

Different depths of shade may be made by varying the quantities of indigo extract.

13. *Pigeon-blue*.—Work in a bath for forty minutes with two ounces of chrome, four ounces of alum, one ounce of tartar; wash from this in cold water and then work for half an hour in another bath with three pounds of logwood; lift, and add one ounce of verdigris; work for fifteen minutes, and wash, and dry.

14. *Apple-green*.—Work for half an hour in a bath with one ounce of chrome, one ounce of alum; wash through cold water, and then work for half an hour in a second bath with two pounds of fustic and eight ounces of logwood; wash and dry.

A variety of this shade can be obtained by diversifying the proportions and quantities.

15. *Green*.—Work for fifteen minutes in a bath with five pounds of fustic, two ounces of argol, five ounces of alum; lift, and add half a gill of indigo extract; and then work for half an hour, and dry.

If the green seem too yellow, a little more extract of indigo may be mixed with the others.

16. *Fast-Green*.—This is first dyed blue in the indigo or wood vat, according to the depth of the green required, and then work for an hour in a bath with four pound of fustic, two pound of alum and dry out.

By dyeing the vat blue lighter than is required for the green, and adding to the bath a little logwood will give the required depth and a good shade; but the colour is not so fast.

17. *Olive*.—Work for an hour in a bath with ten ounces of fustic, eight ounces of logwood, four ounces of madder, two ounces of peachwood; lift and add to the same bath four ounces of copperas in solution, and work for half an hour and dry.

18. *Wine colour*.—Work the goods for an hour in a bath, with four pounds of cudbear and dry.

If a darker shade be required, give more cudbear; if the tint be desired bluer, add, after half an hour's working, one gill of ammonia; if a redder tint is wanted, add a wine glassful of hydrochloric acid.

If the acid be added, the goods should be washed before drying.

19. *Light violet*.—Work for an hour in a bath with four ounces of cudbear, four of logwood, two of barwood or caunwood, two of peachwood; lift and add two ounces of alum in solution, and work half an hour, and dry.

20. *Puce*.—Work in a bath for one hour, with ten ounces of logwood, one ounce of caunwood, eight pounds of cudbear; lift and add two ounces copperas in solution; work half an hour, and dry.

Recipe for Dyeing Hats.

The bath for dyeing hats, employed by the London manufacturers, consists, for 12 dozen, of

144 Pounds of logwood.
12 " green sulphate of iron or copperas.
7½ " verdigris.

The copper is made of a semi-cylindrical shape, and should be surrounded with an iron jacket, or case, into which steam may be admitted, so as to raise the temperature of the interior bath to 190° Fah., but no higher; otherwise the heat is apt to affect the stiffening varnish, called the gum, with which the body of the hat has been imbued. The logwood having been introduced and digested for

some time, the copperas and verdigris are added in successive quantities, and in the above proportions, along with every successive two or three dozen of hats suspended upon the dipping machine. Each set of hats, after being exposed to the bath, with occasional airings, during 40 minutes, is taken off the pegs, and laid out upon the ground to be more completely blackened by the peroxydization of the iron with the atmospheric oxygen. In 3 or 4 hours the dyeing is completed. When fully dyed, the hats are well washed in running water.

A skilful operator furnishes the following valuable information relative to the *stiffening* of hats. He says:

All the solutions of gums which I have hitherto seen prepared by hatters, have not been perfect, but in a certain degree a mixture, more or less, of the gums, which are merely suspended, owing to the consistency of the composition. When this is thinned by the addition of spirit, and allowed to stand, it lets fall a curdy-looking sediment, and to this circumstance may be ascribed the frequent breaking of hats. My method of proceeding is, first, to dissolve the gums, by agitation, in twice the due quantity of spirits, whether of wood or wine, and then, after complete solution, draw off one half the spirit in a still, so as to bring the stiffening to a proper consistency. No sediment subsequently appears on diluting this solution, however much it may be done. Both the spirit and alkali stiffenings for hats made by the following recipes, have been tried by some of the first houses in the trade, and have been much approved of:

Spirit Stiffening.—7 pounds of orange shellac; 2 pounds of gum sandarac; 4 oz. of gum mastic; ½ pound of amber resin; 1 pint of solution of copal; 1 gallon of spirit of wine, or wood naphtha.

The shellac, sandarac, mastic, and resin, are dissolved in the spirit, and the solution of copal is added last.

Alkali Stiffening.—7 Pounds of common black shellac; 1 pound of amber resin; 4 oz. gum thus; 4 oz. gum mastic; 6 oz. borax; ½ pint of solution of copal.

The borax is first dissolved in a little warm water (say 1 gallon); this alkaline liquor is now put into a copper pan (heated by steam), together with the shellac, resin, thus, and mastic, and allowed to boil for some time, more warm water being added occasionally until it is of a proper consistence; this may be known by pouring a little on a cold slab, somewhat inclined, and if the liquor runs off at the lower end, it is sufficiently fluid. If, on the contrary, it sets before it reaches the bottom, it requires more water. When the whole of the gums seem dissolved, half a pint of wood naphtha must be introduced, with the solution of copal; then the liquor must be passed through a fine sieve, and it will be perfectly clear and ready for use. This stiffening is used hot. The hat bodies, before they are stiffened, should be steeped in a weak solution of soda and water, to destroy any acid that may have been left in them (as sulphuric acid is used in the making of the bodies). If this is not attended to, should the hat body contain any acid when it is dipped into the stiffening, the alkali is neutralized, and the gums consequently precipitated. After the body has been steeped in the