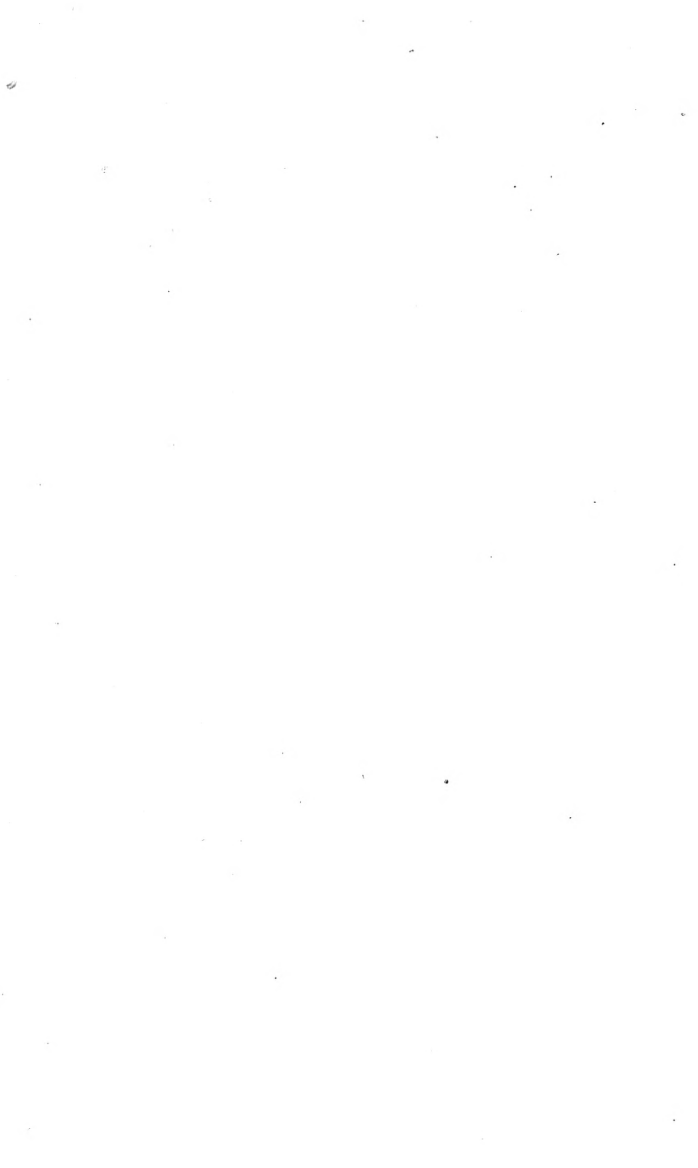
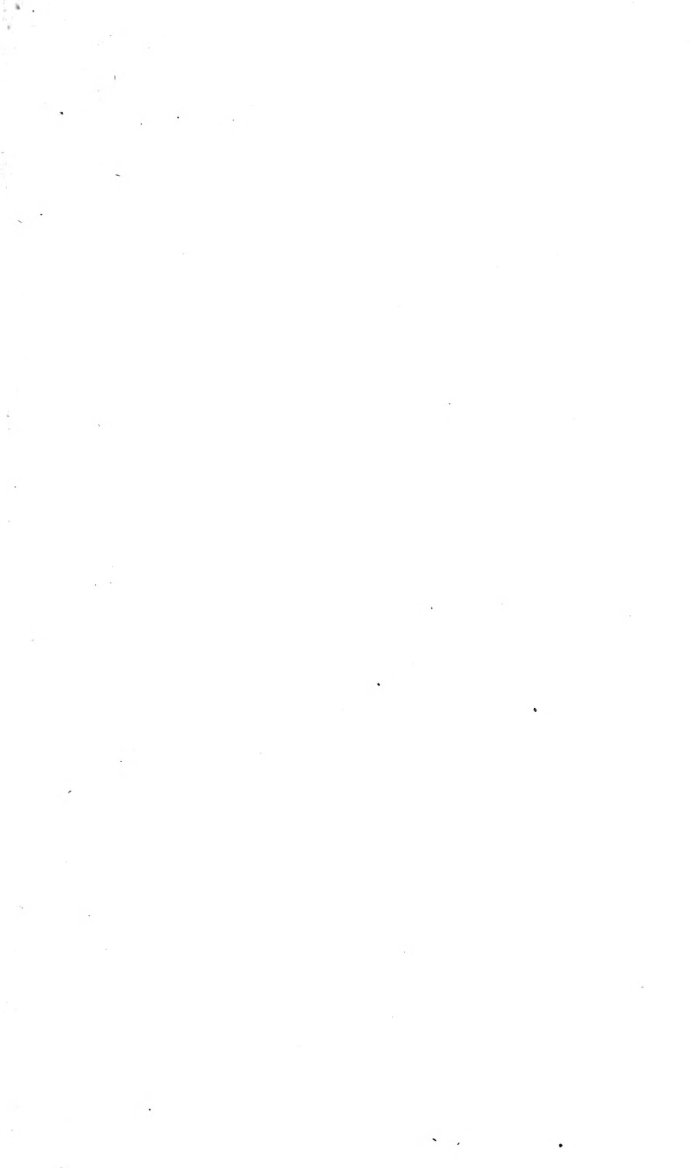
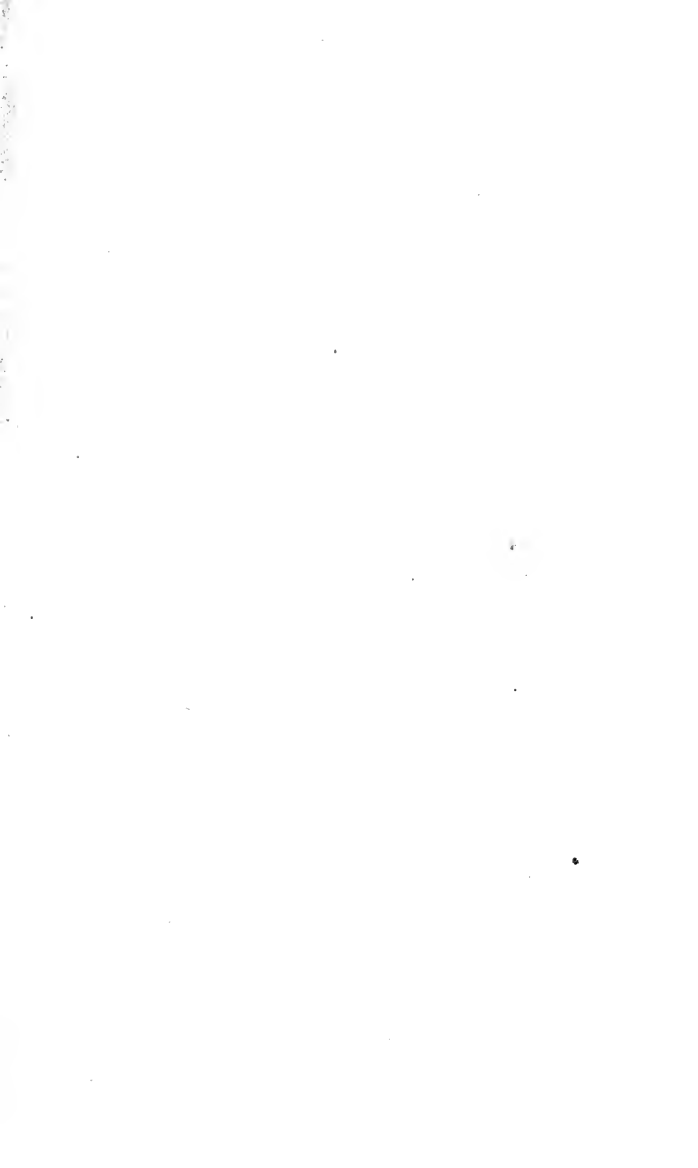

MOLONY'S
MASTERPIECE ON
DYING.







M O L O N Y ' S

MASTERPIECE ON

WOOL, SILK AND COTTON

D Y E I N G :

CONTAINING

HIS BEST RECEIPTS,

WITHOUT THE LEAST RESERVE;

ACCORDING

TO HIS PRACTICE IN

GREAT BRITAIN AND AMERICA.

BY

LOWELL:

PRINTED BY DEARBORN & BELLOWS,
CORNER OF CENTRAL AND MIDDLE STREETS.

.....
1837.

Entered according to an Act of Congress, in the year 1837,
BY CORNELIUS MOLONY,
in the Clerk's Office of the District Court of Massachusetts.

P R E F A C E .



THE AUTHOR of the following pages, wrote the work entitled the "Practical Dyer," in 1833, also the "Modern Wool Dyer," in 1834. His former works being so satisfactory to persons engaged in his profession and also to manufacturers, that he was solicited by a number of his friends, to write this work, in which he pledges himself to mention the result of his best experience, and state his improvements, and not curtail anything on the subject of Dyeing that he considers useful to the manufacturing interests of the country.

RECOMMENDATIONS.



Mr. Cornelius Molony has been in my employment for the purpose of communicating information in the Art of Dyeing, and has given good satisfaction. I think him worthy of the patronage of those who desire an acquaintance with those processes of the Art which have not obtained a general circulation among native artists in the United States. His knowledge in woad dyeing I presume is also thorough, he having conducted a woad vat for me about two months.

WILLIAM BARRETT.

Malden, February 22, 1830.

This is to certify, that Mr. Cornelius Molony has been in our employ as a Practical Dyer, and has evinced himself to be master of his profession.

MELZAR WATERMAN & CO.

Roxbury, July 1, 1831.

Mr. Cornelius Molony has been in my employment, for the purpose of communicating information in the art of Dyeing. I was much pleased with him while in my employ. I do highly recommend his knowledge in producing colours on Silk, Cotton and Woolen Goods, on the principle as practiced in some the largest establishments in Great Britain and America. He has been thousands of dollars worth of benefit to the United States, in communicating information on the art of Dyeing.

DAVID CROWLY,

Agent of Lynn Dyeing and Printing Establishment.

Lynn, September 29, 1834.

Mr. Cornelius Molony has been employed in the dye-house of the Lowell Carpet Factory, something like two years. He is a first rate workman, an honest and faithful man; and has, by the publication of two valuable works on Dyeing, in my opinion, done essential service to the manufacturing interests of the country.

ALEXANDER WRIGHT.

Superintendent of Lowell Manufacturing Carpet Co.

Lowell, June 6, 1834.

This is to certify, that I have practised the receipts of Mr. Molony's book the last two years, entitled "The Practical Dyer," I have also proved his receipts at Mr. Aaron Hale's, of Troy. I feel positive it is the best publication on the subject of Dyeing, ever before offered to the public.

LUCIUS B. NUTING.

Troy, June 9, 1835.

This is to certify that I have in possession a book of Mr. Molony's entitled "The Practical Dyer." I feel satisfied that it is the best work on the subject of Dyeing, extant.

AARON HALE.

Troy, June 10, 1835.

MOLONY

ON DYEING.

Method of Scouring Fine Wool, as practised in the North and West of England.

A kettle containing from 40 to 50 gallons is a very convenient size; though some prefer a larger vessel to do the business more expeditiously. I do not approve of putting any more than from 10 to 14 lbs. at most, of wool in a kettle at once; as it could be turned round brisker, and is consequently not so much matted or settled as by having in a greater quantity; and I likewise presume it can be cleansed better in the scouring. Heat the water in the kettle to 130 degrees Fahrenheit's Thermometer. Make up the kettle with the proportion of one pail of stale urine to two pails soft water at the above heat. Increase when the urine and water are in the kettle, and both mixed for the scouring—lather to be 130 deg. of heat. Then put in the wool. Stir it around with a pole, so as not to reverse it, as it would mat it, and consequently put it in a bad condition. If the liquor, as dyers term it,

is in good condition, it will shew a frothy substance. in the similitude of a soap lather, by agitating it with a stick about three minutes, which is as much agitation as I think necessary.

The rinsing box ought to be situated within 3 or 4 feet of the scouring vessel. It is also necessary that the water come in through the bottom, and run out through both sides and ends of the rinsing box. The water should be forcible enough to agitate the wool sufficiently to cleanse it, without a man turning it with a stick. A board should be placed on the kettle occasionally, to put a small basket or box with holes in the bottom, to allow the scouring liquor to drain in the kettle. When the wool is taken out of the scouring kettle into the basket, do not allow it to drain until it is cold, as it would be more difficult to cleanse the lather from it when put into rinsing box. If the wool is not well scoured and well cleansed from the scouring, if to be dyed blue, the colour will be dull and fugitive, if dyed in a woad vat when in the highest state of perfection. In fact, all colours will have a similar effect; therefore I think it very important to woolen manufacturers, to employ men who understand scouring both fine and coarse wool, as it differs very materially. When the scouring liquor gets low, make it up according to the same proportions of strength and heat. I think it advisable in this method of scouring, to empty the kettle, when about 500 lbs. of wool has been scoured in it; though I have known

men to continue until they had scoured 2000 lbs. without making a new liquor, (as it is termed in Dyer's language) and succeed very well. It is very reasonable to suppose that it requires more rinsing in the cold water, than it would if done otherwise.

Method of Scouring Coarse Wool.

Pursue the same method of handling in the kettle and rinsing box, as before directed on fine wool, with the difference of making the scouring lather to 140 deg. of heat, instead of 130. Use one part of urine, to three parts of water. If the scouring lather is in good order, when stirred 3 or 4 minutes, it will have a white lather on the surface, similar to that of a soap lather. If that be the case, there is not the smallest doubt of the wool being well scoured. I advise any person who scours coarse wool, to empty the kettle when 500 lbs. have been scoured, as it will be much easier rinsing it in the rinsing box.

On Dyeing Fine Cloth Blue Black.

The goods ought to be perfectly free from oil, otherwise they will not be well penetrated with the dye, and the colouring matter which would adhere would be more fugitive.

First Process.—The cloth, if dry, should be boiled one hour at least; by that means it will receive

the preparation more evenly, owing to its softening even the warp; consequently it will be better grounded, than it would otherwise be.

If the above process were to be omitted, the cloth ought to be well spread on the wynch; and when taken out of the kettle upon the wynch, it should not be allowed to drain more than 3 minutes; then struck off and listed out its full width, and listed 4 or 5 times to and fro, until it be completely cold; otherwise wrinkles would appear, which could not be got out in the tenters, nor even the best brushing mill I have ever seen, would not contract.

For 50 lbs of cloth, dissolve 5 lbs 8 oz. copperas, 2 lbs. 8 oz. sulphate of copper, and 2 lbs. red tartar. Put it into a kettle, of convenient size, of clear water at 150 degrees of heat, enter the cloth, get up a brisk fire and commence boiling and wynching; continue boiling 90 minutes, run some cold water into the kettle to stop its boiling, then wind up on the wynch.

In all cases of cloth dyeing, do not allow it to remain longer than 3 or 4 minutes to drain, then cool it well at its full width, and let it drain on the wooden horse for 6 or 8 hours at least. Prepare as much cloth in one day as can be conveniently dyed the next day; but diminish the quantity of drugs about one fifth, every different quantity of cloth; and observe to run off some of the liquor every time a fresh quantity of goods is prepared, so as to allow it to be cool enough to enter a fresh set. For

50 lbs. of cloth prepared as above, boil up about 6 lbs. (or perhaps 7 lbs. would be necessary,) of chip Campeachy logwood. Continue boiling it one hour; then put 24 oz. of pearlash, (but observe, cool the liquor previously,) then rake up the liquor; enter the cloth, turn it rapidly for 10 or 15 minutes, get on a brisk fire, commence boiling, continue boiling and turning the cloth until deep enough.

Method of Cleansing the above Cloth, is as follows :

For any black cloth, get some fuller's earth and put it close to a fire or in a stove room, so as to make it perfectly dry; then put it into a large tub and put some boiling water upon it to dissolve it; then make it a little thinner with water and sprinkle the cloth with it—and a little of it with a little dissolved soap; put it in the fulling stocks and let the hammers work on it for 15 or 20 minutes; then run the water upon it till it is perfectly clean and done.

Method of Dyeing Jet Black, 50 lbs. Fine Cloth made of Saxony or fine Spanish Wool.

Take a convenient sized kettle at 170 degrees of heat, dissolve 6 lbs. of sulphate of iron (copperas,) and 3 lbs. sulphate of copper; 2 lbs. red tartar pulverised, put all in together, rake up well, enter the cloths, turn briskly for 10 or 15 minutes; get on

a strong fire, commence boiling and continue wynching for 90 minutes, cool the kettle, take out the cloth, cool it and list it out straight.

If it be necessary to prepare any more goods in this liquor, use about one fifth less drugs, as 8 or 10 times the above quantity might be prepared without running off the mixture. Allow the cloth to drain 8 or 10 hours. It need not be rinsed from this preparation. Empty the kettle, boil up 9 lbs. good logwood, and 2 lbs. Sicily sumach; enter the goods, boil one hour, take out, and cleanse the cloth with fuller's earth and soap in the fulling stocks.

To Dye Lac Scarlet on Flannel or Milled Cloth.

An excellent tin liquor for 50 lbs. lac scarlet. Take 6 1-2 lbs. muriatic acid and 1 1-2 lbs. sulphuric acid; put them into a stone pot; feed it slowly with 20 oz. of grain tin. It will be fit for use next day. Have your flannel or cloth perfectly clean. It ought to be dyed in a pewter or block tin kettle. Fill the vessel nearly full; pulverize 6 lbs. good Lac dye; put it in the kettle; also, 2 lbs. cream of tartar, and 2 lbs red tartar pulverized. Allow the drugs to boil 15 minutes; then cool the liquor, and put in the tin liquor and about 2 oz. tumerick. Enter the cloth, and continue the process one hour, if flannel; if fulled cloth, continue boiling about 90 minutes. Cool the kettle, take out the goods, throw it into cold water; rinse very well in that. If the cloth gets properly managed, it ought to be afterwards cleans-

ed with fuller's earth in a fulling mill, which would impart much beauty to the cloth. Six or seven times the above quantity, or six or seven times any given quantity, may be dyed in the same kettle, by diminishing the acids about one-sixth every kettle full. For instance, if the kettle is large enough to contain 150 lbs. of goods, 7 quantities may be done in the same liquor, at the above proportions.

Method of Dyeing Black Wool. 100 lbs. Wool.

When the wool is well scoured, get on a convenient sized kettle ; bring it to boil ; put 20 lbs. ground logwood and 3 lbs. sumach in a large cloth, or very coarse bag ; boil it 20 minutes ; enter the wool, observing to stop the boiling previously ; handle it briskly with a very strong pole. Commence boiling ; continue for 3 hours. Dissolve 7 lbs. copperas, and cool the dye kettle very cool ; if too full to admit of much cold water, run off some of the liquor.—Put in a little of the copperas ; turn the wool remarkably well. After an interval, put in some more of the dissolved copperas, and turn the wool. In 10 minutes after, put in the remainder of the copperas ; commence boiling, and continue one hour. Draw, or take out the fire, allowing the wool to remain in the kettle (if it should be in the evening,) till next morning. Run off the kettle, and rinse the colour well in cold water, and dry in the atmosphere if the weather will permit. Much sulphate of iron has a

tendency to enfeeble the staple of the wool, and if dyed in a very warm dye-house, I think it makes it still more tender. In consequence of the same, I advise all dyers to use as little copperas on any description of wool or woollen goods, as will just answer their purpose. I presume all dyers of skill are as well aware of the injury as I am.

Another method of Scouring Wool.

Boil up 50 lbs. of good American potash in a convenient sized kettle ; allow it to cool. Then take 2 qts. olive oil, 12 qts. sulphuric acid ; stir it well together. Then put in 4 or 5 qts. of warm water, slowly. Mix it well together ; then put slowly into it the dissolved potash ; likewise put in about 7 lbs. muriate of soda, table salt, and stir well for 10 or 15 minutes. Next day it will be fit for use.

Method of Scouring on the above principle.

A kettle containing from 40 to 50 gals. is a very convenient size. Heat to 140 deg. ; put in about a qt. of soft soap, and about a pint of the above oil soap ; put in about 12 or 14 lbs. wool ; stir it with a stick, so as not to reverse it, about 3 minutes ; put it into a small basket to drain for a few minutes ; then put it in the rinsing box, and rinse it remarkably well. It is not necessary to use much soap on this principle. You may scour 1000 lbs. of wool with

safety, without emptying the scouring kettle. If the surface of the scouring lather is frothy, like a soap lather, it may be depended upon to answer the purpose intended. I have scoured considerable quantities of American and other wool on this principle, with as much success as on any other method I have ever seen adopted. The wool, when carefully managed according to these directions, will be quite light and in good condition. Some manufacturers, perhaps, might be prejudiced against this method of cleansing wool, owing to the caustic nature of the potash; its burning nature is greatly counteracted by the sulphuric acid, and the opposition of the olive oil and muriate of soda. The combination and opposition of these mixtures almost neutralizes the fixed alkali. Certain it is, they destroy its burning nature, so that it does not make the staple of the wool tender, which is bordering on being rotten. Potash without any opposition, is injurious to wool, if it is not used very sparingly.

Situation of a Blue Dye-House.

It should be either handsomely flagged, or with a boarded floor. The vats should be of a uniform height, and in one direct line at each side of the dye-house. It is very necessary to have good windows, to afford as much light as possible, as much depends on having a clear view of the liquor when the indigo is coming to a state of fermentation; and in fact, it

is necessary at all times. The vats should be from 32 to 34 inches higher than the floor, which is a very convenient height for wool dyeing. If the vats are 7 feet deep, the fire should not be placed within 3 1-2 feet of the bottom. I think it most convenient to have the vats so situated as to have the fire to each, out of doors, as it would save much room in the dye-house, and promote cleanliness.

If the building be large enough, there should be at least 3 feet distance between each vessel, to afford room for the men to perform their work conveniently. Black and blue may be dyed with safety in the same room; but blues and colours ought not to be done in the same apartment; more especially light shades, cannot be managed with safety, as the wool will be constantly liable to receive spots.

Situation of the Colour Dye-House.

The building should be about ten yards in height, with a good flagged floor. If the building exceed 60 feet in length, and four or five kettles are placed in it, there should be one ventilator in the centre, and one at each end, that as much steam as possible may pass off, for the convenience of the workmen and the benefit of their health. A wool kettle should be superior in diameter to its depth, and as wide in the bottom as in the upper part, with a bulge or swell about halfway between the top and bottom. A vessel containing about 250 gallons, is

a convenient size for dyeing 100 lbs. of wool, either coarse or fine. It should have a strainer, and a pipe attached to one side of the bottom, to let off the dye-stuff, when spent or useless, and a shore to take it off. There should be 3 feet space between each kettle, if the building will admit of it. The vessels should have about 12 inches of flange, with a little descent inwards. It is also necessary to bear the pole on to turn the wool when colouring. There should be 3 windows in each side of the dye-house, if the kettles are placed on both sides, and should be parallel, and be all of one height from the floor.

On Woad Blue Dyeing.

A vat 7 1-2 ft. deep, and 6 1-2 ft. diameter, was about the common size of vats when I left England. Fill the vessel within 16 inches of the top; heat it to 150 deg. Fahrenheit. Take 700 lbs. good couched Woad; put it into three or four large tubs, and pour on some hot water to soften it. Then chop it quite fine with a spade, and divide 10 lbs. of humber, or good common madder, and two pecks of bran, in the tubs containing the Woad. I think it necessary to put three or four pails of stale urine into a new vat, to excite a bolder fermentation, and also a quicker one; but I do not approve of the urine after the first heating. Have 30 lbs. good Bengal indigo well ground in water. Put all these drugs into the vat, and rake up well; cover the vat closely, and look at

it in seven or eight hours; agitate the liquor with a stick, and if the indigo is coming to a state of fermentation, it will hold a feeble bead on the surface. Cover the vat again, and agitate in two hours after. If the bead hold on pretty strongly, it is a demonstration that the indigo is coming to a state of solution. If it be in a middling state of fermentation, there will be a strong bead on the surface. Put in a little white wool, and let it remain ten or fifteen minutes; then take it out and squeeze it. Put it to cool. It ought to look green when first taken out, and change to a blue in four or five minutes. If that should be the case, rake up the vat well, and put in three quarts of quick lime, newly slacked.—Look at the vat in three hours after, and rake up well. If the liquor looks much clearer, or of a lighter green, it is a proof that it did not get the lime too soon. If so, put in three qts. more. Rake again in two hours, and, if the vat is any clearer, use four qts. more lime. Rake again in two hours, but do not use any lime. If the liquor is any clearer in 2 hours after the last raking, put in 8 qts. more lime.—Rake again in two hours, without lime. Rake in three hours after. If the vat come on well, it will show a copper-like appearance on the surface. Use, in that case, about 4 qts. of lime.

Next heat the vat to 150 deg. Fahrenheit, and put in 2 lbs. madder, and 2 or 3 lbs. bran. Rake up well and cover the vat, and allow it to settle 12 hrs. If it assume a greenish yellow, put in about 100 lbs.

of wool, but put it in a dye-net previously. Handle it so as to reverse it in the vat. Turn it every five minutes for one hour. Wring it out of the vat, and shake it up well to cool. If the green continue more than five minutes when exposed to the atmospheric air, it is an indication of the want of more lime. In that case, add 2 qts. lime; rake up and allow it to settle three hours. Then put in the dye-net and wool. Turn it with a large dye-stick every five minutes for one hour. Then wring out and shake it up well. Rake up the vat completely from the bottom, and allow it settle three hours. If the colour is not deep enough, put in the dye-net and wool, and handle it until full enough. Then take out the wool and rinse it in the washing basket.—Heat up the vat to 150 deg. as usual, and put in as much indigo, well ground in water, as will be sufficient for the next day's colouring. If the vat has an over charge of alkali, put in half a pail of wheat bran, and three or four pounds of good common madder, to destroy some of the caustic of the lime, and to excite fermentation. If the vat smell strongly of lime, it is proof of having in it too much alkali. If lime can be smelled at all, there is no lack of alkali; but if short, the smell will not be perceived in the least. A smell of sourness indicates a lack of alkali. If that be the case, put in about 2 qts. quick lime, with the indigo and madder, at the abovementioned heat, (150 deg. which I approve as standard heat.) When the indigo, madder and lime (if ne-

cessary) are in the vat, rake up well and allow it to settle 12 hours. Then if the vat looks clear, or of a greenish yellow, put in the dye-net and the wool; turn it as usual. Wring it out in one hour, and shake it up well to cool. Rake the vat, that the liquor may be thoroughly mixed; allow it to settle three hours; then put in the dye-net and wool; handle it one hour, as usual. Wring the wool, and shake it well to cool off the green; rake the vat, and allow it three hours to settle; then put in the dye-net and wool, and handle it one hour, or according to the shade.

Some dyers keep the vat at such a strength that the wool may be dyed deep blue by putting it only twice in the dye, which I do not disapprove, as it expedites business. In that case, I would enter the wool but twice each day.

Another method of knowing the condition of the vats:—If only the necessary quantity of lime be put in, the wool will be bright and even; if it have an excess of lime, the green wool will change to blue in about two minutes, when exposed to the atmosphere. In that case, it will be evenly coloured, and will assume a gray appearance, even if the blue be very deep or full. If any vat is too much in want of lime, the blue dyed in it will be dull, and of a greenish appearance, even when deep enough in colour.—I do not think it wise to dye more than three or four tons of clean wool in any vat of the size above-mentioned. Then empty the contents, and proceed ac-

ording to the same method as before described. By so doing, I think the work will be done to better advantage, and the vats will be more easily kept in good working order. If worked more than 70 or 80 days, the dyer ought to be possessed of very superior skill, though I have seen good blues dyed in vats that were worked from 6 to 9 months. If a vat is very much overcharged with lime, I know of no better way than to boil a bushel of wheat bran, and 7 or 8 lbs. good common madder, and 3 or 4 lbs. pearlsh, and strain off the clear liquor, and put it in the vat, to counteract the surplus of lime.

Royal Adelaide. 100 lbs. Wool.

The vat for blueing this colour, should be in good condition, but weak of indigo, and should not exceed 120 deg. of heat. The wool should be well shaken, and not matted in the least, as it is very important to have it dyed even in the first process. Put in the dye-net, and then the wool, and turn it very attentively with a dye-stick for fifteen or twenty minutes, according to the strength of the liquor; then wring it, and shake it up well to cool off the green; rake up well, and allow it three hours to settle. Then put in the net and the wool, and handle it till deep enough, which should not exceed half the depth of colour of deep blue wool. The vats should be of such a strength as to admit the wool's being dipped twice; then rinse particularly well in the washing

basket; then take a kettle of convenient size, and fill it with clean soft water; get up a brisk fire, and make it boil. Put in about 8 lbs. barwood, and boil it 30 minutes; then cool the liquor with water, rake it up well, and put in the wool; turn it briskly in the kettle for ten minutes, get on a strong fire, and commence boiling, and continue to boil ninety minutes, observing to turn the wool every fifteen minutes.— Take out the wool, and put into the kettle 2 lbs. ground cochineal, 3 lbs. allum, about 2 lbs. cream of tartar, and 4 oz. tartaric acid; boil all together fifteen minutes; then cool with a few pails of water, rake up well, and put in the wool; turn it for fifteen minutes. Then get on a brisk fire, and continue boiling 90 minutes; observing to turn the wool every 10 minutes. Cool the liquor, and take out the wool, and rinse it well in the rinsing basket, and dry the most convenient way.

Permanent Lavender. 100 lbs. Wool.

The vats should not exceed 110 degrees of heat, for this colour. Let the wool be well shaken; put in the dye-net, then the wool, and turn it diligently until deep enough of the blue, wring out and cool off the green; then rinse well in the rinsing box.— Get a suitable kettle of clean soft water, and make it boil; then put in 24 oz. good cochineal, ground in a mill similar to a coffee-mill; also, 8 oz. pulverized Aleppo gall nuts, 2 lbs. allum, 2 lbs. cream of tartar

and 4 oz. tartaric acid pulverized. Allow these drugs to boil 20 minutes, then run in some cold water, rake up well, put in the light blue wool, and turn it diligently for 15 minutes. Then get on a brisk fire, and commence boiling, and continue the process 90 minutes, observing to turn the wool every 15 minutes during the process. Run in some cold water, and draw out the fire. Then take out the wool, cool it, and rinse it well in the rinsing box; allow it to drain 12 hours, and dry in the open air if the weather will permit; if not, dry in a warm room.



Another Lavender. 100 lbs. Wool.

Take a kettle of clean soft water, and make it boil; then take 12 or 14 oz. good cudbierd, and put it into a tub. Put in merely as much water as will wet it, and stir it until completely wet; then run in some cold water to stop the boiling; put in the cudbierd and 1 lb. cream of tartar; rake up well, and put in in the wool. Turn it well with a long pole; keep the kettle to 200 deg. of heat. If the dye boils, it is most likely to boil over, and cause waste, as cudbierd is of that nature, that if it simmer it generally boils over. Continue the process 90 minutes. Cool the kettle with water, take out the wool, and wash it in the rinsing box, to take off the loose dye-stuffs.—When it is well drained, put it in the nets in the blue vats, and turn it diligently until deep enough

in colour, then wring it and rinse it well. If not *red* enough, heat the old cudbierd liquor to 200 deg. and return the wool to it, turn it occasionally until red enough. If necessary, a little more cudbierd may be added to the liquor, but observe to take out the wool when red enough, or the right shade obtained. Rinse and dry in a room, as the sun injures this colour materially.

The vats in which this colour is blued, should be very weak of Indigo, and ought to be raked 6 hours previous to dipping the wool. This is a fugitive colour, but will answer for coarse cloths and satinets.— To add much to the durability of this colour, get a kettle of clean, soft, cold water, and put in about 1 pint sulphuric acid, and stir it well; then put in half the wool, and turn it for about 10 minutes; take out and rinse well, and put it to drain; add to the above another half pint sulphuric acid; put in the remainder, and turn it well for 10 minutes. Take it out and rinse well in cold water. I am well aware that strong acids are injurious to wool, but I have proved by long experience that when used cold they do not injure it in the least; and the wool may be dried in the hottest sun, and not fade one shade.

A Dyer's Post

Is made of deal or pine. It ought to be 10 feet in length, and the upper parts at least 12 to 14 inches square. The heaviest end of the tree should be sunk

4 1-2 feet in the ground. The part above ground should be smoothly planed and square. There ought to be four arms of *lignum vitæ* inserted in the post, and placed about three feet above the floor. The arms should be of a flattish round, and tapering from the post to the extremity; and particularly smooth, if skein silk is to be wrung on them. Four men can wring at the same time. The wringing sticks should be about twenty-seven inches long.

Golden Olive. 100 lbs. *Wool.*

Take a kettle of clean soft water, and make it boil; put in 50 lbs. ground fustic, 5 lbs. pulverized red tartar, (put the fustic into three large bags,) 5 lbs. good common madder; allow these drugs to boil 20 minutes, then run in some cold water to cool down. Rake up well and put in the wool, turn it with a long pole attentively for 20 minutes; then get on a brisk fire and commence boiling; turn it every 15 minutes and continue the process 3 hours, observing to keep it boiling all the while. Then put in some cold water; take out the wool. Dissolve 1 lb. copperas, and 4 oz. sulphate of copper in boiling water; take out some liquor and cool it with water to 100 deg.; put in the copperas and sulphate of copper; rake up well, put in the wool, and turn it very attentively for 20 minutes; then get on some fire, and heat to 170 deg., observing to turn the wool every 15 minutes. When the kettle is at 170 deg. draw the fire and run

in some water, turning the wool completely from the bottom, that it may all receive an equal degree of heat; allow it to remain in the kettle till next day, then run off the liquor, and take out the wool and rinse it well in the wool-washing basket; dry in the open air, if the weather will permit.

The quantity of dye-stuff I have mentioned, will produce a handsome Golden Olive, if the drugs are of good quality; if not, more of each sort may be added. When the first kettle full is dyed, the workman will, of course, add or diminish the quantity of drugs, according to the shade. Dye drugs frequently differ from 20 to 50 per centum, and more dye strength of dye is required for very fine wool, than to produce the same shade in coarse. By using 16 oz. Aleppo gall nuts, and 8 oz. Sicily sumach, instead of the logwood, with the other drugs, the colour will be more permanent, and stand the process of steaming better.

Permanent Slate Colour. 100 lbs. Wool.

Have a woad vat at 110 or 115 deg. of heat; it should be very weak of indigo, and raked up 6 hours previously. Put in the dye-net, then the wool, and keep in the wool until it shows an appearance of weak green; then wring it out, and shake it up well to cool; rinse well in the rinsing box; get a suitable kettle of clean soft water to boil, and put in 4 oz. Aleppo gall nuts pulverized; also, 6 oz. barwood and

2 lbs. pulverized red tartar. Allow these drugs to boil 20 minutes; then run in some cold water to cool to 170 deg. Rake up well, and put in the wool, handling it carefully with a long pole for 20 minutes. Then get on a brisk fire and boil three hours, observing to turn the wool every 15 minutes; run in some cold water, and take out the wool. Dissolve 16 oz. sulphate of copper, and 8 oz. sulphate of iron; put some water in the kettle, rake up, put in the wool and turn it for ten or fifteen minutes; get on some fire, and turn the wool every ten minutes, and boil it one hour; draw the fire, and let it remain all night. Then take it and rinse well, and dry in the open air, if the weather will permit; if not, put it in a warm room.

Permanent Slate. Another Method. 100 lbs. Wool.

Take a suitable kettle of clean soft water, and make it boil; put in 2 lbs. pulverized Aleppo galls, and 2 lbs. pulverized red tartar. If this Slate is wanted to assume a slight shade of purple, put in 8 or 10 oz. barwood, and boil all together twenty minutes; cool to 170 deg., rake up well, and put in the wool, turning it for fifteen minutes; then get on a brisk fire, and commence boiling, turning it every fifteen minutes, and continuing the process three hours;—then turn in some water, and take out the wool.—Dissolve 1 lb. copperas and 1 lb. sulphate of copper,

and put it in the kettle; run in some water, rake up well, and put in the wool, turning it for fifteen minutes; then get on a brisk fire, and commence boiling; turn the wool every fifteen minutes, and continue the process ninety minutes; let it remain in the kettle till next morning. Then run off the dye-stuff and take out the wool, and rinse it well; Dry it in the open air, if the weather will permit. If the Slate is wanted to appear a little green, instead of purple, omit the barwood, and use about 6 oz. ground fustic, with the galls. and red tartar.

Permanent Sage Drab. 100 lbs. *Wool.*

This colour should be dyed a very pale azure blue, in a weak woad vat; then rinsed well in the wool-washing basket. Then get on a kettle of clean soft water, and make it boil; put in 10 lbs. fustic and 2 lbs. sulphate of copper finely powdered; allow these drugs to boil twenty minutes, then cool to 170 deg., put in the wool, and turn it attentively fifteen minutes; then get on a brisk fire and commence boiling, turning it every ten or fifteen minutes for three hours. Then take out the wool, dissolve 8 oz. sulphate of copper, and 16 oz. sulphate of iron; put it into the kettle; also, some cold water to cool it to 170 deg. Rake up the liquor, and enter the wool, turning it for fifteen minutes; then get on a brisk fire, and boil, turning every fifteen minutes, and con-

tinue the process one hour from the commencement of boiling. Then take out the fire, and run in some cold water; allow it to remain in the kettle all night. Then run off the dye-stuff, take out the wool, rinse it, and dry it in the open air, if the weather will permit.

Slate Colour for Coarse Cloth Manufacturing.
100 lbs. Wool.

Get a kettle of clean soft water to boil, and put in 3 lbs. ground logwood and 8 oz. barwood; boil twenty minutes, then cool to 170 deg., rake up well, and enter the wool, turning it with a large pole for fifteen minutes; then get on a brisk fire, and commence boiling, turning every fifteen minutes, and continue the process two hours; then put in some water, and take out the wool. Dissolve 16 oz. copperas and 8 oz. sulphate of copper, rake up the liquor, and enter the wool, turning it for fifteen minutes; then get on a brisk fire, turn the wool every fifteen minutes, and continue the process one hour after the boiling commences; then take out the fire, run in some water, and allow it to remain in the kettle till next morning. Then run off the dye-stuff, take out the wool, rinse well, and dry in the open air. This colour is not permanent, but will stand air and sun nearly as well as a logwood black which is not previously dyed blue.

Citron Green. 100 lbs. Wool.

For this colour, have the woad vats at 120 deg. ; put in the dye-net, then enter the wool, turning it diligently for about ten minutes. The vat should be very weak of indigo, and the colour should not exceed sky blue. When wrung out, rinse it very well in cold water ; get on a suitable kettle of clean soft water, and make it boil ; put in 70 lbs. ground fustic and 2 lbs. common madder, in three or four large bags made of very coarse thin cloth, and dissolve 24 oz. sulphate of copper in boiling water, and enter this with the fustic into the kettle ; boil these drugs thirty minutes, run in some cold water and cool to 170 deg. ; put in the wool, and turn it for ten or fifteen minutes ; then get on a brisk fire, and commence boiling, turning the wool every fifteen minutes, and continue the process three hours : if not yellow enough, take out the wool and boil up some more fustic ; and if not brown enough, use a little madder, and manage as above mentioned, until full enough of colour. Rinse in cold water. If not green enough, boil 8 or 10 oz. pulverized nut galls. It will substitute for three or four shades deficiency in the blue. Any shade of permanent, full green, may be dyed on this method. If the green require much darkening, dissolve (according to shade) say 5 or 6 lbs. copperas. Take out the wool, and put it in ; enter the wool, after raking well, and turn it till dark enough ; then rinse well, and dry in open air.

French Plum Colour on a Red Shade. 100 lbs. Wool.

Get on a suitable kettle of clean boiling water, and put in loose 70 lbs. barwood, 3 lbs. Aleppo galls. pulverized ; let it boil thirty minutes ; then cool with water, rake up well, and enter the wool ; turn it for fifteen minutes, get on a brisk fire, and commence boiling, turn the wool every fifteen minutes, and continue the process three hours ; take out the wool, and dissolve 8 lbs. alum and 4 lbs. cream of tartar, put it in the kettle, rake up well, enter the wool, and turn it fifteen minutes ; get on a brisk fire, and commence boiling ; continue the process for two hours, observing to turn every fifteen minutes ; take out and rinse, and done.

Weld Yellow. 100 lbs. Wool.

Boil a kettle of clean soft water, then put in 18 lbs. English alum, or 23 lbs. American do., boil until all is dissolved ; run in some water, rake up well, then enter the wool, and turn it for fifteen minutes, get on a brisk fire, and boil for four hours, turning every fifteen minutes ; run off the liquor, take out the wool, and cleanse the kettle well by scouring with wood ashes ; if that is not convenient, cleanse with dissolved pearlash, used with a coarse cloth. Rinse the wool particularly well in the rinsing box, get 50 or 60 lbs. good Weld, and rinse the roots in cold water to cleanse it completely from the clay ; then put it in the bottom of the kettle, and press it down

that it may not float on the water. You may use a large cross-barred brass or copper hoop. Fill up with clean soft water; or, which I think a little better, put the Weld loose in a kettle of boiling water, with 24 oz. pearlash to extract its colouring matter. Boil it thirty minutes, draw the fire, and strain off this liquid into another kettle; enter the wool, get on a fire, and boil ninety minutes, turning every ten minutes during the process. If the Weld be strong, the above quantity will dye 100 lbs. wool a good yellow: if not, boil up some more weld and pearlash in the same proportions given above. Take out the wool, and strain the boiled weld into the wool kettle; return the wool, and boil till full enough of colour; take out, rinse, and dry in a warm room.— Done.

Bark Yellow. 100 lbs. *Wool.*

Take 20 lbs. citron bark, put it into a kettle of soft water, and heat to 200 deg. ; strain off the clear into another kettle; for this colour, the heat should not exceed 140 deg. Put in 2 qts. tin liquor, (see page) 5 lbs. alum, and 2 lbs. cream of tartar, rake up well, and enter the wool, handling it well fifteen minutes; commence boiling, and continue one hour; then pour in some cold water, and turn the wool; then run off the dye-stuff, take out the wool, and rinse particularly well; make a soap lather, tolerably strong, in a kettle at 120 degrees, enter

the wool for twenty minutes, to destroy the harshness of the tin liquor; rinse well, and dry in the open air. Woven goods, or worsted, do not require any soap when dyed yellow.

Method of setting an Ash Blue Vat, for Woollen goods.

If the vat is 7 feet deep, and contains 1200 gallons, do not allow the fire within three feet of the bottom. To set it strong, heat the water in it to 160 deg., then put in 14 lbs. good Bengal indigo, well ground in water, 18 lbs. potash, 12 lbs. good common madder, 1 peck of wheat bran, and 3 pails of old urine, and rake well. It should look green in fourteen or sixteen hours, and when agitated should hold a strong bead; it should be of a clear blue. If it be so, rake up well, and put in 10 lbs. more potash, and heat to only 150 deg.; put in 4 lbs. madder and 3 or 4 qts. bran, and it will be fit for colouring blue next morning. If the blue bead does not appear on the surface, when agitated in fourteen hours, let it rest four hours more, and heat to 150 deg; put in 7 lbs. madder, and 1 peck of bran, but no more potash till it holds a blue bead when agitated. An excess of fixed alkali—in that case, when the vat is renovated with indigo, use the potash in rather less proportion than in making a new vat; likewise, some of the water of the boiled bran, and 3 lbs. madder to destroy part of the caustic nature of the potash. An ash vat in good order will settle in one hour, when

raked. I approve of using 2 or 3 pails of urine in setting a new vat, as it comes on rather bolder and will spring sooner. Although potash and urine are both alkalies, the urine has a different effect in many instances, being more fixed and less caustic when in a working state. Blue, dyed in an ash vat, is considerably more fugitive than a woad blue, though I admit that an ash vat in good order will dye a handsome colour, and that it will stand the operation of manufacturing nearly as well. I advise all persons engaged in manufacturing woollen cloths, to prefer woad blues, for various reasons. A woad vat does not enfeeble the staple of the wool, but adds to its strength; while potash has a tendency to injure it, by making it to bristle, which will cause much waste in all the different operations of manufacturing.—Another advantage—Woad is a weak indigo plant, and assists indigo so that it will produce at least 2 lbs. more deep blue wool than can be done in each pound of indigo, in the best ash vat; besides the credit of its durability to the manufacturer and merchant. I do not approve of working a woad vat more than three months, without emptying the liquor and setting it anew. Some scientific workmen continue dyeing more than a year, and their blues are equally permanent, but the vats do not work so pleasantly, or yield as much produce, in my opinion. The vats are more liable to get out of order, and waste time. An excess of alkali often happens in such cases, and they require more fermentation than vats oftener set.

A putrid fermentation is also more likely to take place, if the workman be not possessed of more than ordinary skill. I advise the ash blue dyer also, not to work his vats more than three months, as it will be a disadvantage to him, by reason of excess of alkali. Some good practical dyers may reply that all the potash used with the indigo in renovating, will form upon the wool, and leave no more excess of alkali, than if the vats were set anew every three months; but from such, I differ in opinion. If the argument were true, it is still a disadvantage. I have proved, by long experience, that old vats require an extra quantity of bean and madder, which form as useful a fermentation as any I am acquainted with, either for ash or woad vats. Some consider it necessary to use a few lbs. of pearlash in woad vats, to excite fermentation. Of this I do not disapprove, if used sparingly and not too frequently.

Fast Mulberry. 100 lbs. Wool.

This colour should be dyed quite a pale blue, and then rinsed well in the washing basket in cold water. Allow it to drain a few hours, then get on a suitable kettle of boiling water, and put in 20 or 25 lbs. camwood, or otherwise 35 lbs. barwood; allow it to boil one hour; cool the liquor, rake up well, and enter the wool; handle it with a large pole about fifteen minutes, then get on a brisk fire and commence boiling, and continue the process three hours; run in

some cold water, take out the wool, rinse particularly well, and dry the most convenient way. If the colour is too *red*, dye it a deeper blue, or otherwise diminish the barwood. Two or more kettle fulls of wool can be done with safety in the same liquor, by using less barwood, at a reduction of 25 per cent. of its proportions.

Coffee Brown. 100 lbs. Wool.

Boil the kettle, take 40 lbs. ground fustic, and 20 lbs. common madder, and 4 lbs. red tartar pulverized, put these ingredients in two large bags and put them in the kettle; also put in about 14 lbs. barwood loose. Allow the whole to boil one hour; run in some water, rake up well all together, enter the wool, and turn it from the bottom and centre, so as to reverse it as much as possible, with a large pole; continue twenty minutes, then commence boiling, continue about three hours, turning once in fifteen minutes. Cool the liquor; dissolve about 5 or 6 lbs. copperas in boiling water, and divide it into three parts; the first part being put in, the kettle should be run up with almost half cold water, the wool turned ten or fifteen minutes; then put in the next part, turn as before; then put in the last, and treat in the same way. Get on a brisk fire and commence boiling, turn the wool occasionally until it is tolerably even, then run off the liquor, take out the wool, rinse it well, and dry the most convenient way. Barwood

will not yield its strength by boiling in bags, which renders it necessary to put it in loose. Were it not so troublesome to take the wool out of the kettle to sadden or darken, it would be dyed more evenly, and I think the evenness will repay for the extra trouble in taking out. Two kettles of wool can be dyed in the same liquor with safety; in that case, the wool must be taken out, as it will not answer to put either fustic, madder, barwood, or camwood, in the liquor that copperas is previously used in.

Light Cinnamon. 100 lbs. Wool.

Put 30 lbs. ground fustic, 7 or 8 lbs. common madder, and 5 lbs. red tartar pulverized, into large coarse bags—also, 10 or 12 lbs. barwood loose in the kettle. Allow it to boil thirty minutes, run in some cold water, and enter the wool; turn it about fifteen or twenty minutes with a large pole; get on the fire, commence boiling, turn at intervals, and continue the process three hours. Run off some of the liquor, and fill up with cold water; take out the wool. Dissolve 1 lb. copperas, and put it in the kettle, which ought not to exceed 120 deg. Rake up well, and enter the wool, turning it for fifteen or twenty minutes; then get on a brisk fire, bring the liquor to 190 deg. and continue the process two hours; cool the kettle, or run it off; take out and rinse, and dry the most convenient way. If a deeper colour be required, use more camwood or bar-

wood, likewise more madder. The madder and barwood will cause a redder shade, and a little copperas will darken. I think the given quantity of fustic sufficient for almost any shade of light cinnamon, if the article be good; if not, use it in larger quantity. Two or three lots of wool can be done, if necessary, by taking out the wool previously to the copperas' being put in, and observing to use less madder and barwood in a proportion of 20 per cent. You need not diminish the quantity of fustic, as the madder and barwood regulate the colour more than the fustic.— I think it extravagant to use a fine quality of madder with any brown on woollen goods, or any colour that requires boiling, as an inferior quality does as well.

Another Mulberry. 100 lbs. Wool.

Get a kettle of water to boil; take 20 lbs. ground logwood, 15 lbs. ground peachwood, and put into two large bags; take 10 lbs. cudbierd, and wet in a pail of water, with the hands. As cudbierd will not wet in a large quantity of water, use just as much as will wet it. Put 7 lbs. barwood loose into the kettle. Allow the logwood, peachwood, and barwood to boil thirty minutes, then put in the cudbierd, rake and run in some cold water; enter the wool, and turn it twenty minutes; commence boiling, and continue three hours; run off almost half the liquor; dissolve 3 lbs. copperas in hot water, mix it with 5

or 6 gallons of cold water and put in one-third; turn fifteen minutes, then put in some more copperas, and continue turning fifteen minutes more; then put in the last part, and turn as before. Boil and continue boiling two hours, so that it may be even in colour cool the liquor, take out, and rinse in cold water.

Permanent Green Olive. 100 lbs. Wool.

Dye the wool a light blue, and rinse it well in cold water. The vats should not exceed 110 deg. of heat, and ought to be weak of indigo, so as not to have the colour dyed too quick, lest it be uneven. Then get a brisk fire to the kettle; take 30 lbs. ground fustic 2 lbs. Aleppo galls. pulverized, and 4 lbs. common madder; (the madder may be put into the kettle loose, but the other drugs should be put into large bags.) Allow all to boil thirty minutes, run in some cold water, rake up well, and enter the wool; turn it thirty minutes, then commence boiling, and continue the process three hours; cool the liquor, and take out the wool. If it is considered necessary to darken, dissolve 24 oz. copperas and 12 oz. sulphate of copper; the liquor should be cooled to 120 deg.; put in the copperas, &c.; rake up well, and re-enter the wool, turn it twenty minutes, then commence boiling, and continue the process two hours; cool the kettle, take out the wool, rinse it in the washing-box, and dry in the most convenient way.

If this colour is not strong, or deep enough, use more of the dye-drugs. I think it unnecessary to exceed as light a blue as can be dyed evenly. If too brown, diminish the madder: if too dark, use less copperas and blue vitriol.

Brown Olive. 100 lbs. Wool.

Dye it as pale a blue as to have it tolerably even, and rinse well in the washing-box; get a suitable kettle to boil, and put 40 lbs. ground fustic into a large bag; take 10 or 12 lbs. common madder, made very fine by pounding, and put loose into the kettle. Put in the fustic, and allow it to boil thirty minutes; run in some cold water, rake up well, enter the wool and turn it twenty minutes; commence boiling, and continue the process three hours. Run off some of the liquor, and fill with cold water; take out the wool; dissolve 3 lbs. copperas in hot water, have the liquor at about 150 deg., and put in the copperas; rake up well, and enter the wool, turning it carefully ten or fifteen minutes; get on a fire, and turn occasionally; commence boiling, and turn frequently until dark enough; then draw the fire, and allow it to remain till next day, if time will admit; if not, rinse it before it becomes cold, and dry the most convenient way. The quantity of copperas named will make it very dark; and the workman may add or diminish, according to his own taste.

Permanent Invisible Green. 100 lbs. Wool.

Dye the wool deep blue in the woad vats, and rinse well in the rinsing box; get on a kettle of convenient size, to boil; put 10 or 12 lbs. fustic in a large coarse bag, and allow it to boil twenty minutes.—Cool the liquor to 160 deg.; dissolve 24 oz. sulphate of copper, and put it in the kettle, rake up well, and enter the wool; turn it with the pole ten or twelve minutes, then get on a brisk fire and commence boiling; continue the process two hours; run in some cold water, take out the wool, rinse well, and dry the most convenient way.

*Another Method of Dyeing Invisible Green.**100 lbs. Wool.*

Get on a suitable kettle, and boil; put in 15 lbs. English, or 18 lbs. American alum, 3 lbs. red tartar, and 4 lbs. copperas; cool the kettle to 160 deg.;—enter the wool, turn briskly for ten or fifteen minutes, and commence boiling; boil three hours, then cool, take out the wool, and allow it to remain in baskets till next day; then rinse it well in the washing box, and put it to drain. Get a suitable kettle and make it boil, put 20 lbs. ground logwood, and 6 lbs. ground fustic into two coarse bags, and allow it to boil one hour; cool the liquor, rake up well, and enter the wool; turn it for ten or fifteen minutes, then get on a brisk fire and commence boiling; turn occasionally,

continue the process two hours ; cool the liquor by running in a considerable quantity of cold water ;—run off the liquor, take out the wool, rinse well in the washing box, and dry the most convenient way.

Method of Dyeing Cloth an Invisible Green. 100 lbs.

In case of not having a woad or ash vat, boil the cloth in water one hour ; then boil 12 lbs. fustic one hour ; put in about 4 qts. sulphate of indigo, and 9 lbs. alum ; cool the liquor to 150 deg. Rake up well, and enter the cloth ; wynch it and keep it well spread ; get on a brisk fire, commence boiling and wynching, continue the process ninety minutes, take out the cloth, and rinse it particularly well. Get on a convenient kettle with clean water ; put about 10 lbs. good ground logwood in a large coarse bag ;—boil, put in the bag, and let it boil thirty minutes ; cool the liquor, enter the cloth, turn it briskly, and keep it spread on the wynch in turning ; get on the fire, commence boiling & turning, and continue the process ninety minutes ; cool the liquor, and take out. Dissolve 10 lbs. copperas, and put it in the kettle ; rake well, and enter the cloth ; get on the fire, and keep turning with the wynch till dark enough. If not green enough, take out the cloth, and boil a few lbs. of fustic in the same liquor, enter again and turn until deep enough ; wash well, and tenter the cloth ; done.

Method of setting a Hot Vat, for Blue Cotton Dyeing.

If the vat is heated by fire, do not allow it within three feet of the bottom, if six feet deep, and contain 800 gallons. Get it to 170 deg. Put in 10 or 12 gallons of old urine, 10 lbs. common madder, 24 lbs. good E. India indigo, well ground in water, and 8 or 10 lbs. wheat bran; rake up well; dissolve 40 lbs. good potash in boiling water, and put into the vat; cover it closely, and allow it to settle twelve or fourteen hours. It ought to be sprung, (as termed by dyers,) or assume a green appearance. If not sprung, boil 10 lbs. bran and 5 lbs. common madder, and strain off the clear liquor into the vat; then it will soon spring. When sprung, let it remain so for a few hours; then heat it to 150 deg. Next morning it will be fit for colouring blue. Run five pieces cotton flannel in it; then rake up. It will be fit to work five times each day, allowing ninety minutes to settle every raking. If it turn blackish in working, it has too much alkali. Renovate with indigo, and work the same liquor for ten or twelve weeks. If it work too dark when renewing with indigo, use the potash rather under the above proportions to the indigo; but the same proportions of bran and madder. Do not put in the sediment. After the first heating, if it looks yellow, use more potash in proportion.

Myrtle Green. 100 lbs. Wool.

Dye the wool a light blue, or rather a middling

blue ; rinse well in the washing box. It will answer to dye this blue in vats at a regular heat, about 130 deg. Get a suitable kettle to boil, put in 50 lbs. ground fustic, and 5 lbs. ground logwood in two large bags ; allow it to boil thirty minutes, cool the liquor, enter the wool, and turn it fifteen minutes ; get on a brisk fire, and commence boiling ; turn, at intervals, and continue the process three hours. Cool the kettle, and take out the wool. If not dark enough put in 1 lb. dissolved copperas, 1 lb. sulphate of copper, and cool the liquor ; rake up well, re-enter the wool, and turn for fifteen minutes ; get on a brisk fire, handle it at intervals until it is moderately even, and deep enough ; cool the liquor, or run it off ; take out the wool, rinse it in the washing box, and dry the most convenient way.

Damson Brown. 100 lbs. Wool.

Put 50 lbs. barwood loose into a boiling kettle, and 30 lbs. ground logwood into a large bag ; allow these to boil one hour ; cool the liquor, enter the wool, and turn it for fifteen minutes ; get on a brisk fire, and boil three hours, turning every fifteen minutes. Cool the liquor ; dissolve 5 lbs. copperas in hot water, and put it into 6 or 7 gallons of cold water ; put in about one-third part, turn well for fifteen minutes ; then put in another part, and turn fifteen minutes longer ; put in the last part and turn fifteen minutes. Get on a brisk fire, and boil two hours,

turning at intervals ; cool the kettle, run off the liquor, take out the wool, rinse in the washing basket, dry, and done. If not blue enough, use more log-wood ; if not dark enough, use more copperas.

Fast Purple Mix. 100 lbs. Wool.

Boil a kettle containing 200 gallons ; take 3 1-2 lbs. English alum, or 4 lbs. American do, 3 1-2 lbs. cream of tartar, and 4 oz. tartaric acid, and boil together ; cool the kettle, rake up well, enter the wool, and turn for fifteen minutes ; then boil for 3 hours ; cool, take out the wool, and allow it to drain ; then put 2 lbs. of good, well pulverized cochineal, 1 lb. of alum, and 1 lb. carbonate of soda into the same liquor ; boil twenty minutes, cool, enter the wool, and turn it fifteen minutes ; boil, and continue the process three hours. Take out and rinse well, and the result will be a pink. Mix it with woad blue, and it will form a purple mix, that will stand steaming. It is as permanent a colour as any that can be dyed on wool.

Lilac, or Light Purple. 100 lbs. Wool.

Get on a suitable kettle, and boil. Put 30 lbs. good cudbierd into a tub, and wet it with as little water as possible, with a whisk or your hands ; put it into the kettle ; put in also 1 lb. cream of tartar ; cool the liquor, and enter the wool ; bring the kettle

as nearly as possible to boiling, and continue the process two hours. It will yeild its strength without boiling. Cool. Fill a large kettle with cold water, and put in 1 1-2 pints of oil vitriol, turn the wool in it carefully, then rinse in cold water. By passing it through the acid, it will resist the sun four or five days, if it should be necessary to keep the wool vat so long from showers.

Green Olive; another method. 100 lbs. Wool.

Take 20 lbs. ground fustic, 5 lbs. Sicily, or 10 lbs. American sumach, and 10 lbs. good ground logwood; put these into three large coarse bags; put them into the kettle, and boil thirty minutes; run in some cold water, and cool to 160 deg. Rake up well, enter the wool, and turn it briskly for fifteen minutes; then get on a brisk fire, and boil for three hours, handling every ten minutes; run off some of the liquor, and run in some cold water; take out the wool, and dissolve 3 lbs. sulphate of iron, and 1 lb. sulphate of copper; cool to 160 deg. and put in the last named ingredients; rake up well, enter the wool, handle it so as to reverse it for ten or fifteen minutes, then get on a brisk fire, and boil for one hour. Run off some of the liquor, fill with cold water, turn the wool so as to reverse it all, and let it remain all night, if convenient. Take it out next day, wash and dry in the open air, if the weather will permit; if not, dry in a warm room. This is not a very permanent colour, but will answer for coarse cloth.

Sandy Drab 100 lbs. Wool.

Take 5 lbs. ground fustic, 1 lb. common madder, and put into a coarse bag; put 1 lb. camwood and 1 lb. pulverized red tartar loose into the kettle; allow all to boil one hour; cool to 160 deg., rake up well. turn the wool in the kettle ten or fifteen minutes, get on a brisk fire, and boil two or three hours, turning at intervals, otherwise it will be too uneven; cool. and take out the wool. Dissolve 12 oz. sulphate of iron, and put into the kettle, while at 150 deg. Rake up well, and enter the wool. Put in the damper, lest the colour be too uneven. Turn for ten or fifteen minutes, take out the damper and get on the fire; turn every fifteen minutes, and boil one hour; run off the liquor, take out the wool, and rinse before it becomes cold, and dry the most convenient way.

Very Light Fawn. 100 lbs. Wool.

Take 2 lbs. ground fustic, 4 oz. camwood, 2 oz. common madder, and 2 lbs. pulverized red tartar, and boil them thirty minutes; cool to 140 deg.—Rake up well, put in the damper to stop the draft; enter the wool, and turn it particularly well for fifteen minutes; take out the damper, get on a brisk fire, and boil two hours, turning as often as once in ten minutes; run in some cold water, and take out the wool. Dissolve 2 oz. copperas, and 4 oz. pulverized red tartar, and put in when the liquor is at 140 deg. Rake up well, enter the wool, turning dili-

gently fifteen minutes; take out the damper, and turn ten minutes, till the heat is 190 deg. Then run in some cold water, run off the kettle, take out the wool, rinse well, and dry the most convenient way. Many dyers may think it too much trouble to take out the wool to sadden, but the colour will be so much more even, as, in my opinion, to satisfy for the extra labor.

Blue Fawn. 100 lbs. Wool.

Boil 4 lbs. ground fustic, 2 lbs. camwood, 1 lb. pulverized Aleppo galls, and 2 lbs. pulv. red tartar; the fustic should be put in a bag; other drugs may be loose in the kettle; boil one hour; cool to 160 deg. Rake up well, put in the damper, enter the wool, and turn it fifteen minutes; take out the damper, get on a brisk fire, and commence boiling; continue to boil, turning frequently during the process, 2 or 3 hours. Run off some of the dye, fill up with cold water, and take out the wool. Dissolve 12 oz. copperas, & 4 oz. pulv. red tartar; cool to 150 deg. Rake up well, enter the wool, and put down the damper; turn for fifteen or twenty minutes, take out the damper, turn at intervals, commence boiling, and continue one hour; run off some of the dye-stuff, and put in some cold water; take out the wool and rinse in the rinsing box, and dry the most convenient way. This colour will be more even by rinsing before it is thoroughly cold.

Silver Drab. 100 lbs. Wool.

Boil a kettle of convenient size; put in 14 oz. ground fustic, 4 oz. madder, 1 lb. cream of tartar, and half an oz. copperas; boil thirty minutes, rake up well, put in the damper to stop the heat, shake up the wool particularly well, enter it, and turn carefully for twenty minutes. Take out the damper, get on a fire briskly, and reverse the wool every five minutes; commence boiling and turning, and continue the process two hours. Cool, run off the dye-stuff, take out the wool, and wash well in the rinsing box, and dry in the clear atmosphere, if the weather will permit; if not, dry it cool on a boarded floor.

This colour is so very light, that it is seldom used; however, the dyer can add or diminish. Some manufacturers frequently use it to mix with other colours, in preference to white scoured wool.

Yellow Drab. 100 lbs. Wool.

Put into a boiling kettle of convenient size, 4 lbs. ground fustic, 1 lb. common madder, and 2 lbs. pulverized red tartar; (these articles may be put into a large coarse bag.) Boil thirty minutes, cool to 150 deg., rake up well, and enter the wool, turning it with a pole about twenty minutes, (having the damper in all this time.) Get on a brisk fire, take out the damper, reverse the wool every ten minutes, boil three hours, run off some of the dye-stuff, and put in some cold water; turn the wool, and take it out. Dissolve

8 oz. copperas in hot water; cool the dye-stuff to 140 deg. then put in the copperas. Put in the damper, rake up well, and enter the wool, turning it for twenty minutes; take out the damper, get on a brisk fire, and boil ninety minutes, turning as often as once in ten minutes. Take out, and rinse immediately, and dry the most convenient way.

Fast Maroon. 100 lbs. Wool.

Boil a suitable kettle; then take 75 lbs. good camwood, 1 lb. Aleppo galls, and 4 lbs. pulverized red tartar, and put them into seven very coarse, thinly woven, hemp bags; boil the above two hours, then cool to 180 deg. Rake up well, and enter the wool, turning well for fifteen or twenty minutes; get on a brisk fire and boil three hours, turning at intervals of ten minutes. Put in some cold water, and take out the wool; then put in 5 lbs. alum and 1 lb. cream of tartar; allow it to be all dissolved; then put in the wool so as to reverse it. Get on a brisk fire and boil ninety minutes, turning the wool every ten minutes; run off some of the liquor, take out the wool, rinse particularly well, and dry in the open air.

Real Olive. 100 lbs. Wool.

In a woad vat at 110 deg., dye the wool as light a blue as can be done to have it even, and rinse well; boil a suitable kettle, and put 40 lbs. ground fustic,

3 lbs. common, and 4 lbs. good common madder, into three large bags, and boil one hour in the kettle; cool to 170 deg. Rake up well, enter the wool, and turn it for twenty minutes; then get on a brisk fire and boil three hours, turning every ten minutes; take out the wool, run off some of the liquor. Dissolve 2 lbs. copperas, and 1 lb. sulphate of copper; cool the dye-stuff to 170 deg.; put in the copperas, &c.; rake up well, put in the wool, and turn it for ten or fifteen minutes; get on a brisk fire and boil one hour, turning every ten minutes; draw out the fire, and let the wool remain in the dye-stuff all night. Run off the dye-stuff, take out the wool, rinse well, and dry in the atmospheric air, if the weather will permit.

Dove Drab. 100 lbs. Wool.

Take a kettle of clean water, and boil; then put in 2 lbs. Aleppo galls pulverized, 4 oz. camwood, and 2 lbs. red tartar; boil these drugs thirty minutes, then cool with clean water to 160 deg. Put in the damper, rake up, and put in the wool, turning it briskly, so as to reverse it all, and continue handling for twenty minutes; take out the damper, get on a strong fire, and commence boiling, and continue for ninety minutes. Allow 40 or 50 gallons to run out; then take out the wool. Dissolve 12 oz. copperas and 4 oz. sulphate of copper; cool to 160 deg. and put in the last named articles; rake up well and enter the wool; put in the damper, turn diligently for

twenty minutes, then take out the damper, get on a strong fire, and boil for ninety minutes, observing to reverse the wool by handling well with a large pole, every ten minutes. Draw the fire, run in some water, and turn the wool; allow it to remain in the kettle all night; take out, rinse well, and dry the most convenient way.

Salmon Drab. 100 lbs. Wool.

Boil a kettle of clean water, and put in 3 or 4 lbs. red tartar pulverized, 2 lbs. ground fustic, and 4 lbs. camwood. Boil one hour, then cool to 150 deg. and put in the damper; rake up well, enter the wool, and turn so as to reverse it for twenty minutes; then take out the damper, get on a strong fire, turning the wool every ten minutes; boil three hours, put in some cold water, turn the wool, and run off the dye-stuff; take out the wool, rinse in the rinsing box, and dry the most convenient way.

Method of making Tin Liquor, for Lac Scarlet.

Get 20 lbs. muriatic acid, and 2 lbs. sulphuric acid, and put into two large pots made of good stone ware; then put about 4 lbs. grain tin into an iron ladle on a hot fire to melt; when melted, pour it into a large tub of cold water, letting it run in slowly; then put slowly into the pots of acids, (if put in too quickly, such is the affinity of the acids for the tin, that a

great heat will be excited, and the pots probably burst;) about two oz. every ten minutes.

No. 2. Another Lac Spirit. Use 6 gallons muriatic acid, 1 gallon of single aquafortis, and 15 lbs. tin, as directed above.

No. 3. Tin Liquor for Cochineal Scarlet, on woollen goods; it will answer also for Pink or Crimson. (3 qts. muriatic acid for 40 oz. tin.

No. 4. Tin Liquor for Logwood or Puce. Use 3 gallons muriatic acid for 6 lbs. tin.

No. 5. Tin Liquor for Bark Yellow. 2 gallons muriatic acid and 2 qts. sulphuric acid; feed with 7 lbs. tin.

Tin Liquors for Cotton.

No. 1. Red. Use 8 qts. muriatic acid and 2 qts. double nitric acid: feed with 8 lbs. tin, in the same manner as before prescribed.

No. 2. Logwood Purple on woollen or cotton goods. Put 4 quarts muriatic acid into a large stone pot, and feed it slowly with as much grain tin as it will hold in solution.

No. 3. For Bark Yellow on cotton. Put 36 lbs. muriatic acid and 9 lbs. sulphuric acid into two large stone pots, and feed slowly with 10 lbs. 8 oz. grain tin, as before directed.

No. 4. For Barwood Red on cotton. Use 3 galls. muriatic acid and 2 qts. double nitric acid, and feed slowly with 10 lbs. tin.

Tin Liquors for Silk.

No. 1. Scarlet, Crimson or Geranium. 6 lbs. muriatic acid, 6 lbs. pure double nitric acid, and 4 oz. sal. ammoniae; feed with 3 lbs. grain tin.

No. 2. Chocolate. 1 qt. muriatic acid; feed with 6 oz. tin.

No. 3. Bark Yellow. Feed 8 qts. muriatic acid with 3 lbs. tin.

No. 4. Purple. 2 gallons muriatic acid and 1 gallon double nitric acid; feed with 36 oz. tin, and 2 oz. sal. ammoniae.

No. 5. Crimson. 1 gallon of muriatic acid and one of single aquafortis.

Method of Scouring Woollen or Worsted Yarn.

If the yarn be coarse, use one part urine to three parts of water at 140 deg.; then make a strong soap lather at 140 deg. and handle in the lather until it is free from oil, and rinse in luke warm water.

Red Drab. 50 lbs. Worsted.

Boil the kettle, and put in 1 lb. ground red tartar, 1 lb. fustic, and 4 oz. camwood; boil ten minutes, and cool with water; rake up, enter the yarn, and give it five turns. Then get on the fire, turn every five minutes, and when you have turned eight times, take out, and put in 4 oz. more camwood, and turn as before. If wanted a little on the blueish

shade of red, take out, and use a little cudbierd.— For this colour, do not exceed 180 deg. If not yellow enough, use more fustic. Rinse well, and dry in a warm room.

Lac Scarlet. 50 lbs.

Boil 6 lbs. good lac dye, 40 oz. cream of tartar, 1 lb. red tartar, 6 pints No. 1 lac spirit, and 8 oz. yellow oak bark, twenty minutes: rake up, cool the liquor, enter the worsted or yarn, and give it five turns. Boil one hour, turning every five minutes; dry the most convenient way. If fuller's earth be used in rinsing, it will impart beauty to the colour.

Cochineal Scarlet. 40 lbs. Worsted.

Boil 8 oz. yellow oak bark in a small bag; then put in 4 oz. good cochineal, 5 lbs. cream of tartar, and boil twenty minutes; then put in 3 pints scarlet tin liquor, (see page 53.) Cool a little, rake up well and enter the worsted or yarn; give it seven turns, and commence boiling; turn every five minutes, and boil two hours; cool the liquor, take out and dry.

Royal Adelaide. 40 lbs. Worsted.

Dye it a light blue in a woad vat, and rinse well; then boil 1 lb. pulverized cochineal, 2 lbs. cream of

tartar, and 2 pints "Tin liquor for Scarlet," (see page 53.) Boil twenty minutes, cool, rake up well, and enter the worsted; give it seven turns, and commence boiling; turn every five minutes, and boil two hours; cool, take out, and rinse well. All cochineal and lac colours should be dried in the open air, if the weather will permit. Some people try to dye this colour with camwood; but so handsome a shade cannot be obtained. Add or diminish the quantity of the drugs, according to the shade wanted, without altering the proportions.

Royal Purple, on Circassian Broadcloth, or Worsted.
40 lbs.

Boil 5 lbs. ground logwood, 1 lb. of alum, run in a few pails of cold water to stop the boiling; enter the goods, and turn carefully for fifteen or twenty minutes; then boil two hours, turning every five minutes, if worsted—if broadcloth, it will require constant turning. Take out, run off about half the liquor, put in the damper, fill up the kettle with cold water, then put in about a pint of "No. 4, tin liquor," (see page 53;) rake up well, enter the goods, and turn very attentively. Get on some fire to heat the liquor, but do not boil it. When done, take out, rinse and dry. The drugs may be added or diminished, in the above proportions.

Imitation of Adelaide on Broadcloth. 60 lbs.

Boil the cloth three hours in 9 lbs. alum, and 2 lbs. pulv. red tartar. If it is fine cloth, turn without intermission; (if turned on a log or solid wynch, the goods will be better grounded or penetrated.) Cool the liquor, rinse well in the rinsing box, or in a running stream. Lay it out straight and cover up for twenty-four hours, before rinsing. Boil 10 lbs. ground logwood, 12 lbs. peachwood, 3 lbs. camwood, and 2 lbs. red tartar; cool, enter the goods, commence boiling and turning two hours, take out, rinse, and done.

To make Sulphate of Indigo.

Take 6 lbs. oil vitriol, 1 lb. Spanish float, or Bengal Indigo, ground fine as flour; put in the indigo, then put in 3 lbs. of the oil vitriol, and stir five minutes; then add the remainder of the acid, stir it ten or fifteen minutes. By mixing as above, it excites such heat that it will be nearly as smooth as oil. By stirring the abovenamed time, it will dye a better light blue in one hour, on worsted, than when twenty-four hours or two days old. If wanted for dyeing green silk, in twelve or fourteen hours after being made, add by degrees 4 or 5 galls. hot water. By doing so, the green can be done with less fustic, as the acid will not oppose it so vigorously. It will also preserve the sulphate of indigo for months or years.

To refine Sulphate of Indigo.

Heat a kettle of clean soft water; put in a quantity of the sulphate; absorb the strength upon some wool well scoured; boil it on the wool, and rinse in cold water. Heat a kettle of clean soft water, and add a little pearlash; boil off the colour, and save it in a pine tub. Add a little sulphuric acid to preserve it.

To prepare China, or neutralize Sulphate of Indigo.

To 2 qts. sulphate of indigo, add 12 or 14 gallons cold water; then add 3 or 4 qts. carbonate of lime, (common whiting) by degrees. It will be fit for use in a few hours.

It is necessary to have a box of Hydrameters to prove acids.

I am best acquainted with Twaddle's scale, and recommend it, it is so easily understood; although other glasses may answer as well. I believe Baumes' scale to be most in use in America. 66 deg. on the latter scale, 170 deg. Twaddle's.

Muriatic acid should stand 33 deg.

Single aquafortis " " 33 "

Sulphuric acid " " 170 "

Method of Dyeing Lavender on Worsted. 20 lbs.

Put 1 lb. cudbierd, well wet with the hands, into a kettle of clean water at 190 deg. Enter the worsted, and turn it on the sticks occasionally, for one hour; try a thread of it in a weak blue vat, and if not red enough, use more cudbierd; rinse in a woad or ash vat, not exceeding 100 deg. Rinse well, and dry in a warm room.

Magazine Blue. 40 lbs. Worsted.

Put 3 lbs. of cudbierd into a pail, and add 2 or 3 qts. warm water; stir it with a whisk, till wet; then put it into a kettle of water at 190 deg. Put in the worsted and turn it occasionally for one hour; rinse it in cold water, then handle it in a woad vat at about 120 deg. until blue enough. If not red enough, return to the cudbierd; and if the liquor be not strong enough, add more of the cudbierd. Handle till full enough. Woven cloth and worsted stuffs can be dyed on the same principle.

Chemical Magazine Blue. 40 lbs.

Put about a pint and a half of sulphate of indigo into a kettle of water at 100 deg. Put in the worsted, turn five times, get on the fire, and heat to 160 deg. Take out and rinse in cold water. Boil a kettle of clean water, and put in 2 lbs. ground logwood, cool to 160 deg. and put in one pint "No. 4 tin li-

quor," (see page 53;) turn the worsted, and heat up until deep enough; rinse and dry in a warm room.

Rose Pink, on Worsted or Woven Goods. 40 lbs.

Boil a kettle of convenient size, and put in about 14 oz. ground cochineal, 24 oz. cream of tartar, and 4 oz. alum; boil twenty minutes, then cool with cold water, put in 1½ pints of "No. 3 tin liquor," (see page 53;) rake up well and enter the goods, turning carefully fifteen minutes; get on the fire and boil ninety minutes, turning occasionally; cool, take out and rinse in cold water. Lighter pinks can be done in the same kettle, by diminishing the drugs, and proportioning as above. If you wish to blue and pink, rinse well in cold water, then get on a kettle of clean soft water, and heat to 100 deg. If the quantity be 40 lbs. put in 10 oz. salt of tartar, enter the goods, give eight or nine turns, then get on the fire, and heat to 160 deg. turning carefully all the time, to prevent unevenness. If necessary to use more salt of tartar, cool to 100 deg. Then heat to 160 deg., take out, rinse and dry in a warm room.—Urine or pearlash will also blue a pink, but not so delicately.

For Worsted Dyeing,

There should be two stationary bearers, about 42 inches in height, over each kettle, to lay the worsted

on, to drain in the kettles. Round kettles are not the most convenient for worsted dyeing.

For dyeing large quantities of worsted, or long reeled carpet yarn, the kettles should be 6 feet long, 5 feet deep, and nearly 4 feet wide, and the upper and bottom parts being of the same width. Flange to be about 10 inches wide.

100 lbs. of carpet yarn can be conveniently dyed in a kettle of the above named size, in all descriptions of dye-houses. I think it very important that the fire should be situated out of doors, thus saving much room, and promoting cleanliness.

Cochineal Crimson. 50 lbs. Worsted.

Put 50 oz. good cochineal, 5 lbs. cream of tartar, and 1 lb. alum, into a kettle of clean boiling water, and boil twenty minutes; cool the liquor, put in 5 pints "No. 3 tin liquor," (see page 53;) enter the worsted, give it five turns, then a turn every five minutes, for three hours. Cool, take out and rinse well. Get a kettle of clean soft water to 100 deg.; then put in 16 or 18 oz. pearlash; handle the worsted 7 turns, then heat to 160 deg., which should not be exceeded. If not blue enough, use more of the fixed alkali. Rinse, and dry in a warm room.

Madder Red on Flannel. 60 lbs.

Boil in a suitable kettle, then put in 12 lbs. Amer-

ican alum, 2 lbs. red tartar, and 1 lb. "No. 1 tin liquor," (see page 53.) Boil the flannel three hours, and keep it well spread on the wynch; cool, take out the goods, and list out straight in cooling, and cover it in a large basket to prevent its drying.— (Pack sheets or wool bags are very suitable for this purpose.) Allow it to remain to sour twenty-four hours; then rinse well. Take 21 lbs. good cropped madder, and put it into a large tub of hot water;— put about one-fourth of the madder into a kettle of cold water, commence wynching, put on a fire, turn constantly. In fifteen or twenty minutes put in another part of the madder, (getting up the heat gradually;) in fifteen minutes more put in the remainder of the madder. The liquor should not boil in less than 100 minutes from the commencement. When it boils a few minutes, take out, rinse well, and dry in tenters.

P. S. Use 7 lbs. wheat bran in the madder kettle.

A new method of Dyeing Fast Red on Woollens.

[INVENTED BY THE AUTHOR IN NOV. 1833.]

For 60 lbs. woven goods or worsted, a strong red. Into a suitable kettle of boiling water, put about 4 lbs. camwood, and boil it twenty minutes; cool, rake up, and enter the goods; boil and turn carefully for ninety minutes; take out the goods; put in 12 oz. yellow oak bark, or citron, 9 lbs. alum, 4 lbs.

red tartar, and 3 pints "No. 2 tin liquor," (see page 53.) Rake up, handle the goods carefully, and boil three hours; take out, and cover the goods carefully to prevent drying. Allow it to remain in that state 48 hours, if time will permit; then rinse well in cold water. Get on a kettle of clean water, and put in 18 or 20 lbs. of mungeete. When the water is a little warm, enter the goods, and bring on the heat slowly; (it should not boil in less than ninety minutes.) Turn all the time. (It does not *require* boiling.) Take out, rinse and dry. This colour will pierce the thickest double milled cloth manufactured.

Bark Yellow on Flannel. 60 lbs.

Put 7 lbs citron, or yellow oak bark, into a bag made of thin cotton cloth; allow it to remain in the kettle at 196 deg.; cool a little, and put in a little more than a quart "No. 5 tin liquor," (see page 53,) 3 lbs. alum, and 2 lbs. cream of tartar; enter the goods, and turn constantly until deep enough. The colour will be rather brighter by not boiling the bark. If a very deep yellow is wanted, the tartar may be dispensed with, as it does not assist in producing it, but promotes that delicate green shade of yellow so generally admired and approved.

Scarlet Barree. 60 lbs. Flannel.

Dye the flannel a yellow, as abovementioned.—

Boil three hours in 12 lbs. American alum, 4 lbs. red tartar, and 2 pints "No. 5 tin liquor," (see page 53;) turn at intervals during the process; cool, take out and rinse. Put 20 lbs. mungeete into a kettle of clean water; enter the goods, get on a fire, and begin to turn when the water is warm; keep it in 90 minutes, without boiling; take out, rinse, and dry the most convenient way.

Royal Purple on goods made of cotton & wool. 60 lbs.

In such goods the warp is generally cotton. Boil 7 lbs. ground logwood, and 2 lbs. alum; cool the liquor with clean water, rake up well, enter the goods, turning carefully; boil two hours; cool to 100 deg. take out, and put in 12 oz. "No. 4 tin liquor," (see page 53;) rake up, turn twenty minutes, heat to 150 deg.; take out, and rinse well in clean water. Boil 1 lb. Malaga sumac in 2 galls. of water, and put it into a large tub of cold water; steep the goods in it one hour; then dissolve 2 lbs. alum in 1 gall. hot water, and put it into a large tub of cold water, and give the goods three or four turns in that; then rinse slightly in cold water. Boil 3 lbs. logwood in 3 galls. water, and put it into a large tub of cold water; handle the goods fifteen or twenty minutes, and take out; dissolve 1 lb. alum in hot water, and give the goods three or four turns; take out, rinse well, and dry the most convenient way.

Peachwood Red. 60 lbs. Flannel.

Into a suitable kettle of boiling water, put 10½ lbs. English alum, 2 lbs. red tartar, and 1 lb. sulphate of copper pulv. When these are dissolved, cool and enter the goods; turn for fifteen minutes, then sink the flannel in the liquor, to boil; boil three hours, turning every fifteen minutes; take out, and allow the goods to remain two or three days in a large tub or basket to sour. (The goods will take a better colour, and do with less peachwood, than if dyed the next day.) It should be well covered, lest some parts become dry. It should be slightly rinsed.—Boil 24 lbs. good peachwood twenty minutes; cool to 190 deg., rake up, enter the flannel, and turn it one hour, (but do not allow it to boil.) If not deep enough, use more peachwood. Rinse, and done.

If this flannel has a cotton warp, boil 6 lbs. Sicily sumac, and put into a tub of cold water; steep the flannel in it 6 hours; put 6 lbs. dissolved alum into another tub of cold water; handle fifteen minutes, then use the strength of 10 lbs. boiled peachwood in cold water, and handle in it fifteen minutes; rinse and done.

Deep Green. 60 lbs. Worsted or Flannel.

Get on a suitable kettle of boiling water; if for flannel, put 45 lbs. ground fustic loose in the kettle; if for worsted, put it into two large bags; put in also 6 lbs. alum; boil thirty minutes, and cool; put in

3 pints sulphate of indigo, rake up and enter the goods; turn carefully fifteen minutes, get on the fire, and boil ninety minutes, turning occasionally; cool, and take out the goods. If not blue enough, use one pint more sulphate of indigo; enter and turn carefully until deep enough. Rinse in cold water, and dry in a warm room.

Light Cinnamon Brown. 20 lbs. Woollen Goods.

Suppose the goods to be Circassian. Boil 6 lbs. ground fustic, 2 lbs. camwood, 2 oz. cudbierd, and 1 lb. pulverized red tartar, fifteen minutes; cool, rake up well, and enter the goods; boil and turn ninety minutes; cool to 150 degrees, and put in 8 drachms of copperas, and a table spoonful of sulphate of indigo; rake up, enter the goods, and handle fifteen minutes; rinse and dry.

Light Buff. 60 lbs. Worsted or Woven Cloth.

Into a convenient kettle of boiling water, put 20 oz. Venice sumac, (young fustic,) and 1 lb. carbonate of soda, and allow it to boil fifteen minutes;—then put in 1 oz. pulverized cochineal, and 12 oz. “No. 3 tin liquor,” (see page 53;) cool to 150 deg. rake up well, enter the goods, and turn carefully 20 minutes; boil one hour, and take out. If short of yellow, use a little more young fustic; if short of red, use a little more cochineal. If found necessary

to use the extra drugs, the liquor must be boiled, and then cooled, handling as above. Rinse well, and dry the most convenient way.

Blue Black. 30 lbs. *Circassian.*

Into a suitable kettle of boiling water, put 12 oz. copperas, 2 oz. alum, 4 oz. red tartar, and 4 oz. sulphate of copper, and boil in that one hour; take out, and list it smoothly, and put it to drain for 12 hours. Boil 3½ lbs. ground logwood and 4 oz. pulverized red tartar ten minutes, and cool; enter the goods, boil and turn one hour, rinse and dry. If not deep enough, use more logwood in the next colouring.

Crimson. 10 lbs. *Bombazine.*

Let the goods be well cleansed; then boil in a copper kettle, 3 lbs. good cudbierd: cool, enter the goods, and turn about thirty minutes, while the liquor is nearly boiling; cool, and take out. If it inclines too much on the beet-root, blue, or crimson shade, put a table-spoonful of oil vitriol into a tub of cold water, and give it a few turns in that; it will redden it to a nice crimson. If the acid be put into warm water, and the goods handled in that, the colour will be dull and blind. Rinse, and dry the most convenient way. By this method, the silk will be of as good a crimson as the woollen part.

Puce Colour. 20 lbs. Bombazine.

Boil the goods three hours, in 4 lbs. alum, and 4 oz. sulphate of copper, turning carefully all the while ; cool the liquor, take out the goods, rinse well in cold water ; boil 2 lbs. ground peachwood, and 2 lbs. ground logwood ; enter the pieces, turn carefully, commence boiling, and continue forty-five minutes, and take out. If not red enough, use more peachwood ; if not blue enough, use more logwood. Rinse and dry.

A Greenish Slate. 40 lbs. Worsted.

This colour is termed in England a "Glove Drab." Put into a suitable kettle of boiling water, 20 oz. ground logwood, 3 oz. sumac, and 4 oz. ground fustic, and boil these drugs twenty minutes ; then cool to 160 deg. Put in 4 oz. copperas, and one table-spoonful of oil vitriol ; rake up, enter the worsted, and give it 8 or 9 turns ; get on the fire, and heat to 180 deg. (but do not allow it to boil ;) continue the process one hour. If not green enough, take out, and put in a little more fustic ; if not blue enough, use a little more logwood and sumac. Rinse in cold water, and dry. Some may think it imprudent to use oil vitriol to this colour ; but without it the shade will be less lively and delicate, and less evenly dyed.

Chocolate. 60 lbs. Worsted.

Boil 3½ lbs. fustic and 12 oz. ground logwood fif-

teen minutes ; then cool a little, and put in 1 lb. red tartar pulv., and 2 lbs. cudbierd, wet in 3 or 4 pints of warm water ; rake up, enter and turn carefully for fifteen minutes ; boil ninety minutes, and turn as often as once in five minutes ; hang the worsted on the bearers, (which should be placed over the kettle.) Dissolve 8 oz. copperas, and cool ; rake up, enter the worsted, and turn carefully fifteen minutes, then heat to 170 deg., turn every five minutes, and continue the process one hour ; cool the liquor, take out the worsted, rinse, and dry the most convenient way. If this colour is not strong enough, a larger quantity of drugs may be used, in the same proportions.

Chemical Bottle Green. 100 lbs. Cloth.

Get a convenient sized kettle of boiling water, and put in 60 lbs. chipped fustic and 10 lbs. alum, and allow it to boil one hour, then cool the liquor to 160 deg., and put in 2 qts. sulphate of indigo, rake up well, enter the cloth, and commence wynching. If the cloth be very thick, boil three hours. For flannel one hour's boiling is sufficient. If not blue enough, take out the cloth, add more chymic or sulphate of indigo. Rake up well, enter the goods, and boil till blue enough ; cool the liquor, take out the cloth, rinse in a running stream, or in a fulling-mill. Then put into boiling water, 7 lbs. logwood and 7 lbs fustic, and boil thirty minutes ; then put in 1 lb.

copperas; rake up well, cool the liquor, and enter; boil, and spread on the wynch, until deep enough. If not dark enough, more copperas and logwood may be added. Rinse well, and dry in tenters.

Method of Cleansing Woollen Cloths for Dyeing

Take some fuller's earth, and let it perfectly dry in a stove or warm room; put it into a large tub, and wet with hot water. If perfectly dry, it will dissolve. Dampen the cloth by sprinkling with a little cold urine and water; then sprinkle it moderately thick with the earth, (6 or 7 times before wetting, is sufficient;) cleanse in the fulling-mill.

Middling Green. 60 lbs. Flannel.

Put 30 lbs. good fustic and 6 lbs. alum, into a kettle of boiling water, and boil thirty minutes; then add a quart of sulphate of indigo; cool to 160 deg., and enter the flannel; keep the flannel well spread on the wynch, and boil one hour, turning constantly. If not blue enough, take it out, cool the liquor, and put in some more sulphate of indigo, and handle the flannel as abovementioned, until deep enough. Take out, and spread on a wooden horse, and cool at its full width. Rinse in cold water, and dry as quickly as possible. If chemical green on woollen goods be left too long without drying, the colour will become uneven.

Pea Green. 30 lbs. Worsted.

Into a kettle of boiling water, put 2 lbs. ground fustic, and 2 lbs. alum, and allow it to boil thirty minutes; then cool to 140 deg. and put in 1 lb. sulphuric acid, and a table-spoonful of sulphate of indigo; rake up well, enter the worsted, and turn it very briskly for fifteen minutes; get on a fire and heat to 170 deg. (which should not be exceeded in dyeing a light pea green.) If not quite blue enough, take out the worsted, cool the liquor to 140 deg. and put in a little more sulphate of indigo. It may be necessary to use a little more fustic; in that case, the kettle should be made to boil, and then be cooled to 140 deg.; then use the extra sulph. of indigo, and enter the worsted. It may be necessary to heat the liquor to a higher degree. For this colour the worsted should be constantly turned, until it comes to a conclusion. This is the method I have pursued for several years, and I have found it to be the best method of producing a delicate even colour. When the dyeing process is finished, rinse well in cold water, and dry as quickly as possible.

General Remarks on Worsted Dyeing.

In dyeing drabs of any shade on worsted, it is very important that the dyeing drugs be previously boiled or scalded, viz. fustic, ebony, logwood, cudbierd, archill, sumac, tartar, and copperas. In drab dyeing on worsted, or any woven goods, as stuffs, merinoes,

or milled cloths, the heat should not exceed 150 deg. when the goods are entered; and not more than half the quantity of drugs necessary to produce the colour, should be put in at one time, lest the colour be uneven.

The greatest trouble met with by pattern dyers, is occasioned by being too liberal in using drugs; and if used more sparingly, they would not be so often disappointed.

By putting ground fustic into a drab kettle, without having been previously boiled or scalded, it will continue to yield its strength for so long a time, that the most careful workman may be deceived; and more particularly so, if he cannot finish the shade very quickly. Ebony is not so uncertain, if used without previous boiling or scalding, as it yields its strength quicker. Logwood is tedious in yielding its strength. In dyeing drab worsted, a considerable quantity of red tartar is necessary, to make the colours even. In changing the shades, if a bright red tinge be wanted, camwood will produce it; if not red enough, and a dull shade be wanted, madder is best; if wanted on the blueish red, cudbierd will best promote it. If necessary to green the shade with copperas, use fustic very sparingly, as in that case, the drab is short of fustic. When the copperas is put in, add a little, and it will yield its strength. Logwood will likewise yield its strength, when used with copperas; (I mean in a copperas liquor, on woollen goods of any description.) Some very nice,

delicate shades of green drabs, are blued with sulphate of indigo, instead of copperas: in that case, it should be refined sulphate, as no other is fit to use with chemical drabs. It will work well with ebony, fustic, logwood or copperas in drab dyeing, without injuring either drugs. Light brown olive, or light green olive, should be saddened very cool, not exceeding 120 deg. when the goods are first put in, or the goods will darken unevenly. The heat should be obtained by degrees, as the colour may require, and more particularly so in cloth dyeing. In saddening worsted, or fulling cloth, dyed brown, if necessary to use copperas, it should be previously dissolved in hot water, and enough of the liquor run off to allow that in the kettle to be cooled to 90 deg. Any brown, dyed with camwood and fustic, if it happen to be too red from excess of camwood, is almost a hopeless case. If the colour is to be matched exactly, the best method I have ever found, in such a case, is to sadden with sulphate of indigo, instead of copperas. It will counteract the red, three shades at least, more than copperas will. All cloths dyed colours which require boiling, should be boiled three hours or more, (particularly if made of fine wool,) and made thick in the fulling mill; otherwise it will not be so well grounded.

Slate Colour. 60 lbs. *Worsted.*

For a very handsome blue slate, boil 24 oz. ground

Campeachy logwood ten minutes; then add 3 oz. dissolved copperas and 4 oz. cream of tartar; cool to 160 deg. rake up well; enter the worsted and turn carefully for ten or fifteen minutes; get on a brisk fire, and boil one hour, turning every five minutes. If not blue and dark enough, cool and take out the worsted; then add more logwood and copperas in proportion to the shade wanted. Commence, and continue the process till dark enough. If a slight shade of red is wanted, it can be obtained by using some more cream of tartar, and a little cudbierd. (Cudbierd will do its duty, even if used in a liquor for dyeing black.) Handle till deep enough. Any shade of slate can be produced by pursuing the above method, by adding or diminishing the drugs. Dry the most convenient way.

*Another Method of Dyeing Slate. 100 lbs. Stocking
Worsted.*

Put 5 lbs. ground logwood into a large hair seive, then put it over a large tub, and pour 30 or 40 galls. boiling water upon it; take out the clear liquor into a large kettle; put in 8 oz. alum; when it is at 180 deg. put in 2 oz. sulphate of copper; rake up well, enter the worsted, and turn it for twenty minutes; boil one hour; cool, and take out the worsted and cool it. Put in the strength of 3 lbs. more logwood, 2 oz. sulphate of copper, and soap enough to make the lather stand well on its surface when raked

up. Recommence, turn fifteen minutes, then boil, and turn thirty minutes; take out, rinse in luke warm water, and dry in a warm room. Add or diminish the dye-stuffs, according to the shade wanted.—Slates dyed as above, will stand soap washing nearly as well as blue.

Royal Blue. 30 lbs. Worsted, or Woven Woollens.

Boil the goods three hours in 5 lbs. alum, and 8 oz. red tartar. Put 20 lbs. of copperas into a kettle of clean water at 120 deg.; enter the worsted, and turn well for fifteen minutes; take out, and rinse well in a running stream. Get another kettle of water to 140 deg. and put in 5 lbs. of pearlash, turn the worsted in that ten minutes; rinse slightly in cold water, and return it to the copperas, handling as before from one kettle to the other till you get a sufficient quantity of copperas on the goods; which can be ascertained by trying a small quantity in a pot at 160 deg. with a little prussiate of potash, and then adding a few drops sulphuric acid. If necessary to add more copperas, use from one-fourth to one-half as much as before; enter the goods, turn a few minutes, and heat to 180 deg. handle fifteen minutes, rinse, and return from one liquor to the other as before. If the pearlash be not strong enough, add more. Get on a kettle of clean soft water, and heat to 140 deg. Dissolve 38 oz. of

prussiate of potash, and put into it ; enter the goods, and handle fifteen minutes ; then take out, and put in as much oil vitriol as will barely change the prussiate to a greenish colour ; enter the goods, and turn carefully twenty minutes, and heat to 170 deg. If the liquor looks too green, use a little more oil vitriol. Let the goods remain thirty minutes, then take out, cool, and enter again. Take out again in thirty minutes, rinse, and dry in the open air, if the weather will permit.

Observations.—When I left England, in 1829, I knew of but two dyers who were masters of this colour, viz. Messrs. Melon & Almon, of Wakefield. I have found out this method by my own trials in this country ; and by it, the shade may be dyed as light or as deep as wanted. This is the only colour on woollen goods in England, which I was not in the habit of dyeing, and I think it probable that some other dyers may be acquainted with a quicker, and perhaps cheaper method of producing it ; but if my directions be followed, the workman will not be disappointed in producing a lively blue. I have seen several professors of the colour, some English, some French, some Dutch, who have left Europe within two years, who have failed of producing as good a colour, while their methods were more tedious and expensive than mine : yet I am of opinion, that it can be, and is done in an easier and better method than I am in possession of at present.

SILK DYEING.

The most certain method of taking Gum out of Silk.

For 20 lbs. silk, use 4 lbs. soap made of whale oil, or if that cannot be obtained, use 4 lbs. hard brown soap, cut finely, and dissolved in a kettle of water near boiling heat. (The standard is 190 deg. Fahrenheit.) Put the silk on round poles, and enter it in the kettle; raise and lower it for twenty-five minutes, and then turn it on the poles, and tend the same way for twenty-five minutes more; take out, and wring at the post, and wash the suds from it with cold water; then put a slight twist in it, and put 10 lbs. on 7 cords of cotton rope; tie the ends of the cords together, and put the silk into a bag made of thin linen, or coarse cotton cloth. Empty the kettle of suds, and fill it with water. Boil 4 lbs. white hard soap cut finely, and rake up well; put in the bag of silk, and boil it two hours; then rinse in lukewarm water, to take out the suds. It is then fit for dyeing.

If this silk is to be made white, the method is as follows:—Put some finely ground indigo into some clean soft water; put the silk on the poles, and make up a lather of white hard soap, and bring it to scalding heat, and put in a small quantity of the indigo water to blue it. Be careful not to put in too much blueing at a time. If you wish for a tinge of red, put a few drops of archill into the same liquor.—Wring at the post, and hang it in the sulphur house, using 3 lbs. sulphur in an iron pot. Allow it to re-

main twelve or fourteen hours. In case the silk be not blue enough for your pattern, put a small quantity of the clear indigo water into cold water, (use it cautiously) If the water be a little hard, it will blue the silk as much as two shades without the indigo water. If you want a French gray, use indigo water to pattern. If silk is blued after being sulphured, it must be done in cold water, whatever the shade may be.

A Sulphur House

Should be 7 yards long, and 2 yards wide, made perfectly tight, having a valve at the top to let off a small portion of the gas, to prevent damaging the goods, or making them tender.

For preparing Annotta.

Boil 6 lbs. annotta thirty minutes, in 12 or 14 galls. of water, with 7 lbs. pearlash in it. This method will answer for silk or cotton.

The strength of Alum Mordants for Skein Silk,

Should be generally 4 deg. on Twaddle's Hydrometer; if intended for piece silk, it should be from 6 to 8 on the above scale. Skein silk should generally be allowed three hours, at least, in the alum mordant, blue black excepted, for which thirty minutes are sufficient.

In Dyeing Copper Crimson,

Either on piece or skein silk, the mordant should stand from 6 to 8 deg. (Twad.) and not exceed 8 deg. for any colour on any kind of silk. It may not be convenient in piece silk dyeing, to allow it three or four hours in the alum mordant, which is the reason why it should be made stronger for woven silks than for skeins.

At the above strength, if silk remain even four days, it will not be injured or prevented from taking any colour which requires a previous alum preparation. It is very important in silk dyeing, when alum is dissolved in boiling water, to allow it to be quite cool before entering the silk; otherwise it will deprive the silk of its lustre and beauty, and leave it but little handsomer than cotton.

To prepare Alum Mordant for all Colours, Cochineal Crimson excepted.

Suppose the tub to be used, to contain 80 galls: use about 25 or 30 lbs. American alum, in case of not having No. 1, Twaddle's Hydrometer.

To make a strong Iron Mordant for Prussian Blue, on Silk or Cotton.

Take 40 lbs. single aquafortis, and add to it 10 galls. of cold water; then add, by degrees, 5 lbs. of turnings of malleable or very thin hoop iron; also,

add by degrees about 3 lbs. of copperas. (Do not feed it too quick, as much gas would waste by so doing.) It will probably require eight or ten hours to consume that quantity of iron. When all the iron is taken into solution, put about half the quantity into 60 galls. of water; rake up well, and enter the goods, handling twenty minutes or more, according to the shade required. If the iron liquor, when raked up, stands at 4 Twaddle, it is very strong. When a quantity of silk or cotton is prepared in this solution, and it is necessary to keep it strong, add some of the prepared nitrate of iron. When the mordant is weak, it may be necessary to wring out the goods, cool, and enter again.

To prepare Safflower.

Put the safflower into a bag, and wash it by beetling in cold water, to take out the yellow colouring matter. The brightness of the colour depends much on cleansing it properly. When sufficiently cleansed, there will be an appearance of yellow in the water which is pressed from the bag. Take the safflower from the bag, and dissolve 2 oz. pearlsh to each lb. of safflower; add the dissolved pearlsh, and stir well for ten minutes, and allow it to soak in the same three hours; then squeeze out, and save the liquor. Put the safflower into another tub of water, and for each pound add 1 oz. of pearlsh, dissolved as before.— This is called the ‘second bleeding.’ Stir it well

ten minutes, and squeeze out the safflower. If the colouring matter is thoroughly extracted, the safflower will be colourless. If strength still remain, soak it as before, only use less pearlash.

Skein Silk

Is generally dyed on very smooth, thin sticks, and divided into separate heads on each stick, (each head contains generally about 4 oz.) and wrung on a dyer's post. (See description in a former article.)

Method of Dyeing Pink with Safflower. 10 lbs. Cotton.

This colour is never dyed as deep on cotton, as when wanted to dye silk with. Let the safflower be prepared according to the directions, (see page 80.) Take a tub of convenient size, and put in the strength of 5 or 6 lbs. safflower, and put in some water; then put in about half a pint of oil vitriol, and turn the cotton in that liquor about an hour. Take it out, and put it into a tub of clean cold water. It will be a very high rose pink. Let it lie in the water, till it is wanted to dye pink on silk. Put about 5 lbs. more cotton into the liquor, to get all the strength of the safflower, as it is a very dear article; and put in a little sulphuric acid, that the strength may be all extracted. The cotton may not be carefully turned, as the silk is to be coloured by extracting the colour from the cotton.

Method of Dyeing Pink with Safflower, on Silk.

If a blue shade of pink be wanted, use a little archill in a very weak soap lather, in water at about 100 deg. ; if a very deep shade, and a shade of blue, use as much archill as will dye the silk a light peach-blossom or lilac, and in that case the water may be hotter. Turn the silk about ten minutes. If the tub of hot water should contain 60 gallons, 1 oz. of white hard soap is sufficient. (By using too much soap, the archill will not yield its strength ; and if no soap be use, the archill will be uneven on the silk.) It need not be rinsed from the archill liquor. Extract the colour from the pink cotton, by using a little pearlash in the bath of cold water. Add as much tartaric acid as will turn the liquor to a crimson hue; then turn or handle the silk till deep enough of colour. If necessary, use more of the safflower liquor. When deep enough, use a little cream of tartar in lukewarm water, and dry, without rinsing, in a warm room. If the colour should be too blue, have the water at 140 deg. and put in some more cream of tartar ; it will make the colour redder.— It is not necessary to use archill for any pink, unless a blue shade is wanted.

If the silk is not to be dyed to pattern, it is a great saving to use archill ; and if too much be not used, the colour will be much more delicate and handsome.

Geranium on Silk. 10 lbs.

In dyeing cochineal colours on silk with a tin li-

quor, (for 10 lbs. fine silk,) the tubs should be three feet deep, in a circular form, like a bell; the bottom about nine inches diameter, and the top about twenty inches. The tub should be made of white pine wood. Put in some clean water at 120 deg.; then put in 1 pint No. 1 tin liquor, (see page 54;) rake up well, and allow it to settle thirty minutes; put in the silk, and turn it smoothly and carefully (so as not to disturb the bottom) about fifteen minutes; then turn every ten or fifteen minutes, for about two hours. Squeeze it out; then put 24 oz. good ground cochineal into the bottom of the tub, fill with clean boiling water, rake up, and cover it with a cover made to fit, and allow it to settle thirty minutes.—Put in the silk, and turn it constantly one hour; then turn every fifteen minutes for three hours. Then sink the silk under the liquor, (but not so as to touch the bottom.) When it has been in twelve hours, take out, wring at the post, and dry in a warm room. Do not rinse it, as it will make it uneven to a real certainty.

Fine Cochineal Scarlet. 10 lbs. Silk.

Prepare 20 oz. good annotta, as directed on page 78, and put it into a kettle of water at 170 deg., adding about 4 oz. white hard soap; handle the silk in this liquor about twenty minutes, (If the annotta is made hotter than 170, it will not produce as full a colour, from the same quantity.) Rinse in lukewarm

water, to get out the suds. Put in a pint and a half tin liquor No. 1, (see page 54.) Fill with water at 120 deg., rake up well, and let it settle thirty minutes. Put in the silk and turn it carefully about twenty minutes, then a turn every ten minutes for two hours. Squeeze it out; then put 30 oz. of good ground cochineal into the bell tub, fill it with clean boiling water, rake up, and allow it thirty minutes to settle. Enter the silk, and turn carefully and constantly one hour, (being careful not to disturb the bottom;) then turn every ten minutes for three hours. Take out, wring, and dry in a warm room.

The sizes I have mentioned for the tubs, are large enough for 15 lbs. spun silk, and nearly large enough for 15 lbs. long reeled sewing silk.

Modena Crimson. 10 lbs. Silk.

Fill the bell tub with water at 100 deg. within 8 inches of the top; then put in a pint and a half No. 1 tin liquor, (see page 54;) rake up and allow it thirty minutes to settle. Enter the silk, and turn (so as not to disturb the sediment,) about thirty minutes; then give it a turn every ten minutes for three hours. Take it out, and put thirty oz. good ground cochineal into another bell, and fill with boiling water; rake up well, and allow thirty minutes to settle; enter the silk, and turn it constantly for one hour; then give it a turn every ten minutes for three hours. Sink it in the liquor for eight or

ten hours, (but not so as to touch the bottom;) then take out. Get a large tub of cold water, and put in 8 galls. of the cochineal liquor, (in which the silk was dyed.) Turn the silk carefully in that for one hour; then if the colour is not blue enough, take out the silk, and empty some of the liquor from the large tub, and add some more cold water; recommence, and turn in it until blue enough. In this method of dyeing, cold water will blue the silk more than twenty shades. The use of the old cochineal liquor is to prevent unevenness in blueing. Dyers who are unacquainted with this colour, will think it very strange that cold water will blue it, while it will not blue woollen goods of any description, which are dyed in the same dye-stuffs. Some dyers use a tub of cold water to blue geranium; but if they do, they must use at least one half the almost-spent cochineal liquor, otherwise the colour would not contrast much with the crimson. I do not disapprove of blueing a geranium a little, if done as I have directed; that is, if a slight blue shade be wanted, put in about a gallon of the spirit liquor in which the silk was prepared, with the almost-spent cochineal liquor, and cold water in the large tub.— I do not know a more dangerous colour to a young dyer, than blueing modena crimson or geranium.— If wove silk be dyed geranium, crimson, or scarlet, it must not reach the bottom of the spirit tub, or the cochineal tub; if it does, the colour will be dull and blind.

Copper Crimson. 10 lbs. Silk.

Steep the silk four hours in a cold alum mordant at 8 deg. No. 1 Twaddle's Hydrometer; then rinse very well in a running stream, or in a large quantity of water; then boil 2½ lbs. cochineal, 5 oz. pulv. Aleppo galls, and 2 oz. cream of tartar; boil half an hour, cool to 170 deg.; rake up well, enter the silk, and turn it constantly and carefully one hour. Heat the liquor to 196 deg. (but not boil;) continue the process in the cochineal from the commencement to the conclusion, about two hours. Rinse well in cold water, and dry the most convenient way.

Note.—By dyeing the silk a light buff, with prepared annotta and soap, it will save a little cochineal. Rinse, and begin as though it had not passed through the annotta. By boiling a weak barwood liquor, and handling in the clear, it will save a little cochineal. I should prefer doing without annotta or barwood, to using too much of either.

Method of setting a liquor for Dyeing Lavender on Silk.

Boil 14 lbs. good chipped logwood three or four hours; strain off the clear liquor into a tub containing 60 gallons. Put 30 lbs. muriatic acid and 15 lbs. double nitric acid, into a large stone ware pot. Then melt 3 lbs. of grain tin, and pour it slowly into a tub of water to make it light. Empty the water, and dry the tin in a warm dry room, and add it by degrees to the acids till it is all used, adding also to

the acids 4 oz. sal. ammoniac. Add this tin liquor to the logwood liquor, and rake up occasionally for three hours. Next day it will be fit for use. Then dip the silk, and handle smoothly till deep enough in colour; then blue it to pattern in refined sulphate of indigo, or chymic; rinse in cold water, and return the liquor back to the large tub again, (i. e. if you take the liquor from the large tub to dye in.) Dry in a warm room. This quantity of lavender liquor will dye 500 lbs. silk.

N. B. The refined sulphate of indigo must be used in the same liquor in which the silk was dyed.

Imperial Black, on Silk in the gum. 10 lbs.

Wet the silk in warm water, and wring it at the dyer's post. Boil 30 lbs. Sicily sumac; put half a pint of nitrate of iron into a sufficient quantity of water to turn the silk in; go 9 turns; put it into the sumac; go 7 turns, and sink the silk in the boiling sumac for twelve hours. Then take out, and give 7 turns in a weak alum mordant; cool, and rinse in cold water. Dissolve 12 oz. prussiate of potash in hot water; add a little more than half a pint muriatic acid, and put it into a tub of water at 100 deg.; give the silk 9 turns in it, and rinse in cold water.—Then put about 6 oz. boiled logwood, and 2 oz. dissolved copperas, into a tub of cold water, and give the silk 3 turns in it. Rinse in cold water, wring up, even it well, and dry in the open air.

P. S. If you want this colour to have a strong shade of blue, give the silk a run or dip in a weak alum mordant; rinse, and then use the logwood.

Fast Magazine Blue. 10 lbs. Silk.

When the silk is boiled for dyeing, boil 15 lbs. of good archill, and cool the liquor to 170 deg.; enter the silk, and turn it for thirty minutes; take out, wring at the post, and shake it well. Put 12 oz. silk on a stick, and turn it in the woad vat for silk, until blue enough; then wring out, and put it into cold water to prevent unevenness. Rinse well in the river, and wring at the post. Make a strong lather of white soap in cold water, and use some dissolved pearlash in it. Handle the silk in it fifteen minutes. If too red, use more pearlash; if too blue, use more soap. Wring very even, and dry in a room not very hot.

P. S. The woad vat may be cold, but should not exceed 90 deg. for this colour.

Fast Lavender.

Dye a very light blue; then steep four hours in a strong alum mordant; rinse well in cold water.—Boil 8 drachms of cochineal for each lb. of silk, cool the liquor to 190 deg., and continue the process at that heat one hour, or until red enough. It may be necessary to use a little more cochineal. Fast violet

can be done in the same way, by using more cochineal; say 1 oz. to each pound of silk; and making it a deeper blue in the vat. Rinse well, dry, and done.

Gold Colour. 10 lbs. Silk.

Dye the silk a light buff, with prepared annotta, (see page 78,) in a soap lather at 120 deg. Rinse well in warm water, for fear the alkali would decompose the alum. Turn the silk into the alum preparation, and let it remain three hours; rinse well in cold water. Boil 20 lbs. of good straw weld, and 4 oz. pearlash, for thirty minutes; then strain off the clear liquor, and make up a tub with half this liquor and the same quantity of scalding water. Handle fifteen minutes, then turn the silk in a strong soap lather at 90 deg., wring up light, and dry in a warm room.

Leghorn on Silk.

Use a very small quantity of prepared annotta (see page 78,) and a very little fustic liquor, in lukewarm water. Turn the silk very briskly and smoothly.—If not yellow enough, use a little more fustic; if not red enough, use a little more annotta. Wring and dry in a warm room.

Buff

Is dyed with a little prepared annotta in a warm soap lather, made of white hard soap. The lather for this buff should be very strong, or the colour will not be clear.

P. S. These receipts will answer for wove or skein silks.

Spanish Fly. 10 lbs. Silk.

Take the strength of 7 lbs. green ebony wood ground and use it in water at 140 deg.; put in also some unrefined sulphate of indigo; turn the silk smoothly and evenly. If not blue enough, use more sulphate of indigo; and if not yellow enough, use more boiled ebony wood. Pass the silk through a tub of cold water, with a little sulphuric acid in it, and dry in a warm room.

Dark Maroon on Silk.

Put the silk on sticks very smoothly, and put it into the alum mordant; go 5 turns; sink it, and let it remain three or four hours; rinse in cold water; then put a strong peachwood liquor into a tub of water at 140 deg. (use a little alum in the peachwood liquor,) and handle until deep enough. Dry in a warm room.

Observation.—In dyeing fine silk, having the gum

boiled out, (which is then termed soft silk,) it is very important in using boiled dye-woods, or archill, to strain them well, that no sediment may adhere to the silk. For wove silk, the dyer need not be quite as particular.

Weighted Light Black on Soft Silk.

Boil 20 lbs. small valonie, and 3 lbs. alum, for four hours; then strain off the clear liquor, and let it cool to 160 deg. Enter the silk, and give it 21 turns on smooth sticks; then sink it in the liquor, and let it remain twelve hours. Take it out, and rinse well in a large quantity of water, or in a running stream; wring it at the post, and stick it up smoothly. Dissolve 3 lbs. pearlash, and put it into a tub suitable for dyeing 10 lbs. silk. Run it up with cold water, rake up well, and turn the silk in it, fifteen or twenty minutes; wring it with the hands, (stick up smoothly.) Dissolve 1 lb. copperas, and put it into a tub of water at 90 deg. Rake up well, and turn the silk in it ten minutes; then take out, and cool in a tub of cold water. Return it to the copperas, and turn ten minutes; take out and cool again. Put about 5 oz. sulphuric acid into a tub of cold water, and give the silk 7 turns in that. Rinse in another tub of cold water, and dry in the open air.

Blue Black, or Dutch Black. 10 lbs. Silk.

Turn the silk in a weak alum liquor, about fifteen

or twenty minutes, and rinse slightly in cold water. Use the strength of 7 or 8 lbs. of logwood in water at 110 deg. Dissolve 3 lbs. hard soap, and put into the logwood liquor; then add 2 oz. dissolved sulph. of copper. Rake up well, enter the silk, and turn until deep enough. If the logwood is too weak, add more. By using a sufficiency of logwood, you can dye as deep a colour as can be dyed by any method, from the bluest shade to jet black.

Emerald Green. 10 lbs. Silk.

Boil 3 lbs. chipped fustic, and strain off the clear liquor. (Steep the silk previously three or four hours in the alum mordant.) Put some sulphate of indigo into the fustic at 140 deg. Handle until deep enough. If not deep enough, use more sulphate of indigo. Rinse it in cold water, with 8 oz. oil vitriol in it; turn it carefully on the sticks; wring, and dry in a warm room. Any shade of light green may be dyed on this principle, by adding or diminishing the drugs.

Deep Grass Green. 10 lbs. Silk.

Use the strength of 40 lbs. green ebony wood ground and boiled, and add sulphate of indigo enough to blue it, at 140 deg. Give the silk 5 turns in cold water, slightly soured with oil vitriol; wring, and dry in a warm room.

Primrose

Is dyed with a very little boiled ebony, and a tinge of sulphate of indigo, in lukewarm water, and dried in a sulphur house, which imparts much beauty and delicacy to this colour.

Pink White.

This colour is dyed in a weak soap lather, with a very little archill at 140 deg. Pearl White is done the same way, by using a little clear indigo water with the soap lather, with a little archill in it.

Peach Blossom and Lilac is done in a weak soap lather at 140 deg. rather strong of archill. If not blue enough, use a little pearlash in a cold soap lather. Dry these colours in a warm room.

Orange. 10 lbs. Silk.

Use the strength of 2 lbs. of annotta, or 2½ lbs. prepared annotta, in water at 180 deg., using a little pearlash and soap; dry in a warm room.

If the colour is not red enough, rinse out of the annotta, and give it a few turns in the alum mordant.

Yellow. 10 lbs. Silk.

Steep the silk three hours in the alum tub, and rinse well. Boil 20 lbs. of good weld for thirty minutes, and put in 8 oz. pearlash; strain off the clear

liquor, and use half of it in a tub of water at 150 deg. and handle the silk in that fifteen minutes; empty the tub, then use the remainder of the weld in another tub of hot water; handle fifteen minutes, and take out. Make a strong soap lather at 120 deg.; turn the silk in that ten minutes; wring, and dry in a warm room.

Green Olive. 10 lbs. Silk.

Use 8 oz. dissolved copperas in cold water, and turn the silk in that fifteen minutes, and rinse well in cold water. Use 3 pails of fustic liquor and 1 pail of logwood liquor in water at 110 deg., and handle in that twenty minutes. If not yellow enough, use more fustic; if not green enough, use more logwood. Dry in a warm room.

Brown Olive.

Make it a buff in prepared annotta, in a soap lather; rinse in cold water. Then use 4 pails of boiled fustic liquor, and 1 pail of logwood liquor, in water at 121 deg. Handle in that fifteen minutes. If not brown enough, use some archill in the liquor. Wring and dry in a warm room.

To darken an Emerald Green to a Myrtle.

Use some copperas and a very little logwood in

lukewarm water ; handle fifteen minutes, wring, and dry in a warm room.

Slate Colour on Silk.

Use a little logwood, a tinge of dissolved copperas, and a little dissolved cream of tartar, in cold water. If not blue enough, use more logwood ; and if not red enough, use more cream of tartar. Wring and dry.

Sage Drab. 10 lbs. Silk.

Use the strength of 8 oz. boiled fustic, 2 oz. do. logwood, 1 oz. of copperas, and a small tinge of cream of tartar, in cold water ; turn fifteen minutes. If not green enough, use a little more logwood ; and if not yellow enough, use a little more fustic. Dry in a warm room.

Black. 10 lbs. Silk.

Dissolve 8 oz. copperas and 1 oz. blue vitriol, and put into a large tub of cold water ; stir up well, enter the silk, and give 7 turns, then rinse in cold water. Then use the strength of 4 lbs. boiled logwood liquor in lukewarm water, and the strength of 3 oz. red tartar dissolved in boiling water ; enter the silk, and turn it thirty minutes. If not deep enough, use more logwood ; if not jet enough, use a little fus-

tic liquor. Then pass the silk through a tub of water at 130 deg. to take off the red shade and improve the colour. Wring, and dry in rather a cool room. Any shade of black may be obtained on this principle.

Light Fawn Drab. 10 lbs. Silk.

Use the strength of 8 oz. fustic, a little archill, a very little prepared annotta, and about 1 oz. dissolved copperas, in lukewarm water; handle twenty minutes. If not red enough, use more archill; if not yellow enough, use more fustic. Wring, and dry in a warm room.

Beaver Drab.

Use a very little logwood liquor, a tinge of archill, a tinge of copperas, and a tinge of red tartar. If not red enough, use a little more archill; if not enough on the slate colour, use a little logwood; if not yellow enough, use a little more fustic. Beware of using too much of the drugs in this colour. Dye it in a tub of cold water, and dry it cool.

Esterhazy Drab, or Blue Fawn. 10 lbs. Silk.

Put 5 lbs. dissolved copperas into a tub of cold water; stir up well, and give the silk 7 turns in it, (don't rinse.) Then use a little archill, a little sus-

tic, a little logwood, and two or three drops oil vitriol, in cold water, and turn fifteen minutes. If not yellow enough, use more fustic; if not red enough, a little more archill; if not blue enough, a little more copperas will blue on the archill. Wring, and dry rather cool.

Crimson Vat, containing 60 gallons.

Boil 150 lbs. ground peachwood for thirty or forty minutes, and put in 6 or 8 oz. newly slacked lime, to extract the strength of the peachwood; strain off the clear liquor, and when it cools to 90 deg. put in 9 galls. of "Tin Liquor for Crimson," (see page 54.) Rake up well, and it will be fit for dyeing crimson, in two or three days. (This liquor should be used in a pine tub.) To dye pink with this liquor, take some of it and mix with cold water. If the pink is not blue enough, use a little pearlash in cold water, and it will nearly equal a safflower pink. This liquor should be used cold. Rinse in cold water, and dry.

Common Scarlet.

Dye the silk a light orange, then turn it in some of the crimson liquor until deep enough.

Fast Chocolate. 10 lbs. Silk.

Boil 14 lbs. camwood; cool, and put in 4 oz. oil

vitriol; turn the silk fifteen or twenty minutes, then take out, and rinse in cold water. Dissolve 1 lb. copperas, and put into a tub of cold water; turn the silk in this until dark enough. Rinse in cold water.

P. S. This receipt is for woven silk. It will not answer to colour fine skein silk among loose dye-stuffs.

Purple Vat, containing 60 gallons.

Boil 180 lbs. chip logwood, put in 8 oz. quick lime, and continue to boil four hours; strain off the clear liquor, and when cooled to 90 deg. put in 8 galls. "Tin Liquor for Purple," (see page 54;) rake up well, and it will, in a few days, be fit for dyeing royal purple. Take off the clear liquor, into a clean pine tub, and handle till deep enough. Blue to pattern with refined sulphate of indigo. Rinse in cold water, and dry in a warm room.

Claret Brown on Silk.

Allow it to remain three hours in the alum tub, then rinse in cold water; then use some peachwood, fustic, and a little logwood; (peachwood ought to be the greatest part.) If not blue enough, use more logwood; if not red enough, more peachwood; and if not brown enough, use more fustic. Dye it at

about 130 deg. of heat. Almost any shade of brown may be dyed on this principle.

Light Yellow Brown. 10 lbs. Silk.

Alum it three hours; use the strength of 3 lbs. boiled fustic, and of 12 lbs. boiled peachwood in water at 140 deg. If not yellow enough, use more fustic; if not red enough, more peachwood.

Rich Cinnamon Brown. 10 lbs. Silk.

Take the strength of 1 lb. annotta prepared, (see page 78,) and put it into water at 170 deg., and add some pearlash; handle in it twenty minutes, and rinse in cold water; then put 6 oz. dissolved copperas into a tub of cold water, and turn in that fifteen minutes, rinse well, and stick up the silk.—Then use the strength of 4 lbs. fustic boiled, in water at 140 deg. If not red enough, use some archill liquor in the fustic; if not dark enough, use a very little copperas and 8 oz. dissolved red tartar, otherwise the copperas being on the top might cause unevenness.

Common Scarlet; the simplest method.

Use the strength of 2½ oz. annotta prepared, (see page 78,) in water at 170 deg. with a little pearlash and soap; handle twenty minutes, and rinse in cold

water; then steep it three hours in the common alum tub (see page 79,) and rinse in cold water;— then get a tub of water at 120 deg. and put in about the strength of 5 oz. peachwood liquor, to each lb. of silk. If not red enough, use more peachwood.— Wring, and dry warm.

Common Crimson; simplest method. 10 lbs. Silk.

Steep three hours in the alum mordant, (see page 79,) and rinse in cold water: then use the strength of 3 or 4 lbs. peachwood boiled, in water at 120 deg. Use a little alum to size it. If not full enough, use more peachwood. Then dissolve 8 oz. pearlash, and put into cold water, and turn the silk until blue enough.

Fast Green. 10 lbs. Silk.

Steep three hours in the alum mordant, (see page 79,) and rinse well in cold water, and stick up the silk; boil 20 lbs. good weld thirty minutes, and put in 8 oz. pearlash to extract the colouring matter, then strain the clear liquor into a large tub, and put half of it into a convenient tub or bark, and make it up with water at 150 deg., and turn the silk in that liquor twenty minutes; then use the remainder of the weld liquor in another tub of hot water, and turn the silk as before; take out, wring at the post, shaking it well, and putting about 12 oz. on each

stick ; blue to pattern in a woad vat just warm or cold. Wring light and even, and dry in the shade.

Woad vats are used, but ash vats are not, for silk dyeing, in London, Coventry, Macclesfield, Manchester and Dublin. The reason why ash vats are unfit, is, by having too much pearl or potash, which deprives silk of its lustre ; also, if you fill silk with archill, for instance to dye a magazine blue, the ash will strip the archill, when in the vat, and of course the colour is not done to shade. If you use more archill, (which must be the case,) the colour will be dull. Every scientific workman will avoid as much as possible the use of either of the fixed alkalies, though in some cases a little cannot be dispensed with.

Volatile alkalies will not injure materially.—Silk will stand more powerful acids without injury, than any animal substance ; but a strong fixed alkali will make it as dull as cotton, and as void of lustre. By volatile alkali, I mean ammonia, sal. ammoniac, urine and lime ; but urine, I consider more of a fixed alkali than either of the others ; yet it does not destroy the lustre or weaken the texture, as much as potash.

Beet Root. 10 lbs. Silk.

Put 20 lbs good archill into a bag, and boil one hour, and stop the boiling ; enter the silk, and turn till deep enough ; then put the juice of lemons or

limes into cold spring water so as to make it taste sour, and turn the silk in it fifteen minutes. If not red enough, use a little more of the above acid.—Dry rather cool. Wove silk can be dyed on the same principle. By using more acids, it will redden to crimson.

Method of adding to the weight of Sewing Silk.

For each lb. of silk, boil 3 lbs. Sicily or Malaga sumac twenty minutes; then turn the silk in it several turns, and sink it; allow it to remain twelve hours. This will add 3 oz. to the weight of every pound of silk.

Yellow. 10 lbs. Silk.

Use 2 lbs. boiled tumeric and 1 lb. alum; dry in a warm room.

Green. 10 lbs. Silk.

Use 3 lbs. boiled tumeric and 1 lb. alum, and a sufficient quantity of sulphate of indigo to green it; rinse in cold water and dry in a warm room.

A Middling Full Brown. 10 lbs. Silk.

Dye it a light orange with prepared annotta in water and a little soap, at 160 deg.; then steep 12

hours in the sumac, and darken with copperas;—rinse in cold water. If not red enough, use some archill in hot water; if not yellow enough, use some tumeric with the archill. Dry in a warm room.

Slate Colour.

Use some archill and alum in water at 100 deg.; then blue the silk to pattern with refined sulphate of indigo and alum in lukewarm water. Dry warm.

Weighted Drab.

Use a little tumeric, a little refined sulphate of indigo, and a little alum, in water at 100 deg. and it will dye a good sage drab.

Yellow Drab.

Use tumeric and a little archill in water at 100 deg. If not red enough, use a little more archill; if not dark enough, use a little refined sulphate of indigo. Any shade of weighted drab can be done on this principle; observing that all these colours, with the exception of brown, must be steeped twelve hours in the quantity of sumac already mentioned.

If silk be dyed a very deep blue in a cold vat, and then steeped in sumac, as the other colours, 3 lbs. of sumac will add 3 oz. to each lb. of sewing silk.

I do not approve of tumeric in silk dyeing; but nothing else will do as well for weighted colours.

Method of preparing an Iron Mordant for Prussian Blue, for Silk or Cotton.

Put 20 lbs. single aquafortis into a large stone pot, and add by degrees 3 lbs. turnings of malleable or hoop iron, (free from oxygen;) add also by degrees 2 lbs. copperas. Very little iron and copperas can be used at once, without causing the acid to boil over, and cause waste; it would also cause too much waste of gas. It will probably require eight or nine hours for the iron and copperas to be consumed. Put the solution into 50 galls. clear cold water, in a tub. When going to use it, stir up well to mix equally.

Prussian Blue on Silk.

Handle the silk in the iron mordant ten minutes, then sink it all under the liquor for a few hours, if a deep blue is wanted. Rinse well in cold water;—then pass it for a few minutes in a strong soap lather and rinse the soap well out in lukewarm water. Get a tub of water at 140 deg., and if for 8 lbs. of silk, put in 8 oz. prussiate of potash, and 12 or 14 oz. muriatic acid; stir up well, enter the silk, and handle it for ten minutes. If not even, add more muriatic acid. (It will certainly be even, if dyed on this method, and carefully handled.) Rinse well in cold water. If wanted on the purple shade, dissolve about 4 drachms of ammoniate of copper in a little warm water, and put into a tub of cold water. Stir up well, enter the silk, and handle briskly for eight

or ten minutes. Do not rinse from this process, but dry in a warm room. If 8 lbs. more is wanted, dissolve half the above named quantity of prussiate of potash, and put into the prussiate tub that the first was dyed in, and treat in the same way. Dry in a warm room. When the mordant becomes too weak, add more of the solution to strengthen the tub.— Continue to strengthen the tub, till 200 lbs. of the iron solution is used. The iron solution should be strong enough to afford a deep blue, without getting the second process in the mordant.

For preparing unbleached Piece Cotton for Dyeing.

To 100 ps. cotton cloth, (allowing each ps. to weigh $4\frac{1}{2}$ lbs.) put 12 lbs. potash dissolved into a vessel, and boil the goods in it three hours; cool, take out, and rinse in cold water. Get a tub of water at about 120 deg. and add as much sulphuric acid as will make it a little sour, and turn the goods with a reel or wynch, go three ends, and rinse well in cold water.

Another Method.

Boil the pieces the same time in the same quantity of potash; then wash in a dash-wheel for ten or fifteen minutes; then pass three turns in the hot water soured with oil vitriol. Rinse in cold water, and the goods are fit for dyeing.

This is the best method I know of. The price

for dyeing cotton is at present so low, that dyers merely boil the goods in clean water; but the colours will not be perfect with that preparation.—Prussian blue and other colours are often imperfectly dyed, owing to the size remaining on the goods. Skein cotton does not require souring or dash-washing. I had rather dye either piece or skein cotton in the brown state, than dye it half bleached. I want it full bleached, or not at all. It is not necessary to use potash for skein cotton. In London, they use a very small quantity of oil vitriol in boiling skein cotton, and rinse in cold water. This method I approve.

Barwood Red. 20 lbs. Cotton.

Boil 20 lbs. Malaga or Sicily sumac, and give the cotton 5 turns in it, and sink for twelve hours. To make tin liquor for this colour, take 5 pints of muriatic acid, 1 pint nitric acid, and put into a stone pot; feed it slowly with 27 oz. grain tin. When the tin is all dissolved, put the solution into a large tub of cold water; stir up well, and handle the cotton in it thirty minutes; sink it, and let it remain three or four hours; then rinse in cold water. Boil 40 lbs. of barwood and 8 oz. pulverized Aleppo nut galls.—Cool the liquor, enter the cotton, boil two hours, giving a turn every five minutes; take out and pass it through a cool soap lather. Dry in the open air, or in a middling warm room.

Peachwood Red. 20 lbs. Cotton.

Boil 10 lbs. Malaga or Sicily sumac, and strain off the clear liquor; give the cotton 4 or 5 turns in this liquor, and sink it for twelve hours. Fill a suitable tub of cold water, and put in 1 quart of "No. 1 Tin Liquor for Cotton," (see page 53;) rake up well, give the cotton 7 turns in it, and sink it for one hour. Take out and rinse in two tubs of cold water, (each tub to contain as much as the spirit tub.) Too much water must not be used in washing, as the cotton would be deprived of too much acid.—Boil 14 lbs. good peachwood twenty minutes, strain off the clear liquor, and add 8 oz. dissolved alum.—Put in the cotton and turn it for fifteen minutes, then give it a turn every five minutes for twenty minutes; take out, and add about one quart of liquor from the spirit tub; rake up well, and turn the cotton in it till deep enough. Take out, and dry in a warm room, without rinsing.

Fast Brown. 20 lbs. Cotton.

Boil 3 lbs. sumac, strain off the clear liquor, and steep the cotton in it twelve hours; then dissolve 2 lbs. copperas, and put into a tub of lukewarm water, and turn carefully in it fifteen minutes. Then dissolve 16 oz. acetate of lead, and put into a tub of cold water, and turn the cotton in it fifteen minutes; wring out, and handle in it fifteen minutes more.—Wring, and return to the sugar of lead tub, and han-

dle in it fifteen minutes more, and rinse well in cold water. Boil 10 lbs. barwood and 7 lbs. fustic for one hour; cool to 160 deg. and turn the cotton in it fifteen minutes; then get on a brisk fire, turning every five minutes; commence boiling, and turn until full enough of colour. Take out, shake off the loose dye-stuffs, and rinse in cold water; then pass the cotton through a strong soap lather, a little warmed, and dry the most convenient way.

Common Brown. 20 lbs. Cotton.

Boil 4 lbs. Malaga or Sicily sumac for fifteen minutes, strain off the clear liquor, give the cotton 7 turns in it, and sink it twelve hours. Take out;—dissolve 2 lbs. copperas, and put into a tub of warm water, and handle in it for fifteen minutes; then take a tub half full of warm water, and put in 7 or 8 pails full of strong clear lime water; stir up well, and turn the cotton in it ten minutes. Get a large tub of warm water, and put in a pail full of old urine, stir it up, put in the cotton, rinse it well, and take out. Boil 7 lbs. peachwood and 5 lbs. fustic; strain off the clear liquor into a suitable tub of hot water, and add 8 or 10 oz. dissolved alum; rake up well, and handle the cotton in it twenty minutes.—If not red enough, use more boiled peachwood; if not yellow enough, use more boiled fustic. Dry in a warm room, without rinsing.

Deep Purple. 20 lbs. Cotton.

Handle the cotton ten minutes in the strength of 7 lbs. boiled logwood warm ; then put half a pint " No. 2 tin liquor," (see page 53,) into a tub of cold water, and turn in it ten minutes ; rinse in cold water, return it to the logwood, and handle ten minutes, and done.

Another Purple. 20 lbs. Cotton.

Handle the cotton ten minutes in the strength of 9 lbs. boiled logwood ; dissolve 2 lbs. alum, and put into a tub of cold water, and handle in that ten minutes ; rinse in cold water, and return to the logwood, go 7 turns, and done. Dry in a warm room.

Lilac. 20 lbs. Cotton.

Handle the cotton ten minutes in the strength of 3 lbs. logwood ; then handle in the strength of 1 lb. dissolved alum in cold water. Dry the most convenient way.

Lavender. 20 lbs. Cotton.

Dissolve 24 oz. alum and 12 oz. acetate of lead in one gallon of water, and add 2 oz. chalk ; allow it to remain twenty four hours ; then put it in a tub of cold water, and handle the cotton in it for ten minutes ; then rinse in a tub of equal size, then use the

strength of 2 lbs. boiled logwood in a tub of water at about 90 deg. and handle in it for twenty minutes. Dry in a room slightly warm.

P. S. Purple, Lilac and Lavender are fugitive colours, but will answer for linings.

Bark Green. 10 lbs. Cotton.

Dye the pieces a light blue in a hot or cold blue vat, and rinse well in cold water. Put 5 lbs. citron bark into a kettle and boil ten minutes, take off the clear liquor, and let it cool to 180 deg.; then put in half a pint No. 3 tin liquor, (see page 53;) rake up well, enter the goods, and turn 11 ends; take out, rinse in cold water, and dry in a warm room.

Bark Yellow is done in the same way, except the yellow is not blued.

Tumeric. 10 lbs. Cotton.

Put 1 lb. good tumeric into 2 gallons cold water, and add 2 oz. pearlsh dissolved in hot water; put it into a tub, and go 7 ends; then dissolve 8 oz. alum, and put into a tub of cold water, and add 4 oz. sulphuric acid; rake up well, enter the cloth, and give it 7 turns. Rinse well in cold water, and dry in a warm room.

This is a very fugitive colour, but is used for linings. Some dyers dye this colour, by using the above proportions of tumeric and cotton, in water

almost boiling, without pearlash or alum; using four times the quantity of sulphuric acid. The latter method, I do not approve, for dyeing piece cottons.

Fast Orange. 10 lbs. Skein Cotton.

Dissolve 3 lbs. acetate of lead in hot water, and put into a tub of cold water; give the cotton 7 turns in it. Dissolve 24 oz. B. chromate of potash of orange crystals, and put into a tub of cold water;—mix well, and give the cotton 7 turns, ringing middling tight every dip, and return to each liquor two or three times. To make a strong lime lye for this colour, take 2 pecks good lime and slack, and put into 100 galls. cold water; rake up well, and allow it to settle three hours; then take out the clear liquor, and mix with boiling water in proportions of two parts water and one part lime water; stir up well, enter the cotton, and turn ten or fifteen minutes. It will change in hot lime water from a strong yellow to a full orange. Rinse in cold water.

Piece cotton is dyed green, yellow and orange, with the same dye-stuffs as skein cotton. The only difference in the process is, that piece cotton is dyed in padding machines, which are generally used for printing.

Were any man to edge piece cotton chrome colours, his fingers would ulcerate in a short time; and I am of opinion that the pieces would be unevenly dyed.

A Fugitive Orange. 10 lbs. Cotton.

Boil 12 oz. good annotta and 12 oz. pearlash fifteen minutes; then strain off into a kettle or tub of water at 160 deg. Dissolve 24 oz. brown hard soap and put into the tub; rake up well, enter the cotton, and handle until deep enough. Dry in a warm room. The orange will not absorb all the strength of the drugs, and the workman can dye light and deep shades of buff in the same liquor, by adding a little soap to keep up the lather. If a pale shade is to be dyed in it, it will be much improved by rinsing the goods in lukewarm water; then dissolve 2 lbs. alum in boiling water, and put into 50 galls. of cold water; handle in that for ten minutes. It will red- den the buff to a salmon colour, and impart much beauty to the shade. The above quantity of alum will be sufficient for 30 lbs. of piece or skein cotton. Do not rinse from the alum. Dry in a warm room.

Wood Green. 10 lbs. Cotton.

Boil 4 lbs. good fustic and 24 oz. logwood, and mix hot water with the clear liquor, to bring it to about 140 deg.; handle the pieces in that ten minutes. Dissolve 6 oz. sulphate of copper, and put into a tub of cold water, and handle the goods 3 ends; return to the fustic, go 3 ends; take out, and put 3 oz. dissolved sulphate of copper into the fustic; return and go 5 ends. If not green enough, use more logwood; if not yellow enough, use more fustic.

Deep Slate. 10 lbs. Cotton.

Handle the pieces 7 ends in the strength of 4 lbs. boiled logwood at 160 deg.; then take out, and dissolve 2 lbs. copperas and 1 lb. alum in boiling water, and put both into a tub of lukewarm water; rake up well, enter the pieces and go 5 ends; take out and rinse. A paler shade may be produced by diminishing the drugs. The above will be a reddish shade. If a greenish shade be wanted, use 4 oz. fustic with the above quantity of logwood at the same heat; use also the same quantity of copperas, but leave out the alum.

Deep Black. 10 lbs. Cotton.

Boil 6 lbs. American sumac and 6 oz. black oak bark, fifteen minutes; take off, and steep the cotton in it twelve hours; then pass it through some clear lime water, and rinse. Dissolve 2 lbs. copperas, adding 2 pails sumac liquor, and put into a tub of cold water; go 3 ends in that, then go 3 ends in the lime tub, and rinse well in cold water. Boil 4 lbs. logwood, and put into a tub of water at 120 deg. and add two pails sumac liquor, and go 5 ends; dissolve 2 oz. copperas and put into the logwood, and go 2 ends and rinse.

P. S. American sumac is about two thirds the strength of the Sicily, if a good article; and I prefer it for black dyeing, as it yields a shade of blue. I prefer the Sicily or Malaga for dyeing red or scarlet on cotton.

Method of setting a Blue Vat for Skein Cotton.

Get a puncheon or pipe tub, and first put in 16 lbs. copperas; nearly fill it with water; then put in 8 lbs. good Bengal indigo ground in water; then slack about 14 lbs. good quick lime and add to the vat; rake up in half an hour for ten minutes, and rake again in three or four hours. If the vat is a dark green, and has no appearance of yellow, put in 3 or 4 lbs. more lime, and rake up again. When it assumes a greenish yellow, you may consider it in good order. Rake up, and allow it twelve hours to settle, when it will be in good working condition; then dip the cotton, and take out and cool. (Do not dip more than 30 lbs.) Rake up, and allow it twelve hours to settle. (Do not work cold vats but once a day.) When a considerable quantity of cotton is dyed, put in a little copperas and lime. If the vat is most in want of lime, it will have a dark green appearance; if most in want of copperas, it will be somewhat yellow. In the latter case, it will require rather more copperas than lime; in the former, more lime than copperas. If not in either extreme, use an equal quantity of both; probably it may require about 2 lbs. of each.

A Green that will stand Bleaching. 10 lbs. Cotton.

Put 7 lbs. dissolved copperas into a tub of cold water. Make up a strong lime tub, rake up, and take off the clear liquor into a tub; turn the cotton

five minutes in the copperas, wring tight at the dyer's post, and allow it to cool a few minutes; then turn it five minutes in the clear lime water, wring tight and cool again; return it to the copperas, wring and cool as before; then return to the lime, wring and cool; then dip it five minutes in the blue vat, take out, wring and cool; then dip from tub to tub, wring and cool, and continue the process from the blue vat to the tubs, till the right colour be obtained. Rinse well in cold water, and give the cotton a strong soap lather; rinse in cold water, and dry in the open air. This is a very dull green, but improves much in bleaching, and is used for stripes in ginghams.

Bleaching Black is also dyed in the same manner, having the lime and copperas tubs and blue vat very strong. It will also require dipping oftener from the tubs to the vat, and from the vat to the tubs, and rinsing in cold water; and must be turned in a strong soap lather at 140 deg. which is the proper heat for the green also.

Full Pink. 2 ps. Cotton.

Take as much prepared saffour (see page 80.) as when dry would weigh 4 lbs. and put into a tub of cold hard water; handle the pieces in that by edging and salvaging with the hands for ten minutes; then put in about half a pint oil vitriol, and stir up well; handle the goods fifteen or twenty minutes,

and take out. Dissolve 8 oz. cream of tartar, and put into a tub of cold water; give the pieces 5 ends in that, and dry cool. Any shade of pink can be obtained on the above method, by adding or diminishing.

Bengal Buff. 10 lbs. Cotton.

Take a pint of "Iron Mordant for Prussian Blue," (see page 79,) and put into a tub of cold water;—rake up well, handle the cotton in it ten minutes, and rinse in cold water. Then steep 8 oz. chloride of lime, and put in a tub of cold water, rake up well, and allow it to settle; then take off the clear liquor, and put it into a tub of cold water; give the pieces 5 ends in that; then rinse, and return to the iron mordant; rinse, and return to the chloride, and dip from one tub to the other, till deep enough. Rinse in cold water; then give the pieces a strong soap lather, rinse and dry. Any shade of buff can be obtained on this principle.

Another Method of Dyeing Fast Buff. 2 ps. Cotton.

Put 8 oz. dissolved copperas into a tub of cold water; dissolve also 8 oz. pearlash, and put into a tub of cold water; turn the cloth five minutes in the pearlash tub; squeeze it well, and put it into the copperas tub; go 7 ends, then take out, squeeze it, and expose it for a few minutes to the air. Return,

squeeze and air it, from one tub to the other, till deep enough; then rinse in cold water; then make a strong soap lather at 110 deg. and handle in that ten minutes; rinse in cold water.

Green Olive. 9 lbs. Cotton.

Boil 7 lbs. fustic, 3 lbs. Sicily or Malaga sumac, and 2 lbs. logwood, for two hours, if chipped wood; but if ground, twenty minutes will answer. Strain off the clear liquor, and handle the cotton in it twenty minutes, at 140 deg. Then dissolve 24 oz. copperas, and 12 oz. sulphate of copper, and put into a kettle of cold water, and stir up well; sadden in this liquor ten minutes; then rinse well in cold water, return to the former tub, and go 5 ends; take out, and put the strength of 4 oz. sulphate of copper in the tub; mix well, and enter the cotton, go 5 ends, take out and dry.

Brown Olive. 10 lbs. Cotton.

Boil 7 lbs. ground logwood, 24 oz. Sicily sumac, and 4 oz. gr. logwood, for 20 minutes; strain off the clear into a tub; have it about 140 deg., and handle the cotton in it thirty minutes, and take out. Dissolve 24 oz. copperas and 12 oz. sulphate of copper, and put into a tub of lukewarm water; stir up well, enter the cotton, and go 7 turns; take out and rinse well in cold water; return it to the sumac and log-

wood tub, and go 5 ends; take out, and dissolve 4 oz. sulphate of copper, and put into tub; stir up well, enter the cotton, and go three ends, and done. If not brown enough, use 2 or 3 lbs. boiled fustic in another tub at 140 deg.

Scarlet. 10 lbs. Cotton.

Boil 20 oz. good flag annotta, and 20 oz. pearlash, for fifteen minutes, and strain off into a tub of water at 160 deg.; handle in this twenty minutes, and rinse well in cold water; then steep one hour in the strength of 12 oz. Malaga or Sicily sumac, in lukewarm water. Boil 2 lbs. peachwood, and put into water at 120 deg. and add about 4 oz. alum; handle in that twenty minutes. If not red enough, add more peachwood to the same liquor, and handle till red enough. Take out and put in half pint "Tin Liquor for Red Cotton," (see page 53,) and go 3 ends.

P. S. I have sometimes used the tin liquor in cold water, after the cotton has been in the sumac. Either method will answer, but I prefer the former.

Crimson. 10 lbs. Cotton.

Boil 5 lbs. Malaga or Sicily sumac for fifteen minutes; take off the clear liquor at nearly boiling heat, and handle the cotton in it five minutes, and sink it for twelve hours; then put half a pint "Tin liquor

No. 1," (see page 53,) into a tub of cold water of about 30 gallons, and handle in that twenty minutes; then sink it for one hour. Take out, and rinse in 30 gallons of cold water, and repeat the washing in the same quantity. If washed in a running stream, it would lose too much of the acid. Boil 6 lbs. good peachwood fifteen minutes; strain off the clear into a tub, add 4 oz. dissolved alum; have it at about 160 deg. and enter the cotton; turn carefully for twenty minutes; then put in half a pint tin liquor for red cotton, (see page 53,) while the peachwood liquor is at 100 deg.; handle the cotton in that fifteen or twenty minutes, and it will blue it to a crimson.

Beet Root is dyed in the same manner, by diminishing one third of the sumac, and using the strength of 1 lb. boiled logwood in the peachwood liquor.

Fawn Drab. 10 lbs. Cotton.

Take the strength of 1 lb. boiled fustic, of 8 oz. boiled sumac, and a litle prepared annotta liquor, in water at 120 deg.; enter the goods, and go 9 ends, and take out; then dissolve 8 oz. copperas, and put into a tub of cold water, and add 20 drops oil vitriol, stir up, enter the cotton, and go 7 ends; done.

Reddish or Sandy Drab. 10 lbs. Cotton.

Put the strength of 12 oz. boiled fustic, of 6 oz.

boiled sumac, and of three oz. peachwood, into a tub of water at 120 deg. ; handle the cotton in that fifteen minutes ; then dissolve 8 oz. copperas, and put into a tub of cold water ; stir up well, enter the cotton, and go 7 turns ; rinse in cold water, and dry in a warm room.

Sage Drab. 9 lbs. Cotton.

Boil 1 lb. ground fustic, 8 oz. sumac, and 2 oz. ground logwood, and strain the clear liquor into water at 120 deg. ; go 9 ends in that, and dissolve 8 oz. copperas, and put into cold water, and go 5 ends.— If not green enough, use a trifle of neutralized sulphate of indigo, (see page 57 ;) rinse in a tub of cold water, with a little alum in it.

Beaver Drab. 10 lbs. Cotton.

Boil 8 oz. ground fustic and 8 oz. Sicily sumac, and put into water at 120 deg. ; go 9 ends in that ; then dissolve 8 oz. copperas, and put into a tub of cold water ; stir up well, and go 9 ends in that ;— done.

Claret. 10 lbs. Cotton.

Have the strength of 2 lbs. boiled sumac nearly at boiling heat ; give the goods 3 ends in it, and sink for twelve hours ; then take out, and put near-

By a pint No. 1 tin liquor (see page 53) into a tub of cold water, and go 9 turns, and sink for one hour; then go 5 ends in 30 gallons of cold water, and repeat the rinsing in the same quantity. Boil 4 lbs. good peachwood and 4 lbs. logwood, and cool to 160 deg.; enter the pieces, and go 9 ends; then take out; and add 8 oz. boiled alum; put in also 3 quarts from the spirit tub; stir up well, put in the pieces, and go 7 ends; dry in a warm room.

China Green. 9 lbs. Cotton.

Boil 10 lbs. Cuba fustic and 6 oz. sulphate of copper two hours, and strain off the clear; wynch the pieces in it fifteen minutes, and sink for one hour.—Dissolve 3 lbs alum, and put into a tub of lukewarm water; stir well, enter the pieces and go 9 ends;—return to the fustic, go 9 ends, and sink for one hour; then take out and return to the alum and go 9 ends, then go 9 ends more in the fustic, and blue it to a green with china in cold water, (1 lb. dissolved alum and 2 pails fustic liquor for china, see page 58:)—dry in a warm room, without rinsing.

Bright Scarlet. 10 lbs. Cotton.

Boil 1 lb. good flag annotta twenty minutes, then add 1 lb. pearlash, and boil ten minutes; strain off the clear into a strong soap lather at 140 deg., and bundle the cotton in it twenty minutes; then rinse

well in lukewarm water; then put the strength of 3 lbs. safflower prepared, (see page 80,) and about 1 pint sulphuric acid, into a tub of cold water; stir up well, and handle the cotton in it thirty minutes. If not full enough, use some more prepared safflower, and more sulphuric acid, and handle till deep enough. If the safflower has enough of acid in it, it will have a crimson appearance. Then boil 12 oz. crude tartar, and put into a tub of cold water; handle the cotton in it, and dry in the shade or in a cool room. Dyeing warm, injures this colour materially. If it be piece cotton, callender as cool as can be conveniently done.

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ERRATA.

- Page 14, line 1—*instead of* "if dyed in a very warm dyehouse."
read—if dried in a very warm dry-house.
- Page 14, line 11—*instead of* "12 qts. sulphuric acid," *read*—1
pint sulphuric acid.
- Page 15, line 17—*read* "so that it does NOT make the staple of
of the wool tender."
- Page 53, No. 3 Tin Liquor, for Scarlet use 1 pint oil of
vitriol and 5 pints muriatic acid.
- Page 55, Cochineal Scarlet—*read* 40 oz. good cochineal.
- Page 59, Lavender—*instead of* "rinse," *read* blue in a woad
vat.
- Page 84, Modena Crimson—*read* bell tub, instead of bell.
- Page 96, Esterhazy Drab—*read* 5 oz. dissolved copperas, in-
stead of 5 lbs.
- Page 99, Light Yellow Brown—*read* 3 lbs. boiled fustic and
12 oz. boiled peachwood.
- Page 100, Common Crimson—Use a little alum to rise it.
- Page 101, Green Silk—Wring tight and even.

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