberian ox-hair.

When you purchase a camel-hair pencil, that is not positive evidence that there is a filament of the hair of the camel in it; and a set of sable pencils which you prize may be wholly innocent of a hair of the real sable; so long as you believe them to be real camel-hair or real sable-hair, and they are good and work satisfactorily, there is no harm done.

Camel-hair, or its imitation, is softer and weaker than real sable, Russian sable (skunk), or ox-hair, and this quality adapts them for soft touches, and for use in all colors except those composed of lead and zinc.

As each single hair of real sable and its substitute, and ox-hair as well, has more stiffness than

the former, this quality renders them better adapted for heavy colors.

A pencil is fitted for the varieties of touch required by the length, quantity and quality of the hair, and the method of insertion.

A pointed pencil has its hair inserted in a round quill or ferrule.

When the hair is inserted flat, the end of the pencil cannot spring to a sharp round point.

The pointed pencils are suited for fine detail work, and to free strokes of various kinds when the color is to be applied heavy.

The flat pencils apply the color thinner and more crisply.

The hair of pencils range in length from $\frac{3}{16}$ to $2\frac{1}{2}$ inches.

The round ornamenting and miniature pencils have considerable hair in proportion to their length, so that the largest, with the hair $1\frac{1}{8}$ long, is too stocky to properly respond to the touch in lettering and striping.

Lettering pencils must be shorter than those designed for drawing stripes, and yet the lettering pencil must partake somewhat of the flexibility of the striper in order to give true and square outlines, which are in fact a series of short stripes.

The hair of lettering pencils for ordinary purposes measures from $\frac{3}{4}$ to $1\frac{1}{2}$ inches, as $\frac{3}{4}$, 1, $1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{1}{2}$ inches; and as the length is increased so is the quantity of material which preserves the free working qualities and adapts the increased sizes to larger work.

Striping pencils must be weaker than lettering pencils; in other words, the hair must be increas-

ed in length—1¾, 2 and 2½ inches are the usual lengths.

The striping pencil is a lazy thing, for it will not do duty except as it is allowed to lie flat, and then it must be dragged along. But therein lies its real worth, for a long stripe cannot be well made by a series of short splices.

The large stripes are well adapted for scroll work—for scrolls require true, clean outlines, which cannot be made by a short stocky pencil.

The stocky pencil, however, is superior to the striper for filling in the body of a scroll and working the color down flat.

The "cutting-up" pencil is employed for feathering and various other strokes, which may be termed shaded, as they are composed of light and heavy parts.

The hair of the cutting-up pencil should be ¾ or 1 inch long, and inserted in a quill or round ferrule.

The sword pencil is one in which the hair is inserted flat. It is used for drawing long stripes, chiefly fine lines, the edge of the pencil being applied to the surface to be striped.

The hair being flat at the heel, gives it increased buoyancy when it is wet with color.

The "dagger" pencil differs from the sword pencil, in having the hair inserted of various lengths, so that while one edge is straight the other is beveled from point to heel.

Like the sword pencil, it is used on its edge, the beveled edge being applied.

This same shape, but with shorter hair, is valuable for producing sweeping strokes.

Porcelain painters have a camel-hair pencil,

which they use for striping, that has the end beveled ; and also a short, stocky pencil for blending that has a beveled point.

A short, thick pencil with square point is used for the same purpose.

For painting grounds they use a short, stocky, camel-hair pencil with round, blunt point, which might be termed club shape.

All pencils, except those used for drawing stripes, require handles, in order to admit of the free movement of the wrist and fore-arm.

These pencils are held like a writing pen, but the fingers are kept well back from the pencil, and where great freedom of touch is requisite the hand is supported by a "rest-stick," which is given a sweeping motion in unison with the arm.

Pencils are made by hand and require exceeding care and nicety in their production ; and as the best material is scarce and very dear it would be unreasonable to expect to get the best pencil at a low price.

A set of fine sable pencils, although seeming unreasonably dear, are cheap when compared with those of inferior grades, when both are put into constant service. Pencils are numbered from 1 up to 20.

You may purchase camel-hair lettering and striping pencils, assorted sizes, at from $2 to $12 per gross, while the ordinary black sables are worth from $5.50 to $30 a gross, and the superfine ones will cost from $14 to $100 per gross.

Pencils are used for a variety of purposes other than painting in oil, water and vitrifiable colors.

They form a part of the druggist's stock. The soft camel-hair pencil is used in the sick-room and

in the hospitals for applying cooling and healing lotions, and in some instances it is called painting, although no paint is used.

Camel-hair pencils take the place of pens with the Chinese, and they and the Japanese surpass all other people in dexterity of handling.

Penciling Brick.—The lines in imitation of mortar are drawn with a brush, called by some a "brick header" (*q. v.*), along a straight-edge. The paint should be mixed with turpentine, and be used thick enough not to run.

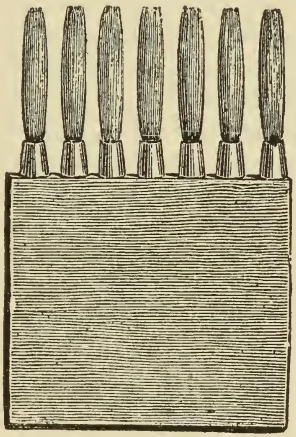


FIG. 89.—PENCIL OVER-GRAINER.

Pencil Over-Grainer.—Several pencils set in a block of wood or other handle for drawing a number of lines at one time and at an equal distance apart in over-graining.

Perspective.—The art of representing, on a plane surface, the appearance of objects, however

diversified, similar to that they assume upon a glass-pane interposed between them and the eye at a given distance. The representation of a solid object on a plane surface can show the original in no other point of view but that from which it is at the time beheld by the draughtsman; the least change in any of the parts require a change in the whole; unless in fancy drawings where a *fac-simile* is not required. Nor can any deviation from the several lines, which will be hereafter explained, and on which the truth and correctness of representation depend, be allowed without changing the bearings, direction and tendency of all perspective lines which constitute the basis of that faithful and converging series which unite all the component parts in the most pleasing and harmonious manner. The following definitions of the principal features in the science and application of perspective will prove useful to the student, viz.: projection delineates objects in plane, by means of right lines called rays, supposed to be drawn from every angle of the object, to particular points. When the objects are angular, these rays necessarily form pyramids, having the plane or superfices, whence they proceed, for their basis; but when drawn from or to circular objects they form a cone. Ichnography, or ichnographic projection, is described by right lines parallel among themselves, and perpendicular to the horizon, from every angle of every object, on a plane parallel to the horizon, the points where the perpendicular lines or rays cut that plane being joined by right lines. The figure projected on the horizontal plane is likewise called the plan, or seat of that object on the ground plane. The points are

the sites, or seats of the angles of the object. The lines are the seats of the sides. By this we are to understand how the basis of figures represented as superstructure stand, or are supported; and we are further enabled to judge of, indeed to measure, their several parts and their areas.

Orthography represents the vertical position and appearance of an object; hence orthographic projection is called elevation. When we see the front of a house, we give it that term, but when the side is displayed, we call it the profile. If we suppose a house or other object to be divided by a plane passing perpendicularly through it in a line at right angles with the point, we call it the lateral section; but if the plane pass in a direction parallel with the front, it is termed a longitudinal section. If the plane passes in neither of the former directions (not, however, deviating from the vertical) it is said to be an oblique section.

These give us modes of laying down plans, of showing the parts and the manner in which the interiors of edifices are arranged; consequently are indispensible to the architect or surveyor, and indeed should be understood by every person in any way connected with building or designing. Nor should the following be neglected, viz.: scenography, which shows us how to direct the visual rays to every point or part of a picture; and stereography, which enables us to represent solids on a plane, from geometrical projection; whence their several dimensions, *i.e.*, length, breadth and thickness may all be represented, and be correctly understood at sight. We suppose our readers to have some knowledge of geometry be-

fore they commence on this or any other of the abstract sciences which are founded thereon.

An original object is that which becomes the subject of the picture, and which is the parent of the design. Any plane figure may become an object, as may any of its parts, as a broken pillar, the ruins of a house, the stump or branch of a tree; but we generally speak of objects as relating to entire figures as solids, or to as much rural or other scenery as may be embraced under an angle of 60 degrees formed by two lines meeting at the eye. This will explain why we are enabled to represent so great a number of distant objects, while the front or foreground will contain, comparatively, but a few; it being obvious that as the lines forming the angle become more distant, the more may be included in them.

Original planes, or lines, are the surfaces of the objects to be drawn; or they are any lines of those surfaces; or it means the surfaces on which these objects stand.

Perspective plane is the picture itself, which is supposed to be a transparent plane, through which we view the objects represented thereon.

Vanishing planes are those planes which are marked upon the picture, by supposing lines to be drawn from the spectator's eye parallel to any original lines, and produced until they touch the picture.

Ground plane is the surface of the earth, or plane of the horizon, on which the picture is supposed to stand.

The ground line is formed by the intersection of the picture in the ground plane.

The horizontal line is the vanishing point of

the horizontal plane, and produced in the same manner as any other vanishing line, *i. e.*, by passing a plane through the eye parallel to horizontal plane.

The point of sight is the fixed point from which the spectator views the perspective plane.

Vanishing points are the points which are marked down in the picture, by supposing lines to be drawn from the spectator's eye, parallel to any original lines, and produced until they touch the picture.

The centre of a picture is that point on the perspective plane where a line drawn from the eye perpendicular to the picture, would cut it, consequently it is that part of the picture which is nearest to the eye of the spectator.

The distance of the picture is the distance from the eye to the centre of the picture. If what has been already said and repeated, regarding the angle of 60 degrees, is understood, the spectator will never bring the picture so near to himself as to occasion the eyes to expand, indeed to strain, so as to embrace more than that angle.

The distance of a vanishing point is the distance from the eye to that point where the converging lines meet. All parallel lines have the same vanishing points : that is, all such as are in a building, parallel to each other, when not represented exactly opposite to and parallel with the eye, will appear to converge toward some remote point, *i.e.*, their vanishing point. Circles when retiring in such manner, are represented by ellipses, proportioned to their distances ; their dimensions are ascertained by enclosing them within a square, which being divided into any number of equal parts

or checkers, will show all the proportions of those most remote. A bird's-eye view is supposed to be taken from some elevated spot which commands such a prospect as nearly resembles the plane or ichnography of the places seen. Thus a view from a high tower, or from a mountain, gives nearly the same representation as if offered to a bird flying over them; whence the term.

Permanent Wood-Filling.—A patented mixture similar in appearance to varnish, designed for the first coat or priming on any substance to be followed by varnish or paint coats.

Picking Out.—A name used by English painters in the same sense that we in America use the word striping.

Pigment.—Paint: A preparation used by painters, etc., to impart color to bodies.

Pink.—A light red or rose color. Pinks are produced by extreme dilution of cochineal, carmine, Brazil-wood colors, with whiting. Some mineral pinks for oil colors are obtained from preparations of manganese. The term pink is also applied to several yellow colors, as *Dutch Pink*, etc.

Pinxt.—An abbreviation of the Latin word *Pinxit*, which an artist usually places after his name on any of his productions, and which means: *He painted it.*

Pin-Holing.—Innumerable small indentations in a varnished surface, caused in most cases in the same manner as pitting (*q. v.*). It is generally attributable to the sweating of the under coat of varnish, or to color which has dried with an oily or glossy surface. Pin-holing is one of the dev-

iltries of varnish, and at times, with all the care the painter may have taken to guard against it, it will occur. Wiping the surface with a damp chamois before laying the varnish, will be found a ready means of preventing trouble.

Pitting.—A trouble or "deviltry" which besets the painter, and consists in the surface of a coat of varnish being filled with small pits or hollows, like the marks on the face of a person who has had small-pox. The causes for this are many and goes to show how extremely careful and how intelligently the coach-painter must do his work. Pitting may arise when too much oil has been used in the under coats; when the rubbing varnish has a very hard or glossy surface; when the last rubbing coat is a mixture of varnish and japan or turpentine, or two varnishes of different make—the surface is then uneven and when rubbed with pumice-stone one part rubs hard, another soft; the soft portions not affiliating with the outer coat, forms pits; and where the hard spots are the varnish appears bright. When the rubbing has been too thorough and several coatings have been laid bare, so that the different varnishes underneath exercise a sufficient degree of absorption to cause pits; when the varnish is at fault, is too fresh, is dirty, or the gas generated in the can has not been allowed to escape before putting the varnish in use; when particles have got upon the surface while preparing it for varnish, as through impure water, or from a dirty chamois skin, or sponge, or soap, grease, etc. The breath of the workman will materially affect a surface so that pitting may occur. If the brushes used were not

clean, or if they have been kept suspended in oil. A draft of cold air will cause pitting. A change in the temperature of the room will affect the varnish, and to sum up: if the room, the varnish, the work, etc., is not as it should be there will be trouble, and it is no wonder the painter calls such "devil tries."

Plastering.—Spreading paint or putty with a putty-knife.

Plum Color.—A sort of purple color, made by mixing two parts white, one Prussian blue and one red.

Polishing.—In olden times all fine work in the carriage shop was polished, for flowing varnish was then unknown. It is done in the following manner: Several coats of hard-drying copal varnish having been applied and thoroughly hardened, the surface is well rubbed with pulverized pumice-stone and water in the same manner as in preparing the surface for varnishing over. A good washing follows, then pulverized rotten-stone is used in place of the pumice-stone, and the surface is rubbed until it presents a smooth and semi-shining appearance, then sweet oil is substituted for the water and the rubbing with rotten-stone and oil is continued until a brilliant gloss is obtained. The oil is next removed with soft rags and wheat flour.

Polishing with spirit-varnish is best adapted for furniture, pianos, the inside fittings of carriages, etc., and is done as follows:

Having made the surface of the wood as clean and smooth as possible, and having well dusted it, the next thing to do is to fill all open-grained

places with one of the many wood fillers now in market, or with a mixture of corn starch and japan. A good sand-papering with No. 0 or 1 sandpaper prepares it for the polish. The polish consists of spirits of wine, 1 pint; gum sandarac, ¼ oz.; gum lac, ½ oz.; gum shellac, ½ oz. Expose the whole to a gentle heat, frequently shaking the mixture until the gums are dissolved.

Another. Wood naptha, ¼ pint; orange shell lac, 1 oz.; dragon's blood, ¼ oz.; benzoin, ¼ oz.; prepare as above.

Another. Orange shell lac, 1½ ozs.; spirits of wine, 1 pint; mix as above.

The method of applying these polishes is the same for all. A flannel rubber is made and dipped in the polish and a piece of fine old linen is then put over the rubber. When the polish oozes through the covering, slightly moisten the pad with linseed oil. Another way is to strain the linen over the flannel pad and then to moisten the linen with a drop or two of the polish, and a drop or two of oil. The pad should be held in the right hand, and the linen strained tightly, so that the pad may present a rounded surface. Apply the pad to the surface of the wood in a series of light strokes, made by a circular sweep of the hand, until the surface is nearly dry, when the pad should be passed up and down in the direction of the grain of the wood. When the rubber is dry, some more polish and oil must be put upon it in the same manner as before and the rubbing continued.

Plenty of what is generally called "elbow grease" should be given to the work, and not too much polish. Beginners generally lay on a large quantity of polish in clots or thick coats, but when

this is done the polish does not look well, neither has it permanent effect. No more polish should be laid on than is absolutely necessary; the polish should be well rubbed in and finished off with a little spirits of wine or naptha, whichever happens to be used in the polish. The naptha or spirits of wine, as the case may be, should *at first* be laid on very gently, and with great care, otherwise it will dissolve and remove the polish already laid on; but if care is taken, its effect will be not only to give the polish a better gloss, but to render it more lasting. Some woods absorb a great deal of polish and in order to prevent it a coat of size or shellac varnish is given before the application of the polish.

In the *Dictionaire Téchnologique*, an accurate French work, we find the following directions for French polishing:

Gum sandarac, fourteen ounces and two drachms; gum mastic in drops, seven ounces and one drachm; shellac (the yellower the better), fourteen ounces and two drachms; alcohol of 0.8295 sp. gr., three quarts and one pint.

Pound the resinous gums and effect their solution by continued agitation, without the aid of heat.

If the woods are porous, seven ounces and one drachm of Venice turpentine.

Before using the polish, the wood should be made to imbibe a little linseed oil, the excess of which should be removed with soft rags. The polish should be applied by saturating a piece of old soft coarse linen cloth, folded into a sort of cushion, rubbing the wood softly at first, turning the linen until nearly dry, then saturating and rubbing

again. If the polish becomes sticky apply a drop or two of olive oil. Finish by rubbing with a clean cloth moistened with pure alcohol.

Potash Lye.—A solution of potash is used by the painter for removing or "eating off" varnish or paint. It is excellent for cleaning varnish cups, the cups being thrown into an earthen vessel filled with the lye and allowed to remain until wanted for use, when a good washing in water renders them as clean as when new.

Pounce-Bag.—A small bag containing a dry coloring substance. In some instances, whiting tied in a rag, the ends and corners being brought together and firmly fastened. It is used to distribute whiting over a surface to be gilded, which effectually prevents the gold from adhering; also when the painter has drawn a pattern of a scroll or other ornament on stiff paper, he perforates the lines with pin-holes, and then laying the pattern upon the job in hand, gently rubs it or pats it with the pounce-bag, which drives the powder through the perforations and marks the outlines of the design on the surface beneath. For glass or light-colored grounds some Venetian red or other cheap reddish pigment is used.

Primary Colors.—In the theory of painting, *red*, *yellow* and *blue* are called primary colors, because they are those from which all other colors are supposed to be derived; and they cannot of themselves be resolved or decomposed into other colors.

When two primary colors are mixed they form secondaries (*q. v.*). When all three of the primaries are mixed in equal strength and proportion they

kill each other and produce *black*; or in a state of dilution *gray*. The primaries and secondaries are the sources from which all other tints and hues are formed.

Priming.—The first coat applied to a surface. White lead and oil was at one time the only preparation for priming in use, but of late years there are many preparations, each claiming superiority. (*See American Method.*)

Prussian Blue.—A color discovered by Diesbach, of Berlin, in 1720, and then studied out theoretically and practically by many chemists and manufacturers. The pigment is made from dried blood, hair, wool, waste of skins and leather, flesh, animal oils, soot, and bone-black, in connection with carbonate of potassa, alum, sulphate of iron, etc.

It is one of the strongest colorings in the list of colors, and is a very durable color, either in its purity, or when added to white in the formation of tints or light blues. Being inferior in point of brilliancy or richness to ultramarine, it is seldom used as a color on carriages, but as a ground for ultramarine it has no equal. Prussian blue being a primary color it cannot be formed by any mixture of pigments, but it enters into all the broken colors as browns, purples, grays, etc., which makes it a very useful color on the paint bench. Prussian blue may be made changeable by simply coating a surface with "dead color" and then using clear varnish over it. This leaves that reddish sheen always noticeable in the dry color, and gives it the appearance of double color.

Prussian Brown.—A color obtained by adding a solution of yellow prussiate of potash to a solu-

tion of sulphate of copper, which throws down a precipitate of deep brown; this, when washed and dried, is equal to madder, and possesses greater permanency.

Pumice, or Block Pumice-Stone.—Lava thrown from a volcano, of which there are two varieties, the light and the dark, the former deriving the name *pumice* from its appearance to *foam*. The lava, after being ejected, is influenced by the conditions in which it is placed. When cooled under pressure it becomes compact and sometimes changed into solid rock; but when cooled in the open air it presents the form and structure of the article of commerce which is familiar to every painter.

The word pumice is supposed to be from the root of the Latin, *Spuma*, foam—because the stone bears a strong resemblance to foam. Nicholson said it is a substance frequently ejected from volcanoes, of various colors, gray, white, reddish-brown or black; hard, rough, and porous; specifically lighter than water, and resembling the slag produced in an iron furnace. It appears to consist of parallel fibers, owing to the parallelism and minuteness of the crowded cells. It is supposed to be produced by the disengagement of gas, in which the lava is in a plastic state.

Pumice is of three kinds—glassy, common, and porphyritic. That which is termed gray is best adapted for cutting down a painted surface, but it must be selected with a view to lightness and porosity. That in which the pores are large, cuts fast, but also wears away very rapidly; but this kind is preferable to that variety which is very close, and has solid veins through it.

Pumice-stone has a grain or a direction in which the partition walls run, and the tooth, or cutting edge, is obtained by sawing the stone at right angles or across the fibers, which exposes the cells, and prevents the stone from readily clogging. The skillful rubber prepares his pieces of pumice-stone to suit the various sizes and shapes of the surfaces presented, which may be plane, convex, or concave.

The necessary implements are a good saw to divide the lumps, and a good file to assist in facing the pieces and shaping them, and to round off all the jagged edges of the stone beyond the cutting face.

The sawing and shaping should be done by the aid of water, the usual plan being to keep a file in a bucket of water, and to immerse the stone while refacing it; or, two flat-faced pieces may be rubbed together in water.

When there is at hand a large level piece of English rubbing stone, it also answers well for facing the pumice-stone, and if the latter retains a little of the grit of the coarser stone, it will assist in cutting the rough stuff in the early stage of the rubbing, but would not be advisable at a later period.

Professional rubbers (those who do nothing else) are quick to select the stones best suited to the work in hand, and to shape them to fit corners, and both convex and concave parts. The flat surface is not by any means the easiest to cut down level, from the fact that the so-called flat surface is often slightly sunken, so that the flat-faced piece has to be used cautiously until it conforms itself to the hollows. The slightly convex surface is the

easiest to handle, while the concave needs considerable care; but if the stone is shaped pretty nearly to the convexity presented it will soon wear itself down to a perfect fit, but even then the rubbing must proceed cautiously to avoid scratching. Crosswise, at an angle, is the better plan, and if when near the finish there are small places that the stone did not bring down low enough, they may be corrected with smaller pieces of stone.

Some years ago a coarse, irregular-shaped stone was introduced to the notice of painters as English rubbing stone. If it was intended to supersede pumice-stone it signally failed; but the painters gave it a place in the rough-body room, and after fair trial rendered the verdict that it was useful for cutting the outer surface of the rough-stuff, but too firm and granular for the close work required at the close of rubbing, and at this point it was cast aside for the old and ever-reliable pumice-stone.

An innovation which came to stay was that of *manufactured* block pumice, well known as *shumacher fabrik*. Now here was a happy thought, for the blocks were composed of real pumice-stone, and having porosity in imitation of it, graded into three degrees of fineness, as No. 1, 2, 3, or coarse, medium, and fine.

The blocks resembled bricks with the upper corners rounded off. At first sight the painter handled them suspiciously, probably because they looked so solid, smooth, and trim. He was so accustomed to the rough appearance of the natural stone in the lump that he had serious doubts that man could successfully imitate that made by the original manufacturers, the terrible volcanoes.

But it was long ago settled that the imitation is superior to the real in the particulars of being convenient in form, equal in cutting qualities, and more economical in use.

Pulverized pumice-stone is used for leveling or removing the imperfections on a varnished surface by rubbing with a cloth or felt in connection with water, preparatory to re-varnishing or polishing.

Punctuation of Signs.—The correct punctuation of a sign is of more importance than many suppose, and to give some idea of punctuation we add a few of the most important:

MEN'S AND BOYS' CLOTHING.
LADIES' SALOON.
CASHIER'S DESK.
U. S. EXPRESS CO.
BROWN, JONES & ROBINSON.

The period (.) is used at the end of every sentence, even if it be but one word, as *Bank. Boots and Shoes. John Hall, Dealer in Paints, Oils and Glass.*

The comma (,) is used to show the omission of words as shown in the following:

Brown and Hall and Co. are Dealers in Hats and Caps and Furs and so forth.

To avoid the use of *and* the comma is substituted, thus:

Brown, Hall & Co., Dealers in Hats, Caps, Furs, etc.

The apostrophe (') is used to show the omission of letters in the beginning or middle of a word, thus: *Comp'y* for *company*; *gen'l ag't* for *general agent.*

It is also used to show the possessive, thus: *Blair's Store. Smith's Boat.*

If the owner's name terminates with an *s* the apostrophe follows the *s*; as *Jones' Store.* Although we frequently see signs where the *s* is added, it is not correct, and particularly is this deplored in the writing of a name ending with double *s* as *Bliss's Store.*

When more than one person is spoken of in the possessive, the apostrophe should follow the *s*, as *Gents' Room, Brown Brothers' Bank.*

When a period (.) would tend to throw a line out of perfect uniformity it may be omitted without great detriment, but with care in laying out the lettering this need not occur. It is generally best not to take into the measurement of a line of letters the period at the end, as it will tend to throw the last letter too far from the edge of the sign board.

Purple.—One of the secondary colors, being a mixture of five parts red to eight of blue, which forms a perfect purple.

Putty.—A kind of paste or cement, of which there are several varieties; 1, putty for glass in windows, and for nail-holes, etc., in house painting, is made of whiting and linseed oil kneaded into a stiff dough. 2. *French Putty.* Seven pounds linseed oil and four pounds umber are boiled for two hours, and 62 grammes wax stirred in. After removal from the fire 5½ lbs. fine chalk (whiting) and 11 lbs. white lead are added and thoroughly incorporated: this putty is said to be very hard and permanent. 3. *Carriage Putty.*—Dry white lead and whiting equal parts, made into a dough with equal parts of rubbing varnish and Crown

coach japan. 4. *Carriage Putty.* — White-lead in oil and whiting in equal parts (in bulk, not weight) made into a dough with Crown coach japan. 5. *"Glazing or Plastering" Putty.*— White-lead in oil, a little lamp-black to color, mix to a paint consistency, with brown japan, then thicken to soft putty by adding either dry white lead or whiting. 6. *Putty for Hearse Glasses.*— Mix lamp-black to a soft putty consistency with rubbing varnish and oil equal parts, then procure a piece of plush or coarse velvet and unravel it, so as to secure the short fibre or flockings; mix this intimately with the putty, in the same manner as the plasterer mixes his cow-hair with plaster; and when it is put around a glass in a hearse body no fear may be felt of the putty rattling out to endanger the glass.

Putty-Knife.—A short-bladed knife with either a pointed or a square end, used for spreading putty in nail-holes, etc., or for puttying around glass in window frames.

Q

Quaker Green.—A green of olive cast; sometimes called *bronze-green*. It can be purchased ready prepared in cans of 1 or 5 lbs. capacity.

Quarter. (*Her.*)—An ordinary of quadrangular form resembling a banner, and laid as a charge upon the field of which it contains one-fourth part, as the name implies.

Quartering. (*Her.*)—The marshalling or regular arrangement of various coats in one shield, thereby denoting the several alliances of one family with the heiresses of others.

Qualities of Pigments.—The general qualities of good pigments, technically called *colors*, are: 1, beauty of color, which includes purity, brightness and depth; 2, body; 3, transparency or opacity; 4, working well; 5, keeping their place; 6, drying well; and 7, durability; but few pigments possess all these qualities in equal proportion.

Quick Leveling Varnish.—As its name implies, it is a varnish to be used for leveling coats on carriage bodies or gears, and dries quickly. For hurried work it has no superior. It can be rubbed in ten hours without sweating, and being a free working varnish, a good surface can be easily brought up with it. It rubs nicely, and is an excellent varnish for inside house work or for furni-

ture, and in fact any use where a hard, quick varnish is desired.

Quick Black Lacquer.—A jet-black, and very quick-drying lacquer (or japan) for hastily repairing the iron work of carriages, etc. It dries in an hour, and requires to be varnished over. Black japan is preferable because more durable.

Quick Color.—Color made to dry quickly. Mix the dry pigment, black, blue, green, etc., with a good quality of japan, which may be tested by putting a few drops in the palm of the hand, and then adding a little raw linseed oil—if the japan be good, the mixture will not curdle, but a perfect assimilation of the two will result—and run the paint through the mill as fine as possible. This "quick color," by the addition of varnish, is made into color-and-varnish, and the addition of oil (a tablespoonful to a pint of paint) forms panel *color*. Paint that has oil in it should not be used for making color-and-varnish, as it is liable to "crawl" or "pit."

R

Railway Coach Finishing-Varnish.—This varnish is to the car-painter what wearing-body is to the carriage-painter—the best quality of varnish for the exterior of railway cars. It is the custom of car-painters now-a-days to apply two coats of this varnish, instead of using more rubbing varnish coats. A good washing and drying with the chamois will prepare the surface for the second coat, providing it be applied immediately after washing and before any sweating of the surface begins. This adds greatly to the durability of the work.

Rampant. (*Her.*)—A term used to describe lions, tigers, bears, etc., when represented as standing erect on their hind legs and pawing the air with their fore feet.

Raw Sienna.—An ochre, of a brownish-yellow color found near Sienna, Italy.

Raw Umber.—A natural ochre abounding with decayed vegetable matter, of the nature of peat. It is a good drier, holding in its parts a large share of manganese, and it will therefore bear a larger proportion of oil than almost any other color. When burned or roasted it gives a beautiful dark brown shade of color. It is highly esteemed by the carriage-painter in making umber browns, etc.

Realgar.—Native tersulphide of arsenic, composed of 70 per cent of arsenic, and 30 of sulphur. It is of various tints of red; it is found in Hungary and used quite extensively as a pigment.

Red.—The second and intermediate of the primary colors, standing between yellow and blue, and in like intermediate relation to white and black, or light and shade. It is pre-eminent among colors as well as the most positive. It gives some degree of warmth to all colors, but most to those which partake of yellow. The list of red pigments may be noted as follows:

Amaranda lake.
Burnt carmine.
Burnt sienna.
Carmine.
Carmine lake.
Carmoisen lake.
Chatemuc lake.
Crimson lake.
Florentine lake.
Indian red.
Italian red.
Light red.
Mars red.
Munich lake.
Orange mineral.
Persian scarlet.
Persian red.
Red lead.
Rose lake.
Rose madder.
Rose pink.
Royal red.
Rose scarlet.
Scarlet lake.
Solferino lake.
Turkey red.
Tuscan red.
Venetian red.
Vermilion, American.
" California.
" Chinese.
" English.
" French.
" Italian.
" Trieste.
" Zubia.

Red Lead or Minium.—A compound of the protoxide and peroxide of the metal. It is a very distinct red color, requiring but little preparation.

Relief.—Painting an ornament or monogram with one color in different degrees of strength. As for instance, if blue be employed, the relief or round-

ness would be brought out by using different tints of blue and white.

Resolvent.—A paint resolvent is really a preparation for removing the paint and varnish from any surface. Equal parts of sal soda and quicklime make an effectual resolvent for some kinds of paint, notably the interior painting in houses. (*See Detergent.*)

Reno's French Umber.—An earth, holding a large share of oxide of iron, used as a filling, or rough-stuff for carriage bodies.

Rinsing Cup.—A cup or can provided with a perforated division or bottom about one-half its depth, which may be removed for cleaning the vessel. The cup is kept filled with turpentine, and when pencils are rinsed in it the color falls to the bottom, and the extra perforated bottom prevents the disturbance of the sediment where pencils are being rinsed.

Roan.—A color between yellow and gray.

Roof Brush.—A brush for painting roofs of buildings and other like work, generally made as shown, virtually three brushes in one, and made to fit a long handle so that the workman may stand up at his work.

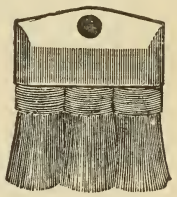


FIG. 90.—ROOF BRUSH.

Roman White.—Is of the purest white color, but differs from French white in the warm flesh color of the external surface of the large square masses in which it is usually prepared.

Rose Color.—The hue or color of a rose, made by mixing carmine and white—when this color is indicated, the *red rose* is generally meant.

Rose Pink.—A pigment made by impregnating common whiting with cochineal or madder reds; it is extremely fugitive.

Rotten-Stone.—A mineral consisting chiefly of alumina, with about ten per cent of carbonaceous matter, and a little silica. It is found in New York State. It is brown; either grayish, reddish or blackish. It is soft and easily pulverized, and is used by painters for polishing or for rubbing the surface of bodies. When a carriage body has been rubbed with pulverized pumice-stone, and washed clean, a second light rubbing with *rotten-stone* will greatly improve the work, as the latter is finer and softer than the pumice, and every little scratch made in the first rubbing may be obliterated and a perfectly smooth surface be secured for flowing varnish over.

Rough-Stuff.—A coarse paint, used to level over or fill the pores and inequalities of surface on carriage bodies and railway cars.

It is made from the following or similar formulas: 1, Yellow ochre, sifted, two parts; keg-lead (white lead ground in oil) one part; mix and grind stiff in turpentine; add rubbing varnish, two parts; crown coach japan, one part. Thin as desired with turpentine. 2, English filling (*q. v.*), two parts; keg-lead, one part; turpentine, two parts; japan gold-size, one part; bottoms of wearing-body varnish, one-half part. Pass through the mill the filler and lead, then mix in the other materials. 3, Dry white lead, 1½ lbs.

English filling, 4 lbs., ground separate, in enough turpentine to form a stiff paste. Mix and add keg-lead, one pound; japan gold-size, one pint; bottoms of wearing-body varnish, ½ pint; thin with turpentine. 4, *First coat over priming.*—Take five pounds of English filling, two pounds tub-lead, one pint oil, one pint finishing varnish, and one-and-a-half pints of japan gold-size; grind quite fine, thin with turpentine to use. *Second, third,* and *fourth* coats.—Take five pounds English filling, two pounds dry white lead, one-half pint of oil, two pints rubbing varnish, two pints japan gold-size, thin with turpentine.

Either of these receipts will give good results if properly mixed. But it is considered best by those who aim to make and preserve their reputation for doing good work, to employ only the *ready prepared rough-stuff,* from the fact that it is mixed from a formula which long experience has proved the best, and being made in large quantities by exact weight or measure is uniform to the last degree.

Royal Red.—This color, so desirable in decoration, may be made so as to imitate vermilion by taking eosine as a base. The following separate solutions must first be made: Eosine, three-eighths of an ounce, dissolved in three pints of water; sulphate of alumina, two ounces, in one pint of water; acetate of lead, three-and-one-half ounces, in one pint of water. The solution of eosine is first added to that of sulphate of alumina, and then the solution of acetate of lead is poured on both. The mixture is to be filtered and washed, and when dry will yield three-and-one-fifth ounces of pure lead vermilionette. The color will not be injured

if, for the sake of a larger quantity of material, a paste is made—six ounces of dry barytes, and water—and added to same, together with a few drops of gum dragon to increase the brilliancy. Mix well, and dry.

Rubbing.—The act of abraiding or leveling either a painted or a varnished surface in order to remove all irregularities. There are five distinct kinds of rubbing to be performed in a carriage paint shop: 1, Rubbing coarse paint to a smooth surface by the use of lump pumice-stone or like material; 2, The rubbing of a surface with sand-paper to smoothe it and prepare for subsequent coats; 3, Rubbing with curled hair or moss a surface of varnish or paint to remove the lustre or slight irregularities; 4, Rubbing with pulverized pumice-stone and water; a varnished surface, to make it smooth for receiving more varnish; and 5, Rubbing the last rubbed surface with pulverized rotten-stone and water to remove any marks left by the pumice-stone.

Next in importance to laying varnish properly is that of rubbing it with pumice-stone, preparatory to applying a subsequent coat; for it is not unfrequently the case that a body which has been well varnished throughout the rubbing-coats does not produce a fine finish, while on the other hand a body indifferently varnished, when taken in hand by a competent workman, will be so corrected by rubbing as to give perfect satisfaction. Rubbing is an art, and although most painters can *rub*, their work seldom comes up to the standard of those who do nothing but rubbing in large factories.

The pumice powder used for rubbing should be

neither too fine nor too coarse; a medium grade will be found best for ordinary work. This, however, should not be entirely depended upon as regards freedom from lumps or coarse grains, but the painter should have a small fine sieve, through which to pass all pumice powder before putting it upon the work, for the least grit or coarse piece of the stone may injure the panel, causing much extra labor and expense.

The above precaution is not the only one to be observed. The painter must also secure good clean cloth or felt for the rubber. A piece of an old head-lining or cushion-top is not exactly the thing, for there may be a tack or some grit lodged within it to scratch the surface. A clean piece of cloth from the trimmer's bench will last longer, as well as do better service. We have always given preference to a piece of old felt hat, as a rub-rag, finishing around the moldings with a soft cloth. A pine stick is sometimes useful in rubbing out small indentations in a job and such places should always be *rubbed*, not slighted. There is also quite a difference in water, though seldom thought of. Rain water is preferable, because it is *soft* and pure. Water from an old well, possibly containing a percentage of ammonia or alkali, from the stable or decayed vegetable matter, is not suitable for rubbing or washing a body. If the water used be clean but *hard*, a piece of soda the size of a hickory nut will improve it, rendering it soft and better adapted for cleaning the work. Next, the sponge used should be clean. Avoid using one fresh from the pail of soap suds, where the painters have washed their hands; or one filled with turpentine and oil, such as we have frequent-

ly seen in paint shops. Cleanliness in these matters is of the utmost importance, without which trouble of some kind is liable to occur. The "shammy," as it is called, should be a real chamois skin, not lime-cured sheepskin. Who ever saw a cheap chamois that did not deposit more lint and dirt on a panel than it removed? Real French oil-dressed chamois skin is the best and cheapest.

The tools being perfect, let us look at the work in hand. The body having been standing aside for some time, has probably some dust upon it, and the rubbing must not be proceeded with until that is removed. Therefore, with clean water and a clean sponge the whole body is well cleansed and dried off with the chamois. Then saturating the rub-rag with water, dip it into the moistened pumice powder and lay it on the panel, bearing on quite light at first to spread the pumice over a part of the work before giving it the pressure necessary to cut the varnish surface. Rub a panel well around the edges, and the central portion will be passed over sufficiently in so doing to get its proper share without extra care. Rub lengthwise the panel, and carefully draw the rag across the ends, then wash off the pumice and chamois dry. Do not put too much pumice powder on the panel at once, nor leave the panel until the pumice is quite well reduced to fine powder; the finer the better the appearance of the work. Be particular to keep all parts of the work clean. Do not let the pumice-stone and water dry upon the work under any circumstances. Go on from panel to panel until all is done, washing everything clean and keeping it so as you proceed. Do not

soak the chamois for hours, in a pail of water, nor wring it out any oftener than necessary; a damp chamois will be more effectual as a drier, and hard wringing will destroy it sooner than ordinary use. When the job is well rubbed with pumice, and an extra fine finish is desired, go over the whole surface with clean rags, dipped in pulverized rotten-stone and water; then wash clean, and dry off with the chamois. Then, to secure a good job of varnishing, run the body into the varnish-room and lay on the varnish before there is the least sign of "sweating" upon the rubbed surface.

Rubbing-In.—The application of graining color, a large brush being used to put the color on, and well brushed over, spread, or rubbed in, before the grain marks are added. The term is applied to the application of priming on carriages.

Rubbing Felt.—A thick felt material used for rubbing varnished surfaces with pumice powder or rotten-stone. Painters were at one time in the habit of cutting their rubbing cloths from an old felt hat, but manufacturers have come to their aid with the material in sheets, and one firm, Valentine & Co., the varnish makers, have put in market a patented article of perforated felt. This is made in various thicknesses, and small holes are punched through it at intervals of say one-half an inch over the whole surface; these are intended to retain some of the pumice powder and thus supply what is required without frequent dipping, and, besides, to retain some of the varnish gum rubbed off, so that the surface of the rubbing cloth will not so soon become glazed over.

Rubbing Coats.—Those coats of varnish which are put on to a surface for the purpose of making a smooth and level foundation for the *flowing coat* or coats of finishing varnish. It is seldom the case that a coat of rubbing varnish is laid as nicely, that is, as clean and free from blemish, as a coat of finishing varnish. Painters are apt to slight their under coats, and put too much dependence in the rubbing to bring the work up smooth. The more pains taken with rubbing coats, the less labor required in rubbing, and the better the work will be.

If brush marks are left in the rubbing coat of varnish, they may be rubbed out, but it occasions extra labor to remove them. It sometimes happens that rough-stuff is laid on too thick and brush marks are left in, then there will be an *appearance* of brush marks in the varnish coats, when in reality the varnish coats are smooth, and perfectly free from brush marks. The marks of the brush in the rough-stuff *will show in the finish.*

Rubbing coats should "flow out" as nicely as finishing coats, and they will do so if freely applied and not brushed too long.

Ruben's Brown.—A rich brown pigment, of a warmer and more ochreous color than Vandyke brown.

Running, Sagging, Crawling.—Technical terms given to a streaked appearance of the varnish coat after it has set, and may be caused by varnishing over an oily glossy surface, or a sweating coat of varnish. It may be prevented by washing the work, or by rubbing with curled hair or a

damp chamois. "Crawling" may be caused by the perspiration of the hands upon the work, and again, varnish is liable to crawl (in the same manner as water thrown upon glass) when applied in a cold room, or upon a cold surface.

Russet.—A reddish brown color, made by mixing the primary colors in the proportion of two parts red and one each of blue and yellow.

S

Sable.—The fur or hair of an animal of the weasel species. Although the name is synonymous with *black*, there is a *red* sable-hair of which artists' pencils are formed. The black sable pencils are made of the hair which grows at the extreme end of the tail of the animal, therefore, its scarcity and cost. Striping and lettering pencils are made of this hair, bound in quills, and for heavy color they are excellent. Some of the black sable-hair is fully two inches in length, but the red sable-hair cannot be obtained over an inch in length, the latter is soft yet elastic, and is generally bound in tin with long cedar handles designed expressly for artists' use.

Sadden.—A technical term used by painters to express the dulling of a color. The opposite of *brighten*, as, white and yellow make a bright flesh color, but a drop of black will sadden it.

Sandy, Seedy or Specky.—Terms applied to varnish when the surface appears as if fine sand or seed had been sprinkled over it. A newly made varnish, which has not had sufficient time to ripen, is liable to make the work look "*seedy*," but an experienced workman should be able to tell, as soon as he puts his brush into such varnish, that it will not do to use it immediately; if set away,

however, and allowed to mature, it will in a few months correct this trouble. To use varnish from a freshly opened can, without first uncorking it and allowing exposure to the air during a few hours, that the "spirit of varnish" as it is called, may evaporate, will sometimes cause a *specky* finish. "Chilling" of varnish is sometimes caused by keeping the cans stored in a cold place or setting upon the floor, the coldest part of the room, and the effect is *specky* varnish. A good warming on or above the stove will cure this difficulty. It has been said by chemists that the specks seen in chilled varnish were particles of drier crystallized from the state of solution; and this may have some bearing on the case, but we have seen both varnish and the *purest raw linseed oil* have that *specky* appearance at a temperature of about 40 degrees. All varnishes deposit more or less settlings when left standing for a long time, and for this reason, when five-gallon cans are used, at least one-eighth should be set away for less particular purposes when the other seven-eighths have been used out. *Specks* are liable to occur in varnish that has skinned over; these specks are simply the broken skin. Dust or pumice powder will also produce *specks* in the work, but the greatest of all troubles in this respect is "chilling." The cans of varnish should be kept *upon a shelf* in a warm dry room, and be disturbed as little as possible.

Saffron Color.—A deep yellow.

Salmon Color.—A color made by mixing five parts of white, one yellow, one umber, and one of red.

Sanding.—Fine white sand is thrown from a cup having a perforated cover, similar to a pepper box, or blown from a pair of bellows, with the head of a water-pot attached, upon fresh paint. To imitate stone the color should be several shades darker than the desired finish, and the paint should be mixed principally with boiled oil. The sand should be well dried before use.

Sap Green.—The juice of buckthorn-berries fermented for seven or eight days, after which a little alum is added; and when evaporated to a thick consistency it is pressed into bladders and hung up until entirely dry. It is principally used in water-color.

Sash Tool.—A small round brush made of bristles, and used for painting sashes, hence its name.

Saxon Green.—Carbonate of copper found in a natural state in the mountains of Saxony and Hungary. It is of a pale hue, and is sometimes called "Hungary green."

Scarlet Lake.—A pigment of a beautiful transparent color and excellent body, working well in both water and oil; like other lakes it dries slowly. Strong light discolors and destroys it; its tints with white lead, and its combinations with other colors, are not permanent. It ought never to be used as a glazing.

Scaffold Bracket.—A contrivance for the use of house-painters. Fig. 91 gives a very clear idea of its construction; it is made of wrought-iron, the lower or supporting beam branching out into two arms, which end in hooks and hang upon the rounds of the ladder. The upper portion is a flat

piece of wrought-iron, with its upper edge notched so that the loop of the hook attaching it to the upper round may be removed from one to the other and thus bring the lower beam to a level, whatever may be the slant of the ladder. All that is needed for its use is a couple of strong ladders, such as are found in the ordinary outfit of any painter, and a strong plank, and you can make a good, serviceable scaffold, suitable for the use of a

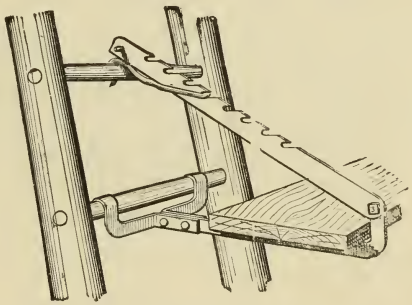


FIG. 91.—SCAFFOLD BRACKET.

painter, carpenter, or mason in their work on the exterior of a building. Mr. Wm. T. Comstock, No. 6 Astor Place, N. Y., is the manufacturer of these brackets, and further information may be obtained from him.

Secondary Colors.—The primary colors in pairs: as *red* and *yellow* forming ORANGE, *blue* and *yellow* forming GREEN, *red* and *blue* forming VIOLET.

Scene Painting.—This peculiar department of painting, as contradistinguished from all others, possesses its own laws, its own practice, and its scientific rules in the same manner as perspective.

The scene-painter, in the first instance, should

be thoroughly conversant with the laws of color, as it is only by that means that he can judge accurately of the appearance the colors he paints by day will have when subjected to an intense artificial light. In the next place, it is indispensable that he be well versed in the rules of both linear and ærial perspective. He traces by fixed geometrical operations, lines blended or inclined, which the spectator at the proper point of view imagines to be straight ones. He uses chiefly water-colors, on account of their operating promptly and presenting no glossy surface. There are two descriptions of lights to be considered in scene painting—one the light which the painter supposes to illuminate his picture, and the other that which actually does light up the canvas, such as head, foot and side lights; and the position and power of these must be carefully studied by the artist before he begins work.

Generally the scenes should have a tone favorable to every color of the dress. If, however, the scene-painter is obliged to depart from so favorable an undecided tone, and to represent a red or yellow chamber, a white tent, or a green garden, the actors should be clever enough to avoid similar colors in their dresses. If an actor in red uniform enters a red room, the upper part of his body vanishes, and only his legs are seen; if with the same dress he enters a green garden, his legs vanish, and the upper part of his body is conspicuous. Thus an actor in a white coat and dark trowsers, will have the upper part of his body vanish in a white tent while his legs will disappear against a dark background. Even when the scene painter is obliged to have a red or yellow chamber, or a

green garden or wood, these colors should be somewhat faint and hazy, that every dress in the foreground may be relieved and have the proper effect.

We will now describe in detail the various implements, brushes, and materials employed in scene painting, for the artist must have all these at hand, and be fully equipped before he can think of commencing work. The *brushes*, being one of the most important items, will first receive attention.

Fig. 92 is an oval ground brush. Numbers required—two No. $\frac{0}{8}$, one No. $\frac{0}{4}$, one No. 1.

Fig. 93 is a scene-painter's tool. These are similar to the ordinary sash tools; the hairs, however, are longer, being from 4 to $4\frac{1}{2}$ inches in length. One each of Nos. 8, 10 and 12. Two each Nos. 1, 2, 4 and 6.

Fig. 94 is a flat hog-hair brush. One each, 1, 2, 4, 6, 8, 10, 12, 14 and 16.

Fig. 95 is a round hog-hair brush. One each, Nos. 1, 2, 4, 6, 8, 10 and 12.

Fig. 96 is a bevelled lining fitch. These are used for ruling lines with the straight-edge, and will be found to do the work better than any other sort. Two each $\frac{1}{2}$ inch, $\frac{3}{4}$ inch, 1 inch.

Quilled or Fine Tools are used also by most scene-painters. They are small sash tools, but bound in quill, and will do well for fine work, one each of every other number will be found sufficient.

Figs. 97 and 98 are two or one-knot ground distemper brushes for priming the canvas and laying in large masses of color.

Stencil Brushes.—One or two of these will be required when painting interiors or prosceniums.

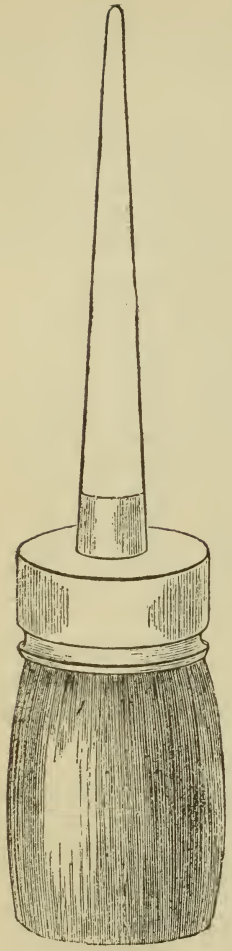


FIG. 92.—POUND BRUSH.

FIG. 93.—NO. 12 SCENE-PAINTER'S TOOL.

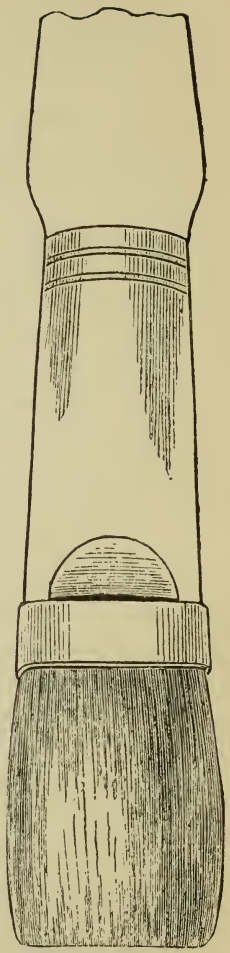


FIG. 94.—NO. 12 FLAG HOG-HAIR LINER.

FIG. 95.—NO. 12 ROUND FRENCH TOOL.

FIG. 96.—NO. 8 FRENCH HOG-HAIR LINER (BEVELLED).

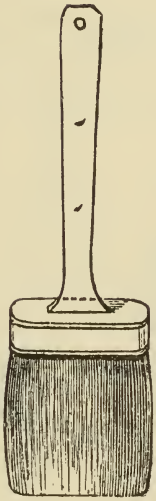


FIG. 97.—DOUBLE OR TWO-TIE BRUSH.

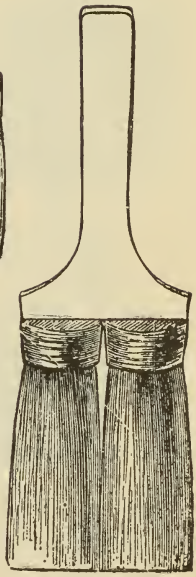


FIG. 98.—ANOTHER FORM OF DOUBLE BRUSH.

One No. 4, one No. 12, and one No. 24, will perhaps be found handy.

This concludes the brushes.

Fig. 99 is a 12-inch palette knife used for manipulating the colors with.

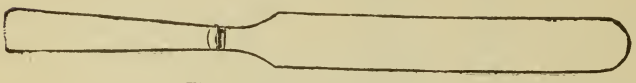


FIG. 99.—PALETTE KNIFE.

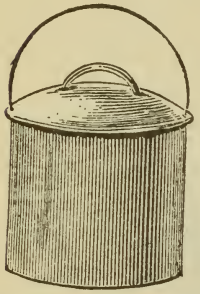


FIG. 100.—SIZE KETTLE.

FIG. 101.—LADLE.

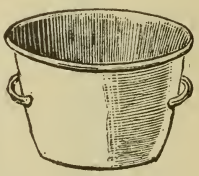


FIG. 102.—EARTHENWARE PAN FOR SOAKING GILDER'S WHITING.

FIG. 103.—PAINT POT.

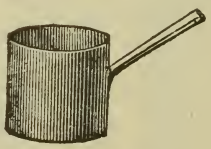


FIG. 104.—PAINT TIN.

Fig. 100 is an ordinary tin kettle used for melting the size in.

Fig. 101 is a tin ladle which is used for taking size out of the kettle.

Fig. 102 is an earthenware pan for soaking whiting.

Fig. 103 an earthenware pot, and Fig. 104 a tin saucepan for holding and warming colors.

Fig. 105 is an easel, about 5 feet high for holding the model or design of scene about to be painted.

Figs. 106 and 107 are a stone and muller, the former a marble slab, about 2 feet square, used for grinding colors on. It should be mounted on

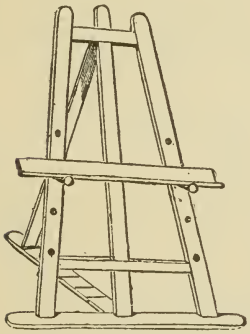


FIG. 105.—EASEL FOR HOLDING MODEL OR DESIGN.

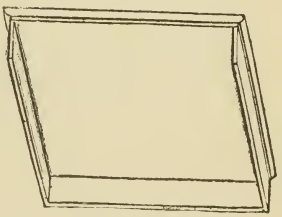


FIG. 106.—MARBLE SLAB.

FIG. 107.—MULLER.

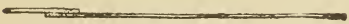


FIG. 108.—CHARCOAL AND STICK FOR TRACING OUTLINES.

wood and have ledges round three sides to prevent colors running off. In some painting rooms mills are used for grinding colors.

Fig. 108 is charcoal for "drawing in" scene on canvas. It is generally tied firmly on a stick to give a larger range and freedom to the hand.

Fig. 109 *A* is a chalk line on reel, and *B* a flogger. The latter is used for dusting away charcoal after a sketch is completed. It is made with several odd strips of canvas, 2 feet in length,

bound tightly on to an old piece of broom-handle, as shown in the illustration.

Fig. 110 is a wooden palette, 4 feet by 2½ feet. It should have a ledge 3 inches high round three sides. On the left hand and at the back are eighteen to twenty divisions or compartments for holding the different colors (see sketch). On the right hand generally stand the pots or cans, containing the weak and strong size. The palette must have three good coats of white oil paint, and be well sand-papered. The brushes are generally

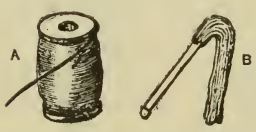


FIG. 109.—CHALK LINE (A) AND FLOGGER (B).

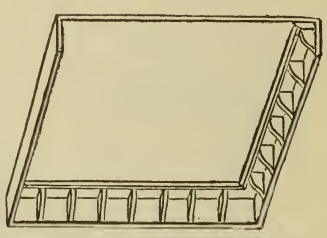


FIG. 110.—SKETCH SHOWING FORM OF SCENE-PAINTER'S PALETTE.

laid out on the right of palette when being used, to be easy of access.

CANVAS.—This is sold in two widths and several qualities. In width it is 36 inches and 72 inches; the latter is the best, as there are not so many seams required. Unbleached muslin may be used for small scenes, and may be had in all widths up to 60 inches. Gold, silver, and colored foils, Dutch metal, frosting, spangles, etc., are employed for pantomine and burlesque scenery, and will be described later on. The following articles will, possibly, complete our list of requisites, viz.,

a sponge, a plumb-bob and line, a two-foot rule, a pair of large shears, and a pair of wooden compasses.

COLORS.—Next in importance come the colors, and they will be named in the order in which it is convenient to place them on the palette.

WHITING.—The best gilder's whiting only should be used, as it lasts longer, and contains less lime than the common article of domestic use. It is generally sold in lumps, and when required for painting should be broken up and put in the earthen pan, Fig. 102. Enough water must be added to make a stiff paste, care being taken not to make it a liquid. *The last remark applies to all colors when put into the stock-pots ready for use.* It is used to mix with most of the colors to reduce them, and also to give them greater covering power. Mixed with size, it is known as priming for covering new canvas with. The pan containing the whiting should stand on the table to the left of the palette.

1. FLAKE WHITE.—A fine solid white, apt to turn a brownish color in the course of time. It is used for extra brightness, and where the highest lights are required. It is sold in lumps, and can be crushed with the palette-knife to be fit for use.

2. LEMON CHROME. — A brilliant light yellow, largely used in scene-painting. It is sold in soft lumps, and only requires to be crushed in water as above.

3. ORANGE CHROME.—A rich color of the same nature as the former, but of a much darker shade.

4. GOLDEN OR YELLOW OCHRE. — This is a most useful and inexpensive color, and will often be re-

quired. It is sold in powder, and only requires the addition of water to be ready for use.

5. Raw Sienna. — A rich golden yellow, and is chiefly used for glazing. It is sold in hard lumps, but had better be procured, ready ground, in a state of a pulp.

6. Burnt Sienna.—A rich glazing color. A small quantity of this should be kept in oil ready for use. It will be required for painting and shading on gold foil or gold leaf.

7. Raw Umber.—A color often required, sold in dry powder, or in pulp.

8. Burnt Umber.—A useful brown, used for glazing purposes.

9. Vandyke Brown. — A rich dark brown, often used, and a good glazing color. Sold, ready ground, in water.

10. Venetian Red.—A cheap and useful color, often in request, and has great covering power. Sold in powder, and requires no grinding.

11. Vermilion.—A bright red in powder, of which there are several grades (*q. v.*) requires no grinding.

12. Rose Pink.—One of the most useful colors used in scene painting, and very cheap. It will be continually required, and is sold in soft lumps. Can be ground on the slab with the palette-knife or muller.

13. Damp Lake.—A deep crimson, and often required. It is sold in damp state, and should always be kept moist. It is one of the best of glazing colors.

14. Brown Lake.—A rich claret-colored brown,

sold in pulp, same as the last. It is rather expensive so should be used sparingly.

15. Ultramarine.—A fine bright blue, sold in powder, and only requires to be plunged in water for use.

16. Indigo.—A deep, dark blue, often required, and a good glazing color. Indigo is extremely hard to grind—it has first to be soaked for several hours in boiling water, and then carefully ground with the muller. It had better be procured ready ground when possible.

17. Dark Brunswick Green.—A cheap and useful green, but not of lasting duration, of great brightness. For extra good work, such as the painting of prosceniums and act drops, the green lakes, afterwards mentioned, should be used. Sold in powder, and requires no grinding.

18. Light Brunswick Green.—Similar to the previous color, but several shades lighter.

19. Prussian Blue.—A beautiful, rich and powerful blue, now largely used by leading artists. Is very hard and requires much grinding, so had best be obtained in pulp.

20. Drop, Ivory, or Blue-Black.—The first or the last of these three blacks will do for ordinary work, but for anything particular ivory-black is recommended. Sold in soft lumps, and easy to grind.

If there are more divisions made to the palette, the following colors may be added with considerable advantage:

Dark Medium and Light Green Lakes.—A most useful green, very powerful and lasting, and of great richness. It is rather expensive, and is sold in jars in a damp or pulpy state.

MAUVE PASTE.—The same color as its name implies, and useful for painting draperies and costumes in figure painting.

DUTCH PINK.—A most useful *yellow* in distemper painting, and mixes well with any color. It is much used for the high lights in foliage painting, and is so often required that it always finds a place on the palette. It mixes well with greens to get different tints and shades.

There are certain other colors that will often be in request, and it may be well to name them.

CRIMSON LAKE, SCARLET LAKE AND YELLOW LAKE. —Very rich colors, used mostly for draperies, and sold in pulp, price very high.

CARNATION PASTE.—A useful color for draperies, and much used for that purpose. It is cheaper than lake.

CARMINE PASTE.—A rich crimson, used for draperies and glazing. It is very dear, and does not keep long.

BLUE VERDITER.—A useful blue for night skies and scenes. Sold in powder, but of a sandy nature.

AZURE BLUE.—A beautiful light blue, very bright and delicate, used for painting a certain class of skies, such as a cloudless summer sky as seen in Italy or Spain.

DAMP BLUE.—A cheap common blue; can be used for common work not intended to stand long.

EMERALD GREEN.—A rich, bright green, not often required.

BRONZE GREEN.—A dark sage green, sold in powder.

DARK BROWN OCHRE.—A cheap and useful brown;

used for foregrounds and rockwork. Sold in powder.

ORANGE RED.—A useful color, and not dear. Can be often used for heightening the effect in several descriptions of scenes.

RED LEAD.—The ordinary red lead, can be used in place of vermilion on much work.

CHINESE RED.—A deep red, may be used in place of many of the lakes.

INDIAN RED.—Similar to Venetian red, but darker.

SALIN RED.—A powder of a light pink or red color.

CRIMSON RED.—Another red, sold in powder.

SPANISH BROWN.—A good and useful red brown, of an earthy nature. It has wonderful covering powers, is very cheap in powder.

There are many others that might be mentioned but space will not permit. Such as, Schweinfurter green, Neuwieder green, silver white, Bremen blue, Solferino, Munich lake, Florentine lake, Vienna lake, and Cobalt blue, which is a very superior blue for skies.

PURCHASING COLORS.—The reader will perhaps be pleased to have some idea as to what colors he should obtain to begin with, and the quantity of each he should order.

Seven pounds each of flake white, Dutch pink, yellow and brown ochre, orange-lead, Venetian red, rose pink, Brunswick greens (dark, medium and light), drop black, German ultramarine, celestial blue and damp lake. Four pounds each indigo, orange chrome, yellow chrome, vermilion and Vandyke brown.

Three pounds each Prussian blue, burnt and raw siennas, burnt and raw umbers and brown lake.

One pound each azure blue, Chinese red, crimson lake, carnation paste, mauve paste, dark and light green lakes.

Fourteen pounds of gilder's whiting and a firkin of best double size.

The regular painting-room in our large theatres is in most cases situated in the "flies"—*i. e.*, over the stage. When the scenes are painted in such a place the framework on which the canvas is tacked for painting is made to sink through a slot or opening in the floor of the paint-loft and is gradually wound up as the artist proceeds with his work. In cases where the painting is done on a level with the stage and a sufficient depth below not allowing the frame to sink low enough, recourse is made to a kind of scaffolding technically termed the "painting bridge," the painting frame in this instance being a fixture; these various appliances we will now describe.

Movable Painting Frames.—In order that the scene-painter may execute his work in a rapid and masterly manner, he should be able to reach any portion of his scene at will, and the quickest way of doing this is by having an opening in the floor as previously described. Fig. 111 is an illustration of the manner in which a large painting frame of this description is worked; *A*, is the purchase wheel; *B*, the spindle; *C*, the counterweight line; *D*, counterweight, which balances weight of frame; *E*, lines attached to frame for raising and lowering it and which wind on and off spindle or axle of purchase wheel; *F*, the line from purchase wheel to windlass; *G*, the windlass; *H*, frame for canvas. Fig. 112 is a section of the same.

For smaller and lighter scenes, we show a modi-

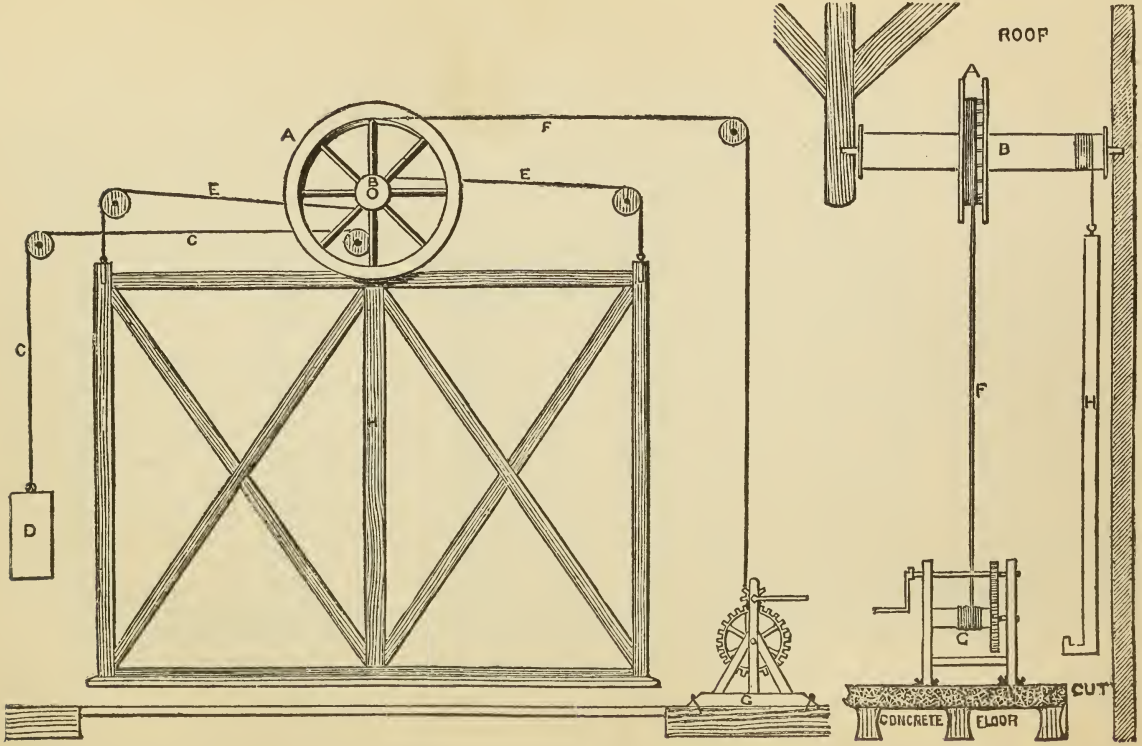


FIG. 111.—MOVABLE PAINTING FRAME WORKED WITH WINDLASS—FRONT VIEW.

FIG. 112.—SIDE VIEW.

fication of the above, which is worked by counter-weights only, after the manner of a window-sash, the sketch (Fig. 113) explains everything.

The Painting Bridge.—One of the simplest forms of painting is shown in Fig. 114. It works on wheels and can be constructed to take to pieces by using bed screws instead of nails. A couple of stout planks are required—one for the artist to stand on, the other to hold palettes, colors, etc. A still more simple kind of bridge is that shown in Fig. 115, and consists of a couple of trestles or ladders, and some two-inch planks. These are easily procurable.

It may not be out of place to explain a few of the terms and phrases made use of by the profession inside a theatre, as many of these words will no doubt be used in latter paragraphs.

Act Drop.—A picture, or single painted surface of canvas, let down by way of a blind or curtain between the acts, so as to close up the proscenium opening.

Borders.—Also known as "hanging scenes" and "soffits." Borders are of three descriptions; interior, sky and foliage borders. The interiors are painted to imitate ceilings or roofs of rooms, huts, etc., the other two are used for exterior scenes. They are merely strips of painted canvas hung across the top of the stage to screen the space above.

Box Scenes.—Instead of the usual wings ranged one behind the other, as in the old method, there is a series of "flats" on each side, extending from the proscenium wing up to the back. The back part of the stage is likewise enclosed in this man-

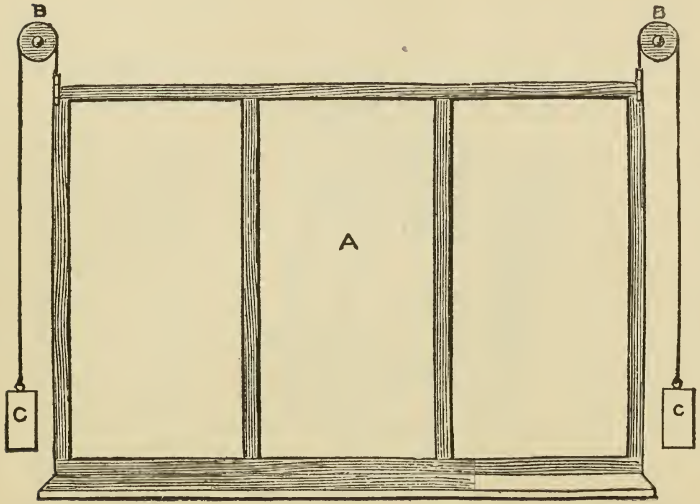


FIG. 113.—MOVABLE PAINTING FRAME FOR LIGHT WORK.

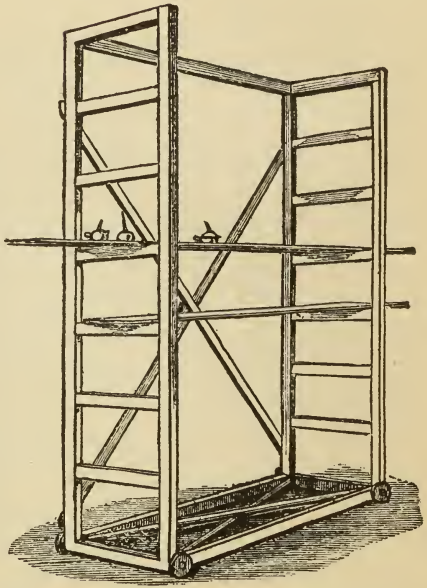


FIG. 114.—SIMPLE FORM OF PAINTING BRIDGE.

ner; the stage is thus completely enclosed on all three sides, the doors, windows, etc., being placed where required. By this means a more perfect representation of a room can be obtained, than where wings are employed. Known, also, as "enclosed chamber scenes." Such a scene as this, of course, represents the sides and further end of the room.

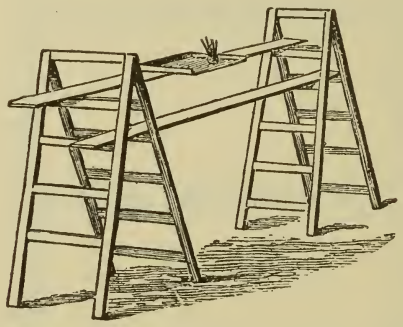


FIG. 115.—PAINTING BRIDGE OF BOARDS SUPPORTED ON TRESTLES.

BACKING.—A small "cloth" or piece of canvas placed behind where an opening occurs in the scenery at the back, such as French windows, double or folding doors, etc. This may be made to represent a conservatory, a street, veranda, or open country. If for interiors, a hall or side room may be shown. When lattice windows are used, a good distant view of the country is very effective, if strongly lighted by ground lights.

BUILT SCENERY.—Scenes that are built out on the stage, mostly of wood, and decorated by the artist to form part of his picture. They are generally strongly made. A bridge or mountain-path on which a number of actors could walk or stand at

the same time, illustrates our meaning. The balcony in "Romeo and Juliet" is a small piece of scenery of this description.

CLOTHS.—These are the scenes which work up and down on rollers from the bottom, and known generally as "back scenes" or "rolling scenes"; in the paint-loft they are invariably called "cloths." The scene at the extreme back is termed the "back cloth," or "drop scenes."

CUT CLOTHS.—Scenes with portions cut out after being painted on the frame. In exteriors they consist of woods, with the spaces left between the trunks of trees and branches cut away. The foliage cut in places, which makes the scene very effective. Ruins, arches, etc., are also treated in this way.

DISTEMPER OR TEMPERA.—All scene painting is executed in distemper—that is, with colors mixed up with size and water.

FLATS.—Scenes, the canvas for which is strained upon framing; they are similar to side wings, but much larger.

SLIDING FLATS are two broad frames, each half the width of the stage. They are worked on from either side, meeting each other and uniting in the centre. These are used when a practicable door or window is required in a scene, which has closed in on the back scene, and where for this reason, a drop scene is of no use. They can be used on any part of the stage, but are generally pushed on from the second entrance. Flats can of course be used also as back scenes; in fact, interiors consist mainly of these. Interiors are seldom painted on "cloths" excepting for corridors,

passages, etc., where doors and windows are not required. Pantomine and burlesque interiors, such as kitchens, with all the different utensils painted in, attics and caves, are, as a rule, painted on cloths.

Open Flats.—Are similar to cut cloths, as they serve the same purpose. They are scenes cut out in places so that the actors can pass through them, as in groves, caves forests, and open arches.

Flies.—The galleries running along each side of the stage, above the proscenium opening and where all drops are fixed and worked for lowering or raising drop scenes.

Fan Pieces.—Used in transformation scenes, and work like a fan, suddenly collapsing and discovering a fairy, etc.

Ground Pieces.—Low pieces of profile running across the stage on the floor, used to mask a row of lights.

Glazing.—Going over work already painted with transparent colors diluted with strong size.

"Laying In."—This term is given to the first painting, and consists of putting in the middle or half tints of the picture, using broad masses of color of the required shades. Over this the high lights and shades are afterwards put in.

Marking Up.—Marking the outlines bolder, especially in the foreground, and should be done with strong size mixed with the proper pigments.

Mordant.—A cement used in fixing Dutch metal to the scenes.

Profile.—Thin boards covered with a particular kind of canvas to prevent them from splitting.

The artist marks out the outlines, and the carpenter saws them out.

PRACTICABLE SCENES.—Those which contains doors, windows, fire-places, cupboards, etc., capable of being worked and used. Any piece of scenery, such as coppers, bridges, porches, gates, stiles, etc., made sufficiently strong to be used by the actor, is known by the term "practicable."

PRIMING.—A composition of double size and gilder's whiting, a coating of which is applied to the canvas in a warm state. Also known as "sheep-skin."

RAKING PIECE. — Similar to a set-piece. Small pieces of canvas and profile painted to imitate rocks, mossy slopes, banks, etc., and set on one side of the stage. They are sometimes made for the actor to lie on.

RISES AND SINKS.—The scenes in this case are divided, but not like a pair of flats. They part horizontally—one part rising into the *flies*, and the other part sinking through the stage to the *mazarine* below.

SIZING.—New canvas is always given a coat of strong size as soon as strained. This and the "priming" is generally done by the laborer, hence he is styled the "first artist" in the theatre.

SET PIECES.—Scenes placed obliquely on one side of the stage when it is required to show a cottage, corner of a house, or porch. They are also placed across the stage, to form palings, low walls, side of ship, bridges, etc.

SET SCENES.—These are very elaborate. Instead of the whole picture being painted on the back drop the distance only is put in, middle distance and

foreground being composed of set pieces, raking-pieces, and ground rows, with strong lights behind each. It requires great skill and experience to paint and arrange a set scene.

Scruto.—A sort of hinge, made by cutting through a piece of profile wood without cutting the canvas.

Trick Scenes.—Scenes which can be instantly changed, as where ruins change to a lighted palace, before the eyes of the audience.

Tableau Curtains. — Used in place of act-drop, they open in the centre and rise in graceful folds to each side and top of the proscenium.

Thin Coloring.—A process employed to give the effect of greater distance to any part of the scene, to impart a hazy appearance to a picture.

Wings, or Side Scenes.—These are merely scenes placed obliquely behind each other, on each side of the stage, to hide the view behind, and cover the entrances and exits of the actors.

Mixing Colors.—The most difficult feature of painting in distemper is, that the colors dry so much lighter than they are when first put on, and many of them have, by gaslight, an entirely different appearance than they have in the daytime. Most colors dry several shades lighter than they are when wet ; and, worse still, they do not all dry lighter in the same proportion ; so that any person new to the work cannot estimate the particular shade of his paint when first laid on. It is, therefore, advisable for the artist to try his colors on a small scale at first, and dry them in front of the fire.

To render the colors opaque, a certain proportion of whiting or flake white is always mixed up

with them according to the shade desired. Transparent and glazing colors being an exception to this rule—no whiting is used with them. The strength of the size also makes a vast difference; very strong size darkens. As to the appearance of colors at night: French ultramarine, a bright blue by daylight, is a muddy purple by gaslight, and therefore unfit for distant tints or for brightness. Verditer blue, Cobalt blue, Celestial blue are best. Yellow is much lighter by gaslight, and rose pink loses its brightness. The colors being all mixed with water to a pulpy state are now put into the compartments on the palette, putting no more on the palette than is required for immediate use. In scene painting many of the different shades are only obtained by mixing one color with the other while on the palette. The way to do this is as follows: Suppose we wanted a purple, the artist would take up a clean brush and dip it in the size-can he would then transfer it quickly to the compartment on the palette containing the rose pink, and having got a good brushful of this color, would spread it on the palette, he would then dip the brush in the ultramarine and mix this also with the rose pink, and to get it a shade or two lighter he would dip the brush in the whiting pan. Tints composed of three or four colors can be rapidly compounded in this way, adding more size as often as required to render them workable. Where a lot of color is required, as for skies, etc., the colors are mixed in pots, and to get the various tints the painter dips his brush first in one pot and then in another, and in this way puts in a sky of perhaps a dozen different hues.

For foliage, a quiet general tint may be obtained by mixing Dutch pink with black, indigo with blue verditer. Light ochre with green lake gives a rich green, which may be changed to a cool one by the addition of indigo. For sunset skies mix in separate pots the following: verditer and indigo; verditer and damp lake; damp lake and orange chrome. For clouds, mix verditer and orange red, or Venetian red and azure blue; rose pink and azure blue. For cold gray clouds add a little black. For lights in clouds, mix yellow ochre and rose pink, or yellow ochre and orange red. For distant foliage mix verditer and rose pink, or use Dutch pink alone. For the sea, Dutch pink, verditer, indigo, raw sienna, azure blue and emerald green will be found most useful. For rocks some of the following tints will be useful: indigo, burnt sienna and rose pink; emerald green and black; Vandyke brown and ultramarine; indigo, rose pink, and ochre. Black and Venetian red make a useful gray. For gold colors mix brown ochre and Dutch pink; or Dutch pink and sienna or Vandyke brown; these for laying in. For the lights use flake white and lemon chrome, orange and yellow chrome, chrome and Dutch pink. Purple and mauve look fresh by day, but are dirty and muddy by gaslight. For moonlight skies a good tint is verditer and indigo mixed. For clouds add black and more indigo. Water is generally the color of the sky and the objects that are reflected therein, such as trees, banks and rushes. For branches and trunks of trees, use indigo, lake and yellow ochre; burnt sienna and ultramarine; Dutch pink, burnt sienna, and indigo. For grass, use pure greens, mix-

ing more or less yellow chrome for high lights. In painting dead leaves use chrome and burnt sienna. For stone buildings, mix yellow ochre, umber, and indigo, or ochre, celestial blue and red. For bricks, Venetian red; and for shadows add ultramarine. Where fire is reflected use orange lead.

Great care should be taken in mixing tints—for some colors like Prussian blue, are so strong that a very little will suffice, so if used without due thought it becomes necessary to add more of the other colors.

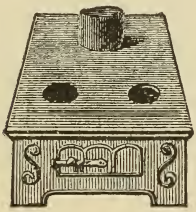


FIG. 116.—CHARCOAL STOVE FOR WARMING COLORS, ETC.

FIG. 117.—GAS STOVE.

Some painters mix molasses or golden syrup with their size, which makes the colors work more freely. In painting a scene on a *new* "cloth" the first thing to be done, after the canvas is strained, is to size it all over. This is done with *strong size*, *i. e.*, size (such as purchased ready mixed) melted in a kettle with just water enough to prevent burning.

WORKING SIZE consists of one part size to four parts of water, the size being first melted or warmed up and measured, the requisite amount of water can then be added. Strong size and

working size when mixed together is known as *half* and *half size.*

Ordinary glue can be used by simply dissolving it in water and boiling. To ascertain the amount of water necessary: Dip the fingers in the size and then close them tightly for about a minute, if, when separating, they adhere slightly to each other, the size is properly made. If they stick too firmly the size is too strong, and *vice versa.* It is a mistake to use size too strong as it causes the color to crack and peel off.

A sufficient has now been said, possibly, to enable the would-be scenic artist to begin operations, supposing that he has already made himself familiar with the laws of drawing and perspective, for these are of vital importance. The next best thing is to visit a theatre and "look on" while the work is being done, and that will be found to be a better instructor than any words we might write or illustrations present.

Scheele's Green.—An arsenite of copper. (*See Mittis Green.*) Its manufacture and use are so dangerous to health, they are forbidden by law in France.

Screen.—A contrivance for protecting parts of a carriage body from dust, while it is undergoing painting or varnishing. A screen is made by covering, or stretching, upon a light wooden frame either paper or cloth, and sometimes of thin roofing boards. In some shops, screens are thus made, large enough to cover a light body, which is a good plan where the varnish room is defective. Screens made upon the Japanese plan, *i. e.*, those used in dwellings, and which stand upon the floor,

are excellent in a varnish room, to partly surround a job and thus protect it from dust and cold drafts. When not in use, screens should be kept in some convenient place outside the varnish room, and when wanted for use, they should first be given a light washing or sponging and then be wiped dry with a chamois, to free them from dust.

Scroll Painting.—A branch of decorative art. The principal demands for executing this class of work, are a knowledge of drawing, light and shade; a free hand, an accurate or quick discerning eye, good tools, and a mind unclouded with other matters—for close attention to the work is indispensable.

The first of these requirements—drawing—is taught in special books or by special teachers, and with the supposition that the student has already a knowledge of the art, even if it be but a limited one, we proceed to—

Lesson 1.—All the requirements at the outset, are some sticks of chalk, and a good sized blackboard. Then, the formation of circles and curved lines must be practiced, drawing them with the chalk in a bold and confident manner in every conceivable direction, always bearing in mind that the drawing of *one* correct circle or sweep out of a *hundred*, is not perfection; and he must keep to work, drawing, wiping off, and drawing again, until in an easy off-handed mark can be made at command.

He must not expect to make elaborate scrolls or anything like them, until he has acquired full command of the chalk. Not only are circles and curved lines necessary, but frequently straight and parallel lines, as shown in Figs. 118 and 119, are to be

made, and it will be well to draw these, alternating with the curved, until both the curved and straight lines can be easily and quickly produced with the chalk.

The line made in a serpentine form or double sweep is called Hogarth's line of beauty, and is embodied in all the beautiful forms of nature and art, such lines are frequently drawn with the compasses, and may be so drawn by the professional; but in order to train the muscles of the hand and

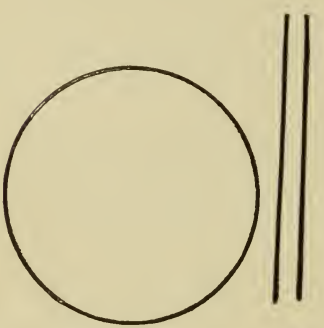


FIG. 118.

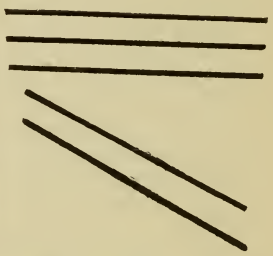


FIG. 119.

eye, it is best for all such auxiliaries to be laid aside, then, confidence will be established, and strength, freedom and beauty will be added to the designs. The drawing of parallel lines either curved or straight may seem to be of little use, but this is done to "coach" the eye and hand to work harmoniously together. The student having become proficient with the chalk, in drawing the curves and straight lines may now pass on to—

LESSON 2.—First let us suppose that we are in an inland town, away from stores where first-

class tools are to be had; away from the great city, where ornamental designs are in abundance, and where frequent opportunity is given to see the handiwork of others, and thus improve the eye. To make the tools for the work in hand is not so hard a task as many suppose—supposing of course that we have a camel's-hair blender or brush with which ordinary coloring is done—from this we cut a small quantity of hair, say, twenty-five or thirty single hairs, being careful to keep them in their relative position, that the *point* may not be so blunt or stubby that cutting must be resorted to—the natural ends of the hairs

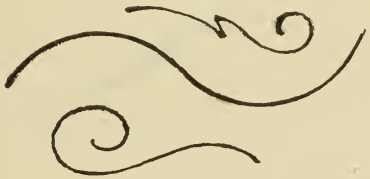


Fig. 120.

make the softest and best point to a pencil—tying the little bunch of hairs near the butt end with firm thread or silk, we look about for a small feather from which to cut the quill, into which to insert the bunch of hairs. This done we find that a fine ornamental pencil is not so much after all, so far as making is concerned. Now for the paint. The color, or paint as some would call it, for this work should be mixed in some quick-drying varnish or japan and tempered with linseed oil until it dries with a little more gloss than an egg-shell has, then thinned with turpentine, upon the palette. Paints mixed with oil, or tube colors, dry too slowly and do not as a general thing, flow so freely

from the pencil—or else if thinned too much flow too freely and cause trouble. The next in order is the *design*, and this must come spontaneously from the end of the pencil. We are not about to present you with finely drawn and pricked patterns. Here you will see what to do without patterns. The first mark made with the pencil (paint pencil we mean, not a lead pencil) will be the line of beauty, which was practiced upon with chalk, and with that knowledge gained it will be quite easy to make it. This forms the starting point. The little pencil which was made from the hair of the blender, we find, will by a light

FIG. 121.—THE LINE OF BEAUTY.

pressure make a fine line, while a heavy pressure produces a proportionate heavy line, being very similar to the action of a pen upon paper: so in making the line of beauty, we begin with a very light pressure increasing as we come to the other end, then stopping abruptly we find just such a mark as shown above (Fig. 121).

The next is the leafing; and this is done by a simple heavy pressure upon the pencil and a light pressure upon lifting the same from the work, which makes a mark like Fig. 122; a series of such marks—all made with little or no exertion, and with one dab of the pencil only—will form a figure something like Fig. 123, which would be an excellent pattern for a spoke face. This style of ornamentation may be carried on throughout the

parts of a gear, on beds, bar springs, wheels, etc., and here in the 2nd lesson you are enabled—if you have practiced well—to make an ornament. And now in Lesson 3, we will look at the next variety of off-hand ornamentation, namely *light scrolls.*

FIG. 122.

FIG. 123.

LESSON 3.—For this work the paint should be quite thin and semi-transparent, and a tint of green, will perhaps look well, so mixing some keg lead and turpentine, and adding a drop of chrome green, then a few drops of quick varnish, we

FIG. 124.

FIG. 125.

FIG. 126.

FIG. 127.

begin ; with the transparent paint, each mark of the pencil as it is twisted around will leave upon the work lines of light and heavy color, forming beautiful shades, and giving to each leaf and stem an effect not easily produced by other means. It must be understood that *one mark* of the pencil is sufficient to produce the desired effect, and if the

work be retouched, all beautiful lines will be effaced. With the small camel's-hair pencil lay on with one sweep, a mark as shown in Fig. 124; forming the foundation or main portion of a leaf. Now by adding the two points shown in Fig. 125, and the additional point shown in Fig. 126, a full leaf will be formed, and by repeating these leaves, if properly placed, a very handsome scroll may be made. The extension of a leaf is shown in Fig. 127; in which we begin to see something that looks "scrolly." These are the main features of a scroll pattern, and if the student will practice as we have shown until he has the knack at his fingers' ends, and can paint them right, left, up, down, and in any conceivable way, he may go on with Lesson No. 4. The desire to push forward and grasp the whole art at once is not the proper way to succeed, and the longer the student is in the primary class the more proficient he will become. The designs have now become sufficiently interesting for an extended amount of practice, and we desire to have the student *invent his own* patterns, these Figs. 128, 129 and 130, being simply to show what can be done with the information imparted in the three lessons already given.

Lesson 4.—There are a thousand peculiar shapes and forms constituting scrolls. The learner should choose one or two standard designs and practice on these until he makes them perfectly, then, add new features as he improves. Each curved line of a scroll must be an easy and graceful sweep, and harmony of design must also be very carefully attended to. For instance, if the design is intended for a centre-piece, circles of the largest

FIG. 128.

FIG. 129.

FIG. 130.

diameter should form the centre, and a gradual diminution of curves, in their various forms, be made to extend therefrom, until the end or apex is reached, on either side. The same rule is applicable to a corner pattern, and a close observation of such work made by an experienced hand will at once clearly define the idea we wish to convey.

This balance of proportions is by many beginners entirely everlooked, and if so, no matter how well the painting may be done the result will be in the eyes of a connoisseur a failure.

The parts which make up a scroll pattern should be connected, or at least touch each other, and not as we frequently see them, remain disjointed, or completely isolated from the parent stem.

The copying from frescoed or engraved arabesques not expressly designed for such use is not to be commended, for in both cases the designs although faultless as works of art in their original position, will invarably be found too finely wrought or too delicately shaded to supply the place of a wagon, car or stage scroll pattern. Very valuable ideas, certainly, may be drawn from them, but a direct copy should never be made. In designing a scroll, the form of panel should at once decide the size and general form of the scroll. In closing our lessons in scrolling, we present two scroll designs for practice, and would be pleased to have the student make them in gold and shades as follows: Lay on the design with gilding-size—after having rubbed the panel over with whiting to prevent the gold from sticking—using a camel's-hair lettering pencil, then, when the size is "tacky" lay the gold leaf (and here we would remark, for practicing, it is just as well

FIG. 131.—SHADED ROMAN SCROLL.

to use gold bronze; a paper containing an ounce costing but sixty cents, and sufficient for covering 1000 square feet of scroll patterns on painted paper) wash off clean and dry with a chamois, and if time is at disposal lay over the gold a thin coat of rubbing varnish—which makes a better surface for shading on—but if not proceed to shade the

FIG. 132.—DESIGN FOR A FLAT SCROLL.

scroll. Procure some common asphaltum and a very little burnt sienna, thin them, when mixed together with turpentine, and with a short-haired camels' pencil lay in the shades as shown in the engravings, putting it on very thin, and repeating the washing of shade until the darkest parts are dark enough and all blend off into the gold

without showing the connection. Next upon those parts and edges where the light is supposed to fall, put fine lines of cream color and others on the prominent lights, of white.

FIG. 133.—DESIGN FOR A FLAT SCROLL.

The Roman scroll having received attention at our hands, we will now look at the FLAT SCROLL. This description of scrolling or ornamentation is nowadays very fashionable on railway cars, particularly for head linings; they are similar to those commonly employed by fresco-painters.

There are three modes of putting on these scrolls, the first and simplest being in plain gold, with no shades or lights; the second, in various colors; the third in colors and gold, but with no shading. Remember that flat scrolling is accompanied by shading, which latter is peculiar to scrolling "in relief." Much of the work of flat scrolling is done with a pencil in the same manner as scroll striping (*q. v.*).

But little information can be given in writing concerning the designing of flat scrolls. Suffice is to say, the patterns are infinite in number and variety, ranging from the simplest curves up to elaborate combinations of curves and straight lines. The beginner should first study the simplest forms. In the same manner as we have suggested with those "in relief," and as he becomes familiar with the requirements of the work he will naturally become more fertile in designing and more daring in execution.

Scrubs.—A short-haired bristle brush, used by artists in painting on velvet, plush, etc.

Sea-Green.—The color of the sea; a faint bluish-green tint.

Seam Brush.—A brush made of horse-hair and bristles, formed similar to a Brick Header (*q. v.*).

Sealing-Wax Varnish.—Crush and pulverize a stick of ordinary sealing-wax to fine powder and put it in a bottle with spirits of wine. Allow it to stand without heat, shaking the bottle frequently, until the wax is all dissolved and the mixture is of the consistency of varnish. A 2-ounce stick of wax will be sufficient for a half pint of spirits. This varnish dries quickly, and should be made only as

required for use. It gives to work-boxes and such articles the appearance of Indian japanning.

Self-Color or Self-Tint.—A pattern in two or more tones of a similar hue.

Setting.—The state in which varnish passes from a limpid fluid to a thick or congealed gum. When varnish has been spread upon a surface, it begins to thicken, and when that thickening has gone on until there is no liability of the varnish moving from where it was put—by running or sagging down—it is said to have *set*.

Sharp Color.—A bright, rich or positive color, also a quick drying paint.

Shade.—The dark portion of a picture; the thickness or relief given to a letter when painted upon a flat surface; degree or gradation of light or color.

Shellac, or Shell Lac.—The latter being the proper orthography—a resinous substance which, in India, flows from certain trees in the form of lucid tears, in consequence of punctures made upon their branches by a small insect.

It is found in commerce in three forms—*stick lac*, *seed lac*, and *shell lac*. Stick lac is the substance in its natural state investing the small twigs of trees, which are generally broken off in collecting it. When separated from the twigs and partly cleansed it is known as *seed lac*. Shell lac is the seed lac after it has been melted, purified and formed into thin cakes.

Shellac is very apt to be adulterated with common resin, and hence, unless when a pale lacquer is required, most artizans prefer seed lac.

When lac is mixed with a little resin and colored with vermilion or ivory-black it forms sealing-wax.

Shellac is soluble in alcohol, but not in turpentine; shellac varnish is extensively used in the arts.

Sienna or Terra de Sienna.—An ochre formerly called Sienna Earth. The raw sienna is a peculiar yellow, and when burned is a dark red chestnut color. Great care is exercised in selecting and burning this pigment, as it is generally used where its brightness and clearness of tone is brought out in the transparency more than its body.

Silking.—A term applied to the appearance of a varnished surface, when it is like a textile or fibrous material, as silk or enameled leather. It is generally caused by cold draughts upon the varnish, but the mixing of turpentine with the varnish, or the use of a brush from out the brush-keeper in which oil is used to preserve the brushes, will cause silking. Brush marks, made by working the varnish too long, often give the appearance of silking.

Silver Leaf.—Silver or alloys of same, beaten out like gold leaf into thin sheets. It is notoriously fugitive, oxydizing to a dull copper color very soon after being exposed to the atmosphere, and its use is extremely limited in late days. Nickel or Aluminium leaf has taken its place in most cases.

Size.—A glutinous or adhesive substance, of which there are many kinds, and used for many purposes. Size may be used for fastening to any surface gold

or other metal leaf, bronze, flockings, etc., and these will be found fully described under the respective heads of *Gilding on Wood*, *Gilding on Glass*, etc. (which see).

A size for ceilings and walls to be painted, papered or kalsomined, is made by simply dissolving one-half a pound of glue in a pail of boiling water. Size for plaster casts to be painted may be made as follows: Dissolve one ounce of albumen (white of egg) in four ounces of acetic acid, or strong vinegar.

Slush Paint.—The refuse from paint-cups and varnish cups, or any waste paint thrown into a receptacle and kept for coarse work, such as painting the inside and bottoms of carriages, roofs, around chimneys, etc. The economical painter will seldom allow any great quantity of slush to accumulate, and if used soon after it comes from the cups there will be no waste, while if allowed to dry hard it becomes worthless.

Smalt.—A coarse powder, made in various colors. Used for signs, etc. The letters being first laid out and gilded, an oily, sticky paint, near the color of the smalt to be used, is then "cut around" the letters, and while yet "wet," the board being laid horizontally, the smalt is sifted upon it to the depth of ½ an inch, left to dry, after which the superfluous smalt is brushed off. Blue, green, black and red smalts look well with gold.

FIG. 135.—SMOOTHING BRUSH.

Smoothing Brush.—A bristle brush made as shown in the annexed figure, for smoothing down paper-hang-

ings, when applying the paper to the wall or ceiling. They answer the purpose designed admirably, and are better than the whisk-broom and wad of cloth which paper-hangers were wont to use in olden times.

Snuff Color.—Four parts chrome yellow and two of Vandyke brown.

Soffit.—The sloping ceiling of a staircase, the under-side of a cornice next the ceiling, and the ceilings of beams and openings.

Soluble Glass, or Water-Glass.—This liquid is now much used for painting where it is desirous of rendering wood incombustible, and for floors in place of wax and oil. A floor is first well cleaned, and then the cracks are filled up with a cement of water-glass and whiting; afterward water-glass of sixty to sixty-five degrees of the thickness of syrup is applied with a stiff brush. Any desired color is imparted to the floor in a second coat of the water-glass, and additional coats are to be given until the requisite polish is obtained. A still higher finish may be given by pumicing of the last coat and rubbing it well with oil. It can also be advantageously used in painting houses, decorations for theatres, scenery, and so forth.

Spanish Brown.—A dull red pigment, similar to Venetian red, but inferior and used only for common work.

Spar Varnish.—A varnish originally intended for coating vessels, masts and spars, hence its name; but being found excellent for other purposes—as for example, the outer doors of dwellings—it is extensively used by house-painters.

Sponge.—A fibrous and porous marine substance, found far down in ocean depths, clinging to rocks and shells, and is gathered in the Mediterranean and in the West Indies. Under the microscope the sponge presents a singular appearance, and it is affirmed that it is actually pinned together by metallic pins, with heads and points, similar to those used at the toilet. These microscopic pins are set at every angle, thus holding the parts together.

Sponges should be selected with care, for many of them are "weighted" with lime and sand, being sold by the pound. In choosing sponges, the light-colored varieties (not bleached), and those of a size that will not require cutting will be found best. Occasionally the dark kinds will answer the purpose but they are generally more open and weak in fibre. The several varieties of sponges are classed according to their market value as "sheep's wool," "yellow," "fox glove," "grass," etc. The first named is the variety most sought as it brings the highest price. The most of the vessels engaged in the sponge trade are owned and fitted out at Key West. The outfit of a sponge schooner consists of a number of long poles with hooks fastened on the end for gathering the sponges; from three to seven small boats called "dingies," with provisions for from eight to twelve weeks; water glasses, etc. In sponging, each dingy carries two men, with water-glasses, hooks and other necessities. While one man sculls the boat about, the other, lying across the boat's thwart with his head in the water-glass, scans the bottom for sponges. The water-glass is nothing but a deep wooden pail with a circular

pane of glass for a bottom. Placing this upright in the water, and putting the head in far enough to exclude most of the light, one can easily see an object on the bottom in six or seven fathoms of water. The sponger directs the sculler how to go by waving his hand, and when in a desirable position, he thrusts his long pole down and hooks a sponge.

The vessels remain out upon the bars from Monday until Friday evening of each week, coming into the keys in order to clean the sponges gathered the week previous, put those gathered the current week into the crawls, put their wood and water on board, and prepare for the next week. The freshly gathered sponges are put into crawls or pens, made by driving posts in the sand, where at low water they will be almost dry. Here they are left until the next Saturday to be washed by the tides. In the following Saturday they are cleansed by striking them one or two light blows with a paddle.

Spurs.—The parts of a letter projecting from the main stem, or perpendiculars of a letter; and a distinguishing feature between the full block and the half block letters (which see).

Spruce Ochre.—A dark variety of Yellow Ochre.

Stains.—To restore the true old color of oak newly worked, put a few old nails or pieces of rusty iron in a bottle with vinegar, and leave them for a few days that a portion of the iron may be dissolved. If this be applied to new oak it will turn it to a purplish black, but oiling and polishing will remove the purple hue; when, however, the solution is applied to old oak newly worked it will restore it to its proper color.

Stain Coat.—A coating put over a surface of rough-stuff of some different color, and generally made of some cheap pigment, japan and turpentine, to enable the workman to see when by his rubbing with pumice-stone and water that the surface is level, for when the stain coat is all rubbed off the surface should be smooth.

Staining Wood.—The staining of plain wood to color it, or to give it the appearance of another variety, as the staining of soft pine to imitate mahogany, rosewood, etc., is altogether a different process from dyeing it, and it requires no preparation before the stain be applied as in dyeing.

A beautiful variety of graining may be executed with strong acids on plain wood, brought out by heat, in which way the nitrous acids and aqua-fortis applied affords amber and yellow shades of a darker and dusky hue, so as together to imitate the various hues of the tortoise-shell, after which the work is cleaned off and varnished.

The following are stains for wood:

1. Cheap Black Walnut Stain.—Burnt umber, 2 parts; rose pink, 1 part; glue, 1 part; water sufficient; heat all together and dissolve completely. Apply to the wood with a sponge, then, when dry, varnish with shellac.
2. Ebony Stain.—Drop black, 2 parts; rose pink, 1 part; mix with turpentine; varnish with shellac.
3. Extra Ebony Stain.—Pour 2 quarts of boiling water over 1 oz. of powdered extract of log-wood, and when the solution is effected, 1 dr. of yellow chromate of potash is added, and the whole well strained through coarse flannel. When rubbed on wood it produces a deep black. Two or three applications will be necessary.

4. Rosewood Stain.—To imitate rosewood it is necessary to use two stains, a red and black, and to make these, proceed as follows:

To a gallon of water add one pound of logwood chips and a double handful of walnut peels or shells, and boil until a strong dark-colored solution results, then strain to remove chips and add one pint of best vinegar. This forms the black stain.

To make the red stain.—Boil ½ pound of logwood in 3 pints of water till it is of a very dark red; add ½ ounce salt of tartar (carbonate of potassa). While boiling hot stain the wood with two or three coats, then when dry form streaks with the dark or black stain (as above) using a flat paint brush which has been cut so that its point or end is ragged, and a very fair imitation of rosewood will result. This process may be transposed if desired: that is, stain first with the black, then with the red.

5. The Best Ebony Stain.—Boil ½ lb. of logwood chips in 2 qts. of water, add 1 oz. pearlash and brush the hot solution over the wood. Then take 1 qt. of the logwood decoction and 1½ oz. verdigris and ½ oz. of copperas; strain and throw in ½ lb. of iron rust. Brush the wood with this and oil it.

6. French Mahogany Stain.—The wood being well smoothed is rubbed with dilute nitrous acid. Then 1 oz. dragon's blood is dissolved in a pint of spirits of wine; this, and ½ oz. carbonate of soda, are then mixed together and filtered, and the liquor is laid on with a soft brush. The application is repeated and in a short interval the wood will appear like mahogany.

7. To Darken Light Mahogany.—To avoid the patched appearance when the mahogany furniture is repaired, wash the new mahogany with soap-lees, or dissolve quicklime in water and use in the same way, being careful not to let either be too strong or it will make the wood too dark.

8. Black Walnut Stain.—Boil for a quarter of an hour 1 qt. of water to which is added 1½ ozs. washing soda; 2½ ozs. Vandyke brown; ¼ oz. bichromate of potassa. Apply with a brush, either hot or cold.

9. Crimson Stain.—Boil 1 lb. of Brazil dust in 3 qts. water for an hour, strain it and add ½ oz. of cochineal; boil again for a short time, and it will be ready for use. If a brighter scarlet is desired, boil ½ oz. saffron in 1 qt. of water and apply before putting on the red stain.

10. Cherry Stain.—Take rain water 4 qts; annato, 5 ozs., boil in a copper kettle until the annato is dissolved, then put in a piece of potash the size of a walnut and keep it on the fire half an hour, then bottle for use.

11. Darkening Mahogany.—To darken mahogany with a deep tint, and yet keep plenty of color, a small amount of chromate of potash may be melted in a quart of water, and applied with a piece of woolen cloth.

12. Walnut Stain.—Genuine powdered Vandyke brown is mixed with a small amount of pearlash in cold water, by heating till it becomes a paste, and a quart of boiling water gradually poured on and stirred. Also apply with a piece of woolen cloth.

13. Fine Brown Stain.—This may be obtained by

diluting the walnut stain with three times its volume of water.

14. Black Stain.—An extract of logwood, obtained by boiling it three hours in water, is to be applied hot, making a red stain. Coat this over with vinegar that has stood three hours in a jar, with rusty nails at bottom, and you have your black.

15. Rosewood.—Grain with above vinegar.

16. Brown Oak.—The walnut stain as described, diluted to the shade required, will serve for brown oak.

17. Birch.—A good imitation of birch is obtained by a solution of chromate of potash.

18. Red Oil.—Red oil for mahogany is got by simmering linseed oil into which alkanet root has been thrown. The oil must be closely watched.

19. Oak Over-graining.—Vandyke brown, ground in water, is placed on a plate, with a basin of stale beer beside it; the pencil over-grainer is dipped in the beer, and then the tips of hairs into the water color. The tips are drawn lightly from top to bottom of the panel, in straight lines, over the combings. The mottler is then brought into requisition for broader veins and for knots, and while the color is still wet the badger softener. To prevent "cissing," go over all the grain with a sponge dipped in a thin paste of whiting, or Fuller's earth.

20. Pine Staining.—Many excellent stains of pine may be obtained by using the ordinary graining colors, Vandyke brown, raw and burnt sienna, ultramarine blue, etc., applied with a brush, without previous preparation, and then wiped off with a cloth—a method that brings out clearly

the grain or marks of the wood, which in pitch pine, now being extensively used for fittings, are often extremely beautiful. A better method for general work, French polish being ordinarily too expensive, is, where dark oak or mahogany stains are not wanted, light varnishes, of which two coats are to be applied. The glue size with which the work is first coated, in order to fill up the pores of the wood, should not be too thick, as in that case it is liable to crack.

21. Staining Pine a Walnut Color.—A foreign exchange, under the heading of "Changing Poor Pine to Walnut," says: "One part of walnut peel extract is mixed with six parts of water, and the wood is coated with the solution. When the material is about half dry, a solution of bichromate of potash with water is rubbed on it, and this completes the operation. It is said to defy detection.

Star Pattern, How to Draw.—Star patterns may be easily laid with the dividers, laying off, for instance, in five parts, moving the dividers and running around from the central upper dot *A* until the point of the dividers just returns to *A*, and five dots are made, *A B C D E*. A line from point to point, as shown in the second cut, will then form a perfect five-pointed star. Any number of points may be made by proceeding in a similar manner. Stars of different sizes, cut out of leather or oil-cloth, will be found very handy in the smith-shop for marking step pads, etc. This pattern is frequently called for in the paint-shop, and one is often surprised to find good workmen who are unable to properly lay out the same with the dividers. When a star is painted, it is generally best

to shade it, or give it "fullness," and this is done by simply dividing each point into two shades of color, taking a line from centre of star to point.

Stenciling.—The application of ornamental designs, letters, etc., to a surface, by spreading color over a perforated pattern. It is a process which, by its simplicity, the ease and rapidity with which it is executed, and the moderate amount of artistic skill which it demands, specially recommends itself to the amateur decorator.

The purposes to which it can be applied are

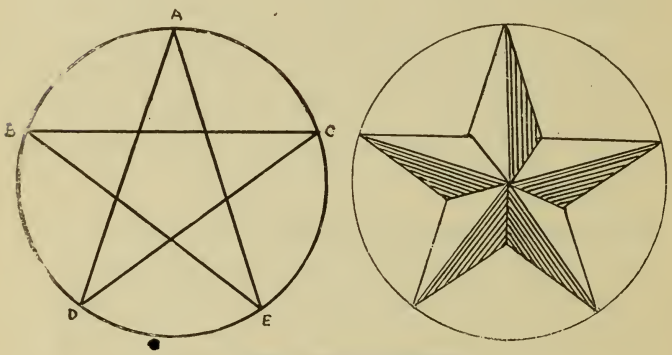


FIG. 136.—STAR PATTERN.

many, and its extensive use in the car shops, as well as by decorators in dwellings, has brought it to favorable notice with the general public.

In making stencil plates for various kinds of work, many different materials have been employed—paper, metal, leather, oil-cloth, etc. For general purposes, that most used is paper, as being cheapest, best fitted to draw the design upon, and most easily cut. Stiff cartridge paper is extensively used, while some workmen prefer a sort

of leather-colored thin pasteboard, sold under the name of "printers' press packing." On this the design can be easily drawn, and the parts cut out with a sharp pen-knife while resting upon a piece of glass. Care must be taken to cut clearly and accurately, the curves must be true and bold, and all angles well cleaned out, for any slight imperfections in the stencil-plates will show in an aggravated form in the work.

To give solidity to the paper some coat the stencil after it has been cut, with shellac varnish or as some call it "knotting," which prevents the absorption of the liquids which are used upon it. Another useful material for plates is that known as "oiled foolscap." This is excellent for small plates or very fine work, besides its semi-transparency enables one to lay it over a drawing and trace. Tin foil is sometimes used where the stencil is to be put on a curved surface, but it is not durable and requires great care in its use. Sheet brass and copper make the most durable stencil-plate, but the cost and trouble of cutting with a graver render it undesirable. A necessary point to be observed in making stencil-plates is to leave a sufficient number of "ties;" that is, bands crossing the openings at intervals, and thus serving to hold the plate together. By referring to the illustrations, and observing the arrangement of one of the designs, these ties will be more clearly understood. These ties may be covered on the work, either by putting one pattern over another or by the use of the pencil.

For the benefit of those who may wish to stencil, but do not care for the trouble of making plates, we may say, that a large variety of stencil

patterns, working size, are published, and that in most large paint stores the cut patterns may be purchased.

Stencil brushes, specially made for this work are to be bought at the dealers. They are of short hair, flattened across the end for the purpose of dabbing, fixed in round handles bound in tin or brass.

Stenciling has a perfectly legitimate use as a help in laying in decorations which are afterwards to be finished by hand penciling. When stenciling is thus made only a preliminary process, the design

FIG. 137.—BRUSH USED IN STENCILING.

may be treated freely. Breadth and simplicity are no longer essentials, and in making the plates ties may be put in at random, or wherever they will give greatest strength, for all traces of them can be removed, as before said, with the pencil, yet a difficult matter in purely stenciled work, as the pencil will not give precisely the same texture as the stencil brush. Thus used stenciling becomes an invaluable aid to an indifferent draughtsman, who by this means get in all the main details leaving only unimportant parts to be made good afterwards by hand work.

Used as a decorative process, stenciling has a character of its own, and an interest in proportion as it is characteristic. The ignorant or timid decorator is ashamed or half afraid of the stencil-

ed look, and seeks to obliterate the traces of the process. The experienced artist values the character that comes of stenciling, and would rather accentuate than blur it. He prides himself upon the aptness of his design to the method of its execution, and is best pleased with it when he feels he has invented something that could not have been so satisfactorily reproduced by any other process.

The drawback to the utility of stenciling, if not entirely removed, may at least be modified by the adoption of the plan shown in the accompanying diagrams.

FIG. 138. FIG. 139. FIG. 140.

STENCIL PLATES.

Fig. 138 represents a scroll stencil cut in the ordinary manner, the pieces *A B C D* requiring to be joined by hand after stenciling the pattern. In Fig. 139 the same scroll is shown, but with the parts *A B C D* extended into simple leaf form, the foliated position of each coming directly in place of the "tie," and at once obviating the necessity of re-touching the pattern after transfer to the work in hand, as the design is complete. From this example it will be seen that the introduction of a more ornamental scroll is really less likely to take time than a perfectly plain curve.

A very unique effect may be produced by the

introduction of imitation inlaid work on the ordinary graining of doors and dados. The method

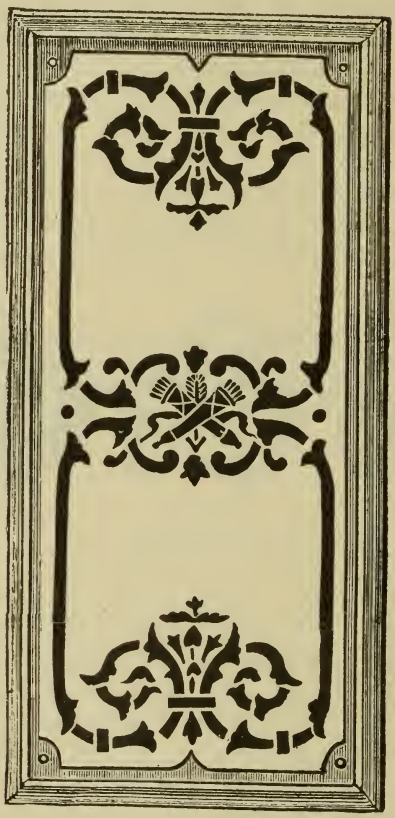


Fig. 141.—Stenciling on a Door Panel.

is simple and capable of infinite variations. The engraving, Fig. 141, represents one panel of a door so treated, and will, if worked on the principles

described, be found a satisfactory addition to the usual decorative work.

After the door has been grained, preferably in imitation of satinwood for the panels, the first necessary step is to prepare the stencil.

The parts of the design possessing a scroll formation should be carefully cut with a sharp penknife out of a sheet of cartridge paper prepared by the application of one coat of patent knotting on each side. It is better to draw the design correctly previous to coating the paper.

Having prepared the stencils, thoroughly clean the panel by wiping it with a chamois or wash leather to remove any grease, etc., from contact with the distemper now to be used. The panel should have been previously varnished. If the inlay is to imitate walnut, take equal parts of Vandyke brown, burnt sienna, and a little damp lake to impart warmth of color.

These must be ground in water and should be used with sufficient stale beer to render the color workable. Coat the panel right over, and with a hog-hair mottler vary the tints by taking out some portions of it before it dries, softening the whole with a badger-hair brush. When this is thoroughly dry the panel is ready for the stencil.

The stencil being laid on in its proper place, go over it with the stencil brush dipped in japan gold-size thinned with turpentine, taking care to use it as sparingly as possible to prevent spreading. The lines may be drawn with the same medium, using an angle fitch and straight edge. In about an hour the gold-size will be dry enough to bear washing with water, and a soft sponge and water will soon remove the distemper,

FIG. 142.—STENCIL DESIGNS.

leaving the parts covered by the size, consequently a walnut inlay on a satin-wood panel.

The greatest care must be taken that the varnish has become dry before any attempt is made to coat the work with distemper. The firmness of hand and precision of touch indispensable to the decorator can only be obtained by patient practice with the black-lead pencil; as well does it afford that education of the eye to the beauty and sym-

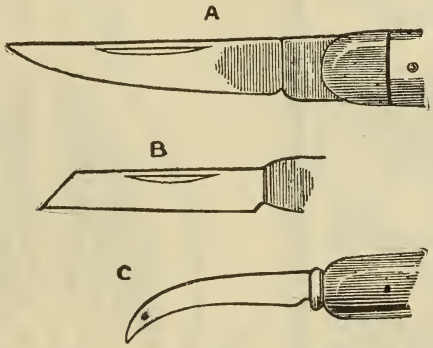


Fig. 143.—Knives for Cutting Stencils.

metry of ornamental forms which the copying of outline examples alone can give.

The design drawn, we may now consider the method of producing a stencil from it. Stencils may be cut in vellum, paper, parchment, lead foil, and thin brass; the two latter are unsuitable to the requirements of the decorator, the lead foil being used principally by glass writers and embossers. Having prepared the paper, the process of cutting out will be found to demand the greatest care, and, above all, well ground and sharpened tools. Have an oil-stone within reach, therefore,

FIG. 144.—STENCIL DESIGNS.

and use it frequently. It is quite useless going to work with a blunt knife. There is much diversity of opinion as to the most suitable blade for stencil cutting. The ordinary penknife blade is scarcely graduated enough for the purpose, for sweeping round the curve in the pattern shape. The best blade to my fancy is the example *A* (Fig. 143), while the angle cut, *B*, is equally useful for straight lines. *C*, is another useful shape for very fine work.

In cutting, the knife should be held firmly between the forefinger and thumb, the thicker part of the blade resting lightly against the tip of the second finger. The stencil paper should be held in its position by the left hand. In cutting a curve draw the paper gently but steadily away from the body, and consequently against the cutting blade in the direction required by the degree of curvature shown in the design. A square of polished plate glass is the best material for cutting on. Perforations of a circular form are made by the use of a leather-punch, procurable at any tool warehouse. These punches are made in various sizes, and are so constructed that the pieces cut out of the stencil paper by the cutting edge pass into the body of the punch, whence they are easily removed at the opening in the upper portion of the implement. It is not necessary to strike the punch, a firm pressure of the hand is generally sufficient for the purpose required, slightly turning the wrist at the same moment.

Glass has been objected to by some stencil-cutters on the supposition that it has the effect of destroying the keen edge requisite in making a satisfactory stencil. Some prefer a sheet of tin as

Fig. 145.—Stencil Designs.

a substitute, while hard wood or stone has even been suggested; none of these, in my opinion, equal the polished plate-glass, provided my suggestion as to the oil-stone be taken into account. A sheet of tin might, and probably does, answer for the time, but the repeated indentations of the surface and the deep cuts or scratches it receives beneath the pressure to which it must of necessity be subjected, militate against its use. The *edge* of the knife may not be so much injured, but the *point* may at any moment slip into one of the scratches, and that simple deviation from the direction in which it was intended it should have gone would not improbably ruin an early completed stencil-plate.

It is, again, a frequent mistake to make a stencil on too stout a paper. The strength of paper does not depend upon its stoutness; a closely woven *thin* paper often possesses greater tenacity than much more bulky specimens. Cartridge paper may be used for almost every purpose.

Stiff Color.—Full-bodied paint.

Stippling.—This is a process of treating the surface with the butt of the bristles, in order to give a solid effect. It requires about double time, and a full coat of color underneath. It is used for fine wall work, and, recently, for heavy (broad) wood surfaces, as it destroys brush marks and lines, and gives a full effect.

Stone Color.—Five parts of white, two of yellow, one of raw umber.

Stone Ochre.—An earthy oxide of iron, forming a pigment of considerable permanence in oil or water.

Stopping.—The English term for puttying, as in filling in and making good all nail-holes, bad joints, cracks, etc. The circumstance calling for the greatest care in stopping, is where a panel or other part of the work has received a blow, or a delve or shallow cavity is formed. The best way to repair such a spot is to deepen it by pricking holes in it with an awl or a nail, and these should incline in different directions, and should be more thickly placed or more numerous near the edges than in the middle of the space. Tacks are sometimes driven into such shallow places, with the head left a little way out from the bottom, so that the putty may cling around it and remain firmly.

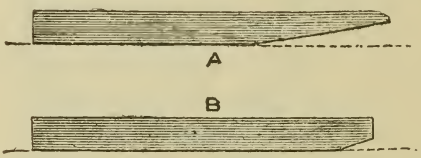


FIG. 146.—STRAIGHT-EDGE.

Straight-Edge.—There are many varieties of straight-edge in use among decorators, but much of their utility depends upon the bevel. In Fig. 146 is shown two of different bevels, that marked *A* is most often met with, but a few words will tend to convince the reader that *B* is really the safest in working. Much of the steadiness of your line arises from the perfectly even contact of the straight-edge with the surface of the work, and it is at once obvious that the *wider* the surface of the straight-edge available to lay on the work, the steadier may it be held by the workman, and the less liable is it to "shift" by the contact

of the lining-fitch as it passes along the bevel. The straight-edge is made of various woods, mahogany, slightly polished, being perhaps the best, but for ceiling work *deal* or pine is preferable, being so much lighter in weight, an important consideration not to be overlooked. An angle-fitch is the proper tool for running all lines upon a flat surface. The sizes commonly in use for general purposes are from $\frac{3}{8}$ in. to $1\frac{1}{2}$ in. in width. Of course smaller sizes are made for finer work.

For running distemper lines it may be noted that the color should be thinned with water only in order that it may flow freely from the fitch, and further, that it may be used much more fluid in substance than the color used for the corners or other parts of the ceiling.

Straw Color.—Five parts yellow, two of white, one red.

Stripe.—A line or long narrow division of anything of different color from the ground (*See Striping*).

Striping.—The application of colored lines of single or of various widths upon a painted surface, particularly on carriages and railway cars.

To stripe a carriage well it is requisite that the workman be supplied with good tools, such as sable-hair or camels'-hair pencils of various widths or sizes, and with paint, or as commonly called "color," mixed in the best manner and ground as fine as possible, for no real fine work can be made with poor materials.

The actual work of striping may be learned in a few moments by simply watching the movements of a good striper, but it requires extended practice to educate the eye and hand up to that

standard where first-class work is readily turned out. The hand alone, no matter how cunning it may be in the use of the striping pencil, will never be successful without the aid of a quick and accurate eye, for that is really the prime mover.

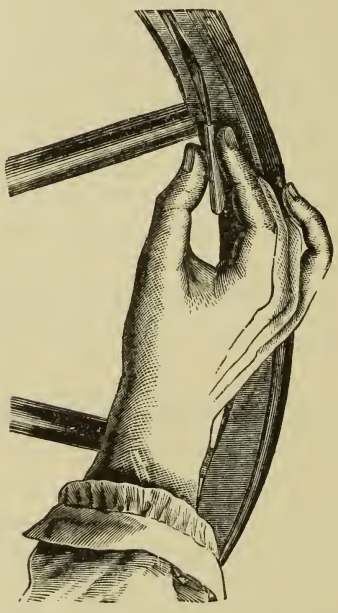


FIG. 147.—SHOWING THE POSITION OF THE HAND IN STRIPING THE RIM OF A WHEEL.

The eye must be quick to detect the slightest variation from a correct line and to change the movement of the hand before a wrong or crooked mark is made.

The eye of the workman is directed, when once the pencil is laid upon the work, alternately from the gauge line, if marked, or an imaginary one if

not ; then to the heel or butt of the pencil where it touches the guage line, resting here during the drawing of the line, leaving the point of the pencil to follow the course of the butt, which it will invariably do.

The pencil is held between the thumb and forefinger, and the middle finger acts as a gauge or guide. The illustration, Fig. 147, shows the hand in position while striping the rim of a wheel. The axle having been raised upon a wheel-board (*q. v.*) or jack, the wheel is kept slowly revolving, with the left hand, until the stripe is complete. Care must be taken in the filling or charging of the pencil; the paint should be worked or thinned upon the palette until of an even consistency, and the hairs of the pencil should be well straightened out before the stripe is begun, and this is of great importance when a corner or angular connection is to be made. When the paint has run out of the pencil and refilling becomes necessary, the stripe should be overrun for several inches in order to make the connection perfect. Pencils for striping are made of sable-hair, camel-hair, and ox-hair.

The sable-hair pencils are best for heavy colors, such as white lead, etc., camel-hair being softer and is therefore preferred by most stripers. The ox-hair pencils (made from the hair which grows in the ear of the ox), are best adapted for heavy colors on coarse work, such as trucks, etc. Pencils can be purchased ready-made, both round and flat, and of many sizes ; but an experienced striper can generally make his fine liners, by cutting up a large pencil, much more to his satisfaction than he can buy.

The flat or dagger pencil is considered by most

workmen to be the best form, as a greater amount of work can be done with it in a specified time, owing to the quantity of paint it will carry. Stripes from eight to ten feet in length have been easily drawn with these without filling.

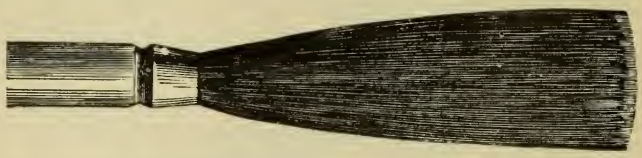


FIG. 148.—BROAD STRIPING PENCIL.

Broad striping, unless done with heavy color, is best done with a camel-hair pencil. To choose these tools, be sure that the hair is perfectly straight, dark-colored, and not over two and one-

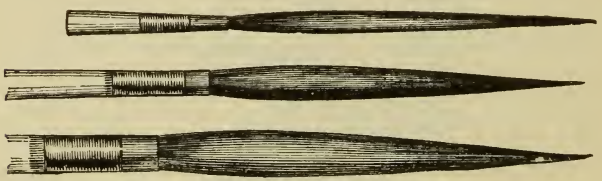


FIG. 149.—THREE SIZES OF STRIPING PENCILS.

half inches in length, for if too long the hairs will drop or sag down to such an extent as to be almost useless; while if too short a straight line cannot be drawn. The old-fashioned round pencils are still in use in many shops, and we illustrate them here. Never, under any circumstances draw a striping pencil through between the lips to form a point, as many do when purchasing them, for it ruins a pencil to come in contact with warm spittle.

All pencils should be well cared for after use. It is a poor practice to stick them against a window-pane with candle grease. A covered box to exclude the dust is not expensive, and in this the pencils may be laid away in safety, having first given them a plentitul anointing with a mixture of tallow and sweet oil which will not get hard in winter. Then have a piece of tin or glass just fitting the box, on which to lay them straight. If a pencil gets bent or out of shape, it can be straightened by simply greasing it and drawing it between the finger and a warm iron.

The varieties of stripes, governed by their width and arrangement are very many, and we give below a complete list of those in general use. The different stripes are named according to their widths, beginning with the "hair-line," the finest line that can be drawn to advantage, and increasing to the "broad stripe," beyond which the stripe is known by its measure, as "three-quarter-inch stripe," "inch stripe," and so on until those made above one-and-a-half inches in width are called "belts." All tracings made by the striping pencil which are more than one-sixteenth of an inch in width are called "*stripes*." All less than that are designated as "*lines*."

In some cases *double stripes*, in width up to No. 11, are used, but it is more frequent to introduce smaller stripes or lines in connection with them as shown in the following combinations.

When the marks which form a double stripe or line are placed far apart, either with or without the addition of a centre line or stripe, the combination is then called "distanced."

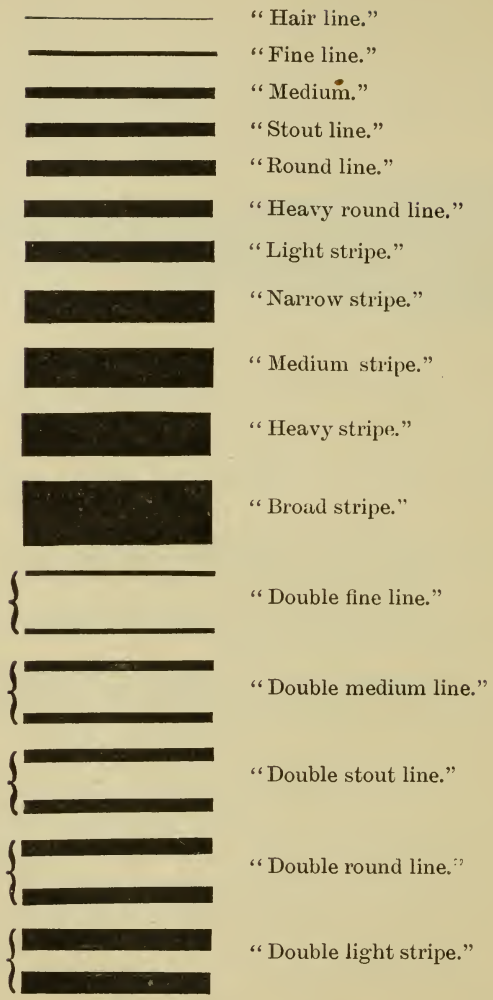


FIG. 150.—VARIOUS STRIPING LINES.

Ornamental stripes are used mostly on business wagons or sleighs, almost all such work being done by patterns. The ornamental stripes are

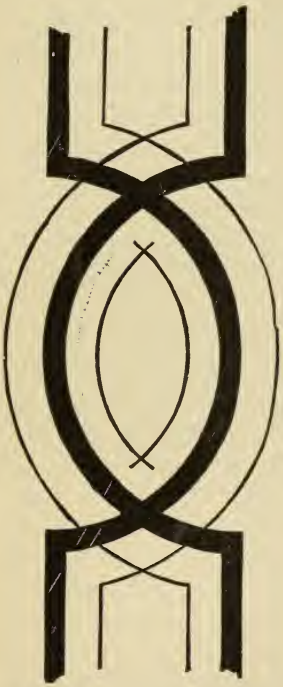


FIG. 151.—STRIPING FOR BUSINESS-WAGON GEARS.

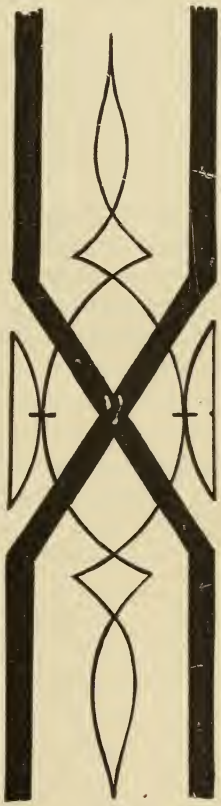


FIG. 152.—ANOTHER METHOD OF STRIPING GEARS.

first drawn on paper, and then each mark of the lead-pencil is punctured with a pin, the holes being made as closely together as possible. This pat-

tern is then laid on the surface to be ornamented, and rubbed over with a small pounce bag (*q. v.*). A fine ornamenting pencil is then used, with which to execute the pattern. Good judgment is necessary in the application of striping, and many conditions must be taken into account in determining the color, width, and combinations of the stripes. The painter should look well to the form of the work, its weight, and the effect his striping will have on it. The wheels of a light trotting wagon or sulky do not require a broad stripe on each side of the spokes to make them look lighter and more slender than they really are, but, by the same means, the appearance of a heavy wheel may be lightened and improved. The style and arrangement of the striping on a farm or business wagon would be entirely out of place on a fine pleasure carriage.

Odd Styles of Striping for Carriage Parts.—

Half-and-Half.—This is done by striping one-half of each spoke lengthwise with a color different from the ground-work. If the ground be straw color and a light brown is selected for striping, then run the brown from hub to felloe on the back half of the spokes, and stripe the remainder of the carriage part in the usual way. The brown may be run on the dead color, over colors that cover solidly without varnish in their mixture. Again, the spokes may be halved by carrying the brown, or any other color, half way from the hub to the felloe, covering the spoke all around.

Dotted Line.—A fine line put at centres of the several parts. It is kept an inch or more from the hub and felloe, and ends have one or two dots of the same color.

Dotted and Forked.—Same as the former, except that it has a double fork at the centre, which forms a diamond, or any other break may be placed at the centre that is easy to put on.

Dotted and Scrolled.—This is a single line, dotted as before, and having the fronts of spokes and other suitable places varied by the introduction of simple scrolls, touched up with colors contrasting with the striping color.

Double Fine Line, Ornamented.—Which may be done at the centres of the spokes, or at centre or ends on the other parts, by plain stripes or scrolls.

Triple Lines.—Three fine lines, at one time, the centre one slightly the heavier, and at another the outside lines the largest, but in both cases the centre line is a half inch the longer at each end, and is dotted.

Broken Broad Line.—This is a broad line run on and afterwards cut in two at the centre with the ground color, making a half-inch opening. Edge, or distance fine lines are then run on, and are joined by cross lines at the opening of the broad line, or the edge and distance lines may be omitted, and the break in the broad line filled with short fine lines at right angles to the broad line, the middle one to be somewhat the longer.

Short Broad Line.—Broad line on centre of spokes, to be one-third the length of same, and the spaces above and below the broad line filled with fine lines forked to the width of broad stripe.

Having given a few examples of the treatment of a single line or stripe, it will be in place to show the effect of a repetition of a single figure or form, composed of a single line, and as here given the

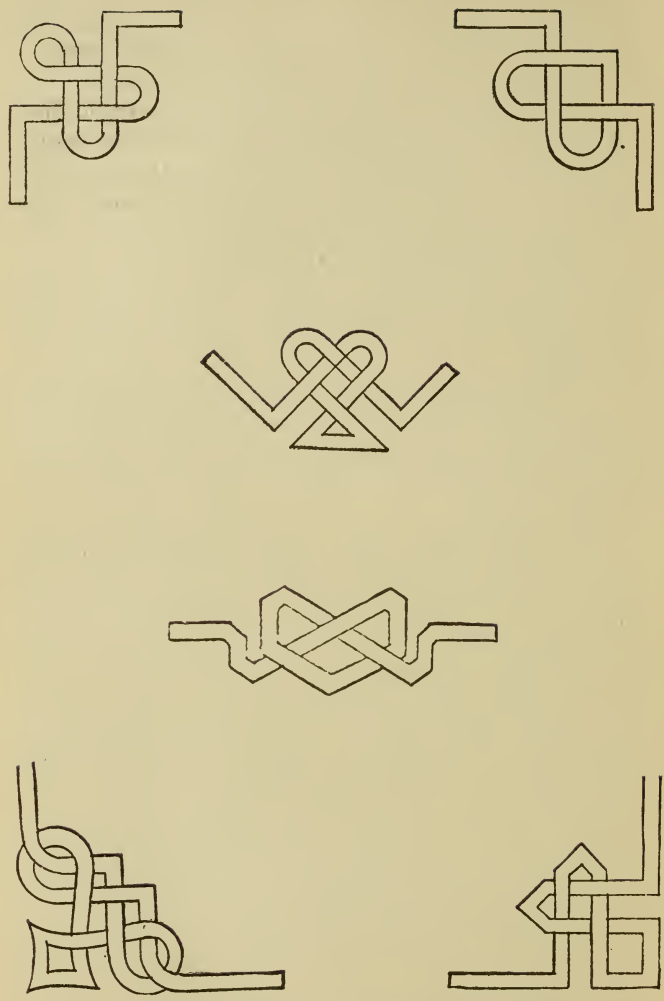


Fig. 154.—Corner Designs for Striping.

completed drawing represents what is termed a border. The border is used chiefly on sleigh bodies and showy wagon work, but occasionally is in fashion for carriages. In the styles here shown, No. 1 is after the style of the Greek Fret or Meander, and it will be readily noticed that the single form resembles the letter S, but it has square instead of round corners. The dotted lines give the spacing and proportions. There are five equal horizontal spaces, and six equal vertical spaces. For the horizontal stripes of the pattern, the first, third and fifth spaces are taken, and for the vertical stripes, counting from the left, the first, fourth and sixth spaces are used. The spaces are, therefore, the same width as the running line.

No. 2 was produced by doubling the former key pattern; that is, there are two of the S forms brought together, which produce a resemblance to the block T. The lines and spaces are otherwise the same as in No. 1

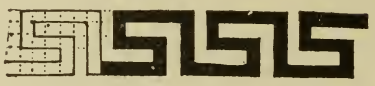
No. 3 is identical with No. 1, when first laid out, the only change being the cutting of the corners at an angle, and yet so slight an alteration is sufficient to make quite a different border.

No. 4 is also like No. 1, with the exception that it has inclined instead of vertical lines. The lines are at angle of 65°. No. 2 may be similarly treated.

In No. 5, there is presented an extra bend, or block form, which it will be seen is nothing more than a change of the inner horizontal line, from a single straight line to the embattled shape. This renders the border a trifle more difficult of execution, but more pleasant when completed.

String.—A horizontal band or border.

Striping Pen.—An ordinary drawing pen may be used for striping, but a patent pen, so arranged that the color was regulated in its flow by set



No. 1.

No. 2.

No. 3.

No. 4.

No. 5.

Fig. 153.—Borders or Belts.

screws, etc., was once brought out by one Crossingham, of Croton Falls, N. Y., but he did not make a success of the instrument on the market, although excellent work could be done with it. A

good striper needs no mechanical device, his eye and hand alone being sufficient to produce the best results.

Sugar of Lead.—A drier for paints. It should be ground fine, and may be used in delicate colors such as lakes, but if used in glazing or in varnish it is apt to cause pitting. Its use in late years is limited, owing to the perfection to which liquid driers have been brought.

Surfacer.—Liquid substance or substances composed of coarse pigments, as ochre or similar to ochre, which are used to level up or load the grain of the wood, after the priming or first coat has been applied. A surfacer requires to be leveled down with lump pumice-stone and water. In the system of carriage painting brought out by Murphy & Co., of Newark, N. J., there are four surfacers used, namely: 1st, Surfacer A—Priming coat; 2d, Surfacer B—Loading coat; 3d, Surfacer C—Leveling coat; 4th—Sealing coat. These four surfacers—the first designed to prime the wood and to permeate its fibres; the second designed to load the pores of the grain; the third designed to level the surface; and the fourth to seal it over—constitute a course of kindred coatings, which combine to produce a surface that for smoothness, solidity and wearing quality is unsurpassed.

Sweating.—The technical term applied to a greasy gloss which makes its appearance upon a varnished surface after it has been rubbed and allowed to stand. The cause of sweating is the reappearance of the gloss, showing that the varnish is not hard enough to rub and receive another

coat. The sweating of rubbing-varnish is a common occurrence, and the inexperienced painter who varnishes over a sweated surface would no doubt be surprised to see his work "enameled," "crinkled up," or "like corduroy." The remedy for this trouble, if time cannot be given for the varnish to harden, is to rub it lightly, wash clean, and immediately apply the varnish—not giving it time to sweat.

Sword Pencils.—Or as called by some *dagger pencils.* These cannot be purchased ready-made, as they should be made, therefore we will explain *how to make them.* Take a small piece of wood —hickory is best—and form a handle as shown in the engraving, having it *flat*, instead of *round;* split it edgewise to the depth of say ¾ of an inch; then, having some good sable or camel's-hair at

FIG. 154.—SWORD PENCILS.

hand, take a sufficient quantity to fill the split with five or six layers of hair, straighten the butt ends by dropping the hair loosely upon the bench or table, and dip that end into some melted glue, then, having opened the split by the insertion of a pin at its inner end, lay the glued end of the hairs evenly within it; pull out the pin, to allow the split to close, and tie a piece of silk or thread around, as shown at *A* to hold firmly together. Do not cut the extreme point, if possible to get along without it. If cutting *must* be done to make

a point, cut just as little as possible; grease the pencil, draw it between the finger and a warm iron and it is ready for use.

How to Use Them.—Fill the pencil, as usual, with color, and holding it edgewise to the work, draw a line with it until by experience you know just the amount of pressure to put on, for the less pressure the finer the line, and *vice versa*. By keeping a steady pressure upon the pencil and allowing about one-half the length of the hair only to touch the work, a uniform stripe many feet in length may be drawn. The mass of hair acts as a reservoir for the paint. These pencils are coming into use in most of the best shops, and those who have acquired the knack of handling them say they can do more and better work with them than with the old style pencils. It requires some considerable practice to master the art, however.

Syssing or Cissing.—A term employed by English painters, being synonymous with "crawling" as used in America, but applied more particularly to this trouble in connection with repair work, and under certain conditions. It is a common plan for an English painter, when a job is brought to him for varnishing only, to give it a thin coating, first, of a mixture of *gold-size varnish and turpentine*, made up as wanted. The object of this is to set the dirt or kill any grease that may be hanging around it. If this is not flatted down, *i. e.*, rubbed with pumice powder—and generally it is not, because it is too thin for flatting—the varnish laid over it will run up in lumps, which is called "syssing" and of course the job is spoiled, there being no remedy but to rub off the varnish and

varnish again properly. The painter may save himself all this trouble by putting about two tablespoonfuls of turpentine into a pail of water and washing off the work before attempting to lay the varnish. "Syssing" will occur on any work not rubbed with pumice as it should be.

T

Tacky.—A term used to express the state of a varnished or sized surface. When the varnish or size is spread upon a surface, it thickens, or "sets," and rapidly hastens on to that state known as *dry*, but just before it reaches that *dry* state, it is *tacky*, *i. e.*, sticky. The hand may pass over it lightly without disturbing it but if the finger be placed directly upon the size or varnish it will adhere. It is then ready to receive gold leaf, bronze, or whatever other ornament is desired.

Tadpoles.—A name given to specks which appear at times on a varnished surface, the same being of the shape of the tadpole, *i. e.*, a round spot, with an elongation or tail. This trouble is due to defects in the under coat; when small specks in the under coat are rubbed down level, the varnish at that spot is not as hard as the surrounding surface and consequently sweat occurs, which acts on the finishing varnish put over it, and little mounds with a comet-like tail are seen. To remedy this, always give the work a light rubbing with a pumice rag just before the varnishing is begun, wash and dry well and no tadpoles will appear.

Tan Color.—A color of oak bark, made by mixing five parts burnt sienna, two of yellow, and one of raw umber.

Tertiary Colors.—There are three only, namely: citrine, russet and olive. Each of these is composed of, or can be resolved into, either two secondary colors or the three primaries: thus, citrine consists of green and orange, or of a predominant yellow with blue and red; russet is compounded of orange and purple, or of a predominant red with blue and yellow; and olive is composed of purple and green, or of a predominant blue with yellow and red.

Terra-Verte.—A bluish-green ochre, not very bright but quite durable. There are several varieties of this pigment, viz: green bice, holly green, verdetto, verona green, etc. When calcined it forms another pigment known as verona brown.

Templet (*Hutchinson's Patent*).—A sheet of metal through which perforations are made corresponding with lines which go to make up the alphabet, and through which a pencil point is drawn to sketch out a skeleton form of any desired letter—plain block. It is convenient for amateurs.

Tempera Colors.—Colors in nearly their natural state, finely ground in spirits, and crushed to powder. They are generally called powdered colors. Mixed with gum they form the water-colors of an artist.

Thinning.—Spirits of turpentine is used principally for thinning paint, and there seems to be nothing to equal it. However, in preparing the *thinning* for striping or lettering, a few drops of oil added to the turpentine will cause the pencil to work better, and this small percentage will in no wise affect the drying.

Tie.—The connecting band of a stencil plate; the parts which hold the stencil together (*See Stenciling*).

Tint.—Any color added to white forms a tint. Also a slight coloring or tincture distinct from tne ground or principal color.

Some of the tints in common use may be of value as follows:

STRAW COLOR.—White lead, Massicot (in oil).
Whiting, Dutch Pink (in distemper).
" Chrome Yellow.

LAVENDER, LILAC AND FRENCH GRAYS.—Produced by the predominance of white, blue or red.
White, Lake, Indigo.
" Lake, Prussian Blue.
" Indian Red, Prussian Blue.
" Vermilion, Prussian Blue.
" Indigo, Rose Pink.

PEARL GRAY.—White, Black, Prussian Blue.

GRAY TINTS.—Of a blue hue.
White, Verditer.
" Blue Black.
" Lamp Black.
" Indigo.

GRAY TINTS.—Of a brown hue.
White, Madder Brown, Prus. Blue.
" " " " " Yellow Ochre.
" Indian Red, Indigo.
" Light Red, Prussian Blue.
" Burnt Sienna, Lake, Indigo.

BROWN TINTS.—White, Lake, Prussian Blue, Yellow Ochre.
White, Lake, Indigo, Yellow Ochre.
" Raw Sienna, Madder Lake, Prussian Blue.

BROWN TINTS—*Continued.*
White, Light Red, Indigo.
" Vandyke Brown, Lake, Indigo.
" Burnt Sienna, Indigo.
" " " Lake.

GREEN TINT.—White, Italian Pink, Antwerp Blue.
" Prussian Blue, Italian Pink.
" Yellow Ochre, Indigo.
" Burnt Sienna, Indigo.
" Brown Pink, Indigo.
" Raw Umber, Indigo.

PEA GREEN.—White, French Green.
" Olympian Green.
" Brunswick Green.
" Prus. Blue, Chrome Yellow.

SAGE GREEN.—White, Prussian Blue, Raw Umber.
" Antwerp Blue, Stone Ochre.

OLIVE GREEN.—White, Raw Umber, Prussian Blue.

ORANGE TINTS.—White, French Yeilow.
" Orange Lead.
" Dutch Pink.
" Chrome Yellow, Vermilion.

PINK TINTS.—White, Rose Pink.
" Crimson Lake.
" Scarlet Lake.

SALMON COLOR.—White, Venetian Red.
" Vermilion.

PEACH TINTS.—White, Vermilion, Indian Red, Purple, Brown.
White, Vermilion, Indian Red, Purple, Brown and Burnt Stone Ochre.

VIOLET TINTS.—White, Vermilion, Prussian Blue, Lampblack.

CHOCOLATE.—White, Spanish Brown, Venetian Red, Vegetable Black.

SKY BLUE.—White, Prussian Blue.

FLESH TINT.—White, Light Red, Yellow Ochre.
White, Lake, Vermilion, Naples Yellow.

DRAB AND STONE COLOR.—White, Burnt Umber.
" Raw Umber.
" Yellow Ochre.
White, Yellow Ochre, Lampblack.
White, Raw Umber, Lampblack.

LEAD COLOR.—White, Black.
" Black, Indigo.

It must of course be understood that the colors are not mixed in equal quantities, but in such proportions as will produce the required tint; the slightest predominance of any one of the pigments gives the prevailing tone of the tints, while the addition of a further quantity of white produces all the numerous gradations, from lavender and lilac to French gray.

All colors in distemper are lighter when dry than they appear in a wet condition.

By mixing white with the original color a *tint* is made; by mixing color with color, compound colors or *hues* are formed; while from the mixture of colors or tints with black, *shades* result.

Traceotypes.—The letters of the alphabet in various styles and sizes, cut out of pasteboard, and used by laying them on the work and marking around them. For a beginner these may be of value, but a professional has no use for them.

Transfer Ornament.—A design or ornament of any kind, painted or printed upon paper which has been suitably prepared, and which can afterwards

be transferred to another surface. To enable the painter to prepare his own transfers, so as to economize time, while the job is being painted, first procure some unsized letter paper and flow upon one side a thin layer of mucilage or dissolved gum arabic; lay this aside to dry, out of the way of dust. Then lay out the design and paint it in the same manner as if putting it upon the carriage panel. Next, procure some soft yet moderately thin blotting paper—lithograph paper will answer—and coat one side of that with mucilage or gum as before, let dry, and when the paint of the design is dry, slightly moisten the gum on the blotting paper, and lay the painted ornament face down upon it, pressing it firmly or rubbing it gently with a smooth hard substance. Let this dry, after which dampen the back, *i. e.*, the paper on which the design was painted, and remove the paper in the same manner as if it was a transfer or decalcomanie picture. This transfers the painting face down to the soft paper. It may now be laid aside until the job is ready to receive it; when that time comes transfer it to the panel by simply sizing the ornament with either transfer cement, or quick-drying varnish, in the same manner as a transfer ornament would be done. The face of the design will be to all appearance the same as if painted directly upon the panel.

Transfer ornaments, as purchased from the dealers, are made by the lithographic process, as follows:

The first step in the process, after making the design, is to take an outline drawing. This drawing is then transferred to as many stones as there are colors in the ornament. Before the stone

receives the outlines it must be polished to a glassy smoothness with pumice-stone. The best work requires from twelve to twenty stones, costing about $80 each. Crayon is now covered over such portions of the stone as are to receive a certain color—the brown shading of a scroll, or the blue sky of a landscape it may be—which, when the stone has been placed under acid, are the only portions of its surface that will receive, or transfer to paper, any color whatever. The next stone is prepared in the same way, and so on until the stones are ready. The first stone is then placed upon the bed of the press, which is the *last* in a chromo-lithograph, being transposed that the ornament may show perfect when transferred. The color having been spread over it with a roller, as in type printing, the sheets of prepared paper, upon which the picture is to be printed, are placed upon it, one by one, and an impression taken. When the whole edition has received the first color, the second stone takes the place of the first, and the sheets are run through the press again, and the second color received. The second stone is then replaced by the third, and so on until the picture is finished. The paper is prepared with a coating of gum that can easily be dissolved by water. Decalcomanie is the same thing as transfer ornaments. It is a French name, and more particularly used in connection with designs of flowers, landscapes, etc.

Transfer Paper.—Paper so prepared that by a light pressure upon it with a hard point of pencil or other material, the coloring matter will be transferred to the surface upon which it is laid. Used for copying a print or drawing, by laying the

paper upon a sheet of white paper, the print then being laid over all, and pinned securely in position. The outlines of the print are then traced with a blunt needle point.

To make transfer paper—rub a piece of ordinary printing or newspaper over with lard or tallow to well grease it, then rub in any colored dry pigment desired, lampblack being one of the best; when the pigment has been well rubbed in, wipe off the superflous coloring matter.

Transparent Paper.—This is used by artists and draughtsmen in copying drawings, etc., and one of the best known methods of preparing it is as follows: Take Canadian balsam dissolved in turpentine,and apply to ordinary white printing paper a thin coating so as to permeate it thoroughly, after which, with a thicker solution of the same, go over both sides of the paper, keeping the paper warm by performing the operation near a fire. A third and perhaps a fourth coat may be applied until the texture of the paper is seen to merge into a homogeneous translucency. Paper prepared according to this process is said to come nearer than any other to the highest standard of perfection in transparent paper. Care must be used in making, as the materials are highly inflammable.

Transparent Colors.—It is well understood that transparency in the proper sense is opposed to opaqueness. A transparent body—strictly speaking—suffers rays of light to pass through it, so that objects can be seen distinctly.

Air, water, and glass are examples of transparent bodies.

The word, however, is sufficiently accurate for

all practical purposes, and, although in the use of a transparent color we cannot see the ground color over which it is laid, still the ground work exerts a modifying influence on the so-called transparent color, and the educated eye of the painter sees the ground color, or at least is conscious of its modifying effect on the superimposed color. There is a mutual support between the two, a giving and taking, the end sought being what painters term depth and richness, which cannot be gained by an opaque or heavy-bodied color.

An opaque color presents to the eye a compact film, while the beauty of a glazing color is due to its property of lying loosely, so to speak, and as varnish is employed the color is asserted by the transparent medium.

The painter may obtain transparent colors in crimson, scarlet, purple, blue, yellow, green, and brown, and semi-transparent ones of less purity of tone ; and as they may be used clear, over various grounds, mixed with one another, or modified by small proportions of opaque colors, every desired effect presented in nature may be correctly imitated, and the extreme richness be produced on surface work.

Carmine and the lakes, from cochineal and the madder root, supply all that is desirable in red.

Dutch pink, Italian pink, and patent yellow furnish the yellow tones, and ultramarine stands unrivalled as a blue.

Verdigris, emerald green, and green lake add to the list transparent greens of great beauty ; and asphaltum has no equal among the browns. Raw sienna supplies a dull yellow, and burnt sienna a very valuable brown orange. The list

might be somewhat enlarged, but those given comprise those which are most useful.

An opaque color may be rendered semi-transparent by using a large proportion of the vehicle to that of color, but such mixtures are comparatively of but trifling value.

Transparent colors are usually applied so as to retain the tone of the pigment, as it appears when moistened with oil or varnish. Thus scarlet, crimson, and purple-toned lake are painted over grounds of light and deep vermilion, Indian and Tuscan red, and as greater depth of color is desired, the change is made in the ground color. A very brilliant red is produced by giving a thin wash of carmine over vermilion, and the same shade of carmine may be deepened through browns of varying depths, the limit being black. We may glaze lake over blue, or blue over lake, and produce purple or violet hues, but this is not generally practised outside of striping and ornamenting. The red-toned lakes place at the disposal of the painter a wealth of warm glazing colors; in fact, nothing better could be imagined.

Next in order is yellow, which is termed an advancing color, and when free from the orange cast, and is glazed over white or delicately tinted grounds, produces brilliancy without gaudiness.

Patent yellow gives clear, white tones. Dutch pink and yellow lake, when "wet up," are of a dull yellow, and may be glazed over drab ground-colors, with good effect, but they are at present employed to add richness to what are termed sea, bottle, and olive greens. In this arrangement, the true color of the yellow is hidden, and its yellow tone interposes between the foundation color and

the eye, a yellow medium thus producing transparency and richness that cannot be gained by any other means.

The soft mild green, produced by English varnish over black, is well known to coach painters, and they know also, that the precise tone cannot be imitated.

A pure, dark, rich blue, is supplied by ultramarine blue. It may be classed as more retiring than many shades of green that are popular, and yet blue is but little used for panels.

It is usually glazed over dark lead color and mixtures of Prussian or Antwerp blue and white.

But that is by no means the limit, as it may be successfully glazed over white, straw color, yellow, orange, etc., etc.

Verdigris is a perfectly transparent bluish green, of exceeding beauty, and in former times was in constant use by coach painters for panels of heavy work.

Ornamental painters are now lavish of it, on gold and silver leaf, and it has almost lost its place as a panel color.

Among the browns, asphaltum is the most transparent, and when painted over a dark groundwork, imparts richness, all its own.

Transparent colors are sometimes modified or changed by the addition of those that are opaque. Thus, burnt umber and yellow lake, or Dutch pink, produce a soft warm brown ; Prussian blue gives a rich green, and so on. The reverse of this process is to add a small proportion of the transparent to the opaque color, as lake added to Indian or Tuscan red, and to the strong-bodied, mixed browns. Of course this is in the line of economy, the

purpose being to retain the body or covering power of the opaque color, and a tinge of richness from the transparent one. There is scarcely a limit to the variety that may be produced, and hence the skilled painter has no difficulty in bringing out new effects in colors.

Trencher.—A name often given to the "Brick Header" or lining brush (*which see*).

Tube Colors.—Colors ground in oil, and for convenience in handling are put up in long metal tubes, having a screw cap upon one end. By compressing the sides of the soft metal tube the color is ejected, when the cap may be replaced and in this condition will keep for a long time. Artists seldom think of using any other colors in these days, and the carriage painter will find them excellent for striping, etc. Carmine, ultramarine and a few other expensive colors are now put up in collapsable tubes of this description holding a pound of color.

FIG. 155.—COLOR TUBE.

Turner's Yellow.—(*See Patent Yellow*, the same thing.)

Touching Up.—The act of repairing parts of a piece of work where the painting is broken or worn off. This often occurs in the rubbing process, sharp corners or edges are laid bare sometimes to the wood, and "touching up" must be done to hide these defects.

Many painters on this account are disinclined to

use japan because, as they say, of trouble in matching the jet color if it is necessary to "touch up." But this difficulty is easily overcome.

In the first place the job should be—at the time for the last coat of varnish—so level, and so well rubbed, that no "touching up" is necessary. However, accident may cause these places, and to cover them, first go over with a thin coat of quick-drying ivory-black, then coat again with common asphaltum—which can be procured at any paint store—thinned down with turpentine and applied with a small camel's-hair brush; the spot will then be the same color as the other parts of the job.

Turkey Umber.—A native earth found in the Roman province of Umbria (whence its name) and in the Island of Cyprus. The native earth, called raw umber, is in light brown lumps, and is roasted to produce burnt umber. Immense deposits of umber are found in this country, but none of them approach that from Cyprus in brightness of color, and yet they are sold, both dry and ground in oil, and as an adulterant of the foreign article.

Turpentine.—One of the products of the pine tree, of which there are four—rosin, crude turpentine, tar and pitch. Spirits of turpentine presents a fine illustration of one of the marvelous revelations made known by chemical science. The constituents of this liquid and of the oil of lemons are hydrogen and carbon in precisely the same proportions, and yet no means of converting the one into the other has ever been discovered. Nature, mighty alchemist that she is, manufactures in her secret laboratory, from the same materials, compounds differing from each other thus widely, and man vainly endeavors to find the secret of her

skill. By chemical operations, spirits of turpentine is resolved into a number of substances of no particular value, the most curious of which is artificial camphor, so called from its singular resemblance in odor and appearance to that of gum. It is made by the action of hydrochloric acid on the spirits of turpentine. One of the most powerful solvents of india-rubber, and of many of the gums and resins, is spirits of turpentine. It possesses electrical affinity and polarizes light: it absorbs ozone to such a degree that if left standing a length of time it acquires the power of bleaching vegetable colors. In the art of painting no substitute for it has ever been obtained, though the scanty supply from 1860 to 1865 stimulated much endeavor in this direction. The various light products of petroleum were used for a time, but were abandoned as soon as spirits of turpentine could be procured. Low grades of white paints are made whiter by its use, while those in which benzine is used steadily turn yellow. The mode of gathering the products of the pine tree and their preparation for market, would no doubt be an interesting subject to many of our readers, but space will not permit it just here. Turpentine is formed by the distillation of the gum which exudes from the tree. The operation is conducted in large turnip-shaped stills, made of copper and set in brick-work, the fire being applied directly to the bottom of the still. The stills will hold from ten to fifty barrels of gum. This is "charged" at the top and the cap fitted on. This cap connects by an arm with the worm, around which cool water is constantly running. As the process of distillation goes on, the distiller adds from time to time a little water

to prevent scorching, and tries his charge by inserting a rod in a small hole in the top of the still, intended for the purpose. When the process has reached a certain point, he draws his fire and allows the still to cool a little; then he takes off the cap, and from the liquid mass inside skims off all the chips and bark, of which there is always more or less in the gum. If the cap is taken off too soon the whole charge will take fire from rapid oxidation. The spirit being condensed in the worm, runs out, mingled with considerable water, into a tub; the water, on account of its specific gravity, settling at the bottom. From this tub the spirits are syphoned off into well-glued barrels for shipment. Though the whole operation is one of great simplicity apparently, yet to insure a good article and a high price, care and strict attention is required in conducting it. From Wilmington, N. C., southward, and nearly all the way to Florida, the pitch-pine trees, with blazed sides, attract the attention of the traveler. There are several kinds of pine trees, including Roumany, and pitch-pine. The latter is the only valuable one for "boxing" as it is called, and differs a little from the yellow pine, with which it is sometimes confounded at the North. The owners of these pine lands generally lease the "privilege" for the business, and receive about $125 for a crop, which consists of 10,000 "boxes." The boxes are cavities cut into the tree near the ground so as to hold about a quart, and from one to four boxes are cut in a tree, the number depending upon its size. One man can attend to and gather the crop of 10,000 boxes during the season, which lasts from March to

September. About three quarts of pitch or gum is the average production of each box; but to secure this amount, the bark of the tree above the box must be hacked away a little every fortnight. Doing this so often and for successive seasons, removes the bark as high as can easily be reached, While the quality of the gum constantly decreases, in that it yields less spirit, as the turpentine is called, and then the trees are abandoned. The gum is scraped out of the boxes with a sort of wooden spoon, and at the close of the season, after the pitch on the exposed surface of the tree has become hard, it is removed by scraping, and is only good for resin, producing no turpentine. The gum sells for $1.50 a barrel to the distillers. From 16 barrels of the crude gum, which is the average capacity of the stills, 80 gallons of turpentine and 10 barrels of resin are made. The resin sells for from $1.40 to $5 per barrel, according to quality, and just about pays for cost of gum and distilling, leaving the spirit, which sells for 40 cents a gallon, as the profit of the business. Immense quantities of resin await shipment at the stations along the line, and the pleasant odor enters the car windows as you are whirled along. After the trees are unfit for further boxing, and are not suitable for lumber, they are sometimes used to manufacture tar; but the business is not very profitable, and is only done by large companies, who can use their surplus labor. The trees are cut up into wood which is piled in a hole in the ground and covered with earth, and then burned the same as charcoal is burned elsewhere. The heat sweats out the gum, which uniting with the smoke runs off through a pipe provided for the

purpose. A cord of wood will make two barrels of tar, which sells for $1.50 per barrel, and costs 37½ cents to make. The charcoal is then sold for cooking purposes.

The name *turpentine* is here given without the appellation oil or spirits, some calling it properly "oil of turpentine," others, "spirits of turpentine." The name of turpentine is applied to a liquid, or soft solid product of certain coniferous plants, and there are several varieties as follows:

American or white turpentine.
Bordeaux turpentine.
Venice turpentine.
Strasburg turpentine.
Canadian turpentine, or Canada balsam.
Chio turpentine.
Frankincense.

Turpentine Varnish.—A resin varnish used principally on musical instruments, toys, etc. It is made as follows: resin, one pound; boiled linseed oil, one pound. Melt, then add spirits of turpentine, two pounds—mix well.

Tuscan Red.—An iron oxide, obtained by burning suitable ochres—it is a very durable color.

U

Ultramarine.—From *ultra,* beyond, and *marinus,* the sea, because it was formerly brought from *beyond the sea.* A blue pigment, highly valued for the purity, delicacy and permanency of its color, formerly obtained from the precious stone *lapis lazuli* by a tedious process. The chemical properties of the pigment are, silica, 35.8; alumina, 34.8; soda, 23.2 ; sulphur, 3.1 ; carbonate of lime, 3.1=100.0, and it is now prepared from such formula instead of making it from the precious stone of the Great Bucharia. Pure ultramarine varies in shade from light to dark, and in hue, from pale warm azure to the deepest cold blue, the former of which, when impure in color, is called *ultramarine ashes.* It requires a good ground-work when used pure, and this should be as near the desired shade of finish as can be well obtained with other blues. Being a very transparent pigment, the ground must be solid, for any streaks or clouds in the ground would be seen through several coatings, and great care must be taken to have the surface smooth, otherwise, in rubbing the varnish coats, imperfections in color will be made.

Umber.—An earth. (*See Burnt Umber.*)

V

Vandyke Brown.—A pigment obtained from a kind of peat or bog earth of a fine, deep, semi-transparent brown color. It owes its name and reputation from the supposition of its being the brown used by the celebrated painter Vandyke, in his pictures. It is a useful color on the palette or in the paint-shop for gears or panels, and finds favor with many painters as a saddening for colors which appear too glaring. This color is also prepared by the calcination of certain yellow ochres found in the south of France, but as this generally holds a large share of brown grit (glass sand) which is added to increase its weight, the former is of more value.

Vegetable Black.—A pigment extensively used in Europe in place of lampblack.

Vehicle.—The liquid with which the various pigments are applied—the medium.

Venetian Red.—An iron oxide, made by burning certain ochres. The brightness of the color depends upon the materials used and the skill of the workman in burning.

Verdigris.—A diacetate of copper, made by corroding copper with acids. It is a very transparent color and is seldom used in any other way than as glazing. It makes beautiful green shades over gold leaf in scrolling and ornamenting.

Varnish.—Carriage varnish is considered the highest grade of all varnishes, being one of the most sensitive of substances; it requires great experience in its manufacture. It must be delicate yet durable, dainty yet tough; brilliant but colorless; flow freely but uniformly; set slowly but harden quickly. English varnishes were for many years the standard, and these were used on almost all the work built in this country. These varnishes were first imported about 42 years ago, *i. e.*, in 1840, by J. R. Lawrence, a New York city carriage maker, since which time American ingenuity has been at work to make varnishes which would equal the English. We are enabled to say now, that some of the American varnishes have not only equaled but surpassed them. It would occupy too much space to enter into the details of varnish making for there are so many varieties of the manufactured article, so many opinions regarding varnish, and so great a number of formulas for its mixture. In years gone by when it was absolutely necessary for one to make his own varnish, it possibly would have been an interesting subject for the readers of such a book as this, but as any kind or quality for any conceivable purpose can be obtained at leading paint stores, there seems to be no pressing need for a long array of formulas for making varnish, and thus we leave it.

Ventilation.—The means of supplying fresh air to a paint shop. This is of vital importance in the varnish room, and all first-class shops are supplied with some contrivance by which air may or may not be admitted. The windows should be made air tight by the use of weather strips, and it is a good

plan to provide double sashes, *i. e.*, have a pair of sashes to open and shut from the inside, like shutters. A pipe at least a foot in diameter should extend upward through the roof, having upon its outer end a revolving jack: the inner end may be fitted with a damper, which may be opened or closed at will. This arrangement will be found very satisfactory, inasmuch as it carries off by suction or draught the foul air. Varnish dries or hardens by absorbing oxygen from the atmosphere, and when the room is closed nearly air-tight, the amount of oxygen in the room will soon be lessened by the absorption of the varnish, and consequently the drying process will then go on more slowly, but when fresh air is admitted, by the exit of the deoxygenized air through the ventilator, the varnish will have something to feed upon and will dry and harden better.

Verditer.—A blue pigment formed from a sulphate or nitrate of copper by lime, the precipitate being ground up with an excess of lime; *green* verditer is formed by sea-salt and sulphate of copper.

Verditure.—The palest shade of green.

Verona Green.—An ochre of bluish-green belonging to a family of which green bice, verdetto, holly green, and terre-verte are members. These greens are found in the Mendip Hills, France, Italy and the Island of Cyprus, and have been employed as pigment from the earliest times. They are almost unknown in the carriage paint-shop.

Violet.—The color of the violet-purple. One of the secondary colors, red and blue combined.

Viridian, or Guignet's Green.—A beautiful green much used by artists. It is a light bluish-green,

which cannot be imitated by mixtures of blue and yellow.

Veining Horn.—A piece of horn formed to take the place of the thumb-nail in graining to imitate various woods. Wrap a piece of soft rag over the horn, hold it in the right hand pressed by the thumb against the inside upper portion of the first and second fingers, with the thumb slightly overlapping the first finger, and near the small end of the horn and with the rag-protected horn wipe out all the lights to form the heart-wood and knots in the grain. When the grainer is possessed of a good, long, and nicely rounded thumb-nail of the right hand, he need not care for the veining horn—but accident may deprive him of this natural implement.

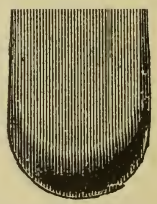


FIG. 156.—VEINING HORN.

Vienna Green.—Same as Brunswick or Schweinfurt green (*which see*).

Vermilion.—A brilliant red pigment found in a natural state, and manufactured artificially, called cinnaber when crystallized, and vermilion when powdered. The red sulphite of mercury is found in all mercury mines. 1 part of sulphur and 2 parts of mercury are intimately mixed and sublimated (brought to a vapor and again condensed to a solid by heat)in clay pots; the pots are then broken and their contents ground in a mill. Another method of manufacture is as follows: Take 300 grammes of mercury, 14 of sulphur, 75 of hydrated potassa, and 450 grammes of water. Mix and grind the mercury and sulphur, then pour on the ethiops thus formed, the solution of potassa and stir it; put the

mixture in earthen pots and heat on a sand-bath at a temperature of 100 degrees Fah. After seven or eight hours the water will be evaporated and the product will pass from a brown to a bright red color.

To use vermilion observe the following rules: For carriage parts or panels, prepare the work by coating with white tinted with red to form a delicate pink color. Mix the vermilion in an earthen vessel, using a stick or wooden palette-knife to stir it, with equal parts of Japan gold-size and hard drying body-varnish. Mix to a stiff paste, and add sufficient turpentine to thin it for spreading evenly with a soft brush. The vessel should then be set away in a clean place, to allow the mixture to assimilate, for vermilion, owing to its sensitiveness, should never be ground in the mill or come in contact with metal surfaces. When it has set a few hours, it should be stirred well, and its application may then be begun. It must be laid on evenly and rubbed no more than necessary. Frequent stirring is necessary, that the heavy globules of color may not fall to the bottom, leaving near the surface those which are lighter and which have an orange tint. Two thin coats are generally necessary, but the surface should not be rubbed. When the second coat is dry, put a little of the color into a cup of hard drying body-varnish, for the color-and-varnish coat, and apply it with a badger or fitch varnish brush. This makes a pure vermilion job. If a carmine job is desired, it is best to add a little carmine to the second coat of vermilion color. Carmine tends to prevent the darkening of vermilion by partially excluding sunlight, but of course the painter does not always

desire to use carmine with it. The brilliancy of vermilion is heightened and rendered more prominent by association with other colors. Red has its complementary in a mixture of blue and yellow which forms *green*. A neutral color, white and black, harmonizes with it, but the color is not so intensified as it is by green. A stripe of green over red will not only be pleasing to the eye, but will make the latter less likely to look faded or dark because its complementary color being present and intensifying it, the eye would not so quickly discern any change that might take place.

There are two brands of English vermilion used, *i. e.*, the English vermilion, light or pale, and deep or dark. The former is used for lettering, striping, etc., as it possesses more body; the latter is best for panel or gear color.

Of late years a new brand called German vermilion has found favor with carriage painters, and and as it appears durable, and may be obtained at a low price, it is superseding the English vermilion to a great extent.

W

Wagon Jack.—A simple contrivance for raising and holding up an axle so that the wheel may be turned to paint or varnish it. To make a cheap and an excellent wagon jack: take the end of a broken shaft—always to be found in a carriage shop—and fit to it the back rest, a strip of hard wood about two feet long; bore a hole through both and insert a bolt for a pivot, then a small hole in front to hold an iron pin, on which the axle rests, completes the work. A wheel may be raised or lowered without touching the gear with the hands, and no adjustment of the jack is necessary, it is always ready.

Water Colors.—Colors ground and mixed with water and gum, or size instead of oil. For drawings on paper, or for water-colored pictures, they are prepared with great care. The coarser grade of work is done with colors mixed with glue-size —virtually, *distemper* or *kalsomine*.

Water-Tool.—A small brush used in washing a body or gear. The ordinary house-painter's sash-tool is generally used for this purpose.

Wall Brush.—A wide, flat, bristle brush designed for painting walls, ceilings, and other large surfaces. (*See next page.*)

Wedgwood Tints.—The delicate colors adopted by Josiah Wedgwood, for cameo grounds, etc.

Wash Leather.—The name often given to a chamois skin or "shammy" (*which see*).

Wearing-Body Varnish.—This varnish is made of the best materials the inventive genius of man can compound. It is designed for the final or finishing coat over carriage bodies, is pale in color, and exceedingly limpid, so that it works well under the brush and possesses that quality so much admired by the varnisher, and known as "thickening under the brush," in order that a heavy coat may be laid upon a panel without fear of its running down in festoons or clouds or heavy masses. It is the

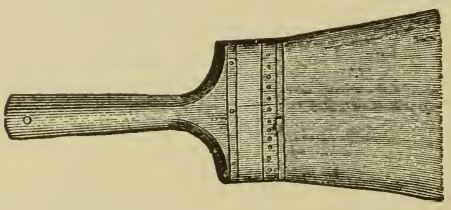


FIG. 157.—WALL BRUSH.

king of all varnishes made, *i. e.*, the best, most durable, brilliant, and therefore valued at the highest price, of varnishes. This varnish is less liable to turn blue by reason of dampness than most finishing varnishes.

White.—Having the color of snow. It is not strictly a color, and yet white light is said to be a composition of all colors.

White Chalk.—Carbonate of lime, used for drawing on dark surfaces.

Whiting.—The same as chalk, a carbonate of lime, but of inferior quality. It is extensively used in making putty (*which see*).

White Lead.—(Known also as Cremnitz, Dutch, Hamburg, Flemish, Venetian, and Roman white.) The system employed in the manufacture of white lead, in this country, is called the old Dutch system, and is recognized as the best. The pig lead is melted and run into moulds, forming what are called "buckles," weighing about a pound each, and shaped like a stove grate. These are placed in earthen pots, but kept from contact with the acetic acid (vinegar) with which the latter are charged, by means of projections made purposely on the pots, and upon which the buckles rest. The pots are then stacked up in what are known as beds—large frame structures, roofed in and provided with double walls—to the number of ten thousand or more. They are placed upon layers, with boards and tan between each, and piled up to the height of the building, the bottom of which and spaces between the walls all being padded with tan-bark, till the whole is tightly shut in, and the contents of the pots are left to the silent action of chemical laws. The tan generates heat, makes an oxide of the lead, and vaporizes the acid, and with the carbonic acid formed in decomposition of the tan, gradually reduces the metal to a beautiful snow-white substance. The result is only attained after an interval of ten to fourteen weeks, when the beds are opened and the buckles found transformed into carbonate of lead.

From the beds it is taken to long, revolving screens, through the meshes of which it falls into bins prepared for its reception, and any uncorrod-

ed particles of metal are separated and returned to the melting cauldrons. The pots, upon being taken out, contain no acid and the lead has increased considerably in bulk and weight. The lead, after having passed through the separating screens, is first thoroughly washed, to deprive it of any free acid, stain or impurities, and is then ground in water, between heavy burr-stone mills, into a pulpy mass; this is then gathered and pumped upon drying-pans in the kiln-house. Deprived by this means of its water, the product becomes dry white lead of commerce. This dry or carbonate of lead is then kneaded with a suitable quantity of linseed oil, generally in the proportion of eight pounds of oil to one hundred of lead. The mixture is then ground fine in mills and packed for shipment and use.

White lead forms the base or foundation of all or nearly all light colors used by the carriage painter. To mix it for first coats or priming, raw linseed oil only should be employed, and the white lead should be sparingly used—just sufficient to color the oil—for it is the oil which gives durability and not the lead.

To mix *color* but little oil is used, if any, and in most cases the oil that is already ground in the lead is an excess, and must be partially extracted. Thin the white lead with turpentine to a milk-like fluid, stir all well together, then set it aside for a day or two, at the end of which time a large share of the oil, together with some of the turpentine, will be found quite free from the lead, on the surface; this should be poured off, and if it be desired to remove more of the oil, another addition of turpentine, and settling, should be given.

However, one "washing" will generally take away a sufficient quantity of oil to make the keg-lead ready for mixture as *color*. Now, add to the washed lead a little rubbing varnish (of light shade) say: one gill to a quart of the softened lead, and this will give "binding" and "drying" qualities to the paint. Stir well, and if too thick to spread nicely, add a little turpentine. Two coats of this color over a light ground, should make a solid foundation. A white surface will remain *white* much longer if no *clear varnish* be laid over it. Apply to the ground made by two coats of color as above described, a flowing coat of white color-and-varnish, made by mixing some of the "washed" lead with light colored finishing-varnish. When dry, rub down as usual, with pulverized pumice stone, and give a second coat of same, or if an extra job is desired zinc white may be substituted for the lead. Next gently rub the glass off with pumice powder, leaving a smooth and even egg-shell gloss only, to the work. If striping, ornamenting or lettering is to be done, this may now be added, and then pencil-varnished, that is, the stripes, ornaments, or letters should be varnished with clear finishing varnish.

Taking the "washed" white lead for a base the following tints may be made:

Normal gray, 8 parts white to 2 of black.

Lead color, 8 parts white, 1 blue, and 1 black.

Oak color, 8 parts white, and 1 yellow ochre.

Fawn color, 8 parts white, 1 red, 2 yellow and 1 umber.

Flesh color, 8 parts white, 3 red, and 3 yellow.

Peach blossom, 8 parts white, 1 red, 1 blue and 1 yellow.

Willow-green, 5 parts white and 2 verdigris.
Pea-green, 5 parts white and 1 chrome green.
Stone color, 5 parts white, 2 yellow and 1 umber.
Lemon color, 5 parts white and 2 medium chrome yellow.
Rose color, 5 parts white and 2 carmine.
Light buff, 5 parts white and 1 yellow ochre.
Drab color, 9 parts white and 1 umber.
French gray, white tinted with ivory black and red.
Pearl color, white tinted with black, blue and red.
Carnation, 1 part white, and 3 lake.
Plum color, 2 parts white, 2 blue, and 1 red.

Whitewash.—The white coating given to the light-houses of the United States is made as follows, having been found to answer the purpose nearly as well on wood, brick or stone as oil paint and is much cheaper: Slack half a bushel of lump lime with boiling water, keeping it covered during the process. Strain it and add a peck of salt, dissolved in hot water; three pounds of ground rice put in boiling water, and boiled to a thin paste; half a pound of powdered Spanish whiting, and a pound of clear glue dissolved in warm water. Mix all together and let stand for several days. Keep the whitewash in a kettle or portable furnace, and when used put it on as hot as possible with whitewash brushes.

Another method of preparing whitewash consists in adding to the slacked lime 2 pounds of sulphate of zinc and 1 pound of common salt; this hardens the wash so that it will not easily rub off.

An improved whitewash is made with sulphate of baryta in place of lime as follows: Take ¼ lb. of powdered or softened glue and dissolve it by

heat in a quart of water. Six pounds of baryta is then made into a milky solution with hot water and the glue size is added. A good stirring while hot and its application with a good brush will produce good results.

Wheel-rest.—A contrivance for holding a wheel while it is being painted, striped, etc. It is the habit in some shops to bore a hole in a post or

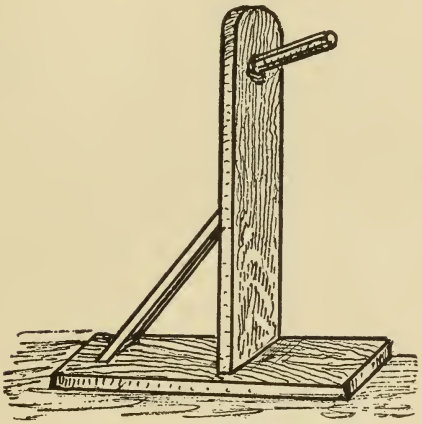


FIG. 158.—WHEEL-REST.

other part of the building, and then insert an iron rod on which to suspend the wheel.

Willow-Green.—A color made by mixing white with emerald-green, or verdigris.

Withering.—Same as "*deading*" (*which see*).

Wrinkling.—A term used by painters to indicate a wrinkled or "drawn up" appearance in varnish coats. Wrinkling is caused by a too heavy flow of varnish; the outside surface absorbs oxy-

gen, and, drying, forms a skin over the larger mass of varnish; this, in turn, gives up a portion of its volatile oils, which lessen its bulk, and the outside skin thereby becoming larger than necessary to cover the under mass, draws up in ridges or wrinkles, somewhat resembling the wrinkling of the skin in old age.

Y

Yellow.—A color of golden hue, and of many varieties. It is one of the three primaries and with blue forms *green.*

Yellow Colors.—The yellow pigments employed by painters are: 1. The varieties of chrome prepared from chromate of lead. 2. Several colors technically called *pinks—Brown pink,* prepared as a lake from a decoction of French berries or fustic; and *English pink* and *Dutch pink,* both lakes, prepared by different processes, from French yellow berries and tumeric. 3. *Naples yellow,* a mixture of metallic antimony, red lead, and oxide of zinc calcined, added to a small quantity of lime, then fused, and afterwards ground to powder. 4. *Patent yellow* consists of 23 parts of chloride of lead and 27 parts of carbonate of lead well mixed in powder, then fused together. 5. *King's yellow* is a tersulphuret of arsenic. 6. *Weed yellow* is prepared from a decoction of weed, or dyer's weed with alum, and is in fact another lake. 7. *Gamboge,* the chief yellow coloring in water-painting.

Yellow Earth.—A coarse yellow ochre, often sold under the name of Prussian red, English red, etc.

Yellow Lake.—A pigment made by saturating whiting with vegetable yellow tinctures in the same manner as rose pink. It may be imitated by mixing equal parts of raw umber and white, and adding

a small quantity of Naples yellow, and a drop of scarlet lake.

Yellow Ochre.—Same as yellow earth.

Yellow Orpiment.—The sulphuretted oxide of zinc, of a beautiful bright and pure yellow color, used as a pigment (*See Orpiment*).

Z

Zinc White.—(Sometimes called Chinese white), oxide of the metal zinc, a beautiful snow-white substance used in painting. It is made as follows: The carbonate and silicate of zinc being crushed and mixed with 33 per cent. of coal, is put into a large fire-brick furnace, just as it comes from the mines. Air is blown into the furnace, and the oxygen in it oxidizes the metallic zinc vapor, for which it has a great affinity, as soon as it is liberated. The oxide of zinc is thus formed, and is propelled by air forced into the furnaces into a high tower in white flocculent particles, with which are associated coal ashes and particles of other foreign substances. It is driven by powerful blowers through a series of chambers connected by pipes; the majority of the oxide associated with impurities deposits in the tower, and the less impure in the chambers and cooling house, the most flocculent and purest passing through pipes to which muslin bags are attached and in which it is collected. The best is like white wheat flour, though very much heavier. Zinc white is used principally in making China gloss (*q. v.*) for the interior of houses, and by artists.

Zinc, the Painting of.—This metal is frequently used for the sides of business wagons, and unless it is properly prepared for painting, the least jar will cause the paint to flake from its greasy, anti-

adhesive surface. To prevent this, first rub the zinc over with dilute muriatic acid, which will remove the "greasiness" and roughen it. Then apply a coat of permanent wood filling as directed (*q. v*). This permanent wood filling is a very tenacious substance and will cling firmly to the metal, and the paint will cling to this filling, and a good job will result.

Zaffre.—A blue pigment prepared from metal cobalt (*See Cobalt Blue*).

Zubia Vermilion.—A local name of a substitute for vermilion made by a New York house, but of transient durability.

Zinc Green.—(Sold also as cobalt green, and Rinman's green) made by macerating Prussian blue in a solution of chloride of zinc.

RECIPES.

Black Stencil Ink.

Mix together 1 part of lampblack, 1 part Prussian blue, with glycerine, then add an equal quantity of gum arabic (dissolved) and glycerine to form a thick paste.

To Transfer Engravings to Glass.

First coat the glass with a thin coat of carriage rubbing varnish and let it dry hard. Apply the second coat and while it is drying prepare the engraving by wetting the paper thoroughly, then lay it between newspapers to take off all water from the face side. The varnish should be "tacky" after a few hours, that is, if the finger is pressed upon it it appears *sticky*, but if simply passed over the surface it seems quite dry, or does not stick. Take the engraving from the newspapers, and lay it face downwards upon the varnish. Rub it down lightly to secure perfect adhesion, then let it dry hard. Now, moisten the paper and rub it off with the finger, leaving nothing but the printers' ink on the varnish. Give a thin coat of varnish, and if desired it may be colored on the back with oil paint to make a durable and elegant picture.

Cement for Fixing Glass Letters.

Marine glue mixed *thick* in wood naptha will securely fasten glass letters to glass window panes. The windows must be perfectly cleaned with ammonia and

whiting, before any attempt is made to put any cement upon it.

Cement for Broken Marble.

To one and a half pounds of plaster of Paris, add one pound of gum arabic made into a thick mucilage with water, and sifted quicklime six ounces. Mix thoroughly, heat the marble, and apply the mixture.

Chamois Skins—to Clean.

Chamois skins are best cleaned by the use of plenty of soap, weak soda and clean water. Allow the skin to lay for a while, well rubbed over with soft soap, then rub it until it is clean. Rinse in warm water to which a little soda has been added, and use yellow soap. A small quantity of soap left in the skin will improve its softness, while pure water rinsing will harden it. After rinsing wring it well in a rough towel and dry quickly, then rub it and work it well in the hands and it will become almost like new.

Furniture Paste.

1. Spirits of turpentine, beeswax and linseed oil, equal parts. Melt all together and cool for use. 2 Turpentine, 10 ounces; beeswax, 4 ounces; alkanet root, melt all together and strain for use. 3. White wax, one pound; liquor of potassa, one-half gallon; boil until of the proper consistency. 4. Yellow beeswax, 20 parts, resin, one part; alkanet root, one part; turpentine, six parts; linseed oil, six parts; dissolve by heat, strain and cool.

Colored Varnish.

A colored varnish for metal work, cork, etc., by dissolving sealing-wax of the color required in spirits

of wine. Apply with a camel's-hair brush, which should be cleansed, when done with, by soaking in spirits of wine.

To Bronze Plaster Casts.

Coat the figure with isinglass size until the surface continues in a moist state, and will absorb no more; then touch it over carefully and sparingly with gold size, and put it away in a clean dry place for several hours, until the size feels sticky and almost dry; then rub on the bronze powder, using a soft camel's-hair brush for the deep parts and a piece of velvet or plush on the higher parts, which will take on a bright metallic lustre if the size is in a proper condition, *i. e.*, not too dry, nor too wet.

To Clean a Hair-Pencil.

Rinse the paint out thoroughly with turpentine, then work the brush well in fine ashes or other like dust, shake the hair out well and the pencil will always appear as good as new. The directions given in some publications to wash pencil in soap and water are entirely at variance with 35 years' experience. The water and alkali destroy the elasticity of the hair, or bristles, and ruins the brushes.

Gilding Glass and China.

Grind gold leaf to a fine powder on a glass or marble slab while mixed with honey, then wash out the honey by adding water and allowing the gold to fall to the bottom of the vessel, dry well, and a very superior gold bronze will be the result; mix the powder with gum water to a paint-like consistency, add a small quantity of powdered borax, and apply the mixture to the glass or china with a camel's-hair pencil. Heat is then ap-

plied by a stove until the borax fuses, when the gold will be fixed. It must then be burnished with a metal or dog's-tooth burnisher.

Pearl Inlaying.

The inlaid work as seen on sewing machines, etc., is done as follows: Select the choicest thin scales of the shell—called shell pearl—and after laying upon the work a heavy coat of black baking japan, place them as desired and press them well into the soft japan; put the work in the oven and bake as usual. Two or three coats of japan will be necessary to level up the work, then the surface must be rubbeddown with lump pumice stone, and polished. The painting and gilding should now be put on and then a flowing coat of varnish over all.

To Improve the Color of Mahogany.

Put into an earthen basin one pint of linseed oil, ten cents worth of alkanet root, and ten cents worth of rose pink; stir well together and let stand for several hours. Thoroughly clean the mahogany, then wet the wood well and let dry; then polish off with linen rags. The white spots made on mahogany tables by hot dishes or water may be removed by first rubbing the spot with linseed oil and afterwards pouring on spirits of wine and rubbing with a soft cloth. Another plan is to take six parts spirits of salts, one part of salts of lemon; mix and keep in a bottle. When required for use, rub a little on the spots, and rub well.

Oil Finishes.

Linseed oil, twelve ounces; black resin, three ounces; vinegar, three ounces; rectified spirits, two ounces; butter of antimony, eight ounces; spirits of salts, one

ounce. Melt the resin and oil, remove from the fire and add the vinegar, allow it to boil a few minutes, stirring it meanwhile, then let cool and bottle for use.

2. Two ounces alkanet root added to one pint of linseed oil; heat, strain, and add one ounce of lac varnish.

3. Same as No. 2, with addition of one ounce of rose pink.

Dark Colored Boiled Oil.

Put into a gallon of linseed oil one pound of litharge and allow it to simmer or slowly boil until a skin appears on the surface, then remove from the fire, skim the skin off and let cool.

Pale Boiled Oil.

Put two ounces of sulphate of zinc into one quart of linseed oil and one pint of water; heat until the water is all evaporated then decant for use.

Very Pale Drying Oil.

Mix two ounces of dry sulphate of lead with one pint of pale linseed oil and agitate the bottle for several days, after which place it in the sun to settle.

Drying Oil Without Boiling.

With the oldest linseed oil obtainable mix two per cent of manganese borate and heat on a water-bath to 100°.

Pencils for Marking on Glass.

Melt together four parts of stearic acid, three parts mutton suet, and two parts of beeswax; then add six parts red lead and one part purified carbonate of potassa; set aside in a warm place and stir frequently, for an hour or more, then pour into glass tubes to form the pencils.

Painting on Silk.

Stretch the silk on a light frame and wash it well with alum water, let dry thoroughly, and apply a wash of isinglass dissolved in water—say, as much isinglass as will lay on a half dollar, in a quart of water.—Now draw the design with crayon or charcoal, or pounce it on the silk, and paint with oil or water colors. The isinglass size will prevent the spreading of the paint.

The best isinglass is made from the air bladders of the sturgeon, and is imported from Russia, where that fish largely abounds.

To Remove Ink Stains from Mahogany, etc.

Add two ounces of oxalic acid and one ounce of butter of antimony to a pint of water.

To Soften Old Putty.

Muriatic acid spread, with a rag tied on a stick, over the putty will soften it quite readily, when it may be scraped off with a knife or chisel. When the putty has been removed wash off clean with water.

Imitation of Ground Glass.

Take 90 grains sandarac and 20 grains mastic gum, and dissolve them in 2 ounces of methylated ether, and add a small quantity of benzine—from an ounce to two ounces ; lay on with a small brush.

To Remove Scratches in Varnish.

Scratches will entirely disappear if a cloth well saturated with raw linseed oil be laid over them

Crystal Varnish for Drawings, Maps, etc.

Take one ounce of Canada balsam, spirits of turpentine two ounces, mix together. Before applying this varnish, the paper should be placed on a stretcher, and be sized with a thin solution of isinglass in water, and dried. Apply with a soft camel's-hair brush.

Whitewash—to Clean from a Ceiling.

Make a thick paste of wheat flour in which put a goodly share of alum. Apply to the ceiling with a whitewash brush, being sure to cover the ceiling thoroughly; then shut the doors, and let it stand over night. In the morning the greater part of the whitewash will be found to have fallen to the floor, and that which remains upon the wall will be easily scraped off.

Pencils—to Clean from Dried Paint.

Put a little turpentine in a saucer and set fire to it; let it burn until it is warm, then extinguish, and rub the hairs of the pencil in it.

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Adelaide Exposition, Melbourne, So. Aus	1881
American Institute of the City of New York	1859–1870
Maryland Institute for the Protection of Mechanic Arts	1873
Massachusetts Charitable Mechanic Association, Boston	1860
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