

marbles is the Florence or olive oil. It may be had in flasks at most druggists' or Italian warehouses. Other oils may be used, such as linseed or boiled oil; but for general purposes the olive is best, and least trouble to work.

#### SPIRITS OF TURPENTINE.

This is also another agent which requires to be kept under careful control, as it will make your colour full of holes and blotches where they are not wanted.

#### KEROSINE, PARAFFIN, OR ROCK OIL.

This is another extraordinary production of nature, only of recent introduction. Little can be said about it at present; but it appears to partake somewhat of the properties, and to produce something of the effects of spirits of turpentine, and if used must be used with caution. However, if any have time and inclination to experiment, let them do so, as, in this way, novel and, it may be, important results may be attained.

#### ALUM.

This is a well-known substance, of a light colour, and a sharp acid taste, soluble in boiling water; but although you may keep it dissolved while heated, if allowed to stand till cold, you will find only a certain proportion of the alum taken up by the water, the remainder forming itself into crystals at the bottom of the vessel; but if you pour the liquid off, and add more water, by repeating

the process you may get it all dissolved. The uses to which this article may be applied in marbling are (first) to counteract the effect of too much gall in the colours. If any one of your colours should spread or run out too much, a few drops of this solution of alum will check it, and cause it to contract or close up, but it must be used with caution, as it will affect the tints of some colours, and will also resist the friction of the flint in glazing, causing it to tear. Secondly,

If put into the solution of gum tragacanth it will make it thicken, and help it to keep good a little longer; but it is not possible to work well with it, as it will only produce very inferior work. It takes a great deal more gall to make the colours flow out upon it, the one being opposed to the other; still, it is sometimes useful at a pinch, but it is better to do without it altogether if possible.

It is also a necessary ingredient in the making size for the paper after marbling.

There are, doubtless, other agencies at present hidden from us, which the light of advancing science and increasing knowledge will reveal, producing effects which may throw all our present attainments in the shade; but till then we must make the best use of the means within our reach, and by cultivating these we may reap more than we expect.

#### WATER.

Soft or rain water, where it can be procured, is best adapted for all the preparations of marbling, but hard water will do, especially if a small quantity of soda or

pearlash be dissolved in it. Water that has been boiled, and allowed to cool, answers every purpose.

#### OF THE PREPARATIONS OR VEHICLES REQUIRED FOR MARBLING.

For Spanish, French, or Shell, Italian, West End, and British, you will require a mixture of the solution of gum tragacanth and the mucilage of flea-seed in the proportion of one quart of the latter to two gallons of the former; beat them well up together till they are thoroughly incorporated with each other, strain the mixture through the hair sieve into your trough, and it will be fit for use.

For Dutch, Nonpareil, Curl, Antique, and in short all patterns which require to be formed with any kind of instrument on the surface of the preparation in the trough, you had better use nothing but the pure solution of gum tragacanth; in fact, you may marble all the patterns on this alone, so that if you find any difficulty in procuring the other articles mentioned, if you can only procure good gum you may do any or all the varieties of marbling upon it, although some patterns are improved by the addition of the preparation of the flea-seed before described.

#### OF GRINDING THE COLOURS.

On this head you must be very particular, for if any of your colours are not finely or properly ground, you must not expect your work to look well. Where a large quantity of colour is required, a colour-mill is the most

advantageous method to be adopted, but if on a small scale the ordinary slab and muller will answer the purpose; but whether by the mill or by hand, the colours must be ground perfectly smooth and fine. They must be all ground with a preparation of beeswax, in the proportion of one ounce of the prepared wax to one pound of colour; this will prevent the colour from rubbing off, and make it burnish or glaze easily.

#### TO PREPARE THE WAX FOR GRINDING.

To attempt to grind beeswax in its native state would be a fruitless task, as it would only stick to the stone, and would not unite with the other ingredients. To obviate this you must prepare it in the following manner. Take of the very best beeswax two pounds, put it in an earthen pipkin, and with it a quarter of a pound of the very best white curd soap, cut in very thin small pieces, place it in a gentle heat, and when both are quite dissolved (but be sure they are not boiling) put the pipkin containing the hot liquid on a table, taking in one hand a jug containing cold water, and gently stirring the wax with the other, pour in the water a little at the time, keeping it constantly stirred, and you will find it gradually thicken till at last you will hardly be able to stir it at all; but you must be very careful not to have it too hot when you pour in the water, for if you do the moment the water and wax come in contact it will fly up out of the pipkin, and perhaps scald you. Set it to cool, and when cold you will be able to pulverize it between your thumb and finger; in this state you may mix or grind it with the colour easily, but

it is best if worked well in with the dry colour before you wet it.

#### TROUGHS.

The troughs are generally made of wood, and must be water-tight, and perfectly flat and smooth at bottom inside, because, where bottom combs are used, any unevenness would injure them, and be likely to distort the pattern. Sometimes they are made of slate, which is better; but they are very heavy, if you have to shift them, and are more expensive. With regard to sizes, some are made to take in a single sheet, others two sheets together; but whatever their size, they should be a little larger than the paper for Spanish, French, Italian, &c., but for Nonpareil and patterns of that class, it will require to be larger still, or the edges of the paper will be imperfect. There should be a small partition on the right-hand side, about three inches wide, made by letting in a narrow piece of wood or slate, about a quarter of an inch in thickness, and so placed in a sloping position,—the top being about the eighth of an inch below the sides,—as to allow of the waste being skimmed over it, without running over the sides. A hole about the size of a wine cork should be made in one corner, to run the contents out whenever you want to do so. A skimmer, constructed of a thin piece of wood about three or four inches wide, and of sufficient length to pass along the inside of the trough without interruption, when drawn along the surface of the fluid for the purpose of skimming, will also be required, as it must be skimmed for every sheet made.

## COMBS.

The combs used in marbling are various in their construction, some being what are termed top and others bottom combs; that is, one is drawn along the top of the fluid in the trough, the teeth just touching the floating colours, while the other is put to the bottom and held down with the points of the teeth touching the bottom of the trough all the time it is being drawn through. They should be made with brass wire, the smaller the pattern the finer the wire. The bottom combs are generally made by a reed-maker, that is, one who manufactures the peculiarly fine and uniformly regular wire apparatus used by the silk weavers in their business, and which they can divide with the nicest precision and exactness into any

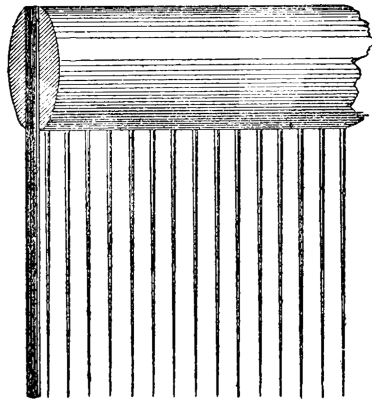


FIG. 1.

number of teeth to the inch; but twelve or thirteen to the inch is fine enough for any Nonpareil comb, if finer it is apt to drag.

The top combs are generally manufactured by the parties using them, and various methods have been adopted for the purpose. Pins, needles, and wire have been brought into requisition, and with various results, according to the ingenuity or clumsiness of the individual attempting the task. The greatest difficulties are: first,

keeping uniform distance or space between the teeth; second, keeping the points exactly level, so that they may touch the level surface of the liquid all over, without having one part under and another not touching at all; third, having them perfectly flat, not bent or crooked, one part inclined to stand out behind and another part sticking out before, as with these defects it will be impossible to produce a regular or uniform appearance. We will, therefore, try to describe to you a method which, after many years' practice and experience, we consider the most easy and most likely to be successful.

Cut some pieces of paper about four or five inches long and about two and a-half broad, carefully, evenly, and exactly fold them as in the following diagram, thus:—

That is, fold it first nearly in half, then turn the widest part back and fold it evenly about one-eighth of an inch from the first fold, turn it back again level with the first fold; then draw a line parallel with the edge of the fold either with ink or pencil about one-twelfth of an inch from the edge, so as to permit the pins or needles to catch in the part folded back, and measure and mark

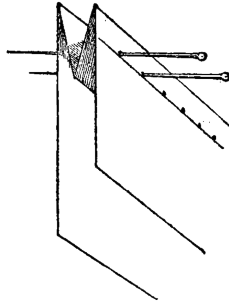


FIG. 2.

out the distances through which your points are to be put. If you find any difficulty in comprehending this plan, purchase a sheet of pins and observe the manner in which they are stuck through, closing up the folds of the paper, and the idea will be realized at once. Some combs have been made of such pins, but the heads are in the way.

When you have stuck your needles or pins you will require to regulate them ; if any have gone askew or you have any crooked ones, they must be replaced by others, and you must leave as much as possible of the length of the needles or pins from the points as you can do consistently with security for holding them fast in their places ; and in order to do this you must flatten the paper out again, and with the side of a knife or something perfectly level, press against the points till they are quite even, then

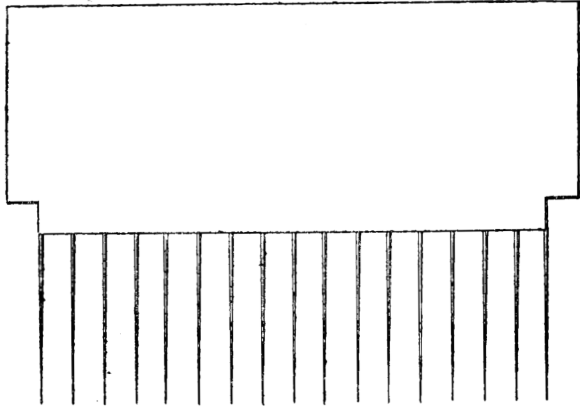


FIG. 3.

take a narrow strip of paper glued and secure them by sticking it on to the upper part, and when that is dry you can turn back the other part of the paper and with a little thin glue stick the two folds together : this will leave the points sticking out like a comb, and render it doubly secure. You can now fix any number of these short lengths upon a piece of thin wood, perfectly true and exact, two or three inches wide, as the size of your trough may require ; taking care to trim the ends of each piece so that



it shall join the other without making a gap between, and it will be necessary to cut a piece out of each end of the wood, permitting it to rest upon the edges of the trough, to allow of your guiding it evenly along. I here again observe that you must have the trough made very true and level in every part, for although the bottom combs may be made to work provided the bottom only be smooth and level, yet the top combs cannot be made to do unless the sides are level also. In order to test the level of the trough when the liquid is in it, take a piece of stick, or your finger, put it to the bottom of the liquid, in one part mark the depth; try another part in the same manner, till you get it the same depth all over. Should your table or bench be uneven, you must wedge it up by putting small wedge-shaped pieces of wood between the bottom of the trough and the table where it may be required; and you must be very particular in thus adjusting your trough, especially in those patterns which require combs or other instruments in their production.

In using the bottom comb it will be necessary to have a small trough, about a couple of inches in width and filled with clean water, on the left-hand side of the trough, in which to place the comb when you have drawn it through the colour, or it will get clogged. The combs must occasionally be brushed, as frequently little impediments will get between the teeth and make an unsightly mark through the sheet.

#### THE ARRANGEMENT OF THE TROUGH AND COLOURS, ETC.

Procure a firm level table, or fixed bench, of a conve-

nient height, sufficiently large to hold your trough and leave you some feet of spare room on each side of it; you must place the pots or jars containing the colours on your right hand, and your paper or books to be marbled on your left. Have the gall-bottle handy; better place it between some of the jars, where it will not be likely to get knocked over, as you will be obliged to have frequent recourse to it, to keep your colours in good working order, as a very trifling matter will throw them out; fill your trough to within half or three-quarters of an inch of the top with your solution, whatever kind it may be, proceed to mix and try your colours, at first a few spots at the time, on the surface of the solution, adding the ingredients, as their effects may reveal to you the necessity thereof by their action and appearance, adjusting their proportions till you obtain the desired effects, and trying them on small pieces of paper before hazarding whole sheets. When you are satisfied that both solution and colours are in perfect order, skim the surface of the solution all over, taking care not to agitate it too much, commence sprinkling on the colours immediately, and then you can proceed as in the following examples:—

#### SIZING THE PAPER AFTER MARBLING.

This depends much upon the nature of the paper you have to size. If it be an ordinary hard-sized printing paper, the size will not need to be so strong as it would be for the proper half-sized paper made for the express purpose of marbling. The ordinary size is prepared as follows: Take half a pound of the best pale soap and half

a pound of best glue. Cut the soap into small pieces, and boil them together in three gallons of water till dissolved. Then dissolve in another vessel half a pound of alum by boiling. Mix the two together in as near a boiling state as you possibly can, in a tub or any other vessel that will hold it, stirring them up well; and, when cool, put the preparation into a trough similar to those used for marbling, and lay the paper in it, just in the same manner, taking it out on a stick, and hanging it up to dry in the same way. If the paper be very soft, more glue may be used in making the size, after which it will be ready for glazing.

#### GLAZING.

This is accomplished by means of a machine similar to those used by calenderers to glaze prints and curtains, and is effected by the friction of a smoothly surfaced flint stone on the face of the paper. We will endeavour to describe it. A polished or smoothly faced flint stone is fixed in a block of wood, having a handle at the centre of each side to work it by. Over the flint is fixed one end of a pole, about five feet long, the other end being placed in a hole or cavity in a spring board overhead, so as to allow the flint to be moved backwards and forwards at will, upon a piece of wood so hollowed out as to admit of an equal pressure all over; the longer the pole the less hollow the plank or block requires to be. It is very hard work by hand, and is now mostly done by steam power. Some is done by heated steel cylinders, as bookbinders' cloth is done; but this is objectionable, as

the paper is made very thin, and is more difficult to use, being apt to curl up when pasted, and difficult to keep from creasing and stretching.<sup>1</sup>

It may be as well to observe that, of the examples of marbling that follow, the completed patterns are all glazed. Only those that illustrate the progress of a pattern are unglazed.

THE ILLUSTRATIVE EXAMPLES IN THIS VOLUME  
HAVE BEEN EXECUTED EXPRESSLY FOR THIS  
WORK UNDER THE IMMEDIATE SUPER-  
INTENDENCE OF THE AUTHOR,  
AND MOST OF THEM BY  
HIS OWN HAND.



EFFECTS OF GALL AND WATER.

