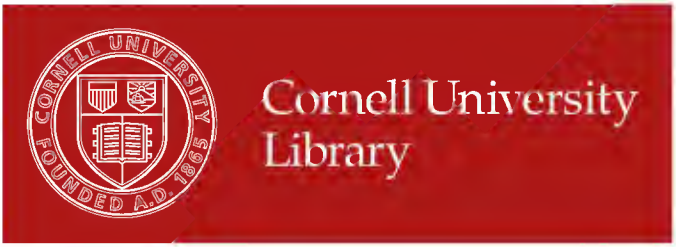

The Dyeing and Cleaning of Textile Fabrics

A Handbook
for the Amateur and the Professional

By F. A. OWEN, B. S.
Based partly on notes of
H. C. STANDAGE

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PUBLISHER'S NOTE.

After the death of the late Mr. Standage, the publishers, who had already issued one of his books, came into possession of a lot of miscellaneous recipes and notes which he had collected, the greater part of which concerned the subject of dyeing and cleaning. These had not been properly revised and were not in such form as to be of use; we therefore asked a well-known American dyer, Mr. Owen, to revise them for publication. The result finally was that Mr. Owen re-wrote the whole, and is responsible for the book in its present shape; he is, indeed, as regards the greater part of it, the author.

PREFACE.

In placing before the reader these useful recipes and processes it has been necessary to use some terms not familiar to everyone, and, therefore, some pages are first taken up with a description and elucidation of such matters as may reasonably be supposed to need explanation. The different processes are classified as much as possible, and directions for dyeing occupy the first part of the book, while cleaning and re-dyeing are treated afterward. Some recipes do not admit of exact classification, and some are applicable to more than one class of materials; but it is hoped that by a frequent use of the index, which it has been the intention to make fairly complete, the user of the book will be able to find what he needs.

In the renovating of wearing-apparel, cleansing and pressing are all that are usually attempted at home; but it is desired to show that more than this is practicable. On the subject of renovating by dyeing there is a very general lack of knowledge and information; dyers, as a class, being the most secretive of mortals. A fairly complete account of all the ordinary processes practised in the art of dyeing is therefore given, and a description of the various classes of dyewares in common use; from a perusal

of which it is hoped that it may be possible to decide not only whether any article of clothing admits of re-dyeing, but also what dyewares and what method of applying them should be used. A list of a few reliable dealers in dyestuffs is given; these were selected without the knowledge of these dealers, and it is not intended to cause any prejudice against other reputable dealers, of whom there are many; but it seemed desirable to name a few. The package dye, although good, is expensive except for the very smallest undertaking.

Errors and omissions there undoubtedly are; but in almost all cases the processes and materials have been tested by long use by the writer, and if, as is intended, the directions are sufficiently explicit, and if they are intelligently followed, good results may be reasonably expected.

F. A. Owen.

November, 1908.

THE DYEING AND CLEANING OF TEXTILE FABRICS.

Solution.

Solutions are fluids, usually water, in which has been dissolved an appropriate quantity of any soluble substance, or substances, to impart to it its peculiar properties. When any other fluid than water is the dissolving medium the solution derives its name from the solvent used. Thus with water it is called an aqueous solution, with alcohol, a spirit or alcoholic solution. An alkaline or acid solution is named similarly, and usually has a prefix to designate the acid or alkali used. Neutral solutions are neither acid nor alkaline, though an acid or alkaline solution may be made neutral by adding to it acid to just combine with the alkali present, or vice versa. A saturated solution is so called when the fluid used for the solution has dissolved all that it can hold of any substance, i.e., until it will dissolve no more. Solids should be crushed or pulverized, to expose the largest surface possible to the solvent action of the liquid. Substances that in the lump would remain for days undissolved, when reduced to powder are lique-

fied in a short time. When a solid, as salt or alum, is placed in a vessel to dissolve, it rests on the bottom. The water surrounding it becomes saturated, and, being heavier, remains also at the bottom, so that the solution proceeds very slowly. By stirring, the solution is hastened, but this takes up much time. The best plan is to suspend the salt in a colander or basket, or coarse bag, at the surface of the liquid. As the particles of water take up the particles of salt they become heavier and sink; others take their places, dissolve more of the salt and sink in their turn, so that action is constant and rapid, and always at that part of the liquid most capable of dissolving things.

Precipitation.

This is quite the opposite of solution. It is the method of obtaining solid matter by mixing two solutions, or more, of substances containing elementary equivalents having a mutual affinity, or chemical attraction for each other. The fluid, or reagent, added to another to produce a precipitate is called the precipitant. Unless otherwise directed, it is best to warm a solution about to be precipitated and to add the precipitant, gradually stirring all the time, with a clean rod of glass or other inert material, until a precipitate ceases to form. After standing some time to settle (subside), a drop more of the precipitant is added to be sure the precipitation is complete; if the admixture remains clear and unchanged the reaction is complete and the fluid may be poured off (de-

canted) from the precipitate, which is filtered if necessary, washed, and dried. Where the precipitate is the chief object of the process it is usually necessary to wash it. Often this may be done by pouring over it fresh water, allowing to again subside and pour off (decant) as many times as necessary. If the precipitate is partly soluble in water more care has to be taken, or to wash with some fluid not having a solvent action upon it. The fluid left after precipitation is called the filtrate, and where the process is to purify a fluid the precipitate is neglected and the "clear" (filtrate) poured off for use.

Infusion.

When the principles to be extracted are soluble in water, and at the same time but slightly volatile, boiling water is poured on the substance of which the infusion is to be made, the vessel is carefully covered, and the whole allowed to remain untouched for some minutes, or even hours, according to the greater or less solubility and penetrability of the substance, and the required strength of the infusion. If an infusion is required of dried leaves or flowers, they are first moistened with a little boiling water, and a time allowed for them to swell and soften before adding the rest of the water. Infusions made by adding all the water at once, as is frequently practised, are deficient in both flavor and perfume. Infusions of all vegetable substances that do not exert a very powerful action upon the human system may be made by pouring one pint of water on one ounce of

the vegetable matter and allow to macerate for from ½ to 1 hour. The ordinary dose of such substances in infusions is 1 to 2 oz. three or four times per day. Infusions, like decoctions, are liable to undergo spontaneous decomposition by standing, especially in warm weather, when a few hours are often sufficient for their passage into a state of active fermentation; they should, therefore, be prepared for use daily, as beyond 24 hours they cannot be depended upon. Infusions should always be made in vessels that cannot be attacked by any of the substances with which they are in contact, and closed sufficiently tight to prevent the loss of the most volatile component. New tin fills the requirements very well, especially if provided with a cover.

Maceration.

When an infusion is made without the aid of heat it is termed maceration. This takes a much longer time than an infusion, properly so called; it rarely requires less than 7 days, sometimes several weeks. In many distillations this method is made use of to soften the substance before putting it in the still, and to facilitate the extraction of its odorous principle. Tinctures, when made by maceration, should be frequently shaken during the process, which should be conducted in glass vessels well stoppered. Digestion is a prolonged infusion which is usually conducted at a medium temperature, between that employed for an infusion properly so called and that of a maceration. Its object is usually to impregnate

alcohol with the principles of a substance which would be but slowly extracted without the aid of heat, such as the sun or other warm situation. Whatever the nature of the vessels employed, care must be taken not to fill them too full, also to cover those that are to be placed on the sand bath with a damp piece of parchment or paper tied around the top, with pin holes pricked in it. If this is neglected the expansion and increased volume of air or vapor may burst it. Moreover, the process is not so well conducted where the vessel is too full.

Decoction.

Decoctions are solutions of the properties of vegetables obtained by boiling, which is presumed to be a more effective method of extracting their properties than by mere infusion. For making decoctions the substances should be well bruised, or reduced to very coarse powder, or, if fresh and soft, they should be sliced small. In the former case any very fine powder or adhering dust should be removed with a sieve, as its presence would tend to make the product thick and disagreeable, and also more difficult to strain. The vessel in which decoctions are made should be furnished with an accurately fitting cover, the better to exclude the air, and the heat so regulated that the fluid may be kept just simmering, or only gently boiling, as violent boiling is not only quite unnecessary, but absolutely injurious. In every case the liquor should be strained while hot, but not boiling, and the best method of doing so is to employ a fine hair

sieve, or coarse flannel bag. In general it is found that as decoctions cool there is a sediment formed, in consequence of the boiling water dissolving more of the vegetable matter than it can retain when cold. This deposit consists for the most part of the active principles of the solution, and should be mingled with the clear liquid by agitation when the decoction is used. It will thus be seen that the common practice of leaving the straining or filtration until the liquid has become cold, and also of rejecting the sediment, is injurious, and should be scrupulously avoided, as, however much decoctions so prepared may please the eye, they are not only inferior in strength, but, in many cases, entirely inert. It may be further remarked that long boiling is in no case necessary, but should be avoided, especially in decoctions prepared from aromatic vegetables, or those abounding in extractive. Distilled water, or perfectly clean rain water, should alone be used for decoctions. Spring and river water, from their containing lime, have less solvent powers. Decoctions of vegetables not exerting a very powerful influence on the human system may be made by boiling one ounce of the vegetable matter in one pint of water for 10 to 15 minutes. The dose of such a decoction is the same as a similar infusion, viz., 1–2 oz. 3 or 4 times daily. When the medicinal properties of vegetables are volatile, or are injured by heat, infusions should be had recourse to, in preference to boiling; but when a solution of the fixed constituents alone is sought, decoction is preferable. In preparing compound decoctions, those in-

gredients should be boiled first which least readily impart their active principles, and those that most readily impart should be added afterward. In many cases it will be proper simply to infuse the more aromatic substances in the hot decoction of the other ingredients, by which means their volatile principles will be preserved.

Concentration.

This is the evaporation of part of a liquid in order to increase the strength of what remains. The operation can only be performed on solutions of substances not volatile to an appreciable extent at temperatures at which their solvent boils. Water is volatile at all temperatures, hence its solutions of substances may almost invariably be concentrated at some temperature without loss or decomposition of the substance. Water also boils at very low temperatures in a partial vacuum, of which property the vacuum pan in sugar-making is a very good illustration. Many of the acids, alkalies, etc., are concentrated by boiling down or distilling off their water.

Crystallization.

Soluble substances are crystallized by the evaporation of their saturated solutions. The tendency in crystallizing is to eliminate impurities, and is very largely practised. Certain salts also will crystallize at temperatures at which others in the same solution do not, and if the temperature be carefully regulated, systematic processes of separation of various bodies

in the same solution can be worked out on a large scale. The solutions before crystallizing are filtered and decanted or in some way mechanically freed from as many impurities, discolorations, slimy deposits, etc., as possible. Crystals form also from the gaseous state. Crystals always assume a definite and distinctive shape, which distinguish certain substances from other similar bodies. Metals in a state of fusion often form crystals when slowly cooled.

Decantation.

This is the operation of pouring off the clear portion of a liquid from its sediment. This is performed by gently inclining the vessel, or by means of a siphon. When a liquid is set aside to settle for future decantation by the first method it is best to use a bell-shaped vessel or one provided with a lip, for convenience in pouring, as in decanting from a full vessel with straight sides the liquid is apt to flow down the outside of the vessel. This can, however, be obviated by holding a glass rod, or a stick, previously wetted with the liquid, nearly upright, with one end resting in or suspended over the receptacle into which the liquid is to be decanted; the liquid is poured gently down the upper side of the stick, keeping the rim of the vessel in contact with it. The liquid will be more attracted by the wet stick than the dry side of the vessel. If this method be inconvenient, or from the nature of the vessel impossible, a siphon must be used. This is a tube of glass or metal bent at an angle of about 30°, with one leg or end longer than the other.

A piece of India-rubber tubing makes an excellent and easily adjusted siphon for decanting liquids that will not affect rubber. The siphon must be first filled with the liquid, then the shorter leg is inserted in the liquid, care being taken to keep its extremity always below the surface, and the liquid will flow out continuously through the longer leg as long as there is any left in the vessel. For decanting, caustic liquids, acids, etc., special siphons are constructed that may be filled and adjusted with no fear of the person coming in contact with those corrosive substances.

Heat Regulation.

In cases where an equable heat has to be sustained at, or not to exceed, a certain degree, it is evident that an open fire, or flame, would be too variable for the purpose. To obviate this difficulty, the vessel to be heated is placed, immersed, or embedded to a convenient depth, in another vessel containing water, oil, saline solution, sand, molten metal, etc., as circumstances require, to which heat is applied, and whose heat can be regulated, if necessary, by the thermometer. Steam is also applied for this purpose; but, of course, requires special apparatus. The baths most commonly used are the water bath and the sand bath.

The Water Bath.

This arrangement is used where the heat required does not exceed 212° Fahr., and consists of one vessel within another, so secured that they cannot come in contact at any point below the level of the water

which has been introduced to fill the space between them. A common double glue-pot is a water bath, also the common rice-boiler. As the temperature of water in an open vessel cannot be increased above its boiling-point, 212°, a vessel immersed in it can never be heated above that point, and by keeping the water boiling, this degree can be steadily maintained. Where other degrees of heat are requisite, glycerine and water, or nearly pure glycerine, may be used to raise the boiling-point. Also salt in saturated solutions, alum, borax, oil, or any substance whose boiling-point is higher than that of water.

The Sand Bath.

An iron or copper dish should be employed for this purpose. Sufficient river or sea sand, previously washed clean and dried, must be put in to completely cover the bottom. The vessel to be acted upon is then introduced, and the intervening space filled up to the desired height with sand, and the whole placed over an alcohol lamp or a furnace. The size of the blaze is proportioned to the degree of heat required, and the object of the sand bath is to cut off direct communication with the fire and to produce a gradual and equable heat.

Distillation.

Distillation consists in vaporizing a liquid in one vessel and condensing it in another with suitable pipes or other means for conducting the vapors to the condensing vessel. The process is used for separating a liquid from a solid substance with which it may be

mixed; for impregnating a liquid with the volatile principle of plants, as in the preparation of eau de Cologne and other aromatic spirits, and for separating a more volatile liquid from one less so, as alcohol from water. Distillation is not, however, confined to liquids, as in simple distillation, but solids may be heated under similar conditions, but to far greater temperatures, and the volatile constituents conducted, condensed, and parted, by having several condensing chambers at different temperatures, graduating finally to cold at the exit. Destructive distillation and fractional condensing are very largely practised with coal and petroleum products, and in the distillation of wood in tar works.

Desiccation.

The drying-off, or evaporation, of the aqueous portion of solid bodies. Plants and chemical preparations are deprived of their humidity by exposure to the sun's rays, a current of dry air, an atmosphere rendered artificially dry by sulphuric acid, calcium chloride, etc., or by the direct application of heat by means of the water bath, sand bath, or a common fire. Planks and timber are now seasoned, on a large scale, in this way, by which a condition may be attained in 2 or 3 days which, on the old system of spontaneous evaporation, took as many years.

Granulation.

The reduction of metals into grains, drops, or coarse powder. This is done by pouring them in the melted

state into water. The same effect is obtained by agitating the molten metal until cold in a wooden box well chalked inside. In many cases the metal is allowed to run through holes of a kind of colander or sieve to produce minute division; if the drops are allowed to fall from a sufficient height they will become spherical. In this way lead shot are made.

Pulverization.

The reduction of any substance to powder is generally performed by pestle and mortar, or on a larger scale, by stamping, grinding, or milling. Some soft substances, like carbonate of magnesia, carbonate of lead, etc., may be pulverized by rubbing through a fine sieve; while many soft substances, such as chalk, fuller's earth, antimony, etc., are pulverized on the large scale by elutriation, while others yield only to the rasp and file. Whichever way is used, the substance must be very dry, and may need artificial drying or desiccation. On the other hand, some substances, as rice, sago, nux vomica, etc., are often soaked in water, or steamed, before being pulverized. In some cases some other substance or intermedium is introduced to aid in the operation; thus, sugar is used in pulverizing civet, musk, nutmeg, and vanilla, absorbing the moisture that could not otherwise be readily got rid of. The addition of a very small quantity of alcohol renders the powdering of camphor easy. Gold leaf is pulverized by mixing with carbonate of potassa and afterward washing out the potassa with water. Fusible metals are reduced to powder

by melting and rubbing in a mortar until cold, or by violent agitation of the fusion in a box coated with chalk or whiting. Glass, quartz, and silicated stones require to be heated red-hot and quenched with water to make them friable for pulverization. When powdering very dusty or costly articles in a mortar, it should be covered with a loose skin of leather, fastened loosely around the top of the mortar and the pestle, to prevent the loss of the dust and possible injury to the operator's lungs. When a substance has to be reduced to an impalpable powder, a slab and muller are used. This process is also called porphyrization.

To Obtain Vegetable Juices by Expression.

The juices of fresh plants are obtained by bruising the fresh leaves in a mortar (a mortar of marble is best), or in a mill, and expressing the juice, which, after standing (defecation) for some hours, is either filtered through paper, or its albuminous matter is coagulated by heat and then strained. Some plants require the addition to the crushed mass of $\frac{1}{8}$ its quantity of water before pressing. The expression of the juice of apples, lemons, oranges, peaches, or grapes is facilitated by the addition of some clean chopped straw. Grapes, mulberries, etc., are often crushed and left from 3 to 7 days to undergo a slight fermentation before pressing. A powerful screw press is required for this purpose. The preservation of the juice of the narcotic plants, and some other vegetables, has assumed considerable interest, from these

preparations having been proposed as substitutes for common tinctures. It appears that the juice of young plants just coming into flower yields only ⅔ the amount of extract which may be obtained from the same amount of juice expressed from the mature plant, or when the flowers are fully blown; and the strength of the product is always inferior. The leaves alone should be preferably employed, and should be exclusively of the second year's growth, where the plants are biennials. Allow the juice to remain for 24 hours in a cool place, then decant the clear portion, add ¼ part by measure of alcohol (90%), agitate, and after 24 hours again decant the clear liquid and filter through paper. Keeps well under ordinary circumstances. In making a corresponding tincture, to the fresh bruised leaves add an equal weight of rectified spirit (alcohol), and after maceration for 15 days, the whole is pressed and the resulting tincture filtered. The commencing dose of narcotic juice is about 5 drops. In the above manner are prepared the preserved juices of aconite, belladonna, colchicum, hemlock, henbane, foxglove, etc.

To Extract Essential Oil from Wood, Bark, Roots, Herbs, Etc.

Put the material into a bottle and pour over it a spoonful of ether; keep in a cool place for a few hours, well stoppered, and then fill the bottle with cold water; the essential oil will float upon the surface and may be easily separated.

Specific Gravity

is the density of the matter of which any body is composed compared with the density of another body, assumed as the standard, or 1,000. This standard is pure distilled water for liquids and solids, and atmospheric air for gases and vapors. Specific gravity, unless otherwise expressed, is always taken at 60° Fahr. In most cases, however, it is sufficient to note the temperature and to apply a corrective, depending on the known density of water or air at the different degrees of the thermometric scale. The above plan has been adopted, because the weight of an equal bulk of different substances varies greatly. Thus, as gold is 19 and silver 10 times heavier than water, those numbers, 19 and 10, are said to represent the specific gravity of gold and silver. Alcohol is about $\frac{3}{4}$ as heavy as water, and as the strength of spirituous liquor depends upon the amount of alcohol it contains, this strength is simply found out by its specific gravity, and is indicated by the depth to which a little instrument, called a hydrometer, will sink in the spirituous liquor. The weaker the spirituous liquor the less the hydrometer sinks, and vice versa, but is always expressed by numbers less than 1,000, or by decimals less than 1. The lightest of all liquids has a specific gravity of 0.6, or $\frac{6}{10}$ that of water. Common air is about 800 times lighter than water; illuminating gas about 2,000; and pure hydrogen 12,000 times lighter than water. The heaviest substance known has about 250,000 times more weight,

bulk for bulk, than the lightest. The specific gravity of solids not soluble in water is found by weighing them in air and again immersed in water, thus getting the weight of the water they displace. Divide the weight in the air by the loss of weight in water and the result is the specific gravity. If the solid is soluble in water, it must be weighed in some liquid in which it is not soluble, and thus determine its specific gravity as compared to that liquid, and then multiply the result by the specific gravity of that liquid. Liquids or gases must be weighed in a bottle of known capacity and divide that weight by the weight of an equal bulk of water; the quotient is, as before, the specific gravity. Powders insoluble in water are weighed along with water in a weighing-bottle; the bottle will hold as much less water as the *bulk* of the powder, and the weight of the powder in air divided by this loss will give the specific gravity. Thus, supposing the bottle to hold 1,000 grains of water, 100 grains of emery are introduced, and the bottle filled with water; if no water were displaced the two should weigh 1,100 grains; they really weigh 1,070 grains; the difference, 30 grains, is the weight of the water displaced: $100 \div 30 = 3.333$, the specific gravity of emery.

To Determine the Weight of a Body from its Specific Gravity.

A cubic foot of water weighs about 1,000 ounces; hence, to determine the weight of a given bulk of any body, the specific gravity of which is known,

multiply the cubic contents in feet by 1,000, and this by the specific gravity, and the product will be the weight in ounces avoirdupois.

The Influence of Temperature on Specific Gravity.

The percentage of absolute alcohol in any spirituous liquor may be given by volume or weight, but as liquors are sold by measure, not weight, it is generally preferred to know the percentage by volume; the per cent by weight remains the same at all temperatures, but the per cent by volume varies with the temperature of the liquid. Many instruments have been introduced to determine the quantity of absolute alcohol contained in any spirituous liquors, and these are known as hydrometers, or alcoholmeters. Hydrometers made by different inventors have come into use in different countries, so that it is necessary to state always by whose hydrometer the operator was working in making any determinations of this kind. Tralles' hydrometer represents $\frac{1}{100}$ part of pure or absolute alcohol for each of the 100 divisions on its scale, at a temperature of 60° Fahr. When the instrument is floated in any spirituous liquor at 60° Fahr. it immediately indicates the strength; for instance, if in brandy at that temperature it sinks to 65°, it shows that 65 parts of the liquor are absolute alcohol and 35 parts are water. Should it sink to 90, it indicates that the liquor is 90 parts, or 90 per cent in strength. An increase in heat causes liquids to expand in volume, and a decrease in heat

causes contraction of volume; therefore spirits above the normal temperature of 60° Fahr. appear stronger than they are, and below 60° they are really stronger than they appear to be. It is therefore evident that the degrees of this hydrometer as representing percentages are correct only when the spirit under trial has the normal temperature of 60° Fahr. at the moment the trial is made. When the temperature varies from this normal 60°, the true percentage can be ascertained only by a long and tedious calculation. To avoid calculation, tables have been prepared by the inventors of hydrometers to relieve, as far as possible, the difficulties involved in bringing a sample liquor to the normal temperature for testing, whereby the tests are applied at whatever temperature the liquor happens to be, and this carefully noted, and the reading of the instrument corrected from the tables, either at once or at a more convenient time. Proof spirit is ½ absolute alcohol and ½ pure water by volume. If it contains more than this percentage of alcohol it is above proof, and if less alcohol than ½ by volume it is below proof. Hydrometers are made that show at once the proof of a spirituous liquor. There are tables provided also, reference to which will show what proof a spirit was from a reading on Tralles' or any other hydrometer, or specific-gravity instrument. Tables are also provided whereby, knowing the proof or percentage of a given sample of liquor, the volume of water to bring it to proof is at once given, or if below proof, the volume of alcohol of 90% to bring it up to proof.

The Hydrometer.

This is an instrument made use of to determine the amount of a substance in solution in any menstruum, usually water. They are made for liquids both lighter and heavier than water. Baumé's hydrometer is most commonly used, and for liquids lighter than water is poised so that the zero of the scale is at the bottom of the stem when it is floating in a solution of 1 oz. of common salt and 9 oz. of water, and the depth to which it sinks in distilled water shows the 10th degree; the space between these two points being equally divided. In Baumé's hydrometer for liquids heavier than water the position of the fixed points is reversed, for the zero is at the top of the stem, and denotes the point to which the hydrometer sinks in distilled water; the 10th degree is lower down, and shows the level to which it sinks in the saline solution, and the graduation is continued downward. This variety of Baumé's hydrometer, when plunged in pure water at 58°, marks zero upon its scale; in a solution of 15 per cent of salt and 85 per cent of water by weight, it marks 15°, so that each degree on the scale is meant to indicate a density corresponding to the percentage of the salt. The temperature at which Baumé's hydrometer was originally adjusted was 54½° Fahr. It is now commonly adjusted at 58 or 60° Fahr.; hence arise the discrepancies observable in the published tables of the correspondence between degrees of Baumé's and real specific gravities.

To Convert Degrees Baumé into Specific Gravity.

For liquids heavier than water: Subtract the degrees Baumé from 145, and divide by 145; the quotient is the specific gravity.

For liquids lighter than water: Add the degrees Baumé to 130, and divide it into 140; the quotient is the specific gravity.

To Convert Specific Gravity into Degrees Baumé.

For liquids heavier than water: Divide the specific gravity into 145, and subtract from 145; the remainder is the degrees of Baumé.

For liquids lighter than water: Divide the specific gravity into 140, and subtract 130; the remainder is the degrees of Baumé.

The Art of Fixing Coloring-Matters

uniformly and "fast" on silk, cotton, wool, linen, etc., is called dyeing. It is a chemical process, and the process varies considerably with the different fibres mentioned. The fibres, too, have different affinities for dyewares, animal fibres far exceeding vegetable fibres in this respect with most of the dyewares in use, no matter whence their source.

The animal fibres in their natural state invariably require to be cleansed by washing in water containing soap and alkali, either potash or soda ash. Coarse wool requires less scouring material than fine, but no very definite directions can be given except to say that the scouring bath should be kept as near

130° Fahr. as possible. There should be soap enough in the water so that a good suds will form when briskly agitated, and alkali sufficient to make the suds "stand up." Unfortunately the unavoidable tendency of alkaline solutions upon animal fibres is to enfeeble them, i.e., they break with less strain than previous to cleaning.

Care in regulating the heat, and in keeping the alkali content of the bath at a minimum, just sufficient to insure proper cleaning, is essential, or serious weakening of the fibre may result; also to avoid prolonged contact with necessarily pretty strong scouring-solutions; 20 per cent of the natural strength of sheep's wool is about the average of tensile strength lost in the alkali-soap-and-water treatment as commonly practised in woollen-mills, and often far exceeds that.

The cleaning of sheep's wool by volatile solvents—whereby is meant immersion in gasoline, benzine, petroleum ether, carbon disulphide, etc., to remove all oily matters, followed by a thorough dusting, so-called willowing—entirely obviates very objectionable effects of alkaline scouring. The wool is entirely uninjured in strength or color. The strain required to break the cloth made from it is very greatly increased, and the waste in carding and breakage during spinning and weaving very much lessened. Time saved from no breaking of warp or filling is considerable; besides, too, all knots thus made must be afterward removed by burling, the burlers often being an expensive part of mill help.

It seems very strange that so little progress has been made along this line. The facts set forth as above have been known for some years, but owing to the extreme conservatism of textile manufacturers and the prejudice and fear entertained regarding the use of volatile and inflammable liquids in large bulk among people not familiar with them, has so far been sufficient to preclude any very extended or persistent effort to bring forth a perfected mode of working. In the writer's opinion, based upon some quite extended experiment and research along this line, one tithe of the effort expended upon the perfection of the process as now practised for the production of synthetical colors, as indigo or alizarine, directed to the perfection of methods in solvent cleaning of wool, would long ago have brought it to a practical every-day working basis, and resulted in great saving of valuable material, now a menace from the pollution of the streams and water-supply. Silk is freed from its natural coating by "boiling off" with rather neutral white soap and water.

Cotton fibres may be, and are, mostly colored "raw." Substantive colors derive their name from the fact that they impart their tint by simple immersion of the material to be dyed in their aqueous solution at elevated temperatures. Adjective colors require the stock to be first prepared, or mordanted, which is done by boiling woollen material in a bath of water containing 1 to 4 per cent of potassium bichromate or sodium bichromate. In ordinary work washing after mordanting is not practised. The dyer

drains off the mordanting liquor, throws out the stock, refills the kettle with water and the desired dyeware dissolved therein, and proceeds at once to dye the stock. Other mordants are used occasionally, acetate of iron, alumina, alum, and some other chemicals.

Cotton may be mordanted, "boiling under" in a bath containing 5 per cent of the weight of the cotton of tannic acid. The bath is manipulated at the boil just sufficient to insure its being thoroughly wet and all air expelled, and left to stand till cold, or over night. Drain without rinsing and immerse for an hour in a cold bath of tartar emetic, rinse well with cold water, and it is ready to be dyed.

Silk is boiled in a decoction of cutch. Gambier and catechu are other names for cutch. Cutchine is a purified cutch. The strength of the bath is governed by the depth of shade finally required. Thirty per cent of the weight of the silk is often used where the ultimate aim is black. After boiling for an hour the silk is withdrawn from the cutch bath, squeezed as free from liquor as possible, and put at a simmering heat in a bath of potassium bichromate 1 to 4 per cent of the weight of the material. This develops the brown of the cutch and at the same time "fixes" the bichromate upon the silk. This may be repeated several times, adding much weight, even as much as ½ the weight of the goods. The silk will now dye with decoction of logwood, fustic, or any mordant-dyeing dyestuff. Silk in delicate shades is invariably dyed on white material, and by what are called the

direct-dyeing processes and dyewares, either in acid or neutral baths. Linen is dyed by same methods as cotton.

The overchromed colors are coming very prominently into use. A single boiling only is required, and much time and labor saved. The general mode of application is, with woollen material, to add the required dyewares to a boiling-hot kettle of suitable size. The dyewares very quickly dissolve and become evenly distributed throughout the boiling kettle. The goods are now entered, a gentle boil being kept up and the goods handled by pole in case of garments or loose fibre, or a reel if a long piece of cloth. Some acetic acid is added soon after entering the goods. Vinegar will answer very well, but would require 2 pailfuls for 100 lbs. of material where 5 per cent of commercial acetic acid is enough. After ½ hour boiling with the acetic acid, sulphuric acid, sufficient to exhaust the bath, is added; 3 to 5 per cent is about right, an excess, if not too great, being not objectionable. After ½ hour the bath should appear nearly or quite exhausted, when 1 to 3 per cent of bichromate of potash is added. The bichromate of potash develops the color. The dry bichromate of potash, mixed, to increase its bulk and evenness of effect, with about an equal bulk of crystallized Glauber salt, may be sprinkled onto loose stock with no fear of doing injury. With garments or yarn they may be lifted out and the bichromate of potash dissolved in the bath and goods returned for ½ hour more boiling. If the goods are not now dark enough, or of the right shade, they may have

additions made to the dye bath, in which case it is well to first add 10 per cent of the weight of the goods of crystallized Glauber salt. Many dyers add this before they start the dyeing at all, in which case if the shade comes out right the Glauber salt is the same as wasted. If the Glauber salt is not on hand, it is usually best to draw off the liquid in which the dyeing has been made and start afresh. The goods now take color the same as any chrome-mordanted goods.

With dyewares not familiar to you, notably the bright blues and greens, it is best to try a small quantity, say a ½ oz., in boiling water. With several of these wares it may happen that they will melt to a sort of wax, very difficult afterward to get into complete solution. In this event they must be first dissolved in cold water before adding to the dye bath. In fact it does no harm to stir up all dyewares with cold water before adding to a boiling kettle that is being got ready for dyeing. Glauber salt is used in dyeing for the reason that dyewares are more soluble in water containing Glauber salt than they are in pure water. The effect in dyeing is that the color goes on to the material more slowly and evenly than without it.

The acid dyeing colors are those that give their maximum and true effect by simply boiling the material to be dyed in water containing the dye together with an acid. Sulphuric acid is most commonly used and Glauber salt equal to 10 per cent of the weight of material is added. Sodium bisulphate, a very acid salt, is also used, and may satisfactorily

replace the sulphuric acid and Glauber salt. Many dyers use commercial acetic acid equal to 5 per cent of the weight of the material. Acetic acid in most cases will not exhaust the bath, but it starts the dyeing slowly and evenly, and then sulphuric acid (commonly called oil of vitriol) or bisulphate of soda is added to complete the dyeing. Most of the acid dyes may be successfully after-chromed. The shade is usually changed thereby, becomes darker, fuller, and more resistant to the action of sunlight and all things else that tend to fade colors.

The direct dyeing colors dye in a neutral bath. Many of them will dye both animal and vegetable fibres to approximately the same shade when boiled together in the same dye bath. The mode of operating is to prepare the bath at or near the boiling-point. In dyeing full pieces of cloth they are usually sewn in and run around by the reel until thoroughly wet, the temperature being raised in many cases quite to the boil. This insures the thorough wetting and softening of the goods and partial correction of the hardness of the water; further effort in that direction is often made by addition of sal-soda or ammonia to the extent of 2 per cent of the weight of the goods. The dyewares have meantime been dissolved in a side-tub. The steam or source of heat is removed and the dye dipped into the feed-box and the cloth allowed to run in the dye ½ hour at 180°–200° Fahr. The cotton or vegetable matter contained in the cloth dyes better at temperatures below the boiling-point and above 180° Fahr.

If the material is all of vegetable origin hard boiling is carefully avoided. If some animal fibre is present the goods must be boiled, but not longer than absolutely necessary to ensure their being fully dyed. The dyer determines this by inspection. The tendency of hard boiling is to transfer color from the vegetable fibres to the animal fibre. When it is evident that the animal fibre in union goods is fully dyed the source of heat is removed and the goods run for ½ hour more at heat below the boil with the addition of 25 per cent of common table salt, best added in two or three portions. If the material is all vegetable of course the actual boiling, except to wet out the material, may be mostly dispensed with and the salt can be added earlier in the dyeing. These dyewares are less soluble in water containing salt, and therefore its addition causes the bath to exhaust more completely. The penetration and evenness is exceptionally good. The dealers in dyewares sell 1-lb. tins of all the powder dyes on the market; the price is easily within the reach of everyone. They furnish gratis full instructions for using their wares. The householder who procures a few pounds each of red, yellow, and blue, and a 5-lb. tin of black for union goods will, after a little practice, find them a source of pleasure as well as profit. Bichromate of potash keeps perfectly and can be readily obtained from most druggists. The price by barrel lots is about 8c. per lb. The stronger ammonia (commercial purity) is 4 cents per lb. in carboys. Household ammonia is 1 part stronger ammonia and 4 parts water.

Sulphuric acid (commercial purity) costs about 1 cent per lb. in carboys. For use it is safer to have it reduced, 1 part acid to 4 parts water. Always pour the acid into the water, and never the water into the acid. The union of sulphuric acid (oil of vitriol) with water produces much heating of the mixture. If the water should be poured without agitation upon the sulphuric acid, it being much lighter in weight than the acid, may float upon it. At the line of contact sufficient heat may develop to cause an explosion. Sulphuric acid, if added without dilution to hot water, produces a violent explosion at once. Strong sulphuric acid is violently corrosive, but not poisonous. Sufficiently dilute, it tastes pleasantly, and is not injurious. Oxalic acid is a white crystalline substance, is poisonous, and used largely in dyeing along with bichromate of potash as a mordant, $\frac{2}{3}$ as much oxalic acid as bichromate. It does not attack in dilute solution cotton materials. Sulphuric acid ever so dilute, if spattered or spilled upon cotton cloth and allowed to dry, makes a hole. Therefore if such an accident occurs, at once apply dilute ammonia liberally. The ammonia is completely volatile at ordinary temperatures, and therefore harmless except to mucous surfaces, as the eyes or mouth.

Carbonizing.

In this connection it may be interesting to note that this property of sulphuric acid has a very extensive and useful application in the removal of vegetable matters from woollen material. Wool comes to mar-

ket frequently just loaded down with burrs, chaff, and hayseed. Tailor's clips and old garments come to the shoddy-manufacturer with all accidental and intentional mixtures of cotton and cotton thread. Also the manufacturer of all-wool goods finds that even after the most scrupulous care to exclude vegetable matters and cotton from his goods, there is still a certain quantity that gets into them and shows up as specks.

These objectionable matters are all cheaply and expeditiously removed by simply soaking the wool rags, shoddy, or cloth in a 5 to 7° Baumé solution of sulphuric acid (oil of vitriol), removing as much of the "soak" liquor as possible by draining, centrifugal force (hydro-extracting), or squeeze-rolls. Then the material is dried and finally baked in an oven or in some way heated to 220 to 230° Fahr. for half an hour. The result is that cotton and vegetable matters turn black (burnt), and friction and rubbing in any way causes them to crumble and fall out as dust. The deleterious action upon the wool fibre is not very pronounced if the process is expeditiously carried out, and the material or cloth promptly rinsed and neutralized after rinsing with an alkali—usually sal-soda or soda ash. In case the acid becomes spattered or spilled on woollen materials, especially if colored with vegetable dyes, as logwood, fustic, etc., the color is sure to be affected in shade if the acid is allowed to dry on the goods; therefore apply ammonia to them. Some caution should be exercised in this case, as where the goods are acid-dyed the color is

removable to greater or less extent by ammonia. It follows then that a much or unevenly faded cloth or garment of wool or silk that has been acid-dyed may have the color removed by boiling the goods in a bath containing ammonia. It is also a fact that the same coloring-matter that has been removed (stripped) can be re-applied to the goods, thereby restoring them to nearly their original shade by simply making the bath acid and returning the goods and boiling. Sulphuric acid is most used, but oxalic, muriatic, and in some cases acetic acid will do the work. It is erroneously stated that boiling woollen cloths in ammonia is injurious to the goods. This is true if carried to extremes, but practically is not to be considered, if any moderation at all is practised. Woollen cloths can be boiled in clear water until tendered, but, as with ammonia, it takes a long time, a whole day, or even more. With white goods of any kind the boiling with ammonia is a good method of cleansing, especially if the goods are looked over first and any spots or stains treated according to their nature with soap, or a drop of oil and then soap, if of an oily nature; fruit- and grass-stains with chlorine water or eau de javelle; muriatic or oxalic acid in case of rust. A very powerful, and in skilful hands, a good spot-remover, is equal parts powdered bichromate of potash and oxalic acid. Damp the spot, apply the mixture and a drop or two of water; rinse at once, when the stain seems to be out. Care is to be used that the spot is not whiter than the rest. It is often very difficult to tell by inspection whether there is any cot-

ton in woollen or silk goods. This matter can be settled, and also the percentage of admixture determined at one operation. Procure some caustic soda, or caustic potash, no matter which. Weigh out 100 grains of the suspected cloth; put it in an earthenware dish of suitable size, a tea-cup or small bowl will answer very well. The caustic need not be weighed, but use plenty of it. It is laid in the dish along with the sample to be tested. Boiling water in a thin stream is turned upon them. The caustic unites vigorously with the water and it boils up quite briskly. Have a glass rod, a piece of iron wire, or a clean, smooth piece of wood to stir up the contents of the dish. In 5 minutes the whole of the wool or silk is dissolved, or formed into a sort of soap that will wash out. Often a complete fabric will remain, and often only some loose threads or fibres. Collect all that remain by straining or otherwise, wash thoroughly, dry, and weigh. The weight gives the percentage of cotton direct. For the purposes of the dyer it is not necessary that he know the percentage of cotton and wool in any mixture very accurately. If the cotton is 10 per cent and under 50 per cent would be as close as necessary to know.

It is never possible to tell exactly what wares have been used in the dyeing of materials purchased for wear; therefore a prudent way is to try a bit of it before going on with the whole piece. In the case of the average householder it is expected that the material to be dyed will be somewhat used, will be soiled

and faded, and too that it will be soiled and faded unevenly. It is expected also that the materials may shrink, and will be sure to do so unless care is taken to reduce the tendency to shrink by all means possible. It will be found that woollen and silk articles have been sewed with cotton thread, that there is cotton mixed with them in their manufacture, and also that minute bits of vegetable matter are scattered through them and will appear after dyeing as specks. Unless means are provided to cover these intentional or accidental admixtures, the work of redyeing will be more or less unsatisfactory. Dyeing and redyeing undertaken at home is apt to be in too small a kettle, the operator has other things on hand to do, and does not give undivided attention to his or her dye-kettle, the heat is so applied that if the goods are not constantly stirred they settle against the side or bottom of the kettle, and local heating causes a spot darker than the rest. If a garment is being redyed to be used again in its present form, do not rip it in any part. If the buttons are such as to be injured by boiling, take them off. A garment to be made over should have tucks and plaits let out. Hemmed edges in many cases may be left to prevent raveling. Look over the job carefully before you begin that all the requirements of the case are known so that a union dye, or whatever is likely to give the best and most expeditious results may be selected.

Wooden dye-kettles heated by steam, with a false bottom to keep materials away from the source of

heat, are usually to be preferred, especially for dyes where the bath is expected to exhaust. In cotton dyeing where the depth of shade depends upon the concentration of the bath rather than upon the percentage of dyeware used, a jacketed copper kettle is best. For domestic purposes a copper wash-boiler is about the best thing available, and if not crowded with materials, and well stirred all the time while over the fire, should give satisfactory results.

Woollen articles should not be taken from a hot bath and plunged into cold water. They should, of course, be rinsed after dyeing, and in many cases should be scoured. The cloth on coming from the dye-bath should be aired to cool it. If the article is too large to handle in that way, cold water may be added to the kettle to cool it down after the dyeing is complete.

A full piece of cloth is tentered. By tentering is meant stretching it from list to list upon tenterhooks set a standard width apart; with odd-shaped pieces of cloth and garments this is not so easy to do. Still if before dyeing the garment is laid upon some flat surface and its outline marked out rather larger than true size, the garment can, after dyeing, be pinned or in some way fastened out until dry. Make it by stretching fully larger than before dyeing, as it will retract some when taken up and during the operation of pressing. Dry the garment fully before proceeding to repair or press it.

Black is composed in dyeing principally of blue,

to which is added some yellow and red to give it any required tone.

Blue is shaded in the same way as black.

Brown is composed in large part of red, and is toned by addition of considerable yellow and a little blue.

Green is composed principally of blue and yellow; slight additions of red are used, and darken the shade very fast.

Purple and lavender are composed of red and blue and either may predominate.

Orange is composed of yellow and red, and by addition of some blue shades rapidly toward olive.

Wine color is red principally, with very little of yellow and some $\frac{1}{10}$ part of blue.

Maroon is brown in tone, while red is very much in preponderance.

Grays are, like all colors, composed of the primary colors red, yellow, and blue. In practice it is easier as a rule to combine a green dye with a brown and black, shading at the last with yellow if necessary.

Slates are bluish gray and may have a cast toward brown.

Tan color means different things to different people, but is generally accepted to mean a light yellowish brown.

Scarlet is a red shaded with yellow.

Of comparatively recent introduction are the strippines. These are usually white powders, soluble in acidulated water with the aid of heat. Each manufacturer puts out one, and they are all for the

same purpose, namely, to remove coloring matter from fabrics.

From unmordanted goods, wool, or cotton, the color is entirely removed, the goods coming out nearly white. With mordanted goods more or less color remains, very thin to be sure, but far from white. This does not, however, stand in the way of redyeing most shades of blue, brown, green, or quite full shades of any color. Up to 20 per cent of the weight of the goods may be used of strippine dissolved in its proper solvent and added to the bath and boiled for some time. The writer prefers to add the dry strippine (or color-discharge under any name) along with the goods in the bath, and after working them about until it is well incorporated and the bath appears uniformly of a milky color, then add the acid in properly diluted condition in small portions gradually during the heating and boiling. If any doubt exists as to whether the bath at the end of the boiling is acid, add another portion of acid, as the maximum result of the operation is obtained only when the bath is finally made of acid reaction. The cloth, or stock, does not appear to be sensibly injured. It does not do to apply strippine to any part of a cloth and afterward put the whole into the kettle and boil with solution of strippine. The parts so treated will then come up much more affected by the treatment than the rest of the goods, and it is quite a difficult matter to get the goods again level. This material is much used by garment dyers, to get rid of the original color before attempting to dye the shade wanted by their

customers, especially where the garment has faded unequally. On cotton and linen goods it is not so rapid in many cases as chlorine or bleaching powder, but there is less risk of "tendering" the goods. On woollens chlorine is not admissible for this purpose, as it tenders the goods and attacks the mordant.

Union dyes are at present, and probably will continue to be, of more general adaptation to the renovating of garments than any other class of dyewares. They are often mixtures of direct-dyeing cotton colors with neutral wool colors, and again they are of unmixed composition. For the purposes of this work their composition is not material, but for large manufacturing establishments it is cheaper, as a rule, to buy all dyewares separate and make their own mixtures to suit requirements. Union dyes as put up being based on the supposition that half wools are to be dyed, hence it is easy to see that in case of but 10 per cent of wool being present in a fabric, a large part of the dye in a union dye mixture would be practically useless. The same would hold true if the percentage of cotton were small with another case, and a loss of the cotton-dyeing material must result. Still in practice to meet all requirements it is about as good as can be had. Percentages of cotton usually fall much below 50 per cent, but cotton is much more difficult to bring to any given depth of color than wool, and it is well to have the preponderance in a union dye mixture on the dyeware for cotton. Full directions are given later for union dyeing. The sour dyes are next in importance for wool and silk ma-

terials. As a rule they stain cotton very little, if at all, and very pretty effects are produced from weaving cotton and wool together and sour-dyeing the wool afterward. The cotton is either put in white, or may be colored any desired shade to contrast with the contemplated wool color. This is called cross-dyeing. Very bright and beautiful shades of color are produceable by these dyes, and are very suitable for ribbons and light-weight garments for women and children, stockings, etc. Some formulæ and full directions for working these dyes are given under Sour Dyes. Where the material to be dyed is entirely of cotton is the next most usual and important form of household renovating of garments and materials, and is treated in similar manner, and some formulæ given as a guide. The others, viz., the after-chromed and regular mordanted colors, are given, not in their order of importance, but in the order of the frequency with which they are likely to occur to the amateur renovator of garments. It will be seen that redyeing of woollen materials presupposes, especially with men's wear, that one or the other of these dyes has been first used; and, therefore, a mordant is already in the goods which is permanent, and no matter how many times redyed or treated in cleansing, is always present to receive more dye. The sour dyes can be put on top of a mordant, if desired; they are in most instances less bright, but much "faster." Union dyes as a rule go on just as well where a garment was originally "chromed" in dyeing, a little less attention to boiling sufficient to insure the wool getting fully

dyed, as directed under that head, being necessary. Sulphur colors and developed colors are not treated, as they are not fit for the purposes of this work. The alkali colors for woollens and silks are good, and to be recommended.

Union Dyes.

These are so called from their property of dyeing animal and vegetable colors approximately the same shade in the same bath. Goods that are made up of a mixture of animal and vegetable fibres are called union goods. When in doubt as to whether a certain piece of cloth is union goods, boil a very small piece with strong caustic soda or potash solution; the wool dissolves readily, leaving the cotton intact. Where the percentage of wool is small the sample may be wet thoroughly in a 5° Baumé solution of sulphuric acid, wrung out thoroughly, and dried at about 230° Fahr. The cotton is thereby destroyed, leaving the wool. The caustic soda or potash gives the quickest results, and is to be generally preferred. To apply the union dyes the general mode is very simple, and the results satisfactory, and they can be obtained in all colors, shades, and modes. The appended formulæ presuppose light-colored or white goods to be dyed. The remarks previously made about the effect on the redyed shade of color already in the goods applies equally here. Also the mordant, if any, will have its effect. At any rate, have the goods clean and remove old, unevenly faded colors where practicable. The bath is made up by dissolving the dyestuff directly

in the bath by boiling up for a few minutes, or the dye is boiled in a side-tub and then added to the bath. No additions of assistants need to be made to the bath before entering the goods. They are worked below the boil ½ hour to dye the vegetable fibres, then boiled to dye the woollen or animal fibre, and worked again below the boil with addition of common salt or Glauber salt, which need not be previously dissolved, but sprinkled directly into the bath. These directions should be sufficient to guide anyone in the dyeing of a plain red, yellow, blue, black, etc. A light drab will result from using

$\frac{2}{10}$ of a per cent Black.
$\frac{3}{10}$ of a per cent Orange.
$\frac{17}{100}$ of a per cent Yellow.

DARK DRAB.

$\frac{8}{10}$ of a per cent Black.
$1\frac{2}{10}$ of a per cent Orange.
$\frac{58}{100}$ of a per cent Yellow.

A LIGHT SAGE.

$\frac{15}{100}$ of a per cent Black.
$\frac{18}{100}$ of a per cent Yellow with a reddish tone.

A DARK SAGE.

$1\frac{4}{10}$ of a per cent Black.
$1\frac{67}{100}$ of a per cent Yellow with a reddish tone.

LIGHT REDDISH BROWN.

$\frac{3}{10}$ of a per cent Red, not too light.
$\frac{35}{100}$ of a per cent Orange.
$\frac{1}{10}$ of a per cent Black.

DARK RED BROWN.

2½ per cent Red.
2½ per cent Orange.
½ per cent Black.

LIGHT BROWNISH SLATE.

$\frac{12}{100}$ of a per cent Black.
$\frac{1}{5}$ to $\frac{1}{10}$ of a per cent Orange.
$\frac{16}{1000}$ of a per cent Yellow.

MEDIUM DARK BROWNISH SLATE.

$\frac{5}{10}$ of a per cent Black.
$\frac{4}{10}$ of a per cent Orange.
$\frac{5}{100}$ of a per cent Yellow.

LIGHT BLUISH SLATE.

$\frac{3}{10}$ of a per cent Black.
$\frac{6}{100}$ of a per cent Orange.

DARK BLUISH SLATE.

$1\frac{3}{10}$ of a per cent Black.
$\frac{3}{10}$ of a per cent Orange.

LIGHT YELLOW BROWN.

$\frac{1}{10}$ of a per cent Black.
$\frac{7}{10}$ of a per cent Orange.
$\frac{6}{10}$ of a per cent Yellow.

MEDIUM DARK YELLOW BROWN.

$\frac{4}{10}$ of a per cent Black.
2½ per cent Orange.

LIGHT BUFF.

$\frac{1}{10}$ of a per cent Black.
$\frac{2}{10}$ of a per cent Orange.
$\frac{4}{100}$ of a per cent Yellow.

MEDIUM DARK BUFF.

$\frac{4}{10}$ of a per cent Black.
$\frac{8}{10}$ of a per cent Orange.
$\frac{15}{100}$ of a per cent Yellow.

A LIGHT OLIVE OF GRAYISH CAST.

$\frac{2}{10}$ of a per cent Black.
$\frac{15}{100}$ of a per cent bright Yellow.
$\frac{1}{10}$ of a per cent bright Orange.
$\frac{2}{100}$ of a per cent reddish Blue.

DARK OLIVE.

$\frac{8}{10}$ of a per cent Black.
$\frac{7}{10}$ of a per cent bright Yellow.
$\frac{4}{10}$ of a per cent Orange.
$\frac{4}{100}$ of a per cent reddish Blue.

LIGHT GREEN.

$\frac{3}{10}$ of a per cent Blue.
$\frac{4}{100}$ of a per cent Yellow.

Any multiple of these formulæ may be used, and proportions varied *ad infinitum*. The weight of the dry cloth or fibre is always taken as the unit of weight, or 100 per cent.

These wares are all substantive cotton dyes, but possess the property to dye wool at some temperature higher than that required to dye the cotton. The skill and judgment required to successfully dye union goods consists largely in correctly regulating the heat during the operation. Common table salt or Glauber salt is used along with the dye-bath to cause the dye to be more fully taken up by the goods, i.e., to exhaust.

Black in small per cents is blue, and therefore can be used in combinations where brilliancy is not the aim. Buy, therefore, black: light blue, which, plus black, is dark blue; orange, which is equivalent to red and yellow; yellow, red in two shades—yellowish and bluish—which, used in conjunction, gives any shade of red, maroon, wine, etc.

Where particular fastness is required the union goods may be dyed twice. The wool or animal fibre contained may be first dyed either by the mordanted method, the over-chromed method, or acid and Glauber salt method. The shade is brought out rather thin, as it will usually and unavoidably fill up to some extent while dyeing the vegetable matters. Where the vegetable matter is but a very small portion of the material "speck dyeing" is resorted to. The old and still much used speck dye is made from extract of logwood, soda ash, and blue vitriol.

44 lbs. extract of logwood
16 lbs. soda ash
8 lbs. blue vitriol
} = 50 gall. speck dye.

The logwood and soda ash are boiled together in ½ bbl. of water for some time. The blue vitriol may be added dry or in solution; in either case the boiling is to be maintained, and the blue vitriol is cautiously added, the boiling being continued until frothing ceases. The speck dye, when cold, is ready for use. Sufficient quantity of it is added to cold water, sufficient in which to work the goods, keeping the bath as small as consistent with even and thorough

working of the goods. In no case can this speck dye be used hot until after the speck dyeing is done; then if it is necessary to darken the main body of the goods, the heat may be cautiously raised. Avoid dashing the speck dye upon the cloth in getting ready the bath; best prepare the bath where practicable, and enter the goods later. Old black woollen goods boiled up with this speck dye are freshened and improved. The dealers in dyewares sell a speck dye—cold black, etc.—that is also very good and used in practically the same way. It is always well to try a small portion of the goods in a small way, that accidents and disappointments be avoided.

The Alkali Colors.

So called because they give their color base to woollen materials in a bath containing an alkali, usually sal-soda, equal to about 2 to 3 per cent of the goods being dyed. The dyestuff and sal-soda are dissolved in the bath and the goods boiled therein. A separate small clipping of the material is often attached to the goods in such manner that it can be readily removed from time to time and dipped in a bowl of acidulated water, which develops the color. When it is decided that enough color has been absorbed by the main bulk of the goods, the whole is acidulated same as the sample, either in a fresh bath or the same bath. In a fresh bath the color comes out somewhat lighter and there is less danger of uneven results.

Nicholson blue in various brands is the best known

of the series, and gives a very bright, serviceable color.

Alkali violet may be used in conjunction with Nicholson blue, or alone; either is applied as above indicated.

The color base from these dyeings can never be wholly removed by boiling with ammonia or other alkaline solutions. Greasy and sweaty garments may be dyed pretty successfully, without previously cleaning, with these dyes, especially if a dark, full color is required, and care is taken to boil and work the goods in the bath before the addition of the dyeware. Then lift out the goods and stock the bath as before stated. These dyes are useful in small quantities for shading purposes, with union dyes, provided there is used some acetic acid in the rinsing bath, but this is of more interest to the professional dyer than to those for whom this is intended.

There is little, if any, color or stain apparent before acidulating these colors. They are one instance of the developed colors, but are entirely distinct and apart from the diazotized and developed colors for cotton, which give a fugitive color before diazotizing with sodium nitrite and developing with betanaphthol, etc., sold under the name of Developer A, F, and C. Sulphur dyes are simpler of application and quite as solid.

The following are reputable dealers in dyewares:

A. Klipstein & Co., 122 *Pearl St., New York City.*

BRANCHES AT

Boston, Mass.	Chicago, Ill.
Providence, R. I.	Hamilton, Canada.
Philadelphia, Pa.	Montreal, Canada.

H. A. Metz & Co., 122 *Hudson St., New York City.*

BRANCHES AT

Boston, Mass.
Providence, R. I.
Atlanta, Ga.
San Francisco, Cal.
Toronto, Canada.
Philadelphia, Pa.
Charlotte, N. C.
Chicago, Ill.
Montreal, Canada.
Hamburg, Germany.

Farbenfabriken of Elberfeld Co., 117 *Hudson St., New York City.*

BRANCHES AT

Boston, Mass., 32 India St.
Providence, R. I., 27 Pine St.
Charlotte, N. C., 509–513 Trust Bldg.
Philadelphia, Pa., 9–11 Water St.
Chicago, Ill., 133 East Kinzie St.
Toronto, Canada, 14 Front St.

Badische Co., 128 *Duane St., New York City.*

BRANCHES AT

Boston, Mass., 86 Federal St.
Philadelphia, Pa., 238 Arch St.
Chicago, Ill., 228 Randolph St.
Providence, R. I., 80 So. Water St.
Montreal, Canada, 6 Lemoine St.

Kalle & Co., 530–536 *Canal St., New York City.*

BRANCHES AT

Boston, Mass.
Philadelphia, Pa.
Providence, R. I.
Greensboro, N. C.

Sour Dyes.

These are very simple in application. Each dealer mentioned in this work can furnish these dyes here mentioned, or one equal in every respect. The bath is made up with the requisite amount of dyeware, usually boiled up in the bottom of the kettle together with 10 to 20 per cent of Glauber salt. The kettle is then filled up with cold water, thus bringing its temperature down to 130° to 170° Fahr. The acid, properly diluted, is added, the whole stirred up, and the goods are then entered, and after working 15 minutes the liquor is again brought to the boil, working all the time; ½ to ¾ hour boiling is usually sufficient. They are bright, and resist action of wear, washing and sunlight sufficiently well for the purpose of ladies' dress goods, ribbons, stockings, carpet-rags, knitting-yarn, etc., and may be had in all colors and shades, and are for woollen, worsted, or silk goods only. The formulæ here given are each for 100 lbs. of woollen material; silk or silk-mixed goods can be dyed, of course. Silk takes more concentrated baths and larger percentage of dyeware than wool as a rule.

Canary Yellow.

No. 1: 1 to 3 per cent of chinoline yellow O. The letter O brand gives a very clear canary yellow. The letter S brand gives more of an orange cast of canary. (H. A. Metz & Co.)

No. 2: 1 to 3 per cent of fast light yellow 2 G. (Farbenfabriken of Elberfeld Co.).

Full Yellow.

¾ to 2 per cent Indian yellow, tartrazine, naphthol yellow S (Farbenfabriken Elberfeld). These wares dye both silk and wool.

Magenta.

Also called rosein, fuchsine, aniline red. This color is soluble in alcohol and to some extent in water, so that a dye bath may be prepared directly from the crystals. It will "tar" if the water is too hot. When making the solution it is well to filter the solution or pour through cloth or strainer; ½ oz. of the crystals should give a fair shade to 10 lbs. of wool. The bath is neutral usually. A little soap in the bath brightens the shade at the expense somewhat of its fastness. Magenta is applied to silk and wool by entering the goods in the bath at 170°–180° Fahr., and handled rapidly to prevent uneven drying; ½ hour will complete the dyeing.

Cotton is first prepared by steeping over night in a 10-per-cent solution of sumac, or 5 per cent tannic acid for some time or over night. Wring out and dye in same manner as wool or silk.

A brighter shade on cotton as follows: For 10 lbs. cotton, 1 oz. soap and 5 oz. olive oil are made into an emulsion in hot water and cooled to 90° Fahr. The cotton is worked in this for 10 minutes. In another bath ½ lb. sumac and 2 ozs. tin crystals are prepared and the cotton worked in this for some time, wrung out, and dyed in a hot bath of magenta and pure water.

Magenta Liquor.

Dissolve 1 lb. magenta crystals in 2½ gallons alcohol .8200 specific gravity; a 5-gallon tin is convenient. Add 2½ gall. hot water, strain if necessary. In water at 180° Fahr., say 1 gall., a tablespoonful of magenta liquor will dye a pair of stockings or a broad and long ribbon very nicely. Magenta liquor from which the alcohol has been expelled by a gentle heat and a little gum arabic water added is good magenta ink. Acid magenta is a different product. Acid magenta is freely soluble in water and dyes in an acid bath.

Orange.

¾ to 3 per cent orange R, orange G, or orange R R or brilliant orange R, brilliant orange O (all of Metz); croceine orange R, mandarine G, orange R O, orange B B (Farbenfabriken of Elberfeld Co.).

Scarlet.

¾ to 3 per cent scarlet R, R R, 3 R, 4 R–6 R (H. A. Metz & Co.). These are bluish scarlets. Scarlet R, from Farbenfabriken of Elberfeld Co., is a yellowish scarlet.

Red.

1 to 3 per cent of fast red B or G (Badische Co.), fast red E–A, the ponceaus R to 4 R, new red R to 5 R, acid magenta B (Farbenfabriken of Elberfeld Co.).

Rose or Pink.

¼ to 1 per cent of rhodamine B or G, eosine, fuchsine.

Rose Running Toward Violet.

$\frac{1}{4}$ to 1 per cent acid magenta G, phloxine B, rose bengal.

Violet.

$\frac{1}{2}$ to 2 per cent acid violet 7 B N, N, 5 B F are bluish violets. Acid violet 3 R A, 4 R S, and violet R concentrated, are red violets.

Blue.

$\frac{1}{2}$ to 3 per cent of any of the patent blues give a greenish blue in A brands, shading toward reddish blues in letters further down the alphabet.

Full Blues (Sour Dyes).

No. 1: 3 per cent acid violet 6 B N–10 B or any acid violet, 1 per cent acid black, $\frac{1}{10}$ per cent acid yellow.

No. 2: 4 per cent of either of these, separately, or in conjunction: patent marine blue L E, greenish, azo acid blue B, patented, reddish, victoria violet 4 B S 8 B S, patented (all of Metz); Alizarine blue B R 3 G, azo acid blue 6 B, cashmere blue T G extra, victoria navy blue B or D K (all of Farbenfabriken of Elberfeld Co.)

Black.

6 per cent of either of these, separately, or in conjunction; acid black No. 3 (Klipstein), acid black 8 B, 4 B L, F L, cashmere black B, 3 B N, T N, naphthaline acid black 4 B, naphthalymine black 4 B,

4 B K, 6 B S (Farbenfabriken of Elberfeld Co.), acid alizarine blacks from any source.

Wool black 4 B, 6 B, 4 B F, and B, wool black 4 B L, 4 B F L, N B, N 2 B, N 4 B, N 5 B, N G, wool black W, 4 B W, B S W, R S W, acid black B, chromate black T, T B, 6 B, 4 B (Berlin Anilin Works).

The dealers have various shades of the same color, which they designate by letters, or numbers, and sometimes both, thus acid violet would mean a violet that dyed in an acid bath; the 6 B N, 10 B, etc., would indicate a certain grade and shade. Order always by the full designation.

Direct Cotton Dyes.

The substantive cotton dyes, or direct-dyeing colors, are meant. The adjective cotton dyes, or those requiring tannin to be applied and fixed with antimony salt or some assistant added to the bath, need not be considered. Sulphur colors are so called because they are not soluble in water, but require caustic soda and bisulphide of soda added to the bath, and lastly common salt in large percentage to cause proper exhaustion of the bath. These are the most solid of all cotton colors, with the possible exception of indigo, and aniline black of the diazotized and developed colors, which, together with the sulphur colors, are not applicable to renovating work. The sulphur colors are, unfortunately, injuriously affected by metals, and therefore mostly restricted to where wood dye vessels can be had. They also tend to spot

if exposed to the air unevenly during the dyeing operation.

For household purposes the substantive dyes are quite sufficient. They are extremely simple of application and quite fast enough for ordinary purposes. They may be obtained of all dealers in almost endless variety of red, blue, yellow, black, brown, etc. They almost without exception will work together to produce any shade required. The bath usually does not exhaust, and where successive dyeings are to be made of the same color, a saving is made by keeping a "standing bath." Alkalies (soda ash, sal-soda) are often used, especially on raw cotton, to soften and remove the resinous matter from the fibre. Cotton in its natural state has about 2 per cent of resinous matter. The alkali is added along with the dyeware to the bath. Common salt is usually added to the bath, and sometimes, improperly, along with the dyestuff; the writer prefers to sprinkle on the salt after "boiling under" the cotton, and after boiling a time to insure the cotton being thoroughly wetted, and air bubbles expelled. After-treatment with copperas, bluestone, bichromate of potash, etc., usually changes the shade somewhat, but, where fastness is especially desired, may be profitably practised. Some acetic acid is usually added along with the saddening.

The following formulæ are given as a guide to a variety of useful shades of color. Where a plain red, yellow, blue, or black is wanted, the reader should be able to procure a suitable color from the dealer. All dealers, too, sell brown, green, olives, purples, etc.

If a standing bath is maintained, or the shade is beyond medium full, it is necessary to remove the cotton to a fresh bath, for any after-treatment with copperas, bluestone, etc. All light shades may be after-treated in the first bath, and it is usual to add along with the saddening 2 to 3 per cent of acetic acid. In large works, pumps are used to remove liquors from the cotton, and often some rinse water is applied, and run off, before proceeding to sadden with copperas, etc.

LIGHT BROWNISH DRAB.

½ per cent direct brown powder.
$\frac{1}{10}$ per cent direct yellow powder.
$\frac{1}{10}$ per cent direct blue powder.

DARK BROWN DRAB.

3 per cent direct brown powder.
$\frac{6}{10}$ per cent direct yellow powder.
$\frac{6}{10}$ per cent black powder.

LIGHT SLATE BLUE SHADE.

1 per cent direct black powder.

DARK BLUE SLATE.

3 per cent direct black powder.
A full black requires about 10 per cent of black.

SLATE WITH DRABBY CHARACTER.

2 per cent direct black.
$\frac{1}{10}$ per cent direct yellow.
$\frac{2}{10}$ per cent direct brown.

RED.

3 per cent of benzo-purpurine 4 B.

There are many other letter brands of this very useful dye; with proper manipulation it dyes wool almost equally as well. It is turned blue by strong acids, but acetic acid, unless very strong, does not affect it. Acetic acid is therefore frequently used to assist toward the end of the operation where wool is being dyed with benzo-purpurine 4 B, in exhausting the bath and deepening the shade; at the same time avoiding to have the temperature of the bath quite to boiling heat.

BLUE.

3 per cent of benzo-azurine G.

This color comes in other letter brands. It dyes wool fairly well with proper care. In conjunction with benzo-purpurine 4 B, you may get any shade of bluish red to reddish blue. Shaded with black, this will make dark blue.

YELLOW.

3 per cent chrysophenine G.

This color is bright and pleasing, and may be shaded to orange with benzo-purpurine. In conjunction with benzo-azurine G good greens are obtained. By proper combinations of these three colors, red, blue, and yellow, any imaginable shade of color may be produced: scarlet, pink, browns, drabs, olives, sages, maroons, etc.

Chrysophenine dyes well on wool, both sour and mordanted.

Afterchromed Colors.

These differ from the mordant colors by the property they have of being absorbed by the woollen material from a boiling bath containing, besides the dyeware, an acid. Acid alizarines, top-chromes, one-dip colors are other names applied to them. They dye well on a chrome mordant. These colors do not, however, give their true shade by boiling with the stock in an acid bath. They must afterward have some bichromate of potash applied to the shade produced by boiling in an acid bath. This may be done in the same bath or in a fresh one. Fluoride of chrome is also used, same as bichromate of potash, to develop and fasten these colors. The advantage of using fluoride of chrome is of principal value only in delicate blue, and such as might be too much changed by using the bichromate. Additions to the same bath may be made, after the color is developed by bichromate of potash or fluoride of chrome, and in the formulas given, suitable shading materials are indicated. Each formula is for 100 lbs.

Medium Slate.

1 oz. mordant yellow O (Metz)
12 ozs. acid alizarine black R (Metz)
4 ozs. acid alizarine brown B B (Metz)
1 oz. acid alizarine red B (Metz) or G (Metz)
20 lbs. Glauber salt.

Boil ½ hour, then add 5 lbs. commercial acetic acid. Boil ½ hour, then add 4 lbs. sulphuric acid. Boil ½

hour, then add 2 lbs. bichromate of potash. Boil ½ hour. Done.

A Blue Slate.

From ¼ to 1½ per cent dyeings of any of the acid alizarine blacks give good slates of a bluish character. Dye as directed for medium slate.

Medium Light Tan.

4/10 lb. acid anthracine brown R (Farben)
3/10 lb. alizarine black B (Farben)
4/10 lb. chrome yellow D F (Farben)
20 lbs. Glauber salt
5 lbs. acetic acid
6/10 lb. bichromate of potash

Dark Olive Brown.

2 lbs. acid anthracine brown R (Farben)
1 1/10 lbs. alizarine black B (Farben)
1½ lbs. chrome yellow D F (Farben)
20 lbs. Glauber salt
5 lbs. acetic acid
4 lbs. oil of vitriol (sulphuric acid)
2 lbs. bichromate of potash

Light Blue.

3/10 lb. alizarine blue S K Y

Shade with acid violet 4 B extra if a more red cast of blue is desired.

3/100 to 1/10 per cent acid violet 4 B extra
4 lbs. acetic acid
10 lbs. Glauber salt
3 lbs. oil of vitriol
15/100 lb. bichromate of potash

Dark Bottle Green.

3 lbs. acid alizarine green C E (Farben)
1½ lbs. alizarine black B (Farben)
1 lb. diamond flavine G (Farben)
20 lbs. Glauber salt
5 lbs. acetic acid
5 lbs. oil of vitriol
2 lbs. bichromate of potash

Yellow Buff.

$\frac{2}{10}$ lb. acid anthracine brown R (Farben)
$\frac{3}{10}$ lb. diamond flavine G (Farben)
$\frac{5}{100}$ lbs. alizarine black B (Farben)
4 lbs. acetic acid
10 lbs. Glauber salt
4 lbs. sulphuric acid
¼ lb. bichromate of potash

Shade with either brown or black; if yellow is needed, use yellow D F.

Dark Red Brown.

3½ lbs. acid anthracine brown R H extra (Farben). Shade to a wine with alizarine red W (Farben) if desired.

5 lbs. acetic acid
20 lbs. Glauber salt
5 lbs. oil of vitriol
2 lbs. bichromate of potash

Dark Blue.

3 lbs. alizarine blue B A 3 R (Farben)
1½ lbs. brilliant alizarine blue G (Farben)
5 lbs. acetic acid
20 lbs. Glauber salt
5 lbs. oil of vitriol
5 lbs. fluoride of chrome, or
2 lbs. bichromate of potash

Scarlet and Red.

3 per cent salicine brown S (Kalle & Co.)
5 per cent acetic acid

Boil ½ hr. Exhaust with 1 per cent sulphuric acid. This gives a good scarlet before adding 1¾ per cent bichromate of potash, when you have a dark red.

Bright Scarlet and Red.

3 per cent salicine red G (Kalle & Co.)
5 per cent acetic acid.

Exhaust with 1 per cent sulphuric acid, which gives a bright scarlet. Afterchrome with 1¾ per cent bichromate of potash, which gives a full red.

Dark Wine and Blue.

4 per cent salicine blue 2 R (Kalle & Co.)
6 per cent acetic acid

Exhaust with 1 per cent sulphuric acid, which gives a dark wine. Afterchrome with 1½ per cent bichromate of potash, which gives a dark blue.

Monochrome Colors.

This is a new group of colors which are dyed by a new process which seems to offer many advantages. As the name indicates, these require the presence of chromium in the dye bath to properly develop the color, but it is used in the rather unusual form of ammonium chromate. As the use of a weak acid is also necessary, the manner of supplying the proper chromium salt can be supplied by the use of sodium or potassium bichromate in conjunction with acetate of ammonia. In practice the method followed is to prepare the bath with the necessary dyestuff, then add 5 to 7 per cent ammonium acetate and an amount of bichromate equal to ½ the weight of the dyestuff. These are wool and animal fibre colors only. The fibres absorb the dyestuff slowly and the shades develop continuously, so that the dyeings are level and the dyer has no difficulty in matching shades, as an extended after-treatment is not necessary, and the final result is obtained when the dyeings have had the proper time in the dye-bath. The shades obtained by the use of these colors are fast to light, stand fulling, scouring, and other processes of finishing perfectly, and will not bleed into interwoven white effects. They can be recommended for all sorts of fast-color dyeing where the shades are not too heavy. They appear to fill a long-felt want in the production of modes, tans, and drabs for perfectly fast and level dyeings on yarn, raw stock, and pieces. The line at present comprises

Monochrome G
Monochrome grays G and B
Monochrome blue G
Monochrome yellow G and R
Monochrome orange R
Monochrome green A G
Monochrome brown A B

and if necessary fast fulling colors may be used for shading, such as:

Fast violet R
Fulling violet N O
Fulling red B and C

Formula for Three Shades of Slate on 100 Lbs.

1½ lbs. monochrome yellow G
5 ozs. monochrome blue G
7½ ozs. monochrome red G
7 ozs. acetate of ammonia
1 lb. bichromate of potash
10 lbs. Glauber salt
5 lbs. acetic acid

Boil ½ hour and add 1 lb. oil of vitriol and boil ½ hour.

13 ozs. fast acid blue S C extra
14 ozs. flavazine S
7 ozs. amido-naphthol red 6 B

Same acids, bichromate, etc., Glauber salt, and time as before. Wares from H. A. Metz.

14½ ozs. fast acid blue S C extra
12 oz. flavazine S
5½ ozs. amido-naphthol red 6 B

Or—

11¾ ozs. fast acid blue S C extra
12 ozs. flavazine S
6 ozs. amido-naphthol red 6 B

Same acids, bichromate, acetate of ammonia, Glauber salts. Time as before.

Metachrome Colors and Mordant.

These are much older than the monochromes. At first they were for the most part sent out as pastes, sticky, nasty compounds to handle, and besides, if frozen, were much injured or rendered worthless. Latterly, however, these very useful colors for woollen material are to be had as powders, cleanly to handle, easily soluble and easily levelling, not injured by freezing, and lacking nothing in their original fastness. Metachrome mordant is reputed to be a mixture of ammonium sulphate with bichromate of potash. Whether this is strictly the case or not, the writer finds that equal parts of the sulphate and bichromate give in practice results tending to confirm the report, and at a less price. Equal parts of metachrome colors and metachrome mordant are added directly to the bath, either both together or separately, or following each other at intervals, an excess of the mordant apparently not injuring or hastening results if within reasonable limits. The color gradually develops and darkens during a boiling of 1 to 2

hours, and may be shaded by additions directly to the bath of appropriate metachrome colors dissolved in water and thinned out considerably before adding. These colors stand light, washing, etc., very well, and are fairly fast to acids, as in carbonizing. Metachromes are the product of the Berlin Anilin Works, with offices in New York, Chicago, etc.

In the writer's opinion Cassella's monochromes, likewise those of Metz and others, are patterned somewhat after the metachromes. It can be truly said of them collectively that they are good colors and worthy the attention of all dyers of woollen material.

Alizarine Chromate Colors.

Of very recent introduction in the art of dyeing are a line of colors that differ from the overchromed or acid alizarines in this: that the bichromate of potash may be added at the commencement, i.e., dye and mordant are introduced to the dye bath at once, and heated to boiling and boiled as usual; finally some acetic acid is added to exhaust the bath. In the writer's experience this has been often done with colors not made with this intention. That it was possible to do so was noted fully fifteen years ago. The advantage over the regular overchromed process in saving of time is not worthy of mention; where great care in matching is requisite there is an advantage, as the exhaustion of the bath is under much better control and can be pushed just as far as needed, and no further, at the discretion of the dyer. With the overchromed color care has to be particularly

taken that an excess of dyeware is never first added, because the shade is not produced until after the bichromate is added, and if then it comes up too dark, there is no recourse. The new alizarine chromate colors offer, therefore, for piece dyers a much safer and exact mode of procedure for yarns and pieces, while at the same time the color is truly a mordant color and fast to washing and exposure, suited to men's wear. It is possible also to make a package dye, containing the necessary dyeware and bichromate that, if kept dry, may be mailed or kept ready for use, and should be very convenient and useful. Acetic acid is to be everywhere had in the form of vinegar and is all that is needed to exhaust the bath. The ultimate details of their use are not yet worked out, but are of great importance. A typical formula would be 5 per cent of dyeware, 20 per cent Glauber salt, 2½ per cent bichromate of soda, or 3 per cent bichromate potash. Enter goods at 100° and raise gradually to the boil. Continue for 1 hour and exhaust, if necessary, with 5 per cent acetic, lactic, or malic acid. Acetate, lactate and malate of ammonia may be used where great care must be taken in coming to shade.

Saddened Colors.

Under this designation may be placed all the dye woods and many vegetable substances used in dyeing. A formula for using them, favorite with some dyers still living and practising their profession, would read about as follows:

DRAB, FOR 100 LBS. WOOL.

1 lb. ground logwood = blue
½ lb. ground fustic = yellow
3 lbs. madder = red and yellow
2 lbs. barwood or camwood = red

Boil 1 hour and sadden by sprinkling in

¾ lb. copperas
2 lbs. argol } producing drab

Simmer ½ hour; draw off, and lay over night.

The way this formula would be applied by these dyers would vary in some slight degree, but may be set down about as follows:

The wool is first scoured. The loss (shrinkage) in scouring is known pretty accurately, by trial or from experienced careful inspection; thus they are enabled to weigh off before scouring a quantity of fleece giving very approximately 100 lbs. The scoured wool, while still wet, is brought alongside the dye-kettle, together with the four first-mentioned materials in the formula, weighed and mixed in a box, with a small scoop left therein. The kettle is prepared nearly full of water near the boiling-point. The dyer's assistants now scatter the wool evenly over the top of the kettle, while the dyer with the small scoop or his hand sifts the ground wood and madder evenly through the wool. Help with forks thrust the wool down into the hot water, and as soon as all the wool and material is in begin at once to pole up the contents of the kettle. The pole is frequently simply a sapling deprived of its bark and trimmed free of knots, or made by turning in

a lathe. The essential thing with the pole is that it be smooth, and straight not only in direction, but in grain. The pole is thrust down at the side of the kettle, the lower end pushed along the bottom to something past the centre of the kettle, then the top end is brought over and outward, the man throws the weight of his body upon the pole, bringing up a large bunch of wool upon the inner end of the pole. By dexterous twists and turns he breaks and scatters the wool about over the surface of the kettle, avoiding to roll the pole at any time so far as to have the wool fall off in a large wad or long strings. Care is taken when first commencing to pole to break the wool thoroughly, as the thorough leveling of the ultimate results depends largely thereon. About fifteen minutes' poling while the kettle is being brought to the boil is the usual rule. Forks are then used to fetch the wool from the centre of the kettle so that the boil may be a comparatively open spot in the centre of the kettle. The wool toward the outer edge of the kettle is at the same time kept thrust under, so that when a "fair boil" is reached, all the stock stays submerged. The contents are now kept boiling quietly for an hour or more. The dyer and help, during this interval, "get in" other kettles, each in its turn marked with chalk, or by a board having hands and a dial with figures like a clock. When the boiling is complete, the dyer, or his assistant having the weighed copperas, calls again the men and the kettle is again poled up and the copperas and argol sprinkled on and through the wool. A simmering

heat is maintained for ½ to ¾ hour longer. After the poling is thoroughly done, which, with two men, is usually about fifteen minutes, the dyer now "samples" the kettle, and if the shade is right, knocks out the plug and allows the stock to smother for some time. By experience the dyer knows about how much to allow for "smothering" and subsequent drying, which both tend to fill up and darken the shade. If at the sampling the shade is not right, additions are made or alterants used to "throw" the color, the kind and quantity being determined by the necessities of the case and the experience of the dyer. Thus, if the shade lacked blue, addition may be made of logwood, indigo extract, etc. If, on the contrary, the shade were too blue, but not quite up on the red, some alum may be added. Alum will tend also to brighten and make lighter the tone. Archil, too, is a favorite red material to add where reddish-blue effect is desired. A slight addition of acetic acid or very dilute sulphuric acid always tends to prevent darkening by smothering and drying.

The kettle is poled at the time additions are made in each and every case. These directions for poling are to be followed in every case, and with all dyewares and colors. Men carefully and well trained in this respect are a joy forever to the dyer, and the amateur who stays persistently at poling or in some way moving his goods about will, by the results, be well repaid for his painstaking method of working.

Copperas Black.

For 110 lbs. of woollen cloth, white or gray. This black is a favorite because it resists better the action of sunlight than a bichromate-of-potash black. It is the broadcloth black of our daddies. It has the defect of being sensitive to acids, urine, etc. It is partly a prepared (mordanted) and partly a saddened color. There is no more brilliant black, except it be the so-called roller blacks, now nearly obsolete.

For 110 lbs. the goods are first boiled with

9 lbs. logwood extract,

$2\frac{1}{2}$ lbs. fustic extract,

well dissolved and added to sufficient water in which to work the goods, and afterward the liquor somewhat cooled.

2 lbs. oxalic acid

is next added and worked for fifteen minutes and

$2\frac{4}{10}$ lbs. bluestone

3 lbs. copperas

are then sprinkled on, and after working fifteen minutes, the whole is brought to the boil along with the cloth and boiled $\frac{3}{4}$ hour. Run off and rinse. The color is now a gray of no special character, and is to be filled up in a fresh bath with

21 lbs. logwood extract,

$2\frac{1}{2}$ lbs. fustic extract,

for fine goods; with coarse stock somewhat less is needed. Dissolve the extracts and add them to the cool dye bath and bring slowly to the boil while working the goods. Logwood and fustic extracts are by no means constant quantities.

The above formula is for a logwood at 6 to 7 cents per lb. Hematines at 12 cents and crystals at 16 to 20 cents would, of course, require proportionately less, while if logwood chip were used 5 to 8 lbs. of chip = 1 lb. extract.

To this class of colors belong sumac extract, and berries, the bark of alder, poplar, hemlock, butternut bark, and shells of the nuts, walnut husks, and a multitude of weeds, horseradish leaves, etc. They may be readily obtained in all parts of the country, and experiments with such things are always interesting by bringing out further possibilities in this direction. Saffron used to be grown by our grandmothers, and many a fine bit of red and orange have they produced. They are many of them very permanent and pleasing dyes. They are often astringent (contain tannin), and will dye cotton and linen or woollen and silk. The scrub palmetto of our southern United States of America contains sufficient of such material to dye the cotton grown there a full and fast brown. Sun actually seems to develop and fasten the color, as is true of many of these things. In general, all that is necessary, in applying them, is to boil the goods in an infusion either neutral or slightly sour from addition of vinegar, acetic acid, muriatic acid, etc., and either in the same or a fresh bath, add copperas, bluestone, alum, bichromate of potash, tin crystals, etc. Man has sought and found dyes to supersede these things; dyes that are good, and better, perhaps, and of which he can control the output and price. Still they are worthy of notice, and it is

hoped many a housewife will yet be found who can, and does, dye with them various things for her use and adornment.

Crossdyeing.

Crossdyeing is the term applied to that form of manufacturing of cloths wherein two fibres are used, one of which, usually the cotton, is "stock-dyed," i.e., colored the desired shade before carding and spinning, and the wool, and perhaps silk also, carded along with it, that is, white, or uncolored. After the piece is woven it is piece-dyed to bring the wool and silk to the same shade as the cotton. There has been much said and written about the comparative value of methods of crossdyeing with the more recently perfected method of "union dyeing," the argument being that where each fibre was taken by itself it could be treated by methods peculiarly suited to it and dyed before making into cloth, thereby getting colors more permanent than could otherwise be obtained. Of course this mode of procedure presupposes that for crossdyeing the color put on shall withstand the following processes without alterations that would injure it. This argument is perfectly true and well founded, and carried into practice very largely, both for stock-dyeing all the fibres entering into a piece of cloth, and also where a portion is left white and afterward piece-dyed; or, as technically called, crossdyed. Since the introduction of the sulphur colors for cotton, the supporters of the argument for separate dyes for wool, any animal fibre, and cotton or

any vegetable fibre, have had their position very much strengthened. Still it remains to be said, for the union-dyed side of the argument, that the trouble and expense involved in the separate dyeing for each fibre is too great, the time required is too long; also that in the present state of the art of dyeing, union dyes have been found that color very nearly as permanently as the separate methods can do, and for domestic purposes this may be assumed to be true. The convenience to the amateur dyer is so very great, saving, as the process does, so many handlings and manipulations; the elimination of chance for mistake or accident; the freedom of the finished work from "specks"; the simultaneous and equal coloring of linings, facings, and thread, make the advantages of union dyeing, for renovating purposes, very apparent. Still further, the amateur is saved the trouble, even if he had the skill necessary, of selecting appropriate proportions of red, yellow, and blue to produce any color, or shade of color. The dealer or package-dye man attends to this, and consequently the dyeing to renovate a garment is reduced to great simplicity. It only remains for the amateur to dissolve his dye in an appropriate vessel, and heat and stir about his goods carefully, to ensure very good and satisfactory results. Sky-blue cannot be dyed upon black, goes without saying; neither can a green garment be dyed red. Still, the faded garment always admits of freshening up with a dye suitably selected for the purpose. Another form of crossdyeing involves the so-called resist dyeing. The stock or yarn may be

dyed an appropriate color, and afterward treated to a "resist," whereby its property of absorbing more dye is destroyed, and if woven in with white or other colored yarn not having the resist upon it, will appear as a line or checked pattern after the woven piece is "crossdyed." The process consists, after dyeing the checking threads, of applying tannin followed by a solution of tin salt, but is of no special interest to the amateur dyer. Crossdyeing is also the term applied to that form of all-wool, all-silk, or all-cotton manufacture, where part of the yarn is first colored black and the rest of the warp and weft is of white or light-colored yarn, and then afterward piecedyed red, yellow, green, brown, etc. The black part is not very noticeably altered by this treatment, and is sometimes made somewhat lacking in fulness that the crossdyeing is expected to "fill up." The object in so doing is usually to have the strong soap and alkaline liquids used in fulling and scouring come only upon the black that is fully equal to such treatment, when a delicate and bright shade of green, red, yellow, etc., might suffer by the treatment, and can just as well be put on later. Another reason is that pieces are often treated with carbonizing liquids for the removal of any accidental admixtures, or the unavoidable presence of cotton and vegetable matter generally that show up unpleasantly as "specks" in the finished goods. Many colors will not withstand the strong acid treatment of carbonizing, and therefore they are not "put on" until this part of the work is done. Carbonizing consists in wetting the speck-

forming admixtures, and unavoidably the rest of the piece, with some liquid that after drying will act upon the vegetable matter energetically enough to make it fall into powder by friction. A heat of about 230° Fahr. in a properly constructed oven or chamber is usually employed for the drying, but often and better it is practised to first dry the goods after coming from the carbonizing liquid and then introduce them into the higher heated chamber. Time is saved by having the liquids pretty strong and the heat pretty high. It is also better that the treatment should be short and sharp than too prolonged, the animal fibre and color seeming to withstand the treatment perfectly if completed in a few hours, when if prolonged for two days they would be seriously affected.

Mordanted Wool Colors.

For the purposes of this work a regular preparation (mordant) is understood to be 3 per cent of the weight of the goods of bichromate of potash, $2\frac{1}{2}$ per cent of the weight of the goods of oxalic acid, dissolved in the hot bath of about 30 gallons of water to each 10 lbs. of material and the goods boiled therein for $1\frac{1}{4}$ hours and the goods drained off, cooled, and rinsed in tepid water. A medium preparation is $\frac{1}{2}$ the above bichromate of potash and oxalic acid boiled same as the regular preparation. A light preparation is 1 per cent of bichromate of potash and 1 per cent of oxalic acid, applied same as the first. The preparations are efficient immediately at the

expiration of the 1¼ hour of boiling, but if aired, and left some time, or over night, acquire additional value, especially for dark shades where especial requirements of fastness and bloom are essential. Pieces if left over night should be folded fairly smooth.

Loose stock should be, before proceeding to dye, picked apart to remove snarls and felted places, produced by boiling or otherwise. A good way to prepare the dye bath is to fill the kettle to about ⅓ its capacity, and boil up the dyewares therein, until solution is assured, then fill up the kettle, add the assistants, acetic acid, etc., and proceed at once to enter the goods. The bath should be about 160° Fahr. The goods are worked for, say, 15 minutes before heat is applied, then gradually raised to boiling, and boiled 1 hour, or to shade. If a shade is to be matched, care is to be exercised that too much dyeware is not weighed up at first, that the goods are examined with care when coming to a boil, and in no case to overshoot the mark. Additions can easily be made, but a color once got too dark is a hard proposition. The following formulæ are each for 100 lbs. wool or woollen fabric:

YELLOW-BROWN, REGULAR PREPARATION.

¾ lb. anthracine brown R, ¼ lb. chrome yellow D F (Farbenfabriken of Elberfeld Co.), acetic acid enough to correct the water, say 2 lbs., and, after boiling some time, further addition of acetic acid sufficient to exhaust the bath.

Pearly Slate.

Light preparation: $\frac{2}{10}$ lb. acid alizarine black B powder, $\frac{5}{1000}$ lb. alizarine red W powder (Farbenfabriken of Elberfeld Co.), 2 lbs. acetic acid. Boil 1 hour.

Medium Light Blue.

Regular preparation: 2 lbs. alizarine blue S powder, 2 lbs. acetic acid. Boil 40 minutes.

Medium Blue.

Regular preparation: 2 lbs. alizarine blue B A 3 R powder, 1 lb. alizarine blue S powder, 2 lbs. acetic acid. Boil 1 hour.

Dark Blue.

Regular preparation: 5 to 7 lbs. extract of logwood in neutral bath, addition of 1 to 10 lbs. of extract of fustic, will make shades of dark green. Boil 1 hour.

Black.

Give the goods a regular preparation. Fill up with 10 lbs. extract of logwood, 1 lb. extract of fustic. Dye boiling for 1 hour and add $2\frac{1}{2}$ lbs. copperas, and simmer $\frac{1}{2}$ hour longer.

Black that is Fast to Sunlight.

Give the goods a regular preparation. Dye with 6 lbs. acid alizarine black R, $\frac{1}{4}$ lb. mordant yellow O (H. A. Metz & Co.). Boil for 1 hour and add 2 lbs. sulphuric acid to exhaust the bath.

Medium Olive, 200-Lb. Stock.

Give a regular preparation. Dye with 15 lbs. extract of fustic or $2\frac{1}{2}$ lbs. of chrome yellow powder,

1½ lbs. chrome brown powder, 12 ozs. alizarine blue powder. Neutral bath, and boil 1 hour.

Medium Brown.

Give a regular preparation. Dye with 10 lbs. extract of fustic or 2 lbs. alizarine yellow powder, 5 ozs. alizarine red powder, 1 lb. alizarine brown powder, 4 ozs. alizarine blue powder. This is a good fast color, and it may be said truthfully that fustic is as good and permanent a yellow dye as is known. Dye your yellows, therefore, where great brilliancy is not necessary, by giving your stock a light, medium, or regular preparation and fill up with 1 to 15 per cent of extract of fustic.

A Medium Red Fast to Sunlight.

Give goods a regular preparation. Dye with 3 per cent of alizarine red powder. Use 2 per cent of acetic acid in the dye bath. The addition to this formula of ½ per cent of alizarine blue powder makes a wine color. The further addition of 2 or 3 per cent of extract of fustic gives a maroon that is very fast and good.

Bright Greens.

Give a medium preparation to the goods. Dye with 2 per cent of alizarine yellow powder or 10 per cent of extract of fustic for the yellow part; 1 to 3 per cent patent blue or 1 to 3 per cent alizarine blue S K Y for blue. Enter in the bath at 170° Fahr., and raise slowly to boiling. After some time add 3 per cent acetic acid and work below the boil for ½ hour.

ORANGE, VERY FAST.

Give the goods a regular preparation; 5 per cent of extract of fustic or 1 per cent of alizarine yellow powder, $\frac{1}{4}$ to $\frac{1}{2}$ per cent of alizarine red powder. Dye neutral; boil 1 hour.

LAVENDER OR PURPLE.

Give a medium preparation. Dye with $\frac{1}{2}$ to $1\frac{1}{2}$ per cent of alizarine blue powder, $\frac{1}{10}$ to $\frac{1}{4}$ per cent of alizarine red powder, 2 per cent of acetic acid. Boil 1 hour.

MISCELLANEOUS DYE RECEIPTS.

Catechu Drab on Cotton.

Work the cotton for 15 minutes in hot water containing prepared catechu. The amount of catechu is governed by the depth of color wanted. The goods are then lifted and 1 to 3 per cent of copperas is added; work again for 10 minutes, or to shade. To prepare catechu, 1 lb. catechu is boiled in 8 gallons of water till all is dissolved; add 2 oz. of copper sulphate and stir.

Catechu Brown on Cotton.

The cotton is boiled with an infusion of catechu for some time. If a dark shade is wanted it is well to have a 20-per-cent infusion (of the weight of the goods) and to steep over night. Lift, and drain well, but do not rinse. In a fresh bath containing 3 per cent bichromate of potash work the cotton for $\frac{1}{2}$ hour. Run off and rinse. This operation is to be repeated

till the goods are dark enough. The writer has dyed very handsome corduroys by this method. Successive treatments from the catechu bath to the chrome bath develop more and more of a wine shade. The cotton becomes thoroughly well mordanted and can be topped with logwood, fustic, alizarine red, blue, or brown direct. Very serviceable for lap-robes.

Iron Buff (Khaki) on Cotton.

First "boil out" the cotton, simply to have it thoroughly wet. For 10 lbs. of cotton dissolve 2 lbs. of copperas in hot water and add cold water to make a bath large enough for the goods. Work the cotton material in this for 20 minutes, wring out, and put at once into lime water, and work 15 minutes. Wring out and expose to the air for ½ hour. If not dark enough, work again in the same copperas bath, and in a fresh lime-water bath. Repeat as many times as necessary, always using fresh lime-water. Finally wash through clean warm water.

Another Way.

Boil the loose cotton or cotton cloth in a weak caustic potash or caustic soda bath to remove the natural resinous matter, size, grease, etc. For 10 lbs. of material, 4 ozs. of caustic is enough. Keep well worked and below the surface of the lye bath. Drain, rinse, and open out the goods. Soak in a bath containing 1 pint of nitrate of iron, wash out in water, and dry. The process is simple and easy, and the color fast.

Prussian Blue.

Work 10 lbs. of wet-out cotton in a solution of 4 lbs. copperas for 15 minutes. The bath is cold. Work again in a fresh bath containing 4 ozs. ferrocyanide of potassium. Finally wash in cold water containing 1 oz. alum.

Permanent Olive.

A very permanent and pleasing olive color can be put upon white woollen material as follows: Gather a sufficient quantity of horseradish leaves. Twist and break or bruise them and pack tightly in a pail or tub. Cover with boiling-hot water and stand at rest over night. Drain off the liquor and add just sufficient acid, preferably muriatic, to change the color of the liquor from its first olive tone to a paler and more yellow tone. Enter now the material to be dyed and boil for 30 minutes, gently, and supplying water that evaporates. To fix the color all that is necessary is to add sal-soda just sufficient to slightly overcome or neutralize the acid previously added. It is a peculiar property of this dye bath that several successive dyeings can be made in it. They all come out the same shade if the volume is kept constant. After one dyeing has been made simply acidify the bath. Boil up in it more material and again neutralize to the point where the color develops. The writer has made eighteen successive dyeings, without exhausting this dye bath. Copperas may be used to sadden this color, but of course must be in a separate bath.

Eight months' exposure does not fade this color to an appreciable extent.

To Make Lime Water.

Fresh-burned stone lime is slaked by pouring water upon it so long as it is absorbed and until the lump opens out and falls to a fine powder. Of this, 1 lb. is added to 10 gallons water, well stirred up and allowed to settle. Use the clear.

Indigo Blue for Yarn.

To a 50-gallon barrel, about ¾ filled with cold water, add 8 lbs. ground indigo, 16 lbs. copperas, and 24 lbs. fresh slaked lime. Stir well for ½ hour and repeat every ½ hour until the vat becomes yellow and veins of blue seem to run through it and a fine flurry of blue froth appears on the surface. Allow to stand and settle over night. Work the yarn in a net in the vat for 15 minutes and expose to the air. Repeat the operation until as dark as wanted. Finally dip the yarn in water containing sulphuric acid sufficient to be distinctly sour to the taste. Rinse well and dry. Several vats are generally used, dipping in the strongest first and matching from the weakest. As the weaker ones become exhausted they are thrown out and made up new, thus in turn becoming the strong, or first dip, vat. In dark shades considerable indigo can be removed by scouring with soap. The color is not much changed, but the goods will "crock" unless the scouring be well done.

The Zinc-Powder Indigo Vat.

This vat is based upon the fact that zinc powder in the presence of water and caustic alkali gives off hydrogen gas. If finely ground indigo be also present in the water it becomes reduced and dissolved in the alkaline fluid. A very strong solution of indigo is thus made in a tub, and the strong solution added to the vat in which the dyeing is done. The dye vat has previously added to it some zinc and caustic alkali to prevent reoxidation of indigo when the strong solution of reduced indigo is added. This vat is ready for use as soon as made up, and keeps indefinitely. If too much zinc powder is present in the vat a continual escape of hydrogen gas makes it roily. A little indigo added to the vat and raked up will correct this difficulty. The vat should have a greenish yellow to yellow color. A red or orange indicates too much caustic, and small quantities of zinc and indigo are added, raked up, and when again clear, work is resumed in the vat. This vat makes very clear and fine sky blue to medium dark indigo blue. Indigo is not a constant quantity. Therefore take 1 part of zinc dust and 3 parts of caustic soda (crushed), both weighed up dry. Dissolve the caustic in a teacup or glass and stir in one part of powdered indigo, add the zinc dust, stir up, and set in a warm place and observe. After ½ hour the stirring-rod should come out looking a rich coppery blue, the fluid if in glass should be yellow, and escape of gas should be very small; if orange or red the reduction

has been carried too far, and if still too blue or green, not far enough. From the data obtained proceed to make up your stock solution of indigo in a 6-gallon jar or other suitable vessel. Fresh slaked lime, caustic potash, and strong ammonia may also be used.

To Dye Cotton Blue.

10 Lbs. of Cotton.

Work for 15 minutes in a solution of 4 lbs. of copperas. Wring out. Work again in a solution of 4 ozs. ferrocyanide of potassium. Finally wash in cold water containing 1 oz. alum.

To Dye Cotton Black.

10 Lbs. of Cotton.

Steep the goods in a decoction of 3 lbs. of sumach extract; have as little water as necessary; boil the cotton under and let it lie over night. Squeeze out, and work 10 minutes in lime water. Work for ½ hour in solution of 2 lbs. copperas; work again through lime water, and dye hot with 3 lbs. logwood extract or an equivalent of decoction of logwood in as small a volume of water as may be. Sadden with 2 ozs. copperas in same bath, wash, and dry.

To Make Nitrate of Iron.

Four parts of nitric acid and 1 part of water are placed in a glass or glazed earthen vessel and so placed that it can be kept quite warm. Add clean iron in

wire or borings so long as effervescence takes place. Take out any undissolved iron and settle for 1 hour. The clear solution is ready for use, and kept in a dark place. The fumes should be guarded against during this operation; they are injurious if breathed and corrode various things with which they come in contact. The principal use of nitrate of iron is for dyeing Prussian blue.

To Dye Black.

First mordant the fabric by steeping in solution of nitrate of iron 4° Beaumé for ½ hour. Rinse and boil with decoction of logwood, shade with fustic, 1 oz. to 1 lb.; according to whether a bluish or dead black is desired.

To Dye Woollens a Gray Color.

Boil the white woollen material in a bath containing to each gallon 1¾ oz. gall nuts, 4½ ozs. tartar, and 1 fluid drachm of indigo extract, for ½ hour. Lift. Add to the bath 3 per cent of copperas; re-enter the goods. Boil ½ hour.

To Dye Woollens Green.

Boil the goods for 1 hour with 3 per cent bichromate of potash and 2½ per cent of oxalic acid. In a fresh bath dye boiling for 1 hour with 2 per cent of fluid extract of logwood and 2 per cent of fluid extract of fustic. If not blue enough add more logwood to the bath and boil again.

To Dye a Yellow Color on Wool or Woollens.

Boil 10 to 30 per cent of the weight of goods Quercitron bark with sufficient water to work the goods. Tie the bark loosely in a coarse bag suspended in the boiling bath. Boil 1 hour. Remove the bag or not and add 3 per cent alum, ½ per cent tin salt, and 1 per cent of argol. Boil 10 minutes. Cool the liquor to 170° by adding cold water. Enter the goods. Raise slowly to boiling and boil ½ hour.

If the woollens have been previously dyed, it will require some skill and judgment to determine just what shades and colors they can be brought to by re-dyeing. A 10-per-cent boiling bath of ammonia removes the sour colors previously upon them. Mordanted colors are not much affected by treatment with hot ammonia baths. All logwood colors are removed or greatly changed by boiling in a 5- to 10-per-cent solution of oil of vitriol. The mordant is not removed, and the goods can be re-dyed equally well without remordanting. It is well always to test a small piece of the goods previous to dyeing.

To Dye Woollens a Dark Blue.

No. 1.—Mordant by boiling for 1 hour in water containing 5 to 10 per cent of the weight of the goods of alum. Run off the liquor and make up a fresh bath by boiling 8 ozs. of logwood chip, confined in a coarse bag, to each gallon of water. Boil the goods again in this second liquor ½ hour. Lift the goods, add some water to cool down the liquor, and add 2¼

ozs. of potash per gallon of liquor, and steep the goods again without heating more than necessary until the blue is developed.

No. 2.—Mordant and dye same as above, using $\frac{1}{3}$ to $\frac{1}{2}$ the materials, thus producing a pale blue color. In a fresh bath boil for one hour with $\frac{2}{3}$ per cent blue vitriol, $\frac{1}{2}$ per cent green vitriol, 1 per cent alum, $\frac{3}{4}$ per cent argol, $\frac{1}{4}$ per cent of tin salt, and a very little nitric acid; lift and lay over night; dye finally in a fresh bath containing 2 to 5 per cent of liquid extract of logwood. Raise slowly to boiling and boil $\frac{1}{2}$ hour. The more extract of logwood used the darker the blue.

To Dye Woollen a Brown Color.

Boil the goods for $1\frac{1}{2}$ hours in a decoction containing for each gallon 1 oz. madder, 1 oz. sumac (or $\frac{1}{4}$ oz. gall nuts), 1 oz. argol, 2 ozs. sanders wood. Lift. Cool down the bath by adding cold water or standing to about 170° Fahr. Sadden by adding to the bath copperas and reboiling the goods $\frac{1}{2}$ hour. Before adding the copperas it is well to dissolve, say, 1 oz. in some hot water; add it to the bath in portions until the shade is as dark as required. Lift the goods between each addition.

To Dye Blue about 2 lbs. of Material.

Steep the fabric $\frac{1}{2}$ hour in nitrate of iron solution 1 to 2 per cent. Boil. Rinse. Dye in solution of 4 ozs. yellow prussiate of potash and 2 ozs. sulphuric acid.

Rinse in cold water containing 2 ozs. spirits of sal-ammoniac. Finally rinse again in clean water.

To Make Acetate of Alumina.

No. 1.—Add solution of acetate of baryta to a solution of aluminum sulphate. Settle and use the clear.

No. 2.—Six parts sugar of lead and 5 parts of alum. Dissolve separately in hot water, cool, and mix. Decant.

No. 3.—Dissolve alumina hydrate in cold strong acetic acid until saturated.

To Dye a Brown Color on 2 lbs. of Material.

Mordant in a mixture of 3 parts of acetate of alumina and 2 parts of acetate of iron, each 5° Baumé. Rinse. Dye by boiling with 1 to 2 lbs. of madder.

To Make Acetate of Iron.

Dissolve ferric hydrate (sesquioxide of iron) in strong acetic acid. The hydrate may be obtained by dissolving copperas in strong sulphuric acid, 20 ozs. copperas and 7 ozs. acid. Heat nearly to the boil and add with care 10 ozs. nitric acid, and when action ceases, add sufficient ammonia to throw down all the iron.

Ferric chloride solution to which some nitric acid has been added may be precipitated in the same way. The brown flocculent precipitate is ferric hydroxide, and is collected upon a cloth filter after dilution, and washed with water. Finally dissolve by putting in a bottle or jar with strong acetic acid.

Hints to Success in Redyeing.

Have the goods clean before dyeing. Don't have the bath too strong. Better have a long immersion in a weak dye bath than a short immersion in a strong one. Keep the goods under the liquid while dyeing; don't let them lie against the bottom of the boiler when over the fire, but keep pushed down, turned over, and continually moving until removed from the fire and from the dye vessel. Dyed goods should be pressed on the wrong side, but if necessary to press on the face or right side, wring out a cotton cloth and use it under the iron. Iron ribbons between damp cloths and stop ironing before they are quite dry to prevent stiffening them. Wind them over a roller instead of folding and laying them away.

Never put dry dye powder directly into the dye vessel, but first dissolve it thoroughly. If adding more dye to the dye vessel remove the goods, and with a portion of the dye liquor dissolve and add the solution to the bath and stir it up well before returning the goods to the bath.

To obtain the best results discharge as much of any previous dye as possible; try first with boiling hot water, and next with boiling water and some ammonia added. Ribbons and ladies' wear generally will strip off. Men's wear will not as the colors are of a much more permanent nature.

Where the old color can be in large part discharged, entirely new color can be put on as bright as can be

desired where, if not got rid of, it might entirely alter or change the new color.

Hard-twisted goods require more time in dyeing and weaker dyes. Light tan shades cannot be dyed satisfactorily in strong dye liquors; have them very weak to commence with.

Too much dye, put on too quick, is the cause of crocking; avoid it, and rinse well in soapy water to make sure all loose dye is out.

An écru is the merest tinge in the dye bath of very light orange to which is added a very little brown to throw it on the écru tint. Cloths taken from the dye bath should be wrung very gently, especially if very thin and light material, and are often torn by wringing too hard; best twist them in a towel if small.

Deep red, if dyed into black, requires some green added to the dye, or the black will be "rusty" or of a brownish shade. Conversely a deep green would require about one-tenth of the dye used in making it black to be red to insure a pleasing tone of black.

Fruit and Vegetable Stains.

Fruit and vegetable stains, wine and colored vinegar, tea, coffee, chocolate, etc., may be classed with saddened colors. Sun, soap, alkalies, perspiration, etc., being the saddening agent, they are often very fast fixed upon fabrics, and nothing short of a good bleaching agent can be depended upon to remove them. On white goods this can be done readily

enough, but unfortunately colored goods in general are sensitive to any reagent that will remove the stain. Fresh stains of this kind should be treated at once with water, cold at first and warm to hot afterward, that the effect be noted both upon the fabric and the stain. Weak acid solution of almost any kind usually makes them paler, but should only be tried after water has removed all that is possible that way. For white cotton goods bleaching-powder is the reliance. This substance, when fresh and good, is a very powerful bleaching agent. Unfortunately it does not keep well, and often when purchased, especially from druggists, is of very inferior quality or worthless from age. A small quantity of the dry powder placed in the bottom of a glass and a little dilute acid (vinegar, etc.) poured over it should effervesce (or foam) and give off a greenish brown vapor plainly visible in the glass. The smell is very characteristic and is injurious if breathed in any great quantity.

To Prepare Bleaching Liquor.

One pound of bleaching-powder to every 2 gallons of water. Rub the powder to a thin cream with a small quantity of water, breaking all lumps. Pour over it the rest of the water. Let settle and use the clear. Well corked, it keeps some time.

Javelle Water Eau de Javelle).

Four pounds sal-soda, one pound bleaching-powder (chloride of lime), and one gallon of water. Dissolve the sal-soda by pouring upon it the boiling-hot water

and stir in the bleaching-powder free from lumps. When cold bottle for use.

Many people keep on hand a quantity of Javelle water, and where considerable is to be made take 2 pails of hot water and stir in 5 lbs. bleaching-powder; stir 4 lbs. sal-soda in 1 pail hot water, 10 lbs. Glauber salt in 1 pail hot water. The contents of the 4 pails are to be poured together, mixed and settled, and stored in a suitable vessel. There are other forms of this preparation not so convenient to make, and possessing no greater efficiency.

It is also convenient to have dilute clear and colorless acid on hand all the time. For small jobs 2 ozs. of bleaching-powder may be quickly crushed in a mortar and one pint of hot water added, and after mixing and standing a few minutes, poured off and through a cloth for use.

Table-cloths, napkins, handkerchiefs, etc., may be put to soak in a tub of cold water containing the Javelle water, and worked up and down and around with a stick or the hand several times during an hour's soak, then wring out and put them into a fresh tub of cold water containing just acid enough to be perceptible to the taste, when they should be thoroughly bleached in a few minutes. Any very persistent stains may be touched with the finger dipped in the Javelle water and to the sour water once or twice.

A dipperful of Javelle water is sufficient for a large tubful of water for general purposes. If care is exercised to have the Javelle water free from sediment, and to rinse the goods thoroughly free from it, as

well as any acid used, the goods will not be injured. Carelessness in local applications of Javelle water are to be guarded against, doing damage to the fabric at the point where applied; not rinsing thoroughly out being most common.

Fruit and such stains do not show, as a rule, upon colored cotton goods except as an alterant to the color, and in rare cases they remove the color. After treatment with water, to get out all possible that way, a little ammonia will usually restore the color. Nine-tenths of all cotton colors are dyed in a neutral or alkaline bath, and acids will change them. Fruit juices are acid enough to do this, but not strong enough to destroy the color, and alkalies, soap, etc., restore it at once. Blood-stains, if very old, are removed by 1 oz. iodide of potassium dissolved in 4 ozs. of water.

To Detect Blood-Stains.

Tincture of guaiacum and a solution of hydrogen peroxide in ether produce instantly with blood or blood-stains a tint of blue, even if the stains are twenty years old.

Many medicinal preparations are decoctions or infusions of vegetable matters, and if got upon the bed-clothing, linen, napkins, etc., produce stains, to be treated in every respect as other fruit and vegetable stains.

If the medicines contain metallic salts and lie upon the linen for a long time, they get firmly fixed, and what does not come out by bleaching and repeated local application of Javelle water and dilute acid

must be treated for a moment to muriatic or oxalic acid quite strong and thoroughly rinsed off.

Iodine stains yield to alcohol, and if iodine solutions have added to them a few drops of liquid carbolic acid they do not then make stains. As follows: 45 parts alcoholic tincture of iodine, 6 drops carbolic acid, 1 oz. glycerine, 5 ozs. water.

All stains not metallic on white cotton or linen may usually be successfully treated with muriatic acid, 1 part of the acid and 2 parts water. Apply the acid to the stain and allow about 2 minutes. Then rinse in cold water. Muriatic acid is a volatile acid and does not injure fabrics if allowed to dry upon them like traces of sulphuric acid. Very delicate colors, where treated with an acid to remove a stain, may preferably have powdered chalk applied, than ammonia, to neutralize the acid effect.

To Remove Spots and Stains from Garments.

Grease-spots are of the most common occurrence. To remove these from white fabrics is comparatively easy, but to remove them from colored fabrics without at the same time doing injury to the color is often very difficult and sometimes impossible. Very much depends upon the skill and perseverance of the operator. Good soap and water is the most universal solvent for greasy matters, and where there is no reason for not wetting the goods, soap and water should be tried. Grease-spots from carriage wheels, sewing-machines, or any source containing iron from wear of bearings, or carbon from any source, red lead,

or any insoluble colored substance, should be first rubbed thoroughly with some oil that is itself capable of being washed out with soap and water, lard or fresh butter, olive oil, linseed oil, etc.

Much depends upon how this is done. Don't be afraid to use plenty of oil, butter, or lard, and then work with the fingers, bending the cloth back and forth as if you were breaking a wire, until upon holding it up to the light you see that the dark matter of the spot is completely and evenly distributed and worked up with the oil. When sure this result is accomplished, then work in a thick, cold, watery soap mass, obtained by boiling up sliced laundry soap in water and allowing to cool. It should have some sal-soda added to it in the boiling. If on touching the dry soap bar to the tongue, it does not "bite," it should have some sal-soda added to it in the boiling; work the prepared soap into the cloth where the spot is until the oil in its turn is worked up with the soap as thoroughly as the spot was with the oil. Now, and not before, wash out the spot with soapy water. Only with very old spots will any trace remain after this treatment. Grease-spots succumb very well if rubbed up with kerosene, the kerosene rubbed up with new milk, and the whole then worked with soap and water.

Removing Grease-Spots by Solvents.

The solvent should not be applied direct to the spot, but first make a ring around the spot with the solvent and then apply the solvent from the ring toward the spot, continuing until quite a quantity of solvent has

passed through the fabric at the point where the spot appeared. A pad may be held under the spot, or a plate set under to catch the drip. If the spot is treated with a solvent for grease in any other way than here indicated it is almost certain that you will have a large ring remaining after the solvent evaporates, fully as objectionable as the original spot. Use no solvent that leaves a stain or ring on a clean white paper when dropped upon it and allowed to evaporate at a gentle heat. The more common solvents are benzine, petroleum spirit, gasoline, naphtha, chloroform, ether, and fresh distilled turpentine spirits. Chloroform may be used near a light if need be, but the others are extremely inflammable. The so-called dry cleaners put the whole garment into benzine, gasoline, etc., and force in ammonia gas under pressure, which is very effectual. The vapors from benzine, gasoline, and all petroleum ethers are heavier than air, and the safest place for bottles containing them is near or on the floor. There is less danger of their being broken or of the vapors coming in contact with a flame. It is always best to scrape off all that is possible by careful use of a knife, followed in some cases by rubbing with cloth. Remove mechanically all you can.

To Remove Pine Gum, Pitch, Pine Tar, Rosin, and Oil Varnish.

These, if fresh, and the garment admits of the treatment, can all be removed perfectly by rubbing with oil and washing out with soap and water.

Scrape or otherwise remove mechanically all that you can first. Spirits of turpentine followed by soap and water is very effective. A mixture of turpentine and alcohol, or alcohol alone, may be used, by making a roll of cloth and using it as a dabber. The roll is dipped into the alcohol until quite wet, then struck forcibly upon the cloth, forcing the solvent through into some absorbent placed underneath. Fuller's earth, magnesia, chalk, starch powder, etc., may be placed under the cloth and a hot flatiron held above the spot and the rosin, etc., forced away from the iron through the cloth and into the dry powders.

To Remove Wax from Garments.

Scrape away as much as possible without injury to the cloth, then apply benzine in the manner given for removing grease-spots.

To Remove Wax Stains from Silk.

Powdered French chalk and lavender water rubbed gently into the silk, a piece of clean blotter laid over it, together with several thicknesses of brown paper and a hot flatiron rubbed over it. The wax gets into the chalk as the water dries out. Brush off the chalk and repeat if necessary. Have a care not to brush too hard or use too harsh a brush.

To Treat White Woollen Articles that have Become Yellow or Stained.

White woollen articles become yellow with age and the effect of repeated washings with soap and alkali. Such articles, when washed, would stay white longer

if no trace of soap was left in them. To this end an extra rinsing in water containing some ammonia is recommended. Small articles of special value may be advantageously treated to a bath composed of alcohol and water of each equal parts. The alcoholic mixture is applied after the goods are washed clean, and therefore becomes little soiled, and may be kept and used many times. The articles are simply immersed in it and squeezed out. Hydrogen peroxide is obtainable at drug stores, and is very handy for whitening small woollen articles. It is used too in a large way, but the practice, to be economical, must be as continuous as possible. The bath containing the peroxide decomposes continually, and if allowed to stand a day or two loses its efficiency. Make a 20-per-cent solution of the peroxide and immerse the goods therein. After some time take out and air. Repeat if necessary. By 20-per-cent is meant one-fifth the bulk of solution is to be commercial peroxide. Four lbs. oxalic acid and 4 lbs. table salt dissolved in 50 gallons of water, and the goods laid in for an hour whitens them very well. Sulphurous acid gas, the product of burning sulphur, is yet the best and most used bleaching agent for woollen materials. Suspend the goods in a close room, or a barrel with a lid, and burn the sulphur with just enough access of air to keep up the combustion and the goods surrounded with a dense fume. Leave them suspended over night. The goods are moistened before sulphuring; repeat if necessary. They may advantageously be moistened in suds before sulphuring, and blued when finished.

Wool fibres resist the action of acids very much better than cotton or linen. Therefore stains upon white woollens may be treated with comparatively strong acids with little fear of injuring them, especially if they be afterward rinsed.

Strong alkalies, especially if hot, attack wool strongly and must not be used except for a very short contact with the fabric, and immediately be rinsed off or neutralized with acid.

Perspiration-stains may be treated with strong solution of soda and well rinsed. Where so old that the woollen looks gray or frowzy, acid, especially sulphuric, or oxalic acid and salt tends to brighten it up after the soda treatment. Ink may be removed by muriatic acid, oxalic acid, etc. Muriatic acid 1 part to 2 parts of water, or oxalic acid may be powdered and put upon the moistened stain and a few drops more of water added and afterward washed off.

Mould should be wet first with ink and then the new stain and the mould taken out with muriatic acid.

Mildew, if gone very far, is irremovable. It is a fungus that preys upon the substance of the wool itself, alters its structure so that it will not take dyes, and finally makes it so tender as to fall away at the least strain. Mildew only attacks damp goods, and in a damp and warm atmosphere proceeds with remarkable rapidity. If the goods are at once dried, the growth is stopped. Woollen materials containing even a little common salt will not mildew, and this is extensively practised in mills to prevent it. For remedies, rub common yellow soap upon the mildew

spot, and then a little salt and starch on that. Rub all well into the article, and lay in the sun. Soft soap and salt, or the juice of a lemon, may be used in the same way.

To Wash Flannels.

Boil up some chipped white soap, or any good quality of soap, in a smallish quantity of water, and when all dissolved cool down in the same vessel with cold water, or pour into another containing water until the bath is just as hot as can be borne by the hands; then the articles are put in. Do not rub soap directly upon the flannel, nor rub as in washing cotton or linen. Use plenty of suds and souse the goods up and down and squeeze the liquor through them and put through a wringer. The rubber-rolled clothes-wringer is in every way far superior to hand wringing. After thoroughly rinsing the flannels in clear tepid water, hang in the sun to dry in good weather, or by the fire, avoiding scorching.

It is well before washing flannels to look them over for mud, chewing-gum, pockets full of dust, lint, etc., and remove mechanically all that is possible. If shrinking is to be wholly avoided the articles must be boarded or in some way kept out to shape while drying. If flannels, before making up, are wet out in hot water, and then suddenly cooled, and repressed after drying or while yet damp, they will not in wear and washing shrink nearly so much. If flannels in the bolt or roll are put into cold hard water and allowed to remain until they sink, then taken out

drained and dried with the least handling possible, they do not lose the new appearance, nor will they afterward shrink very much.

To Wash Red or Scarlet Flannel.

Prepare a suds of soft or olive-oil soap. Four table spoonfuls of flour are added to a quart of cold water and then boiled for 10 minutes; add this to the suds. Wash the red or scarlet flannel in this suds, sousing up and down, and rinse in 3 or 4 warm rinse baths. This will preserve the brightest scarlets. By soft soap is not meant the brown home-made article reeking of free alkali, but a good potash soap. Woollen articles always look and feel better where potash soap is used, and it should be as nearly neutral as possible for flannels. In lieu of the flour, bran may be used, or a decoction of clean, dry hay on colored goods.

To Keep White Flannels from Turning Yellow.

In the last rinsing put a tablespoonful of a solution of 1 part of oil of turpentine dissolved in 3 parts of alcohol. The white woollens after immersion in this are to be well squeezed out and hung to dry in the open air. The theory is that the turpentine converts oxygen into ozone when thus exposed to the light. The smell of turpentine disappears, leaving no trace behind.

To Clean White Woollen Shawls.

Brush and shake out as much dust as possible. Spread on a table, and sprinkle over it a liberal quantity of ground white rice or potato starch (not wheat);

fold up the shawl into a square, laying the powder liberally between each fold. Lay aside for a day, then take out of doors and shake, and brush out all the starch. If the starch is very slightly blued the whiteness of the shawl is improved. Any light gray or blue shawl can be treated in this way and much improved, where any process of water washing would have felted and matted the fibres, giving a most mangy and unpleasing appearance.

To Treat Soiled and Stained Colored Woollens.

These articles are of great variety of weight, color, and fineness of stock. The aim should be to cleanse them with the least amount of friction and rubbing. and to subject them to no sudden and great changes of temperature. Also to not allow them to lie in rough heaps when wet, but immediately to open and spread them in the best manner possible to conform to their proper shape and to hold them in that position until quite dry before proceeding to press them. They should never be sprinkled, but pressed under a damp cloth free of lint. Men's suits or any cloth with a nap should, before drying, be brushed with a good bristle clothes-brush to lay the nap all one way. If this is thoroughly well done the pressing is a comparatively easy task.

Some colors on wool are unfortunately not fast to steaming; that is, when damped and a hot flatiron is applied the color is changed or even destroyed. This is only true in certain light and delicate colors for ladies' and children's wear, and where the dyer has

used certain of these dyes to shade his color. Therefore it is well to try a portion of the goods in hand and see if they are changed, and too if the heat of the iron and dampness can be regulated to prevent it. Many colors that seem at first quite changed will restore, on standing; and again some are more affected by dry than damp heat.

Where there are stains upon colored woollens that do not come out in the cleansing it may nearly always be assumed that there has taken place a removal or alteration in the color that will require treatment with special reagents to restore them.

To Clean Woollen Clothes Not Much Soiled.

To clean woollen clothes not much soiled mix 1 oz. sulphuric ether and 1 oz. ammonia in 1 quart of water. Rub all one way with a sponge wetted with the mixture to remove the dirt. The sponge should be squeezed out frequently, and all parts evenly treated. Recent acid stains are neutralized by the ammonia, and the ether helps to remove oily matters, and both being completely volatile require no rinsing out. If the article is very soiled it will be necessary to go over it a second time, using fresh and clean solution.

To Clean a Suit of Clothes.

Prepare 4 ozs. washing-soda dissolved in 1 quart hot water, and add to it one fair-sized *fresh* beef gall. Lay the garments flat on a table or board and with a brush, the way of the nap, rub well the spots and most soiled portions first, and afterward the whole

garment. Dip the brush frequently in the liquid and when sufficiently rubbed in all parts, rinse in clean soft water until the rinsings are clear. Pass through a clothes-wringer if possible, or press out the water as well as possible with the hands, but do not wring. With fulled cloths it is sometimes permissible to press them while still damp, but it is best in most cases to dry thoroughly while the goods are kept in proper shape by stretching, hanging weights, or in any manner holding them out to prevent shrinking. Bear in mind to keep the nap laid as straight as possible during the drying; see that the cloth used in pressing is free from lint, and the flatiron not too hot, and press the seams from the wrong side. The rest of the garment from the face. Keep the brush handy, and lay the nap if needed as you work.

To Clean Wool Carpets.

Take them up and thoroughly beat and shake them in a good breezy place to get out all dust. Have the floor scoured clean and when dry replace the carpet, and if still much soiled and dingy go all over the carpet with ox gall and water. The secret of success is to clean and rinse them thoroughly without soaking them through. A pint of *fresh* ox gall is put into a pail of clean soft water and another pail of clean water set handy. With a brush rub up a lather upon about a square yard of the carpet by dipping the brush in the ox gall and scrubbing not too hard, but with just the movement that raises a lather, but does not remove fibre from the carpet. Now with a soft cloth

or large sponge, not too wet, remove the lather, aiming to get it by frequent wringing out of the sponge in clear fresh water. After all is done open the windows and the carpet will soon dry out. Any particularly dirty spots should be rubbed with strong gall solution, only ½ water. After drying, if grease-spots show up, pulverize and mix equal parts of magnesia and fuller's earth. Make into a paste with boiling hot water and apply to the spots as hot as possible. After drying brush off. It is best usually to let this mixture be on over night and until quite dry. This operation is laborious, but the results are good. Soap suds and ox gall may be used, but it is not nearly so easy to remove, and any soapy residuum catches dust and soon becomes soiled again. Ox gall brightens the color of the carpet, especially greens. Rugs and stair carpets can be laid across a table after beating, to remove the dust, and be treated in the same way.

Any wool, silk, or worsted article not too large, that admits being wet, may be most efficiently cleaned as follows:

To a suitable sized tub or vessel partly filled with water add 2 per cent of the weight of the goods of sal-soda and an equal amount of ammonia. With coarse goods and fast colors the sal-soda and ammonia may be doubled or trebled. Pour now into the water a solution of soap in carbon tetrachloride. This article may be purchased under the name of tetrapole from Farbenfabriken of Elberfeld Co., and is most valuable. It is entirely neutral, will not injure colors or the most delicate or sensitive skin, is miscible with

cold water in all proportions, and as a remover of grease has no equal. The quantity to be used depends upon the condition of the goods, and a trial will determine if enough has been added to the bath. Excess does no harm. If very large or bad grease-spots appear, concentrated tetrapole may be applied to them, without fear of injury, before or after they have been in the bath. Spots of grease can be thus rinsed out without wetting the garment throughout. The only precaution is to add the tetrapole to cold water first, and if warm water is wished, add it later. Adding tetrapole to hot water causes a loss of the volatile carbon tetrachloride. Cold water, or at most, warm water, is all that is needed, and the odor is quickly lost on drying. An equal money value of tetrapole will do as much work as soap. The labor and time are shortened, and above all spots come more easily out of the goods. The formation of lime and magnesia soaps in the bath and upon the goods is in great measure avoided and the goods feel softer and keep clean longer than if washed with soap.

To Clean Woollen Stockings and Hose.

Boards made to fit the stockings and hose are almost a necessity where first-class work is to be done, that by drawing the articles one by one upon them when the washing and rinsing is finished they may keep their original size and shape. White woollen socks for laboring men, and indigo blue articles of footwear shrink and thicken very fast in the ordinary way of washing and drying. Never rub soap directly

upon the stockings. Where they are very soiled two soap baths are provided, the first very soapy, into which the stockings are best put one by one, but may be thrust under several at a time and lifted almost at once. Drain and squeeze just so they do not drip, finish the washing in the second soap bath, avoiding rubbing, but by an effort squeeze the soapy liquid through their substance, and rinse well in water of the same temperature as the soap bath.

To Clean Woollen Underwear.

Boards for these are very necessary if their shape and comfort and good appearance are cared for. Ammonia in the soapy bath tends to fluff and keep them soft and easy to free from soap in the rinsing. Stains from perspiration, contact with leather, buttons, etc., may be touched with quite sharp-tasted muriatic acid, and rinsed, or powdered oxalic acid and salt. Colored underwear must be treated pretty carefully that the spot may not be worse. Perspiration turns cochineal-red shirts a dirty faded blue that is helped by acids.

To Remove Paint.

Paint, when fresh, washes out as readily as any grease-spot. As it ages and oxidizes it becomes more and more difficult to soften and remove it. Paint-spots on very delicate colors, when old, will require treatment calculated to remove the color along with the paint. Oil the spot and rub the oil in patiently. striving to blend the spot with the oil. If the spot is

very old allow to lie with the oil upon it for several days, rubbing occasionally to see if the paint is softening. A few drops of turpentine, kerosene, or any solvent for greasy matters may be added and worked in. Old lead paint is very persistent. Finally, wash out like a fresh grease-spot. Large quantities of such materials, like paint and tar clips from wool-sorting plants, are treated as follows:

Weigh up the material to be treated, and for every 5 lbs. of it weigh off 1 oz. of caustic soda, which dissolve and add to a tub of sufficient size to hold the batch. Crowd the material down under the water and mix by poling. Allow to stand for several days in the cold, poling up occasionally, and testing the spots of paint until they spread out under the fingers to a smear, then wash the whole in the usual way in machines or hand tubs. Tar is more resistant than paint, if old. The writer is of opinion, after many experiments, that when tar has weathered enough to become brittle, it is quite hopeless to try to remove it. When fresh it rubs up with oil and will wash out. The preparation of soap dissolved in carbon tetrachloride is most excellent for removing paint when fresh, or when softened by oil, and preserves the color of the article more fully than soap and water. Varnish is treated same as for paint.

To Restore the Lustre to Woollen Cloths Removed by Washing.

Brush the cloth over the way of the nap with a cloth-brush wetted with very weak gum water. Lay

over it a piece of heavy glazed paper or sized cloth (the paper is best), and apply a weight, or put in a screw-press until dry. Heated press-plates are used in a large way for this purpose, alternated with folds of cloth and paper until several feet in height, then a powerful screw-press is brought down upon it for some time. This is repeated to bring what was the edge of the folds to the centre. It often happens in removing a spot or stain from woollens the lustre goes with it. The treatment with gum water after brushing the nap level and the right way will quite restore it.

To Restore the Nap on Cloth.

Where the nap seems to be worn away and the cloth still has a good body, the nap may be restored by soaking the cloth thoroughly and laying on a smooth board. Then with a half-worn hatter's card, a well-soaked teasel burr, or even a cockle burr, or thistle-head, scratch up a new nap. Brush finally the right way of the cloth with or without gum water and press. Care must be taken not to overdo this work.

To Wash Woollen Shawls.

Make a good suds as for flannels and to it add 3 tablespoonfuls of spirits of turpentine and one tablespoonful of ammonia. Souse the shawl up and down and press out and through it until apparently the suds has done its work. Rinse in plenty of clear water, warm to be comfortable to the hand, and if delicate colors likely to run are present, rinse in

another water containing salt. Fold between two sheets so that the folds of shawl are entirely separate, and finally press with a cool iron. Shawls so treated look very much refreshed. Fringes may be beaten with any smooth article like the back of a hairbrush, avoiding to strike forcibly enough to detach the fringe.

To Clean Colored Woollen Dresses.

Four ozs. potash (or soft) soap, 4 ozs. honey, the white of an egg, and 4 tablespoonfuls of gin. Mix all well together and add just enough water to have it work well with the brush. Such parts of the dress as cannot be laid flat should be ripped apart, then with a rather stiff brush, on a smooth table, scour the whole thoroughly. Afterward rinse thoroughly in cold water, leave to drain well toward the narrowest point, and while yet quite damp iron with a piece of muslin laid over the dress. Keep the dress quite smooth during the brushing, and brush as evenly as possible the way of the cloth, which is always down (toward the feet) when worn.

To Wash Colored Woollens.

Colored woollens may be well washed in a solution of one part of waterglass in fifty parts of water. The bath should be 100 to 120 degrees Fahr.

Boil 2 lbs. soap shavings to a paste with water, and add 6 to 7 gallons warm water, 1 tablespoonful spirits of turpentine and 2 tablespoonfuls of ammonia, and mix thoroughly. Have the bath at about 110° Fahr. and put the goods to soak for 1 hour. Have the tub

covered, while soaking, and then souse the goods up and down to work the liquor through them and rinse in fresh warm water. The soap liquor may be reheated, and about half as much turpentine and ammonia added and used over again. Wash the least soiled articles first. Observe when hanging the goods to dry to have them as nearly as possible pulled and stretched to their proper shape.

To Wash Flannels and Woollen Articles.

Shave a little white soap into a pail, pour water boiling hot upon it to dissolve it, and add a tablespoonful of ammonia. Pour the hot suds upon the flannels in a tub and pole them up with a stick, as the suds is too hot for the hands. Squeeze out through a wringer and pour upon them a fresh suds with only one-half the soap. Have this suds as hot as can be borne and rub the soiled spots, but never rub fresh soap on them. Wring into clear hot water containing just a little ammonia for the rinse bath; wring through the wringer as dry as possible and dry quickly. Never scrub flannels on a washboard, nor rinse in cold water, as either will cause them to shrink. Never use soda or bleaching-powder on flannels. When they are dry, stretch them and rub all over with a clean rough flannel, to keep them fluffy and soft.

To Iron Flannels.

Flannels are best if not ironed, but where thought necessary to do so, lay the dry flannel upon the ironing-board, covering with a damp cloth, and iron

over this. Use a moderately hot iron and press heavily.

To Wash Woollens.

Separate the white from the colored woollens. For white woollen articles make a very hot suds, to which add a liberal quantity of powdered borax, or lump borax dissolved in boiling water. Plenty of borax gives to white woollens a softness and looseness of texture and a brilliancy of whiteness which frequently they do not possess when new. For a very choice article, where shrinking is to be avoided and wanted to look the best possible, pass it once through the wringer when the dirt is washed out and from very hot rinse water, then repeatedly through the wringer with soft dry drilling or a dry sheet around it. After several wringings in the dry cloth the flannel will feel almost dry, and finish the drying in a warm place in the shade. For the colored woollens add to the suds sal-ammoniac. Prepare two tubs by dissolving 2¼ ozs. yellow soap in every 2 gallons of nearly boiling-hot water in the first tub. Have this tub pretty full and take from it for the second tub and dilute with water not so hot until it is about half as strong with soap as the first, and add to this second tub one table-spoonful of spirits of sal-ammoniac for every gallon. Take the smaller and cleaner articles first, just a few, say, three or four pairs of socks or equal bulk of other goods, and push them down and about with a clean stick. If the stick has a flat square piece upon the end it will aid in squeezing the articles on and against

the sides and bottom of the tub. When sufficiently worked, squeeze as dry as possible, and into the tub containing sal-ammoniac. Work in this and look for spots, which rub out, and wring by a clothes-wringer. Pull the garments as well as possible into shape. Undershirts should be stretched in the width, especially the sleeves, which tend to become slim and long. In hanging on the line, hang them to favor the true shape; for instance, with jackets and undershirts, hang only crosswise, collar to the right and tail to the left.

To economize heat, water, soap, etc., it is of importance in washing woollens that but few articles be handled at a time. It is also very important that the suds be kept hot, or be reheated. A good plan is to replenish the first tub from the second and adding fresh hot suds to replenish and some sal-ammoniac or borax, according to whether the goods be colored or white. Even suds that is almost black can be further utilized by allowing to settle and pouring off the upper portion, and using for first washing of coarse colored cloths, rugs, etc.

To Clean Carpets.

To Sweep a Carpet.

Before applying the broom, have at hand some material to scatter upon the carpet to catch and retain the dust, as sawdust, tea-leaves, salt, meal, etc. If also the broom is dipped in soapsuds once a week it becomes tough and pliable and will not cut the carpet. It is best to scatter the slightly damp

material over but a yard or two of carpet at a time, and sweep from one corner of the room where it is not likely to be so dirty. After sweeping along a few feet take up the bulk of the sweepings and scatter a fresh portion. When across the room, return on the next breadth, and so on until the room is finished, moving as best you can the furniture. The tannin of the tea-leaves, oak-sawdust, also the salt, tend to brighten many colors. A pint of ox gall to a pail of water is an excellent thing to apply to spots on a carpet. Work with a brush and sponge off with clear water, having the sponge as dry as possible.

To Clean Chamois Skin.

Chamois skin (wash leather) requires to be kept clean, soft, and free from any hard particles that will scratch varnished surfaces over which it is rubbed. Chamois leather washes like any fine piece of woollen cloth, except that the leather is injured by hot water if beyond a heat that the hand can comfortably bear. They must also be kept from drying stiff by having the last water quite soapy or by putting a little glycerine in the water from which they are last taken, and before quite dry be pulled and worked until quite flexible and soft.

To Remove Roofing-Tar from the Hands and Garments.

Roofing-tar (coal tar and asphalt) is not in the least affected by washing with soap and alkalies, even when fresh. If rubbed, however, with tetrapole until soft-

ened, which is quickly accomplished, it will rinse out with cold water. Rubbing up with oil until thoroughly incorporated with it will render tar of this sort removable with soap and water. Kerosene softens it, and with skimmed milk and soap it comes out fairly well.

To Wash Silk.

The cleansing of silk is a very nice operation. Many of the colors are liable to be altered or removed by washing in hot suds. Wherever possible a small piece of the goods should first be operated upon in order that the solidity of the color may be determined, and the general effect noted of the menstruum employed for washing. No person should ever wring or crush a piece of silk when wet, for the creases thus made may remain forever, especially if the silk be thick and hard. A good way to cleanse silk is to spread it upon a clean, smooth board and brush with a rather stiff bristle brush dipped in a rather stiff solution of good neutral soap. Nap is not usually present upon silk; still it is best to brush mostly in one direction, as it is easier to see what progress is being made, to note the general effect of the work, to observe if spots are coming out, and the evenness of the work. The soap should be removed by brushing both sides with clean, cold, soft water rather copiously and soaking up excess with a clean soft sponge. The sponge may be dipped finally in alum water and, not too wet, rubbed on the face of the silk, to prevent colors running. Though all colors may not withstand

alum, still 1 oz. of alum to the gallon of water does not alter most colors noticeably; best try it on a small piece first.

To Clean Silks and Silk Unions Having Delicate Colors.

Peel and grate raw potatoes to a fine pulp. Add one pint of water to each pound of potatoes. Pass the liquid through a rather coarse sieve or cloth into a vessel and allow the starch to subside. Pour off the clear for use. Spread the article upon a table which is covered with a sheet, and sponge the fabric until the dirt is removed, then rinse several times in clear cold water. The colors will not be injured. Prints can be successfully treated in this way. Avoid wringing the fabric unless through a wringer.

To Wash Silk Ribbons.

Silk, Damask, Satin, and Brocade Ribbons.

Rub the materials with a yolk of egg or Venetian soap, wash them in tepid water, rinse, and dry. Next dissolve good gum tragacanth (gum dragon) in equal parts good white vinegar and soft water. Strain the solution through a cloth. Dip the fabric in the gum water, very thin, and brush out the bulk of it as far as possible. Spread the ribbon flat and dry quickly. Iron when quite dry. The gum water should be about half the consistency of bandoline for the hair. Gum dragon swells enormously, and a very little of

it suffices. Soak the gum over night, warm up in the same water, and add the vinegar. Don't be afraid of getting too thin. Keeps well, and if used to moisten the hair causes it to keep its position much better than when the hair is done in the ordinary way.

To Wash White Silk Stockings.

Wash in the ordinary way with good soap lather and rinse well to remove the soap. Then hold them over the fumes of burning sulphur, stretching the stockings so that the fumes get to every part of them. Turn the stockings inside out and draw up on a frame and smooth with a glass roller while still moist, and dry in the sun.

To Wash Silk Pocket Handkerchiefs.

Soak the handkerchiefs over night. Any containing snuff should be soaked by themselves, and after rinsing put with the others. Wash in lukewarm water. Have a rather concentrated solution of soap, as neutral as can be obtained, in a basin; work the handkerchiefs in this one at a time to soap them, and then wash in the warm water. They may wait to be rinsed all together. If yellow or stained they should be sulphured. Put sulphur in an iron pot, or melt and dip into the melted sulphur rags put in a split stick. The latter can be thrust into the ground and ignited and a barrel containing the suspended handkerchiefs turned over them. Sulphur for several hours.

To Renovate Black Silk Crape.

Skim milk and water with a very little glue or gelatine in it made scalding hot will restore old black rusty crape. If clapped between the hands and pulled gently till dry it will look as good as new.

To Wash China-Crape Scarfs.

If the fabric is good it may be washed as frequently as need be with no diminution of its beauty, even if various shades of green and other colors appear in it. Make a strong lather with boiling water and shaved soap, let it cool, and wash the scarf quickly by dipping in the lather, squeezing in the hand and washing out in clean water just warm to the hand. Rinse in water containing a handful of salt, squeeze as dry as possible, and pin to the line at the extreme edges so that no part is folded upon itself. Dry as quickly as possible.

To Wash Black Lace Veils.

Any article of black lace can be successfully washed in this manner. Mix ½ pint beef gall with ½ pint hot water, have as hot as the hand will bear. Thrust the veil into the mixture with the hand and open and shut the hand around the veil repeatedly. Rinse in two portions of fresh water, the last one very blue with bluing. After drying, dampen with very weak glue water, bandoline, or gelatine water. Clap it between the hands; open and pin the edge very nicely to the line. When dry iron on the wrong side over a linen ironing-sheet.

Silk Ribbons Having Gold or Silver Threads.

Boil the ribbons in honey-water to protect the colors; then wash in solution of ox gall and soap; manipulate the ribbons with one hand while pouring the soap and gall solution over them with the other hand. After washing, dip in clean gum water, either gum Arabic or gum dragon, and press between mangle rollers. Fasten some weight to one end of the ribbons and hang to dry; the quicker they dry the better they will look.

To Clean and Revive Black and Other Silks.

Cut an old kid glove in fine pieces and pour a pint of boiling water upon it. Cover, and let stand all night in a warm place. Boil it up again in the morning and strain it, and add ½ tablespoonful of alcohol. Use the warm solution, and sponge the silk on the right, or face, side, and press immediately on the back side. For white or light silk use a white or pale glove. A flannel dipped in gin is good to rub and restore all dark-colored silks.

Black Reviver for Silk.

Bruised galls 4 ozs., 1 oz. each of extract of logwood, sumac leaves, copperas, and filings of iron free of grease. Put the galls, logwood, and sumac into a quart of good vinegar and keep in a warm place 24 hours. Then add the crushed copperas and iron filings, and let stand for one week with occasional stirring. Keep in well-stoppered bottles. It may be applied to faded spots with a soft sponge, on the end

of a wire and attached to the cork. It is also very good for restoring the black color of leather. Remove all grease from the leather before applying. For silk not much faded put ¼ pint of the reviver in ½ gallon of water and a cupful of ox gall. Make hot, and sponge the silk not too wet, and dry and smooth with an iron.

To Wash Black Taffeta.

Wash in three baths containing Venetian soap. Rinse and stiffen with gum Arabic water and a little vinegar, or rub the fabric with a sponge dipped in beer. Wring between cloths and iron on the wrong side.

To Wash White Taffeta.

Soak one hour in warm water. Make a 2-gallon solution containing 2 ozs. Venetian soap (or any good soap) and a double handful of bran. Rinse, sulphur, and stiffen by passing through a very thin solution of gum Arabic or gum dragon colored slightly blue with Saxony blue, or any good bluing, mangle between two cloths, and afterward brush the surface lightly. Venetian soap presumably contains some Venice turpentine.

A Preparation of Soap for Washing Silk.

150 oz. soap,
150 oz. ox gall,
16 oz. honey,
16 oz. white sugar,
25 oz. Venice turpentine.

Melt all together, and pour into a mould lined with a damp cloth. The soap will become hard and ready for use in 24 hours.

Ox Gall.

This is the contents of the gall-bladder of beef cattle, and may be obtained from slaughter-houses. It is best when fresh, but several galls may be procured when convenient or ordered sent to the house, and the contents may be emptied out and treated, to preserve them. One pint ox gall and 2 ozs. of powdered alum are boiled together, to which add 2 ozs. common salt. Let the liquor settle, and add a few drops essence of lemon. Pour off into a bottle and cork tightly; or—

Stir 45 parts ox gall with equal quantity of hot water, and add 2 ozs. alum. Stir the mixture for ½ hour, and when cold filter; the filtrate is colorless; add to this ⅛ of its bulk of strongest alcohol, let stand 2 days, and pour off the clear for use. The crystals of alum, etc., remaining are of no value; or—

Empty the gall into a bottle, put in a handful of salt, a teacupful of gall to 5 gallons of water will prevent colored articles from fading.

A Scouring Liquid.

22 gals. hot water, in which dissolve
15 lbs. white Marseilles soap,
10 lbs. carbonate of potash,
10 lbs. extract of Panama.

In another vessel mix 15 qts. ox gall or sheep gall,

3 pts. ammonia. Take $\frac{1}{3}$ of the soap mixture and $\frac{2}{3}$ of the gall mixture and add some aromatic essence. Heat, let cool, and add 3 gallons 90-per-cent alcohol. Decant and filter.

To Clean Silks.

Washing silks in the way that linen is washed spoils them, no matter how carefully it is done, and therefore should never be done unless absolutely necessary. It is far better to lay them on a flat surface and sponge them with soapy water and rub with dry cloths and iron on the wrong side. If the article is of such shape that it is inconvenient to iron the wrong side, it may be done on the right side with thin paper laid over to prevent glazing. If faded, sponge over with alcohol, or any reviver of colors before pressing with the iron.

Bullock's gall is a universal reviver of colors and one of the best detergents. Where it is deemed best to wash the silk pass it through and through the soap liquor, working the more soiled places and spots with a squeeze of the hand. For white silk there should be employed a white soap containing very little free alkali, well rinsed, and stretched with pins to dry. White may be bleached with alcohol containing $\frac{1}{2}\frac{1}{4}$ its bulk of muriatic acid. For black and dark-colored silk, best use no soap, but sponge with ox gall and hot water equal parts, and use warm on both sides of the silk. Remove the gall thoroughly by sponging with clear, warm, soft water. Lastly, if the silk needs to be stiffened, sponge over with glue

or gelatine water on the wrong side, being careful to do it evenly, and dry quickly. The glue water must be very thin. Smooth with a warm iron on the wrong side. Rain or cistern water is termed soft water. Usually well waters contains more or less of lime or magnesia and other mineral matters, and are termed hard water.

To Bleach White Silk.

The article to be bleached must be first cleansed from grease and dirt, and the process of cleansing chosen with due regard to the nature of the article, and all the cleansing agent thoroughly removed by sponging, rinsing, etc. Use peroxide of hydrogen, one part of peroxide to four parts of water with or without traces of ammonia or soda lye. The silks are simply laid in the liquid to steep as long as may be necessary. Heat decomposes the liquid, but accelerates the bleaching; but never heat above 90° Fahr. Setting in the sun is sufficient. The bleaching goes on for some time after the article is taken out of the bath, and yet moist; therefore do not hurry the drying. White articles of wool are bleached by identically the same process. When the goods have laid long enough in the bath, and also lain as long as deemed necessary after taking out of the bath, rinse in soft water and dry.

To Remove Tar-, Grease-, and Oil-Stains from Silk.

Rub up the tar with fresh oil. Don't rub so hard as to break the grain of the silk; best use a brush with

the silk drawn tight over a bottle. Old oil- and grease-stains may well be treated as for tar. Linseed oil stains, if old, yellow the fabric so the spot needs bleaching. When you have got the spots prepared, remove by brushing with a tooth-brush dipped in a solvent for grease. For very small spots lay the silk over the end of a concave-bottomed bottle, the spot in the center, and wet the high edges with clean solvent and work toward the centre so as to have the solvent drip through the centre. Work a bit with one finger end to cause any solid matter to work through. Endeavor to prevent spreading in every way possible.

To Treat White Cotton Goods.

By far the larger part of garments and other articles made for use in the form of cloth are of white cotton. White paper is also to be classed under the same head. They are both nearly pure cellulose, a vegetable substance composing a large part of all plants, trees, grass, etc. Cellulose may be considered as insoluble in alkalies. Cotton goods, uncolored, may therefore be treated at any heat up to the boiling-point with very alkaline solutions without sensibly affecting their strength or wearing qualities. Most forms of grease and dirt yield to such treatment and come out in the boil. It is always well in the boiling to have the boiler covered. The cover holds the steam almost to the exclusion of the atmosphere. Cotton projecting above the surface of the boil is very apt to acquire a stain from oxidation unless a

cover is provided. These stains are usually gray in color, though sometimes brown or brownish. They are probably oxidation products same as the weathered appearance of an old wood house, or fence-rail. The brownish stains probably are from metallic salts from rusty boilers or fruit juices (pectous matters). Either one is very permanent, and an ounce of prevention is better than a pound of cure. To remove chances of these stains and to soften and remove as much as possible of dirty matter, that might "boil in," the white cotton goods should be soaked over night, wrung out and rinsed before going to the boil and specially all stains of vegetable nature, blood, discharges from the body, removed in cold or hot water free of alkalies before the boiling is proceeded with. Also the very soiled and stained things should have a separate boil by themselves. Stains remaining after boiling require usually to be bleached. Very much of the tendered cotton we get from washer-women and laundries is from an ill-advised use of bleaching liquors and compounds.

The boiling liquor from which the cleanest clothes have been taken may be used again for articles not needed to be so white, that have been sorted out from the first lot. A tablespoonful of turpentine, kerosene, and some other things are recommended to be added along with soap and alkali in the boiling of white clothes.

The "sudsing water" is a matter of importance. It should be clear, soft water, and warmed so as not to chill the clothes and cause loosened-up matters

to "set." Ammonia in the water, or borax, is a great benefit. The goods are lifted from the boiler with a pole of convenient size and shape, often forked at the end to facilitate getting a grasp upon the cloths and sort of winding them up so as to express as much of the "boil" as possible and also to expose as little to the air as possible, and transferred with a dexterous twist into (not on top of) the sudsing bath. They may lie in the sudsing bath for some time without any ill results, or until the next boilerful has been got going. They may now be soused up and down and wrung out into the rinsing water, which may, or may not be the bluing water. The writer considers that too great care is impossible in rinsing and bluing cotton goods.

Yellow cistern water is found in many places. This is very objectionable, and the water in the cistern should be thrown out and the cistern cleaned and provided with a charcoal filter, which is a small cistern at the side and above the main cistern, and connecting with it by a rather large conduit protected by a screen. The charcoal should be as free from dust as possible. A layer of gravel is laid over the screen to the conduit and the charcoal placed in the filtering cistern as evenly as possible to $\frac{2}{3}$ to $\frac{3}{4}$ its capacity. A board or stone is so placed that the water first strikes it and is spread over the charcoal.

Where from any cause the water in the cistern cannot be thrown away, it may be deodorized and cleared perfectly, making it even fit for drinking purposes.

A saturated solution of permanganate of potassa is one of the most efficient and elegant of all disinfectants. A teaspoonful in a soup-plate full of water placed in a room is very useful to remove bad odors; when the pink color disappears add more permanganate. Crude permanganate of potassa is sixteen times cheaper than the pure, and is just as good for deodorizing purposes. Its solution is green, but even in the cold, and rapidly on boiling, changes to pink, and is fit for use. About a tablespoonful per hogshead is generally enough to purify the water in a cistern. Even if an excess is added it is only necessary to put a clean white piece of wood, or a cup of tea, into the cistern to remove the red color. The small amount of potassa remaining in the cistern (not $\frac{1}{100}$ grain per gallon) cannot do any harm.

Bilge water in boats and large ships may be very successfully treated with permanganate of potassa.

Besides the better appearance of her wash, the housewife can well afford the little trouble and expense of purifying the cistern water. It is very disagreeable to think of that putrid smell so often met with in kitchens, and from purely hygienic motives, all that is possible ought to be done to keep a water supply clean and sweet.

From a variety of causes, boiled cottons acquire a faint yellow tint; especially is this true where not well soaked and rinsed or from having unbleached cotton boiled along with the white goods. The effect of "bluing" is to overcome this, and if a bluing is

selected having a reddish shade of blue, the result is more perfectly to restore the goods to a white condition. Bluing must be very carefully dissolved and thoroughly mixed with the bluing water, and the goods put in well opened out and the bluing-tub never crowded with materials to be blued. After bluing they should be wrung so dry as not to drain when hung, and the drying done as quickly as possible in the open air.

To Fold Clothes from the Line.

Fold the fine articles and roll them in a towel; then fold the rest, turning them right side out. Lay the colored articles separate from the rest; sheets and table linen should be shaken and folded. Starched things are very apt to mildew, and the other unstarched things may mildew if left to lie too long.

To Iron Clothes.

The ironing of the every-week wash may be said to be a matter too simple to need any elucidation, and that plenty of good hot "flats" and elbow grease are the prime requisites. However, in ironing a shirt, first do the back, then the sleeves, then the collar and bosom, and finally the front. Iron calicoes generally on the right side, as they keep clean for a longer time. In ironing a frock, first do the waist, then the sleeves and then the skirt. Keep the skirt rolled while ironing the other parts, and set a chair for the sleeves while ironing the skirt, unless an iron-

ing-board is used. Silk should be ironed, if at all, on the wrong side, while quite damp, and with a very moderate iron, or the colors will "steam out." Always iron lace and needlework on the wrong side and put them away as soon as dry. Damp velvet on the back and draw it around the iron set upon end, holding it straight.

Scorched Linen.

It often happens that things get scorched in the ironing, and rendered thereby very unsightly, if not permanently injured. To restore scorched linen is a matter of great difficulty, and where the scorch actually consumes the thread, is hopeless. Slight scorches often disappear in subsequent washings, but this may be hastened and greatly aided by applying the following composition:

Beat two large onions to a pulp in a mortar, and express the juice; add to this 2 ozs. pulverized fuller's earth, or any clean dry clay, ½ oz. scraped soap, and 1 oz. dry hen's droppings, and ½ pint of strong vinegar. Boil this mass for some time and stir occasionally until it is quite thick. Spread this thickly over the entire size of the scorch and let lie for twenty-four hours. With light scorching this is sufficient, but if bad another application is necessary. Wash well each time and a complete cure is usually effected. Keep the balance of the compound where it will not dry out, in a jelly tumbler with a rubber or similar receptacle.

To Bleach Yellow Linen.

Never try to bleach linen before washing; if the bluing does not restore it, it must be bleached. Work the linen well in water containing some clear solution of bleaching-powder, and afterward rinse well in clear water. Avoid using too strong bleaching-liquid. Use as little as may be. A slight souring in water containing acid after being in the bleach and returning to the bleach bath will thoroughly whiten the goods without further addition of bleaching-powder. Rinse well when done.

To Detect Cotton in Linen Goods.

Remove the size by boiling in water, then unrave some threads from both warp and filling and put into a solution of fuchsine in aniline. Both become dyed, but take out and wash and put, while damp, into ammonia. The cotton threads will lose their color.

To Clean Lace, either Silk or Thread.

Make in a boiler a very strong lather of white soap and clear soft water and add a few drops of strong ammonia. Sew around a black bottle a piece of linen or muslin; tack one end of the lace to the covering, and then wind the lace around the bottle; wind from the top downward, having the edge of the lace down in such manner as to keep covering the edge; secure the end finally with needle and thread. Fill the bottle with water at same temperature as the lather in the kettle and secure the bottle upright in the kettle by

strings tied to the ears, and around the neck of the bottle. Boil it for an hour, keeping the liquid above the lace, and when clean remove the bottle, drain, and rinse with very warm water and dry in the sun. When dry wind it round a ribbon block, or lay in long folds between paper, and press in a book.

Instead of boiling, the lace on the bottle may be set in the suds and gently rubbed up and down with the hand. Let it stand thus in the sun, changing the lather daily for several days, and without rinsing remove and pin on a large pillow, covered with a tight pillow-case. Every scallop must have a separate pin of small size, and if very large scallops, several pins to each; the plain edge must be pinned down too, to keep it straight. When quite dry take it up, but do not starch, iron, or press it. Lay in long folds in a box.

MISCELLANEOUS.

Chinamen's Starch.

A rather thick paste is made by beating up a handful of raw starch, usually corn starch, and a teacupful of rice flour with about one quart of water, making a liquid of cream-like consistency. A portion of this, previously determined by experience, is added to a quantity of boiling water while the latter is vigorously stirred with a clean stick. With this the articles to be starched are well smeared while the linen is yet moist from the wringing and the starch quite hot. The pieces are laid aside for a few minutes and then

vigorously rubbed between the hands until the starch is evenly distributed in the fabric. The linen is then usually dried by artificial heat. When ready for ironing the starched portions are damped by means of a cloth dipped in raw starch water, to which has been added about ½ oz. to the quart of blood albumen. The proportion of starch in the water is one to fifty parts of water. In ironing, the irons are made very hot at first, but are superficially cooled and cleaned just before using by a plunge for a moment into a pail of water. The irons are what is commonly called polishing-irons; their posterior edge is rounded instead of angular as is the ordinary smoothing-iron or "sad-iron." Much of the fine gloss observed on shirts laundered by Chinamen is accomplished by skilful manipulation of this rounded edge over the work, a manipulation impossible to describe in words. It is most laborious work for those not accustomed to it. It not only renders the surface glossy, but imparts an easy flexibility to the heavily starched fabric otherwise not obtainable.

Formula for Starch.

One lb. corn starch, 37½ ozs. boiling water and bluing *q.s.* Make into boiled starch in the usual way.

Starch Gloss.

Gum Arabic, 8¾ parts; loaf sugar, 2½ parts; white curd soap, ¼ part; syrupy waterglass, 1 part; egg albumen, 4 parts; warm water, 20 pts. The first three ingredients are to be boiled together, the waterglass

is added, and when cooled to 140° the albumen is put in and the whole well stirred together. Add about ½ oz. to the above formula for boiled starch as soon as the boiled starch is finished. This keeps well if corked tight and kept cool. A good starch gloss is made by putting 2 ozs. fine white gum Arabic into a pint or more of water and let it stand covered all night. Pour off carefully next day from the dregs and bottle it for use and keep cool and well corked. A teaspoonful of this gum water to a pint of starch made in the usual way imparts to white or printed lawns a look of newness which nothing else can restore to them after being once washed.

Perfumed Gloss Tablets.

Melt 2½ lbs. very best paraffine wax over a slow clean fire, and when removed from the fire stir in 100 drops oil of citronella. Have some new tins or pans of bright tin, set them level, and pour into each about $\frac{3}{16}$ inch in depth of the melted and perfumed wax. When cooled stamp out about the size of peppermint lozenges, either square or round; add two of these cakes to one pint of starch and they will cause the polishing-iron to impart the finest possible finish to muslin or linen besides perfuming them.

To Treat Colored Cottons, Colored Muslins, Piqué, etc.

Prepare a good suds with soft water and good white soap. Wash the dress or other articles one at a time. As soon as the one suds appears much soiled

change for fresh suds. Have the water warm, but not hot, and squeeze (not wring) the articles out of one bath before putting into another. When thoroughly clean, rinse in pure cold water and squeeze the water thoroughly out and hang in a shady place to dry. The best prints fade in sunshine if wet and may run if hung out too wet; in wet weather best dry by the fire. Expedition, not allowing the goods to repose in soiled soapy water, is the secret of success. Cotton and linen articles have the property of attaching to themselves any grime that is suspended in the water in which they are worked; therefore keep them going, and as soon as one suds has loosened up what it will, get immediately to a clean bath.

Hints in Washing Colored Clothes.

No colored articles should ever be boiled or scalded, nor allowed while wet to freeze. They should be ironed immediately they are dry enough, and not allowed to lie over night. They should not be sprinkled, nor should the iron be very hot. Many colors change when a hot iron is put over them, especially when damp. Endeavor to smooth them with as little damp and heat as possible to preserve the color.

To Wash Colored Muslins.

In washing colored muslins there are many very essential points to be observed whereby the colors are preserved from injury. In the first place they should not be soaped or soaked over night. They should, when ready for washing, if not very dirty,

be put into cold water and washed up very speedily. If very dirty, the water used may be lukewarm and no more. The soap should be as neutral as possible, and to this end a small piece of alum may be dissolved in the water in which the soap is boiled up. Have the soap thin and cold. The soap should not be allowed to remain on the article for any length of time, and should be applied and washed off and out as speedily as possible. Therefore wash one article at a time and immediately rinse in two clear baths of water. Where running water is to be had, one rinse bath is enough, and before wringing out dry the article should be soused in salty water and hung at once to dry in the shade.

To Render the Colors of Cotton Fabrics More Permanent.

Dissolve 3 gills of salt in 4 quarts of hot water, put the prints in the hot liquid and allow to remain until cold. Washing after this treatment does not affect the colors nearly so badly.

To Wash Chintz to Preserve the Gloss.

Boil 2 lbs. of rice in 2 gallons of water till soft. Cool until quite easily comfortable to the hand, and put the chintz in, and use the soft rice like soap, and rub the article until the dirt appears to be out. Having boiled the same quantity of rice as before, strain off the water and rinse in this. No further starching is needed, and the dew will not affect it, and it will remain well starched while worn and keep

clean a long time. Dry as smooth as possible and smooth with a hot-water bottle.

To Wash Colored Dresses.

Boil 1 lb. of best rice in 1 gallon of water for 3 hours. Best do this the day before, and warm it up the next morning, first pouring off sufficient in which to starch the dress. Wash the dress in the remainder, using the rice for soap, and rinse it in clear cold water. Wring it well and starch in the rice water poured off and hang to dry. Iron when dry enough; if any spots get too dry damp with a wet cloth while ironing. This starch scorches very easily and the iron must be rather cool. No soap must be used, and the dress must not be allowed to lie damp, but be quickly got through the whole process. This recipe will be found equally good for printed muslins and alpaca dresses.

To Wash Gingham Articles.

The writer had brought to him a gingham waist, very much soiled, and smeared also with black axle-grease, very old. This was completely removed in 2 quarts of cold water in an ordinary hand washbowl with 1 oz. of tetrapole in a very expeditious manner. The color did not appear in the least faded, and was of a check pattern and light bluish slate color. The tetrapole was simply mixed with the water and the waist thrust in and squeezed by putting the hands flat upon it and squeezing up and down. No further treatment was necessary except to rinse in 2 quarts of fresh water. This article is soap dissolved in carbon

tetrachloride, and may be bought from the Elberfeld Co., whose main offices are at 117 Hudson St., New York City and at 133 East Kinzie St., Chicago, Ill., and in the principal cities of this country they have branches whose street and number are given elsewhere.

To Remove Stains from Acids from Clothing.

Nitric acid utterly destroys the color, and no means can be employed to restore it on woollen and silk. If the spot is small and upon a valuable article, it may be touched up with water colors with just alcohol enough previously added either to the pigment or cloth to cause ready penetration. This can be done in so skilful a manner as to be noticed only by the one who knows where to look for it. When it is known that acid has fallen upon the clothing, apply household ammonia *at once* to neutralize the acid. On most clothing this ammonia can be freely used with no fear of damage. Where the ammonia is not readily obtainable, sal-soda, or saleratus, baking soda, or any weak alkali should be tried at once. Strong acids should be at once treated with water as copiously as may be. If they have once dried upon the cloth, their maximum effect has been produced, and preventive measures are of no use. Alkalies intensify the yellow produced upon wool and silk by nitric acid. The cloth is not made noticeably tender except with very strong nitric acid and its action prolonged or aided by heat. The yellow stain of nitric acid on white woollen, silk, and the skin is permanent. It of course wears off from the hands.

To Remove Stains from Sulphuric Acid upon Garments.

Concentrated sulphuric acid is very destructive to fabrics. Spilled upon cotton or linen they blacken at once, a syrupy solution is formed, and it makes a mess generally. Woollen and silk resist, in some measure, and if the garment can be got to water at once and copiously rinsed off, destruction of the fabric may be prevented.

Some few colors are fast to all but the strongest sulphuric acid, but the majority of colors change either at once, or after some time, or upon drying.

All colors may be completely restored where changed by sulphuric acid if taken *at once*, even if the acid was pretty strong or hot. Household ammonia should be applied to the stain, using due care not to mess up adjacent parts. Many reds on cotton turn blue if touched with even very dilute sulphuric acid, but are restored perfectly if treated with an alkali, ammonia, saleratus, sal-soda, or even soap, even after some time. Bear in mind always that if sulphuric acid dries upon cotton material or linen, the fabric is destroyed, and no matter how dilute the sulphuric acid, damage will inevitably result if allowed to dry upon the goods. Therefore, after ever so thorough a rinsing off, it is a prudent measure to neutralize any trace of this acid by ammonia. Where it is apprehended that the direct application of ammonia to the goods may affect the texture or color, a cloth can be wrung out of ammonia and laid on or near the

spot to be neutralized, and the fumes of ammonia will speedily accomplish the desired effect. Stains of sulphuric acid do not occur upon white fabrics, fabrics colored by sour dyes, pure indigo shades, etc. Logwood turns red, and vegetable colors generally are seriously affected. A black spotted red by sulphuric acid, if not fully restored by neutralizing, may be restored by touching it up with logwood decoction and rubbing over a hot flatiron. Have the decoction fairly strong; add a little tannin substance too if logwood seems not quite the thing after a trial.

Effect of Various Acids upon Colored Garments and to Treat Stains from Same.

Oxalic acid is a dry substance, and not liable to be spilled upon things to their detriment. It dissolves in about nine times its weight of cold water and its own weight of boiling water. In dilute solution it does not affect colors very quickly or energetically even when dried upon them, especially if the goods were mordanted or sour-dyed. The stains from it, if any occur, are treated with dilute ammonia or its fumes. Iron buff color is spotted by oxalic acid, and all the colors from organic substances, whether saddened or not by copperas or bluestone. If the spots are old they may not restore with ammonia, and will require especial treatment. The most common thing is, with saddened colors, that the iron has rusted, which treat as any rust-spot; if darker than the shade of the rest of the cloth, touch with muriatic acid cautiously, and remove the acid as

soon as possible after it has done its work. Apply ammonia and weak decoction of logwood, sumac, fustic, archil, or such thing as seems best to produce the desired result. Muriatic acid and acetic acid being volatile, do not produce very permanent effects. The muriatic acid, when strong, will act quite energetically and should be removed by rinsing as soon as possible. None of these acids have a marked carbonizing effect upon vegetable fibres, but will make muslins tender to some extent and therefore should be neutralized. They are useful in removing stains from fruits, etc. Lactic acid is used as a mordant assistant, and is the acid of sour milk, buttermilk, beet root, etc.

Fruit stains, by repeated treatment with sour milk, buttermilk, sour whey, or dilute water-white lactic acid, and laying in the sun, soon bleach out.

Effect of Acids and Alkalies upon Various Colors.

The effect of acids upon blacks, purples, blues (except indigo and Prussian blue), and upon all those shades of color produced by vegetable and astringent substances, iron salts, archil, etc., is to turn them red. They render the yellows more pale, except annatto, which becomes orange. A chrome mordant is not removed except by nitric acid, and where any spot occurs upon a chrome mordanted garment from acid or alkali it is possible to restore the color or to touch up the spot with the proper dye in solution, and by the hot iron to fix it fast upon the spot.

Alkalies turn some scarlets violet, and some greens upon woollen goods yellow, and give a nasty effect generally.

A spot produced by unknown means should be treated both by ammonia and acetic acid before proceeding to other means to restore it. To succeed well in this work some knowledge of the art of dyeing is necessary and also some skill to judge how the original color was applied and thus be enabled to modify the means accordingly.

After using an alkali to remove an acid spot from brown, violet, or blue cloth, try a solution of tin or copperas to restore a color like brown produced with galls. Indigo extract will restore a faded blue woollen or cotton garment, or spots upon the same. Red or scarlet may be restored by cochineal and muriate of tin. The proper choice of reagents is the main thing in treating spots upon colored fabrics. Have a care always in applying them, and with patience and perseverance failure to restore a color or to reproduce the same again is rare.

Use ammonia wherever obtainable as an alkali, and acetic acid in preference to other acids. Neither of these are likely to do damage, and in a majority of cases are all that is necessary. Follow them with chloroform, and often where a yellow still remains, chloroform will restore the original shade.

Many vegetable and some aniline colors are very sensitive to acids and alkalies. Archil is red in presence of an acid, and purplish blue in presence of an alkali. Litmus is another so sensitive as to be

employed as a reagent to determine whether a fluid is acid or alkaline. Methyl orange is an aniline color of extreme sensitiveness.

Vegetable juices have this property in some degree and it is usually the case that they are paler when in the presence of an acid than if alkaline.

On textiles it is a fact that by adding soap or an alkali to stains from vegetable or fruit juices or grass stains a very permanent color is fixed upon the goods. Vegetable and fruit juices contain pectous matters that if got upon cloth, handkerchiefs, napkins, etc., and the sun allowed to shine upon them, they become very firmly fixed upon the cloth. Therefore it follows that as much as possible of such matters should be first removed by pure water, either hot or cold, before any reagent or sunlight has a chance to act upon them. Stains upon white napkins of this character may have to the water in which they are soaked an ounce or two of muriatic acid added with most gratifying results. Coffee and chocolate stains, if they do not wash out, need to be sulphured. Burn a small piece of sulphur on a plate. Cover it with a paper cone, and apply the damp stained place to the opening of the cone. A "Portland Star" match will sulphur a small stain, if lighted and held carefully under the moist stain.

To Prepare Colored Silks for Washing and Dyeing.

If the silk to be washed is a dress, remove the band from the waist and the lining from the bottom. Do not rip the seams of the skirt. If gathers, tucks, plaits, etc., occur, let them out if going to be made

over when dyed. Trimmings, curtains, and furniture, where there are deep folds the bottom of which is difficult to reach, should be undone so as to lie flat. Most colors are really improved by the following method, especially red, blue, purple, olive, drab, etc. Spread the silk upon a clean, smooth table. A flannel is made just wet and well soaped and the surface of the silk rubbed always one way and not back and forth or around. Rub but a small place at a time, and quite evenly. The soap is removed by a sponge as soon as the dirt seems gone. Keeping the sponge full as possible of cold water, do only a small place at a time, and go over both sides of the garment in the same way. Satin dresses, and ribbons, both white and colored, and all sorts of silk ribbons and trimmings may be successfully treated in this manner.

The following formula and directions for coloring silk are added, not so much for their present value as for the purpose of showing how our forbears went about it. The methods are good, and where the materials to carry them out can be procured, may be found most useful. Compared to the modern one-bath methods of working, they seem very crude, and to the amateur involve a needless amount of labor and preparation. If sending goods to the dye works, let them do the cleaning to suit themselves.

Cleaning Old Silk Garments that are to be Dyed.

For a garment weighing 2 lbs.: Boil the garment in sufficient water to which 3½ ozs. of crystallized soda

(sal-soda) has been added, so long as it seems to be necessary. Boil again in a fresh bath containing some good soap, sufficient to suds when briskly stirred with the fingers. Rinse in clear water and the garment is ready for dyeing. Remember that the present shade of the goods will vary the tone of any subsequent dyeing, and the color should now be level.

To Dye Black on 2 lbs. of Silk.

Make a solution of nitrate of iron 4° strength Baumé. Work the goods in this solution ½ hour cold. Rinse. Make a decoction with 3½ lbs. chip logwood and 1 lb. chip fustic sufficient in which to boil the goods. Boil ½ hour; 10 per cent of logwood extract and 1 per cent fustic extract may be used in place of the chips. If a bluish black is desired, use less fustic. Decoctions of the different dyewoods are prepared in the dyehouse as they are required, 1 lb. of the chipped wood to 1 gallon of water, boiled for 1 hour. The wood is reboiled in the same bulk of water, and this water used for fresh chips indefinitely. The saving is nearly 25 per cent. Ground fustic, ground logwood, camwood, or barwood are often added to the dye bath along with the goods, the whole boiled for an hour and saddened with copperas, or a mixture of copperas, bluestone, and argol. Alum may be added if needed to redden the shade. Camwood and barwood are used in no other way than boiling their powders direct with the goods.

To Dye a Rose-Red Color.

No. 1.—Two lbs. of silk, cleaned as directed: Grind together 1 drachm of cochineal and $1\frac{3}{4}$ ozs. of pure alum (free of iron), add the mixture to the hot dye bath, and stir thoroughly. Dye the silk in this liquor for as long as it gains in depth of color, then work in the same bath for 15 minutes after lifting and discoloring the bath with white vinegar or acetic acid.

No. 2.—Dissolve 2 lbs. alum in sufficient hot water to handle the goods, and work for 6 to 8 hours, stirring frequently. To shorten the time the goods may be lifted and the bath reheated to 130° or even more. Rinse and dry. Dye in the same bath at 130° Fahr. after the addition of cochineal, ground fine and mixed with 1 teacup hot water.

To Dye Scarlet 2 lbs. of Silk.

Steep for 2 hours in acetate of alumina at 6° Baumé, squeeze and dry, then wash in hot water containing $3\frac{1}{2}$ lbs. bran and $8\frac{1}{2}$ ozs. of powdered chalk. Dye in hot decoction of $3\frac{1}{4}$ lbs. Brazilwood and $8\frac{3}{4}$ ozs. cochineal, with or without the addition of 1 lb. of bran; the color is brighter when bran is added.

To Dye Violet Color.

Boil with $3\frac{1}{2}$ ozs. sulphuric acid $8\frac{3}{4}$ ozs. blue vitriol, $8\frac{3}{4}$ ozs. common salt, and $4\frac{1}{2}$ ozs. cream of tartar. Boil for 40 minutes, squeeze out, dry, and then cleanse by working thoroughly in water containing 1 lb. bran and 8 ozs. chalk. Dye just below the boiling-point

for one hour in a fresh dye bath containing 6 lbs. madder and ½ lb. bran.

To Dye Crimson about 2 lbs. of Silk.

Steep in solution of acetate of alumina of 6° Baumé to which has been added a solution of 1 to 1¾ ozs. of copper sulphate (blue vitriol) for 1 hour. Squeeze out of the solution and cleanse in a mixture of bran, chalk, and water made up pretty thin. Dye in a hot, but not boiling, decoction of 3½ lbs. Brazilwood and 13 ozs. of cochineal and 1 lb. of wheat bran. Dye for 1 hour and rinse in water containing 2 to 3 ozs. sal-ammoniac.

To Dye Drab or Gray 2 lbs. of Silk.

3½ ozs. sulphuric acid,
8¼ ozs. blue vitriol,
8¼ ozs. table salt,
4½ ozs. white tartar.

Mordant in cold solution 1 hour; squeeze, and rinse. Dye at 130°. For yellowish gray, decoction of fustic; for deep gray, decoction of gall nuts; for greenish gray, decoction of quercitron bark.

To Dye a Red Color 2 lbs. of Silk Cleansed as Directed.

Mordant for 1¼ hours in a solution of acetate of alumina, strength of 5° Baumé hydrometer. As it is risky to wring like a washerwoman any old fabric, therefore squeeze as dry as possible and cleanse in

water containing wheat bran and powdered chalk, 1 quart bran, 8 ozs. chalk. Boil up 6½ lbs. madder and 8¾ ozs. sumac and ½ lb. bran and dye therein 2½ hours. Brighten by boiling 2 hours with 3½ ozs. castile soap, 1 lb. bran, 2 ozs. muriate of tin.

To Prevent Injury to Kid Gloves from Perspiration.

Dust the hands, just before drawing on the gloves, with powdered corn starch or pulverized soapstone. Persons whose hands perspire badly will find that their gloves will keep clean and looking well much longer.

To Clean Kid Gloves.

No. 1.—A single pair of gloves is nicely cleaned by putting them into an ordinary pint fruit jar, along with ½ pint of ordinary stove gasoline. Screw on the cap with its rubber and shake up. Some little may escape around the cap, but if not inverted, they can be shaken enough in ½ minute to do the work. Remove them from the gasoline, and examine for any dirt not removed. If traces yet remain, rub them with a cloth dipped in gasoline, when the last traces disappear. The gloves dry very quickly, and to remove the last traces of odor, place them upon a plate covered with another plate and place over the top of a boiling kettle. This temperature will not hurt the glove, and the warmth of the hand will not afterward develop any odor. Beware of getting near a fire or naked flame of any kind while working with gasoline.

To Clean Kid Gloves.

No. 2.—Where a large number of gloves are to be cleaned, procure a wide-mouthed glass jar, say 2 ft. high and 8-inch stopper of glass. Such jars are easily procurable, being much used in pharmacy. Put in 2 or 3 gallons of benzine or gasoline and as many gloves as the liquid will cover. Close the bottle and shake well. After a few minutes shake again, and remove the gloves with a hook or pair of suitable iron forceps, wring them out one by one, or in pairs, if the wise precaution has been taken to tie the button-holes together, or in some way pairing them before putting them in, or when received from the customer. Let all the liquid run back into the bottle. The operator should be protected from the gases, by facing a good draught, or better, in front of a chimney opening somewhat below the top of the bottle. The gases being heavier than air, will thus easily be drawn away from the operator. The chimney should be built purposely for this work, and may be of wood, and where power is available, have a blower. Provision is made for hanging the pairs of gloves across a wire inside the hood of the chimney, and steam or hot-water pipes may be provided to raise the temperature sufficiently to expel the last traces of odor. The chimney should have two openings, one above and one below the arrangement of heating pipes. The upper one is opened only while placing the gloves to be dried. The benzine remaining in the bottle assumes a dirty gray color during the washing, and when too dirty

must be redistilled or thrown away. A very good distilling apparatus can be made for a small sum, and the redistilled gasoline or benzine is less odorous than at first. A common 3-gallon tin can makes a good retort for this purpose. It has two openings, one with a screw cap and the other is the spout. Arrange to set it in a water bath, which may be a tub of water heated with steam. A common tin pail with straight sides answers well for the cooler for the worm. Make the worm coil from $\frac{1}{4}$-inch lead pipe by winding it around something somewhat smaller than the cooler. Set the worm into the cooler, passing the lower end out through a hole in or near the bottom; the upper end may rest in a notch on the top or pass out through a hole near the top. The top and bottom openings of the worm had best be on opposite sides, and may be soldered or luted watertight. The upper end of the worm is belled out so as to admit the pipe from the retort and to be packed with damp cotton, clay, or anything not soluble in gasoline. After getting all ready and connecting the pipe from the retort, fill the cooler with water and add a lump of ice. Steady the retort in the tub so ebullition will not disturb it, and make the spout, with a short piece of pipe to connect with the belled end of the worm. Distillation is begun by filling the tub with hot water, and a very small steam pipe will keep it going. It is best to fill the retort before surrounding it with hot water, but with care fresh charges can be added.

To Remove Stains from Kid Gloves.

Provide a glass jar, and in the bottom of it place about ½ inch in depth of ammonia. Have a care that the sides and top of the jar are not wetted with the ammonia. Suspend the gloves from the cover in such manner that they touch neither the sides of the jar or liquid in the bottom. The most delicate shades of colored gloves are not injured by this treatment, and should remain about 8 hours in the atmosphere of ammonia.

To Clean Kid Gloves.

No. 3.—Fuller's earth and powdered alum, both dry, and rubbed upon the gloves with a brush; follow with bran in the same way, or roll and work the glove about in the dry bran. Brush this off, and if not quite clean rub with a clean woollen rag dipped into dry powder of fuller's earth.

To Clean Kid Gloves.

Put the gloves on the hands, and wash them in rectified spirits of turpentine until quite clean. Rub them exactly as if washing the hands. When finished hang them in a current of air to dry and until the odor of turpentine is removed. Where turpentine is used, heating to expel the turpentine is to be avoided, as a slight yellowing may result.

It is obvious that gasoline, benzine, benzol, ether, chloroform, petroleum spirit, etc., can be used in place of turpentine, in which case the drying may be

completed and odor removed by heating between two plates over boiling water. Remember the precautions about fire. The gloves may finally be folded and pressed between paper with a warm iron.

To Clean Kid Gloves.

Where there is fear or prejudice against the use of inflammables like gasoline, etc., the following way is good: Make a strong solution of soap in hot milk and beat up therewith the yolk of one egg to each pint of solution. A little ether, say a teaspoonful to each pint, is beneficial. Put the gloves on the hands and wash hands, gloves and all, in the mixture. When clean press one hand gently over lengthwise to press out the wet and dab them as dry as possible with a cloth held between the hands. White gloves are not discolored by this treatment, and the leather is made clean and soft as when new. Dry them in a cool place and draw them gently through the fingers several times while drying.

To Clean Kid Gloves.

Make a strong lather with curd soap and water. Lay the glove on a plate, or any unyielding surface, dip a piece of flannel in the lather and rub the gloves until the dirt is out, turning the glove so as to get at all its parts. Don't dry too quickly. When dry they will look like old parchment, and should be gently pulled and stretched just before they are quite dry.

To Dye Kid Gloves.

The gloves must first be thoroughly cleaned, or if not much soiled, they may be dyed and cleaned at one operation. Dyes, called oil-soluble dyes, are to be first obtained from the dealer, a red, a yellow, and a blue. Take a bit of each of these and dissolve in each of three small phials in gasoline, shake well up and allow to settle. To the gasoline in which you intend to clean the gloves add a small portion from one or more of the phials until about the right color is obtained. Wash the gloves *both together* in the gasoline. Colors are not taken up always with equal rapidity, so keep your liquor on the *light* side and see what you get after the gloves are put in. You can then add a little more red, yellow, or blue from the phials as seems needed to complete the shade wanted. The gloves are dyed inside and out in this way, and if too dark shades are attempted the hands may be soiled when wearing them. To remove smell of gasoline place the gloves over boiling water between two plates for some time, until the odor is gone.

To Dye Kid Gloves Black.

First clean the gloves from perspiration and grease. Draw the glove very smoothly on a wooden "glove hand" and apply the dye liquor with a sponge as evenly as possible. The glove is first moistened with a solution of 1 oz. of sal-soda to 1 pint water and dried. A strong decoction of logwood is then brushed over it and left for 10 minutes, and preferably rotated so

there shall be no draining down or uneven drying. Repeat the application of logwood and again dry. If the logwood decoction is strong enough, this ought to be enough; then dip hand and glove into a solution of copperas, or nitrate of iron. When the glove begins to dry rub with olive oil and talc and take from the hand and press between flannel. Afterward it is again rubbed with a little talc and olive oil and put upon the hand. Be careful that the dye does not get upon the inside of the glove; it will not crock, but the appearance is injured.

Any of the water-soluble anilines may be used for this purpose. The gloves must be clean of greasy matter. The kid has great affinity for these dyes and holds them very well. Place the glove on the wooden hand and apply a decoction of the dye made up like paint to the shade wanted. A sponge works more evenly than a brush, though good work may be done with either. To prevent stiffness, especially in the seams, apply gasoline in which a little oleic acid has been dissolved, or add to the dye a very little glycerine. Glycerine and water may also be used after all else is done; don't use too much glycerine.

Neutral dyeing colors are best for these purposes.

B–blue,
B–yellow,
B–black,
B–green,
B–brown.
} Elberfeld Co.

These colors are soluble in alcohol and benzine, gasoline, etc. Their solutions are equally good for

feathers. The benzine solutions should have a trace of oleic acid (red oil) dissolved in them to prevent stiffness. By some practice very satisfactory work can be done with these wares. Undissolved particles must be guarded against, as a few specks of undissolved dye in making a light shade would spoil the glove for any color except black, and even then a bronze effect may result.

To Dye Various Articles without Wetting Them with Water.

Of quite recent introduction to the trade are the so-called "oil-soluble colors." These are soluble in gasoline and petroleum products generally. A bath may be made by using these dyes dissolved in the gasoline, benzine, etc., and dipping the articles into it for a moment. The articles can be thoroughly cleansed from greasy matters and dirt at the same time. By the one operation silk veils, kid, silk, and lisle gloves can each and all be thus dyed. Although the colors thus obtained boast of no great permanency, still they will last until they need cleaning again, when the operation can be repeated. As a rule the same bath of gasoline can be used a dozen times over and finally employed to run the gasoline stove or automobile.

Steam Cleaning.

"Steam-cleaned" means washed with soap and water. A "steam laundry" therefore simply means that they heat their water, melt their soap, dry their

customers' linen, etc., by heat from steam pipes, either "open" or closed. Their goose, or flatirons, also are heated in a "steam chest." Steam-cleaned garments, however, imply a little more than simply washed with water. It has been found that men's coats, waistcoats, trousers, etc., require to be hand-treated in such a way that the soap and water is worked into them thoroughly while there is at the same time no friction of the parts of the garment upon one another that will cause "felting," which is but another name for shrinking, when used in this connection. The best means yet found is to place the garment upon a table or bench and apply hot suds to it with a scrubbing-brush. Dirt and grease that has been for months gradually accumulating in the fabric is thus speedily loosened and worked out and into the lather, and will rinse off when water is poured over it. The secret of success seems to be, thoroughly brush up a warm lather and then to thoroughly rinse it off. Occasionally an exceedingly soiled garment needs to be gone over a second time with the scrub-brush, and again rinsed off. Bristle brushes are made especially for the purpose, and are the best. Any good clothes-brush may, of course, be used, but the wood of its setting is ruined in a short time. Wringing, by twisting the goods, will not do at all, and in regular works hydro extractors or centrifugal machines are used. The common clothes-wringer is good, but where not obtainable, best squeeze out what you can and hang up. After draining for a time the excess of water will settle in

the lowest points and can be again squeezed with the hands. Small articles can be placed in a towel and the towel swung round like a wheel and the water thus thrown out pretty well. Also large garments can be put in a sheet and two persons can swing it round same as children jump rope and throw out the water in imitation of the centrifugal machine. Out of doors would, of course, be necessary for these operations unless the house were provided with a regularly appointed wash-room. Where no better way is to be had take the garment into a tub, and with a brush, and on the common washboard, work up a good lather all over the face of the goods. Don't rub the garment at all upon the board as in washing linen; the board is simply to support the garment while you scrub it with a brush. You may souse it up and down in clean warm water to get out the soap, and thoroughness is essential. It is usual and necessary to "steam-clean" all garments before attempting to redye them. The exception is where a union dye is to be used. These dyes usually contain some carbonate of soda, or you are directed to add some to the dye bath. The dye bath may be heated to boiling and the garment put in without the dye, but with the carbonate of soda; don't boil but thoroughly work the garment in the hot liquid for say 10 minutes, lift, and inspect it after draining. It will usually appear that the dirt is sufficiently removed and that no spots remain. If spots do remain, some soap on your scrub-brush must be applied as a further treatment, and the garment

again soused in the dye vessel and soda liquid. If the soda liquid is very soiled, best throw it away and start afresh. Garments that are to be worn in their present shape are not to be ripped at all. If the garment, however, is to be made over, all folds, tucks, gathers, etc., must be let out. Detached pieces are, however, very liable to be lost, or to settle down in the dye bath and get unevenly colored, and therefore leave them on in part if possible. Seams ravel if let out, so take out no more than necessary.

Dry Cleaning.

"Dry cleaning," so-called, is performed in a variety of ways, all of which, however, immerse the garment in a fluid other than water, with more or less agitation, to work out as much as possible other matters than those of an oily nature that may be caught and imprisoned in the cloth. Soaps soluble in benzine are used in conjunction. Ammonia gas is forced in under pressure in air-tight drums to aid and facilitate the process. The ammonia process is best, but can hardly be carried out at home. Immersion in gasoline, benzine, naphtha, carbon disulphide, petroleum spirits, chloroform, ether, etc., can, however, be done if there is due care taken to prevent accident by fire. Chloroform is not inflammable, or at least not readily. Carbondisulphide is not only very inflammable, but both the vapor and the products of combustion are irrespirable and may cause great injury or even death if inhaled, though the flame does not come in contact with the person. The most important

thing in connection with this process is to thoroughly squeeze out the fluid used for cleansing. A second bath, for rinsing purposes, is highly important where first-class work is to be done. A cylinder press is economical in the large way, but at home the best recourse is to squeeze out all possible and place in a towel or sheet and wring or whiz out of doors. The gasoline, benzine, etc., holds the grease in solution, and if left in deposits it again in the goods upon drying. The goods after drying must be well beaten that any dust be knocked out and "spotted." Spots that remain are often simply mud and scratch away with the finger nail and slight brushing. Soapsuds and the brush, soap bark, tetrapole, alcohol (chloroform to restore the color), or any other thing within the knowledge and experience of the operator can be tried upon spots and stains that are likely to remain. The chief advantages of "dry cleaning" is that the garment in bulk does not have to be wet, and therefore does not shrink, the color is not affected, or, if it is, is affected all over evenly, and if carefully done leaves behind no dust-catching residue of soap or unctuous matter of any kind. So simple a thing as sugar candy will not, however, come off with "dry cleaning," but must be supplemented by local treatment with warm water and afterward rinsed—not just simply rinsed by a dash of cold water, but rinsed out, and it may take hot water to do it. Water is a universal solvent. It will act upon more forms of dirt than any other liquid known. After dry cleaning, therefore, sponge any spots with a sponge

wrung out of warm water before trying anything else, then soap and water and gradually stronger alkaline things, having due regard for the color, not to injure it. Neutral solutions of soap may be used in volatile liquids like carbon tetrachloride, chloroform, alcohol, etc., and it is but one time in a thousand that a spot fails to come off. Where the color is actually gone, or greatly modified by acids or alkalies, it must be restored by redyeing, either local, or throughout. Small spots can be touched up with the camel-hair pencil dipped in solutions of the proper shade and the color set by a hot iron. This can be so skilfully done that only the practised eye could detect where it had been done. Tetrachloride of carbon is excellent for household use, being absolutely non-inflammable, much less costly than chloroform, and is not dangerous to have about. The solvent sold under the name of "Carbona" appears to be the same thing.

Laundry Starches and Starching.

In the large way all this work is done by machines that rub the starch into and through the goods with a regularity and evenness of penetration not possible to attain by hand labor. "Boiled starch" should always be used, and wheat starch for stiffness. Corn starch is used, but usually only to prevent brittleness. Rice starch would probably be a more lasting form of starching for damp climates and situations. Many laundries use only wheat starch, some $\frac{2}{3}$ wheat and $\frac{1}{3}$ corn, some equal parts of each. Nothing should be

added to the starch. The popular idea that laundries use paraffine wax or some other form of wax, gum Arabic, etc., is all bosh. The gloss is due entirely to pressure and friction. Pressure alone gives a dead or "domestic" finish, without gloss. If a collar is ironed on a machine where the iron turns and the ironing-board is stationary, the result is a high gloss; where the ironing-board is turning at the same time, the result is the dull or "domestic" finish. Collars or any heavily starched goods should have the wrinkles worked and smoothed out with the palm of the hand, then dried and damped again before ironing. The iron should be as heavy as the operator can handle if working by hand. Set the iron upon a collar and don't move it until the collar is dry, and you get domestic finish. If you rub the iron back and forth or use a polishing iron, which is rounded off upon the heel in such manner as to tip it up with a sliding or a jerky sort of hitch, a high polish will result. Anyone who has watched a Chinaman will understand the movement he uses, but it is impossible to describe it. The formula here given is for starching collars and cuffs and shirt fronts: Take 1 lb. of wheat starch, or any admixture of wheat and corn starch to suit the fancy or requirements, and stir it thoroughly with cold water until a uniform milky fluid results, free from lumps; then add boiling water enough to make the whole up to one gallon, and boil the mixture for at least 20 minutes, better ½ hour or longer, stirring all the time. The vessel should be covered to keep out dust and dirt, both while boiling and

when removed from the fire, and furthermore to prevent a skin of hardened starch paste from forming upon its surface. The above is from a practical laundryman, and should be accurate and up to date.

The Pressing of Woollen Cloths and Garments.

In textile mills it is thoroughly understood that steam is the chief means of making the fabric soft and flexible so it may be stretched perfectly to width and smoothness, and furthermore that it must be pressed and heated until dry to make it retain its width, length, gloss, and smoothness. The goods are stretched, however, when simply wet, and held stretched out until dry. They also have been brushed to make the nap all lie one way. Before pressing the goods run over a plate perforated with holes to allow escape of steam, which passes through the cloth and softens and warms and damps slightly, and immediately afterward under the press cylinder. These conditions must be met as nearly as possible when woollen clothes or garments are "done over" at home, whether it is simply pressing a pair of pants that have never been wet, or whether it is some garment that has been scoured or washed, or whether in addition the garment has been redyed. The endeavor should be always as soon as the scouring or any process that wets the goods is finished, to pull and stretch the garment to as nearly as possible its proper shape and keep it there until quite dry. Then as steam is necessary the expedient is resorted

to of pressing under a damp cloth, the object being that the damp of the cloth is quickly converted into steam by the heat of the iron and forced down, into and through its substance, softening it at once so it may be pushed and pulled under the iron to exactly the shape it should have. This is not all, however, that is necessary. It must be pressed and kept pressed until quite dry and all steam ceases to rise from it when the cloth is lifted. To this end the damp cloth is exchanged for dry ones and the pressing continued until perfectly dry. Garments pressed in this way keep their shape, if they ever had any, and preserve their lustre (press finish) for weeks, where if let to go but partly dried and still smoking under the iron they would become wrinkled and cockly in two or three days. A worn old piece of canvas, soft from much use, is best for dampening and laying on over the goods; less flexible ones may be used to press with for drying out the work, and as the softer ones wear out, take the next softest and replace it and use the newest ones only for the final passing of the iron. Home flatirons are nearly useless to press heavy-men's-wear goods. The heavier the iron the better, as big as the operator can handle, 20 lbs. or more. Pressure upon a small flat is a help, but the pressure is not backed up with the proper volume and lasting quantity of heat to do good work. With a proper goose, and care to lay the nap well, press carefully to shape and dry under the iron in that position; there is no reason why the done-over suit should not look as perfect in shape as when new.

If faded and threadbare even, it will still have a presentable appearance, and no one need feel ashamed to appear in it until actually ragged. It is a fact that the person having but few clothes, but taking good and intelligent care of them, gets more genuine satisfaction from his or her dressed appearance than the person with new suits every month thrown carelessly by. Associations should make garments prized, as well as any other object, and your neighbor will enjoy your company and conversation quite as well in the done-over suit that he may know you helped your wife or sister to put in order.

The Effect of Previous Mordants in Garment-Dyeing.

It is not at all easy to say what mordants have, or have not, been used in the dyeing of a garment by the manufacturers that produced the cloth. If it is an all-wool garment, all one color, it may be assumed that it has a mordant on all the fibre composing it except, of course, the linings. If, again, it is all-wool, but has a number of light and bright overplaidings, hair lines, etc., they may or may not have any mordant, and any interweavings of white yarn or mix effects in any part showing up white, these may be assumed to be without any mordant. It will be readily seen that a somewhat different mode of procedure will be necessary, according to how much of the component parts of the garment, or piece of cloth, have previously been mordanted. Also it will be easy to understand that any dye about

to be applied having any affinity for chrome (or any mordant chemical) will be first attracted by the chromed fibres, and will be taken up by them in undue amount, and the resultant dyeing may be expected to not "cover," i.e., the light threads still show up. It will be found too that where green, red, and brown, etc., threads or checks were in the cloth that they show up still, even though the whole has been colored black. Where these check effects are prominent it is usually conceded that no monotint can be secured unless the color from all the fibre composing the garment can first be removed, which is seldom attempted. It is more often that a fresh mordant bath is prepared and the percentage of bichromate made pretty high that the fresh mordanting may not only even up the dye-receiving condition, but also strip off some of the colors already on. To this end 10 and even 20 per cent of bichromate of potash and $\frac{2}{3}$ the amount of oxalic acid are used in a mordant bath for such goods. It matters not whether the dye to be used is an acid, afterchrome, regular mordant, union, monochrome, or what-not color, the effect is to yellow all the wool material somewhat and to change the cotton linings in color according to what they have previously been dyed with. The garment should have been scoured previous to chroming, but any spots are left to see the effect of the chroming upon them, as usually they disappear. Thousands of pieces of cloth are sent out every year by the manufacturers that are union-dyed, or acid-dyed, and have no mordant upon them. Burning the cloth to ashes

and treating the ashes to water and a drop of acid will develop a yellow color if chromium is present, and if neutralized with a little potash, crystals of bichromate of potash will form upon evaporation.

Soap-Making.

Soap is a chemical combination of a fatty acid with caustic lye the base of which is usually potash or soda; the potash lye producing true soft soaps and soda lye hard soap.

Caustic soda or caustic potash is now readily obtainable in any quantities in the market. It is furnished in drums into which it was poured in a molten condition, and as hard as stone. It is also furnished ready crushed to about the size of a grain of barley, and simply needs to be dissolved in water to the proper strength for soap-making.

Formerly each soap-boiler causticized his own lyes, and employed 3 strengths of lye, one of about 25° to 30° Baumé, another of 12° to 18° Baumé, and a third of 2° to 5° Baumé. The causticizing was done thus: One part of quicklime, slaked by sprinkling on just sufficient water to crumble it, was added to 3 parts of soda carbonate in 5 parts of water. If potash, the same weights and proportions were adhered to. Stir the mixture and allow it to settle. The clear liquor is poured off and constitutes the first, or strong lye, 25° to 30° Baumé. By adding successively 5 parts of water to the sediment from the first, a second and third lye was obtained, the final washings being used

to start a fresh lot. The second and third lyes are strong enough for general purposes. Twenty lbs. fat are melted in an iron boiler and kept at a moderate heat, stirring in a little at a time of third lye, 10 lbs.; after about an hour let the mixture get up to boiling-point and stir in by degrees 10 lbs. second lye. This completes the first stage, which is termed sponification. The next step, "cutting up the pan," is to add by degrees a mixture of soda and lye containing 2 or 3 lbs. common salt. This separates out the excess of water from the curd, leaving a soapy paste; boil and stir for some time, settle, and draw off from the bottom the water, which is usually quite colored. The third operation, called clearboiling, has now to be performed. Stir now into the paste by degrees 5 lbs. of first lye; and, when perfectly mixed and smooth, boil for 2 hours; if the soap meanwhile should become too liquid, as may happen if too weak a lye has been used, some salt, or weak lye containing salt, is added. The boiling is terminated when large, regular, dry scales appear on the top; when this is the case let it settle and draw off the liquid from the bottom. Put the soap into frames lined with cotton cloth which has been well powdered with lime and starch, and as soon as the soap is firm cut and lay it out to dry. No salt is added in making soft soap and no separation of any of the liquid takes place. The whole is used, and care must be exercised that just enough caustic lye is used to make the soap and not leave an unused excess to injure the hands.

Filled Soaps.

Hard soaps are usually made by the process just described, with some slight variations, the excess of water being separated from the paste by the use of salt. That class of soap is termed grained soap, but there are some kinds of soap, cocoanut oil and soda soap, for instance, that are so hard by nature that "salting out" is unnecessary, the water remaining in the paste. Soaps of this class are called filled soaps. It is apparent that all soft soaps are of this class.

Cocoanut-Oil Soap.

Put 100 lbs. cocoanut oil and 100 lbs. soda lye of 27° Baumé into a soap kettle. Boil and mix thoroughly for 1 to 2 hours, until the paste gradually thickens, then diminish the heat, but continue the stirring until the cooling paste becomes a white, half-solid mass. Then transfer quickly to the frames. Equal parts of tallow and cocoanut oil will make a very fine filled soap. Cocoanut oil mixed with any fats, if in not too large a proportion, will produce filled soaps.

Home-Made Caustic Soda.

Dissolve 6 lbs. common washing soda in 4 gallons warm water. Slack 6 lbs. quicklime in just enough water to crumble to powder, add the slaked lime to the soda solution, and stir the two together and add 4 gallons boiling water. Stir thoroughly and let settle, and use the clear.

Home-Made Hard Soap.

To the above lye in a clean iron kettle add 12 lbs. clarified grease, stirring in at the same time 4 ozs. powdered borax; let it boil until it becomes thick and ropy. Have in readiness a tight box and piece of muslin large enough to lay over the sides to allow the contents of the box being conveniently lifted out. Pour the contents of the kettle into the box and let it stand a few days. Remove from the box and cut with a wire into bars. Soap thus made and left to harden will become fit for use in a month.

Home-Made Soft Soap.

Wood ashes mixed with slaked lime are leached by packing into a barrel or other receptacle lined with straw. The packing should be rather harder toward the outside than the centre, but all should be packed quite firm so the water used will not pass too quickly through the leach. If the leach is properly set up the first lye coming through from hardwood ashes is very strong, if the ashes are fresh. Ashes should be stored away from air and damp. If a potato will float, the lye is good. Fill a kettle $\frac{2}{3}$ full of the lye and add to it, a ladleful at a time, melted fat, stirring continually until a perfect ring can be made on the surface with the stick. Let the fire go out, and the soap cool. Any lye that separates may be poured off by tilting the kettle. The leach must be set high enough to allow of some vessel being set to catch the lye, and about $\frac{1}{20}$ as much lime used as

ashes; if the last run of the leach is too weak, boil it down until a potato will float on the cooled lye.

Toilet Soaps.

To this class belong the finer kinds of scented soaps, which have emollient properties. They are rarely made by the perfumer, the body or basis being a well-selected white soap subsequently to be cleaned and purified. For the choicer grades olive and sweet-almond oil should be selected, as the fat, lard, and beef tallow make the next best grade, and, for palm-oil soap, a small quantity of bleached palm oil is added to tallow or lard. Cocoa oil and pale rosin also enter into the composition of certain toilet soaps. These body soaps may be obtained as wanted from any well-ordered soap factory. To be adapted to the purposes of the perfumer they must be neutral, firm, free from unpleasant odor and all tendency to crust or effloresce in cold or dry weather, or sweat in damp weather. They should, moreover, give a rich lather without wasting too much or rapidly in the water. Soaps in their original condition are apt to be deficient in some of these points, and must first, for the purposes of the perfumer, undergo a refining process. The soap as purchased in bars or blocks is piled upon the shelf of the rasping-machine, and placed in the hopper, and as the wheel revolves knives come against the soap and cut it into meal, which falls into a reception box underneath. In this state it melts very readily and is transferred to a steam bath and mixed with rose and orange-flower water,

of each ½ gallon to every 100 lbs. of rasped soap. The kettle is steam-jacketed, and when steam is turned on the soap gradually melts and must be "crutched" with a stick having a cross or board upon its end until a paste of uniform consistency is obtained. It is now allowed to cool, but is again melted without addition of rose water and crutched as before. When there are several kinds of soap to be used in one blend, each must be rasped, melted, and crutched separately, or added one at a time successively and crutched constantly to effect an even mixture. When the paste is nearly cool, coloring matters may be added, and lastly the perfume, to avoid as much as possible loss by evaporation from the hot paste. When extracts or bouquets are used they must be added direct to the meal and forcibly incorporated by kneading with the hands or passing repeatedly between marble rollers. Any application of heat would occasion loss of perfume and impair the odor. The soap is now ready for the rectangular well, made of wooden frames set one upon another, called cooling frames. In a day or two it is hard enough to be cut into tablets the size of each frame; these are set up edgewise and allowed to dry for several days and then barred by means of wire. The height of the lifts make the length of the bar and the gauges of the wire the width, and made to cut any required number to the pound. The bars are divided into tablets, which are pressed to give them solidity, and to ornament the surface with any appropriate device, the maker's name, etc. The shape of the mould deter-

mines the form of the finished cake. The press is of ordinary construction, operated by hand or foot, or may be a hammer giving vertical blows of constant force. A spiral spring throws each cake from the die-box as soon as the pressure is removed.

Floating Soaps.

All the hard soaps increase in bulk by mechanical beating of the paste. The loss of density thus produced gives them the property of floating in water. The beating is best accomplished by a churn twirl rotating in the bottom of the pan and operated by a handle. Expose 5 lbs. olive-oil soap to a steam or water heat along with $1\frac{1}{4}$ pints of soft water, and beat up the mixture until it has doubled its volume. It may be colored and scented at the same time. When beaten enough pour it into a cold frame. Cool quickly, and when hard cut it into bars or cakes. This soap floats on water, but will not bear much soaking, as it rapidly softens.

Transparent Soap.

This is made by dissolving hard white soap, previously reduced to meal and thoroughly dried, in alcohol. A steam bath fitted with a still head makes a good containing vessel. Alcohol and soap are taken in about equal parts and as the solution proceeds any alcohol that comes over in the condenser is saved. The heat should not exceed 212° Fahr. Time is allowed for settling, after which the clear fluid is drawn off into wooden frames, or britannia

metal globes if desired to make it into balls. Previous to settling it may be colored with alcoholic tinctures of alkanet for red, chlorophyll for green, turmeric for yellow, etc. Transparent soap is only translucent when first made, and only becomes clear when perfectly dry. The perfumes are the same as other soaps.

Glycerine Soap.

Any mild toilet soap with which about $\frac{1}{20}$ of its weight of glycerine has been incorporated while in the melted state. It is generally tinted red or rose color with a little tincture of archil or dragon's blood, or orange with annatto. It is variously scented, bergamot or rose geranium, supported by oil of cassia, being common.

White Windsor Soap.

Genuine old white Windsor is made from a body of which lard and olive oil is the stock, and attars of caraway, lavender, and rosemary the perfume. Modern Windsor soap is made from fine white curd soap 115 lbs., cocoanut-oil soap 20 lbs., perfumed with attar of caraway 1½ lbs., attars of thyme and rosemary 8 ozs. each, and attars of cloves and cassia of each 4 ozs.

Brown Windsor Soap.

Curd soap, 100 lbs.; cocoanut-oil soap and pale yellow rosin soap of each 25 lbs.; color with caramel 8 ozs., and perfume with attars of caraway, cloves, thyme, cassia, petit grain and lavender of each 1 oz. Oleic soap of first grade is peculiarly adapted as a

body for brown Windsor, as it gives a rich lather, is very smooth and highly emollient, and holds its normal moisture for a very long time.

Honey Soap.

White curd soap, 40 lbs.; melted and crutched with white honey, 10 lbs.; storax, 2 lbs., and powdered benzoin, 1 lb.

Sulphur Soap.

White curd or Castile soap, fresh made, ½ lb., 1 oz. fine well-washed flowers of sulphur, 1 oz. rectified spirits (alcohol) colored with alkanet, and sufficient attar of roses to strongly scent the mass. Beat the whole together in a marble or Wedgwood mortar until it is a smooth, even paste. Its daily use tends to render the skin fair and smooth. The alcohol and color may be omitted at will. Highly recommended in various skin diseases.

Caution in Using Medicated Soaps.

Before using mercurial or sulphur soaps, finger rings, ear rings, and bracelets of gold, etc., should be removed and not replaced until a short time after the skin is again dry; otherwise they may become tarnished, or even corroded. The same applies to all other cosmetics containing sulphur or mercury.

Whale-Oil Soap to Destroy Insects.

Boil any quantity of whale-oil foots with sufficient caustic lye to make it into soap. Pour off into moulds

and, when cold, it is tolerably hard. Whale-oil foots is the sediment from refining whale oil.

Carbolic-Acid Soap.

Freshly-made cocoanut-oil soap, 150 parts; fuse, then add a solution of caustic potassa, 2 parts; oil of lemon, 1 part; and carbolic acid, 6 parts; alcohol, 10 parts. To be poured into moulds.

Mercurial Soap.

Crushed corrosive sublimate, 1 drachm; alcohol to dissolve, about 1 oz.; powdered Castile soap, 4 ozs. Beat them to a uniform mass in a Wedgwood mortar and perfume with attar of roses or oil of cassia and oil of bitter almonds. Nothing metallic must touch it. This has been recommended in various skin diseases.

Glycerine-Soap Balls.

To any recently made toilet soap, sliced, and melted without water, if possible, add pure glycerine 1 oz. to the pound; thoroughly incorporate, until the mass has become cool and make at once into balls.

Sand-Soap Balls.

Melt recently made best yellow soap with or without $\frac{1}{3}$ of its weight of white soft soap and a little sweet oil, and add $\frac{1}{2}$ the weight of the melt of finely powdered pumice stone, marble dust, fine sifted washed sand, etc. Used for scouring purposes and for dirty, hard work generally, and to prevent roughening and thickening of the skin in cold weather. Nothing equal to it for

lavatory work, greasy saucepans and any earthen ware that gets a film of smear not readily removed by soap and water.

Spermaceti Soap.

This soap, though superior to all others in emollient properties, can scarcely be said to exist on the market, owing to the difficulty of saponifying it. As vended it consists of white curd soap 14 lbs., perfumed with a mixture of attar of bergamot 2½ ozs. and attar of lemon 8 ozs.

Musk Soap.

Best tallow soap 30 lbs., palm-oil soap 20 lbs., Spanish brown 4 ozs., essence of musk 3½ ozs., and a little attar of cloves and rose water, and 3½ ozs. attar of bergamot.

Cold Soaps.

Although the commoner soaps are usually made by boiling, they can be made by the cold process if desired, and the fats used may be the same in both methods. The cold or "little-pan" process is, however, almost exclusively used for making fancy or toilet soaps, and for these purposes the fats require to be very pure and odorless or to undergo a purification process where any delicate scent is to be used in perfuming. The lye used for saponification must be much stronger than that used in the boiling process and should be entirely clear and colorless; 36° to 40° Baumé is the strength usually employed.

Incorporate by degrees 50 lbs. caustic soda lye,

36° Baumé, with 100 lbs. fat at a temperature not higher than 104° Fahr. Continue to stir with a broad paddle until a complete ring can be drawn on the surface. With scented soaps, the perfumes must now be stirred in. The paste is now put into the frames having broad cotton-cloth linings so that when the frame is completely full there shall yet remain sufficient of the cloth to completely cover the soap. The frames are now covered with a wooden cover and left 12 hours, during which time the temperature will rise considerably, producing completely the saponification. When cool the soap is cut, pressed, etc., in the usual way. The degree of hardness of the soap will depend upon the sort of fat used. Very hard fats, like tallow, must be melted previous to incorporating the lye, and require mechanical means to stir in the caustic soda. With cotton-seed foots containing much water the stirring is easy and may be done with a hoe, like mortar-mixing, and the lye may be less in proportion to the water in the foots, but should be rather stronger than 36° Baumé, mixed in a mortar box, covered with old sacking for a couple of days to ripen. This cotton-seed soap is largely made and used in textile mills.

Washing-Soap.

A mixture of 60 lbs. tallow or 30 lbs. each of tallow and palm oil, with 40 lbs. cocoanut oil treated by the cold process with 125 lbs. caustic soda lye of 27° Baumé and 25 lbs. of salt water of 12° Baumé will turn out 244 lbs. washing-soap.

Cold-Made Soft Soap.

Soft soap by the cold process is identical with soft soap by the boiling method. Potash lye must be used and will always be pasty or gelatinous if the lye is free from soda. Shaving creams are usually made by this process, using white clean lard and caustic potash, with some alcohol to give it the proper consistency, and perfume it well. To ¼ lb. white soft soap add 2 fluid drachms liquor of potassa and 1 pint of alcohol. Put into a strong bottle and agitate well and keep in a warm place until solution is complete. After settling pour off the clear. If not transparent add some more alcohol before decanting, and at any time, if too thick, it may be thinned with alcohol or proof spirit. If much essential oil be added to perfume it the cream will not be so clear.

Grease-Removing Liquids for Textiles.

The nature of a liquid for this purpose must be such that, when applied to the greasy, oily, resinous, or tarry spot upon the textile, it shall soften and mingle with it by rubbing, or simply by contact. This is a prime requisite, but it is not all that is needed. There must also be the property after the spot is softened that will allow of some rinsing-fluid, usually and preferably cold water, being applied to rinse the cleansing-liquid together with what it has removed from the textile, completely away. A further requisite is that it shall contain no chemical that will destroy or attack to an appreciable degree either the

fibre composing the textile, or any coloring-matter that has been applied to it in its manufacture. A very great number of formulas would be required if it were undertaken to enumerate the varieties of textiles and their colorings, and state specifically in each and every case exactly a liquid compound that was the limit of strength admissible in each and every case. However, it may be said that the more nearly neutral the detergent liquid may be, the less risk of injury to the textile, either in texture or color. Many textiles are changed in color by water alone. They are inexpensive fabrics, as a rule; yet very many silks "spot" with water, and if wet at all must be wet all over in order that all may be changed alike and equally. In such goods, when greasy spots occur, removing the grease will invariably leave a changed place, but if in addition to treating the spot the whole article can be treated, even in lesser degree, the change is blended in outline at least, and becomes much less noticeable. White goods, of course, are in very much less degree, if at all, subject to spotting from water or liquids used to clean them, except as to the starching and lustring; it is therefore not necessary to discriminate very closely in the nature of detergents used on them, so long as it will remove the spot and not act too energetically upon the fibre of the fabric. All that class of detergent liquids that combine with neutral soap, that is, will act as a solvent for soap or soap powders, and are solvents for grease or although not solvents for soap, are solvents for grease and with soap are miscible with water,

and further, are neutral, may be safely used on any and all fabrics and colors. Soaps in combination with chloroform, carbon tetrachloride, ether, alcohol, benzine, naphtha, gasoline, etc., are quite harmless anyway, while formulæ combining with soap, ammonia, sodium carbonate, sodium hydrate, potash in any of its alkaline salts, borax, lime, or lime water, are to be used with caution. Not that they are not good, but that they may, from their alkaline or caustic nature, do harm. The tongue and nose are nature's laboratory. A liquid smelling strongly of ammonia, or when touched to the tongue "bites," is to be used only where possibilities of doing injury to fibre or color are rather remote.

Small Spots on Broadcloth.

Mix 1½ ozs. pipeclay with 18 drops of alcohol and 18 drops spirits of turpentine. Rub the spots with the mixture and dab a little of the dry clay on the opposite side. Allow to dry and then rub off and beat out the clay.

To Clean Spots from Black Cloth.

Dissolve 1 oz. of bicarbonate of ammonia (smelling-salts) in 1 quart of warm water, and rub the cloth with this fluid by means of a black stocking, or dark-colored cloth of any kind. Rinse in same way with cold water, brushing in each case the way of the nap, then dry and press. This mixture is volatile even if not rinsed out, and therefore eliminates any danger

of leaving some substance behind that may catch dust and look badly after a time.

Cloth-Cleaning Compound.

Mix together 1 oz. glycerine, 1 oz. sulphuric ether, 1 oz. alcohol, 4 ozs. ammonia, 1 oz. of Castile soap, then add water to make 1 quart. Rub the cloth with liquid and rinse well out. If the color is very delicate, omit the ammonia.

Lightning Eradicator.

Mix together thoroughly and allow to stand a few days before using 4 ozs. of strong liquid ammonia, 1 oz. nitrate of potash, 2 ozs. of mottled soap, in shavings. Cover grease-spots with this compound, rub well in, and rinse off with water. Good on strong colors, and removes grease-spots very soon. Any good soap shavings can be substituted for mottled soap.

Cleansing Fluid for Spots of Unknown Origin, that may be either Acid, Resin, Tar, Wax, or Grease.

One hundred parts of alcohol, 30 parts ammonia, 4 parts of benzine. This mixture passes very readily through cloth; therefore if the cloth be stretched over a cup, plate, or any concave article, the fluid may be passed through; a little friction at the worst points hastens the work. If there seems to be a part of the color destroyed after the above treatment, try a few drops of chloroform upon it, as it may restore the color. If a residue remains best let the whole dry and with a few drops of sperm oil soften

up tar or resin and again wash with a bit of soap on a tooth-brush, and rinse off with warm water.

Spots Known to be Grease.

Melt 8 ozs. good curd soap in sufficient water, or take equal weights of soft soap; add 1 oz. of ox gall and 1 oz. spirits of turpentine and fuller's earth enough to allow of being made into balls or cakes; moisten the grease-spot and rub the balls or cakes upon it. Allow to dry; brush and rinse off and rub some as the spot is getting dry.

Cleaning Compound.

Four ozs. soft soap, 20 ozs. proof spirit, and 20 ozs. water. Proof spirit is equal volumes of absolute alcohol and water. Therefore 12 ozs. of alcohol and 30 ozs. of water would come near enough. Ordinary gin is a close approximation to proof spirit, is clear, and the scent of juniper is no objection or detriment. In fact, gin is often recommended in cleaning compounds, and for black silk is highly recommended. The black silk is simply sponged off with a clean sponge dipped in gin.

Directions for Dyeing Feathers.

Cleanse the feathers first in warm water at 100° to 120°, containing a little soda, ammonia, or carbonate of ammonia, and allow to remain in this bath until the grease has been entirely removed, i.e., until they are absorptive. Oftentimes feathers are cleaned in cold water containing soda, to which a little powdered starch has been added.

Feathers are bleached in a similar manner to wool, with peroxide of hydrogen, or peroxide of soda.

Feathers are usually dyed with acid dyestuffs (acid colors), seldom with basic dyestuffs.

With Acid Dyestuffs (Acid Colors).

Dye the well-cleaned feathers in a bath just below the boil for ½ hour, or for ½ hour at the boil, with the requisite quantity of acid color and the addition of 5 per cent of oil of vitriol (sulphuric acid) 144° Twaddell.

With Basic Colors.

Dye the well-cleaned feathers at 100° to 120° Fahr. in the well-dissolved basic color. It is well to dry the feathers after dyeing in a rotating-machine.

List of Acid Colors.

(From the Elberfeld Co.)

Reds.

Acid magenta,
Brilliant croceine 3 B,
Carmoisin 3 B,
Eosine S extra bluish,
Fast red A,
Rhodamine B, G, B extra, G extra.

Orange.

Croceine orange G,
Eosine S extra yellowish,
Mandarine G,
Orange 11 B, G T.

YELLOW.

Quinoline yellow,
Indian yellow G R,
Naphthol yellow S.

GREEN.

Acid green 3 B, B B N, G G.

BLUES.

Alizarine blue S A P,
Brilliant wool blue B extra,
New patent blue B, 4 B, G A,
Wool blue N extra, R extra.

VIOLETS.

Acid violet 3 B extra, 4 B extra, B W.
Fast acid violet 10 B,
Methyl violet B.

BROWNS.

Bismarck acid brown,
Bronze acid brown,
Dark acid brown,
Fast brown.

BLACKS.

Acid black 4 B L, L D,
Feather black T B extra 21911,
Wool black N 4 B.

Leather Bleaching.

Three methods are employed for leather bleaching: oxidation, reduction, and acid bleaching. There is a topping process in addition to the real bleaching processes, a method, that is, of hiding a color instead of bleaching or stripping. It goes without saying that in many cases the actual process is a combination of two or more of these processes, or typical methods. The oxidation bleach is the favorite with chamois and skins of furred animals. Reduction bleach is used for the same articles to a less extent. Ordinary leather is generally acid-bleached.

Oxidation Bleach.

The oldest of these methods is grass bleaching, but the great time it requires has caused bleaching with peroxide of hydrogen, or sodium, which from this point of view may be regarded as concentrated sunlight, to replace it in a very large measure. Leather tanned with vegetable tannin should not be bleached in this way. It bleaches easily under this treatment certainly, but is very apt to darken again afterward. In using sodium peroxide, the white commercial powder is stirred into a ½-per-cent solution of oil of vitriol until the liquid is just perceptibly alkaline. The leather is then soaked in the liquid until the bleaching has reached the desired point. It must be stirred about occasionally. Another bleaching agent for leather is permanganate of potassa, but it is most important to use this in acid solution, as alkaline

permanganate liquids tender the leather. This is a very favorite way in France for bleaching chamois leather. The solution used is one of 2 lbs. of permanganate in 200 gallons of water, and it is just acidified with oil of vitriol. A sulphurous acid (sodium bisulphite hydrochloric acid) is often necessary to free the bleached leather from brown manganese oxide precipitated upon it. No other oxidation methods than these have turned out to be of any value for leather.

Reduction Bleach.

This method is in practice confined to the use of sulphurous acid. It is chiefly carried out with the gaseous oxide, and is generally used for fur skins. The bleaching chamber is then worked exactly as in straw or silk bleaching. The liquid sulphurous acid bleach is prepared by dissolving sodium bisulphite in weak hydrochloric acid; the strength required varies within wide limits and must be adjusted by an experienced leather-bleacher. This is the disadvantage of wet sulphur bleaching as compared with the use of gas. Whether the wet or dry process has been used, it is most important to remember that the oil of vitriol formed in the leather during the bleaching, which will destroy it if left in it, cannot be gotten rid of by rinsing. An alkaline bath must precede the rinsing, and if the sulphur bleach has not turned out well, the bath may well take the form of a weak solution of sodium peroxide.

Acid Bleach.

For this bleach the leather is first freed from grease with alkali, preferably borax. A solution of 3 lbs. of borax in 6 gallons of water is required for 100 lbs. of leather. After working the leather in this for ¼ hour, it is drained, rinsed, and bleached in a 4-per-cent solution of lactic acid. The bleach takes another 15 minutes.

Topping Methods

answer well with leathers already light-colored, as they do not injure the leather as bleaching is apt to do, even under the most skilful hands, and are also cheaper. Dark colors, however, cannot be hidden. Sugar of lead and oil of vitriol in alternate weak baths are used, repeating until sulphate of lead is deposited sufficient to hide its natural color, ½ to ¾-per-cent solutions, and the leather must first be freed from fat, and the first bath must be sugar of lead, also the last bath, to neutralize the oil of vitriol, and saves much rinsing; of late tin salts have been used in conjunction with white pigments, such as talc, blanc fixe, and pipeclay. These pigments are also used alone, being well rubbed into the leather, which is first thoroughly soaked.

MISCELLANEOUS.

Grease-Stains from Paper.

Scrape away with a knife any smear thus removable. Warm the paper and lay a blotting-paper upon it and press gently with a hot iron. Traces remaining are to be removed by hot turpentine. Place the turpentine in a bottle; place the bottle containing the

turpentine in a vessel of cool water and heat gradually to boiling. Lay the turpentine upon the stain on each side, and then, after a few moments, remove the turpentine with alcohol, by means of a brush or swab dipped repeatedly in the alcohol. Finally restore the lustre and smoothness of the paper with a hot iron.

Grease-Spot-Remover.

Four ozs. alcohol, 16 ozs. spirits of turpentine, 4 ozs. ether. Mix, and keep well corked. Place a blotter under the stain and apply the fluid over the stain with a rag until the spot is out. Blot again on both sides with fresh blotters and dry in the shade, exposed freely to the air. Very old stains of grease may require several applications.

To Use Soap-Wort.

Twenty-four parts of the root and dried leaves, 185 parts alcohol, 1,700 parts of water. Powder the soap-root and boil it in the water 15 minutes, then put in the leaves cut up fine and boil 2 to 4 hours and strain. When cold add the alcohol. The fluid is used cold or lukewarm. Dip the stained part of the fabric therein and rub up a lather with the hands. More especially for silk goods. May be applied to calico with a brush. Rinse well out with cold water and iron nearly dry.

White Stains upon Varnished Table-Tops.

Usually, or at least often, these disappear if the stain is smeared slightly with any oil, or better, with oil containing some turpentine. Dry powdered car-

bonate of soda, or sal-soda, in fine powder, saleratus, or even lime in powder so fine it won't scratch, may be sprinkled over the spots and afterward rubbed with a cloth saturated with kerosene. Rub first the spots and then the whole top and wipe and polish with a dry cloth.

Iron-Rust Spots.

Iron oxide is soluble easily, or after some time, in 1 part muriatic acid to 5 parts of water. If the rust spot is upon anything that is not attacked by the acid, there is no simpler method. Oxalic acid has similar solvent powers on iron oxide, and as it is a dry substance, is more convenient to keep in the house, but being poison, is unsafe where any child or person not responsible can have access to it. Iron rust on any white goods can be safely treated with muriatic acid and the acid rinsed off well afterward. On delicate-colored things, the rust usually acts upon the coloring compound also, and even if the rust can be dissolved out there is a spot remaining. Dry salt and lemon juice; lay the salt just the size of the spot and moisten with the lemon juice; it will slowly dissolve the rust. Iron rust properly applied is a very permanent dye, and much used for cotton buff (khaki colors), and no formula can be given to remove it from all the many articles that can become stained with it in the daily affairs of life. Two parts of tartaric acid, 1 part powdered alum, laid on like salt and lemon juice, are rather more energetic in removing iron rust, and not destructive to fabrics.

To Dye a Carpet.

Carpets have been dyed, where badly faded, in the following manner: First take up the carpet and beat thoroughly either before or after ripping the breadths apart. Then scrub and wash it on a table with a brush and soap and water, not driving any more water through than can be avoided. Let it become about half dry and make up a dye in a basin of the required color and, keeping it hot, scrub it into the carpet as evenly and thoroughly as possible. Do not, however, try to get the full depth of color at once going over the carpet, but go over it twice, and with the brush not too much filled with the color, and get it as evenly distributed as possible. It should not be so soaked with the dye liquor as to drain toward one edge after being hung on a line in the shade to dry. or that part hanging lowest will become overcharged with the dye and be too dark to match the rest.

To Make Colored School Crayons.

Make a solution of the dyeware of a concentration about right for use as ink. Use common school soft crayons. Stand as many as are needed in a cup and pour on the solution of dyeware to cover them, and let stand about 10 minutes. Place the wet crayons where they will keep warm for about 12 hours, or over night. When dry they are fit for use. The dye not absorbed by the crayons may be saved for further use.

Colored Starches.

Use a little dye of the color of the article to be starched in the water in which the starch is boiled. The effect is to brighten the finished work very materially.

To Dye Wood.

Wood is very difficult to dye where the pieces are of any great thickness. Veneers are dyed entirely through, but the operation is a very prolonged and tedious one. The veneers are soaked in water for a week and a good deal of slimy extractive matter is thus worked out. A further treatment is to soak the veneers in a 10-per-cent solution of caustic soda for 24 hours and then to boil therein for ½ hour, whereby a lot more of stuff comes out of the wood, and the texture is very much softened and rendered as near an approach to pure cellulose (the cotton fibre) as can readily be arrived at. The dyeing operations are facilitated the more thoroughly this is done, but there is a limit to which it can be carried on account of the veneers becoming brittle and tender when dry. The quality of the finished dyeing of veneers is improved by several intermediate dryings during the dyeing operation, and, where possible, should be dried in the open air. Some dyeings of veneers are so soft and disintegrated that they must finally be dried between blotting-paper under heavy pressure to retain their shape. The prepared veneers are well washed before dyeing. The old method of dyeing

black veneers, still largely practised, is to boil and steep the prepared veneers in decoctions of logwood (1 part logwood to 3 of water), or solutions of logwood extract for 24 hours, removing and drying and putting them in hot solutions of copperas (1 part copperas to 30 of water) for another 24 hours. Acids will, of course, turn this black to red, which in a short time becomes a faded and nondescript shade. Alkalies in turn would purple it, and fade eventually to a yellowish stain of drabby-brown character. The writer is of opinion that the sulphur colors could be used to dye veneers. They are fast to all reagents, sunlight, and abuse generally. The process is carried out in caustic soda solution and the percent of caustic soda can be any amount required. The dye is dissolved in sodium bisulphide (being insoluble in pure water) equal to $\frac{2}{3}$ or more of the weight of the dye, and some bisulphide is added also to the bath. In practice the whole could be added to the bath and boiled until dissolved. Salt equal to the weight of the veneers is added to cause the bath to exhaust more completely. If the veneers were thrust in lengthwise in a cage of rope (metals affect the bath injuriously) they could be withdrawn at any time for examination and drying out. The bath is a standing permanent one, and is strengthened from time to time as needed, and no precautions are necessary to keep it from spoiling. The sulphur colors come in red-yellow, blue, green, black, yellow, etc., and will combine with each other to make any shade.

Bright Red Dye for Wood.

Put 2 lbs. genuine Brazilwood dust in 4 gallons of water boiling hot; put in as many veneers as the liquor will hold; boil for 3 hours; then add 2 ozs. alum and 2 ozs. of nitric acid. It is well to lift the veneers, or draw off the liquor and mix the alum and nitric acid with the bath and return the veneers to the bath, or the bath to the veneers, and boil a short time longer. Every day the bath must be warmed up until it has struck through. This red is fairly fast to light and acids, and finishes well.

Bright Yellow Veneers.

Persian berries 1 lb. per gallon of the water required in which to boil the veneers, and boil until the color goes through; 2 ozs. nitric acid are added after 3 hours, and help very much to get the color through. Closed lead pipes for steam and wood vats are best for dyeing veneers where nitric acid is used.

Orange for Veneers.

Combine the red and yellow dyes, and dye exactly as directed.

Blue for Veneers.

Extract of indigo in strong solution and the veneers heated to boiling occasionally and allowed to steep until colored quite through. The prepared veneers best be quite dry, or at least two-thirds dry when put in the bath. Rinse well finally, or expose to

ammonia fumes, or carbonization and "wooling" of the surface of the veneers under the tool may result.

Any cotton dye in alkaline solution will dye wood. Any of the direct blacks, 10 per cent of the black, 2 per cent soda ash and 20 per cent common salt. If the wood is softened and well prepared, 2 days' cooking and steeping will penetrate $\frac{1}{16}$ of an inch of ash (in grain), or more exactly basket splints pounded from an ash log. If sawn in sheets $\frac{1}{16}$ inch they will dye much sooner.

Red.

Ten per cent benzo-purpurine, 2 per cent soda ash, 20 per cent common salt.

Yellow.

Ten per cent any bright cotton yellow, as chinoline yellow, chrysamine G, 2 per cent soda ash, 20 per cent common salt.

Blue.

Ten per cent benzo-azurine G, or any cotton blue of like character.

Green.

Five per cent benzo-azurine G and 5 per cent chrysamine G, 2 per cent soda ash, 20 per cent common salt.

Purple.

This is best with logwood, thus: Prepare a decoction of logwood as for black. Boil and steep the prepared wood in the decoction until well penetrated.

Dissolve 2 per cent of the weight of the veneers of alum in hot water and add directly to the bath after lifting the veneers, if the bath is to be therein. Otherwise make a fresh alum bath. Traces or considerable quantities of indigo extract may be added to the alum bath to shade the color if desired.

Purple.

Archil in decoction of ½ to 1 lb. per gallon of liquor dyes with good penetration, and is fairly fast. Can be shaded with indigo extract and saddened with alum for red, and copperas and blue vitriol for more brown and sombre shades. Simply soaking white veneer in copperas solution will give a silver-gray color without previous preparation of the wood.

STAINING WOOD.

Staining wood is an altogether different process than dyeing wood, and requires no preparation of the wood before the stain is applied. In preparing the stain but little trouble is required, and generally speaking its application differs but little from painting. When carefully done and properly varnished, staining has a very beautiful appearance, and is much less likely to meet with injury than japanning. For any bright color the powder dyes upon the market, without exception, may be used for this purpose. All are not soluble in water, some only in alcohol. Another class are soluble in gasoline, kerosene, benzine, oil, and varnish. The solution in oil and

varnish is, however, very slow-drying, and apt to remain too sticky for furniture. The water solutions are as good as any, if the raising of the grain is no objection. Where sandpapering from raising of the grain is to be avoided, the oil-soluble colors dissolved in gasoline are used. Where a full black is desired, the old logwood and copperas stain is as good as any. Wash the wood over with solution of copperas two or three times and let it dry. Then apply two or three coats of a strong decoction of logwood; wipe the wood, when dry, with a damp sponge, and polish with linseed oil.

A Permanent Brown-Colored Stain.

First paint the wood with a solution of cutch (catechu or gambier) with 30 parts of water. The article may be dipped in the solution if small, and slats for Venetian blinds and frames of window screens are stained in this way. A little soda ash and blue vitriol may be added to the solution, and gives a darker and more red appearance. This is allowed to dry in the air, and the wood is then painted over, or dipped, with solution of bichromate of potash, 1 part bichromate to 30 parts of water. The strength of the solutions can be varied, and fustic, logwood, sumac, archil, Brazilwood, etc., decoctions added to suit the fancy. An extract from the saw palmetto would answer the purpose admirably in place of cutch, in sections where it grows. Neither cutch nor palmetto will fade from sunlight, especially where varnished. Where neither oiled nor varnished it

"weathers" as fast as the board and no more so. Permanganate-of-potash solution in water makes a very permanent brown stain upon wood, which after careful washing, drying, and oiling, assumes a reddish tint upon polishing.

Beechwood Mahogany.

Dissolve 1 oz. aloes and 2 ozs. dragon's-blood resin in 1 quart alcohol and apply to the wood. The wood must have been completely surfaced previously, as it will not do to apply sandpaper after the stain is applied. If wanted more yellow, the wood may be gone over with more or less diluted nitric acid, and after smoothing up, the above stain be applied, or boil 1 lb. logwood chip, or 3 ozs. extract of logwood, in 2 quarts of water and add 2 handfuls of walnut peel; boil again and strain, and add 1 pint good vinegar.

Imitation Mahogany.

Any species of close-grained wood may be given the appearance of mahogany. The surface is planed smooth, the wood is then rubbed with solution of nitrous acid. One ounce of dragon's blood is dissolved in $\frac{2}{3}$ pint of alcohol. This and $\frac{1}{3}$ oz. of carbonate of soda are to be mixed together and the liquid filtered, and the liquid in this state is laid on with a soft brush. This process is to be repeated, and a short time after the wood assumes the appearance of mahogany. Polish and renew with cold-drawn linseed oil.

Imitation Rosewood.

Boil ½ lb. of logwood in 3 pints of water until it is a very dark red, and add ½ oz. of carbonate of potassa or soda. While boiling hot, stain the wood with two or three coats, taking care that it is nearly dry after each coat; then with a stiff flat brush give streaks with the black stain previously given, which, if carefully executed, will be very nearly the appearance of rosewood. Or the black streaks may be put in with a solution of copperas and verdigris in a decoction of logwood. A handy brush for the purpose may be made out of a flat varnish brush; cut the sharp points off and make the edge irregular by cutting out a few hairs, and you will have a tool that will very closely imitate the grain. Or stain with the black stain, and when dry go over it with a brush made as above dipped in the following liquor: Strong nitric acid 1 pint, 1 oz. grain tin, and sal-ammoniac the size of a walnut. Set it aside for a day or two with the cork out and shake it from time to time. In the course of two or three days it will be fit for use. Don't get this liquid on hands or clothing. It stains the hands a yellow that must wear off and stains the clothes in such manner it cannot be removed.

To Imitate Old Mahogany.

It frequently happens that mahogany darkens by age. Therefore in adding a patch of new wood, it shows up much too light-colored. To obviate this

difficulty apply any alkaline liquid, soap lye, lime-water, or milk of lime, soda carbonate, ammonia. Have a care that you do not get the patch too dark; therefore use weak alkali and work up to it by repeating the process with gradually stronger solutions.

Cane-Staining.

Dissolve a few grains of sulphate of manganese in sufficient water to take it up. Moisten the surface of the cane with it, and hold it over the flame of a spirit-lamp close enough to scorch it. By care the whole surface may be brought to a uniform dark, rich brown, or beautifully variegated by heating some parts more than others, thus varying from near white to almost black. The color appears dull at first, but on oiling with linseed oil (raw) and rubbing with a smooth piece of hard wood it will be beautifully developed. Give the cane no other finish, unless it be to give it another oiling some days after the first.

Dark Mahogany Color.

Boil ½ lb. madder and 2 ozs. of logwood in 1 gallon of water; then brush the wood well over with the hot liquid. When dry, go over the whole with a solution of 2 drachms pearlash in 1 quart of water.

Light Mahogany.

Brush over the surface of the wood with diluted nitrous acid, and when dry apply the following with a soft brush: Dragon's blood 4 ozs., common soda 1 oz., alcohol 3 pints. Let it stand in a warm place.

Shake it frequently, and then strain. Repeat until dark enough to suit.

Mahogany Color.

Pure Socotrine aloes 1 oz., dragon's blood ½ oz., alcohol 1 pint; dissolve and apply two or three coats to the surface of the wood, and finish off with wax and oil tinged with alkanet. Or, wash over the wood with strong nitric acid, and when dry apply a coat of the above and polish with the wax and oil, or logwood 2 ozs., madder 8 ozs., fustic 1 oz., water 1 gallon. Boil 2 hours, and apply it several times to the wood boiling hot. When dry slightly brush it over with solution of pearlash 1 oz., water 1 qt. Dry and polish as before. Or, logwood 1 part, water 8 parts; make a decoction and apply it to the wood; when dry, give two or three coats of the following varnish: dragon's blood 1 part, alcohol 20 parts; mix.

Black Walnut.

Besides the cutch brown given before, you may use the following: 1 quart of water, 1½ ozs. washing-soda, 2½ ozs. vandyke brown, ¼ oz. bichromate of potash. Boil 10 minutes and apply either hot or cold. An excellent stain.

To Stain Brown Beech, Boxwood, Shad, Orangewood or Holly.

Hold the wood to the fire until it feels warm to the hand; then take nitric acid and with a feather pass over the work until it changes to brown, keeping it

continuously before the fire and warm. After thoroughly dry, it may be shaded by a brush, or the feather dipped in solution of potash or soda.

Green.

Green is not a natural or pleasing stain for wood except in special cases. If wanted, besides the very numerous green powder dyes on the market, you may use 3 pints strongest vinegar (or some acetic acid), 4 ozs. best verdigris, pounded fine, ½ oz. sap green, and ½ oz. indigo carmine.

IVORY.

To Color or Dye Ivory or Bone.

With regard to the coloring of ivory, it may be said that in general the colors penetrate better before the surface is polished than afterward. Should any spots appear, they may be cleaned up by rubbing them with chalk, after which the ivory should be dyed once more, to produce uniformity of shade. On taking it out of the boiling-hot dye, it should be plunged at once into cold water to prevent the chance of fissures being caused by the heat. Ivory may be dyed by any of the methods employed for woollens, after being freed from dirt and grease, but more quickly as follows:

To Dye Ivory Black.

After being well washed in an alkaline lye, the ivory is steeped in a weak neutral solution of nitrate of

silver and then exposed to the light, or dried and dipped into a weak solution of ammonium sulphide.

To Dye Ivory a Deep Black.

Boil the cleaned ivory in a strained decoction of logwood for some time and then steep it in a solution of acetate or sulphate of iron.

To Dye Ivory Red.

Make an infusion of cochineal in dilute ammonia and immerse the clean pieces therein, having previously steeped them in water just sour to the taste with nitric acid.

To Dye Ivory Red.

Four parts of picric acid, by weight, dissolved in 250 parts of water boiling hot; add after cooling 8 parts ammonia. Dissolve 2 parts magenta in 45 parts alcohol, dilute with 375 parts of water (hot), and add 50 parts of ammonia. As soon as the red color of the solution has disappeared mix the two solutions. Ivory and bone should be first steeped in very weak nitric or muriatic acid before being immersed in the ammoniacal solution of picric acid and magenta. By varying the proportions of picric acid and magenta any shade from bluish-red to bright orange may be obtained; the colors do not appear until the ammonia has evaporated. When to the ammoniacal solution some gelatine solution is added, it may be used as a red ink that will not corrode steel pens.

To Dye Ivory Blue.

Steep the cleaned ivory in the dyer's green indigo vat, or first steep in very weak muriatic acid for 15 or 20 minutes, and from this to a bath of indigo carmine, and keep it there until it assumes a uniform blue tint. Then dry and polish. Any acid blue, sulphate of indigo, or weak decoction of logwood will color ivory blue. For logwood the acid bath is not necessary nor admissible. For violet steep the clean ivory in a very dilute solution of tin crystals and boil in the logwood bath.

Aniline Dyes for Ivory.

Any of these colors give a fine and permanent color to ivory by immersion in their more or less strong solutions, according to the depth of color wanted. Make a very strong solution in a small vessel and add from it to the dye vessel until dark enough. The ivory may be shaded with red, yellow, or blue to meet all requirements.

To Render Ivory Flexible.

Ivory is rendered flexible if immersed in a solution of phosphoric acid, specific gravity 1.13, until it loses, or partially loses, its opacity, when it is washed in clean cold water and dried. In this state it is as flexible as leather, but gradually hardens by exposure to the air. Immersion in hot water restores its elasticity and softness and pliancy. Or put the ivory

to soak in 3 ozs. nitric acid diluted with 15 ozs. water. In three or four days the ivory will be soft.

To Harden Ivory.

If, after ivory has been softened, it is desired to harden it again, wrap it in a sheet of white paper and cover with dry decrepitated salt and lay it by for 24 hours, when it will resume its original hardness.

To Dye Ivory when Softened.

Dissolve in alcohol such color as is desired to use. When the alcohol is sufficiently impregnated with the color, plunge in the ivory and let it remain until dyed to suit.

To Bleach Ivory.

Twenty-two and a half ozs. of ivory. Place them in a solution of $11\frac{1}{2}$ ozs. carbonate of soda crystals, $45\frac{5}{8}$ ozs. water. Leave in this bath two days and wash well in pure water. Next immerse in a solution of 17 ozs. sulphate of soda in $45\frac{1}{2}$ ozs. of water for five or six days, and add to the liquid, yet containing the ivory, 1 oz. muriatic acid and $5\frac{1}{2}$ ozs. water. Cover and allow to remain 24 to 36 hours, and wash well in cold water and dry.

To Restore Yellowed Ivory to its Original Whiteness.

A thin lime paste is prepared in a pot and heated over a stove. The ivory is placed in this and left until white, when it is taken out, dried, and polished.

To Bleach Ivory.

Rub it with finely powdered pumice stone and water and expose to the sun while still moist, under a bell glass, or some glass covering, to prevent too rapid desiccation and cracking. Observe to repeat the process until a proper effect is produced. Ivory may also be bleached by immersion for a short time in water containing sulphurous acid, chloride of lime, or chlorine in solution, or by exposing to the fumes of burning sulphur, largely diluted with air. In many cases, as with piano keys, that can't be removed, the rubbing with pumice stone and water, and the polishing process will be found at least partly successful.

To Polish Ivory.

Putty powder and water and a piece of old felt hat will in a short time produce a fine gloss on ivory if rubbed vigorously upon it; or set the ivory in a turner's wheel and after having worked it to shape, rub with a paste of pumice stone and water until perfectly smooth; then heat it by holding a piece of linen against it, or a sheepskin, by friction, and rub it with whiting and olive oil. Next with dry whiting alone, and finally with a clean soft rag, and the ivory will appear remarkably white and glossy.

Fluid for Marking Ivory.

Take nitrate of silver, 2 parts; nitric acid, 1 part; water, 7 parts; mix.

Etching-Varnish for Ivory.

White wax, 2 parts; tears of mastic, 2 parts; mix by heat.

To Etch Ivory.

Cover the ivory to be etched with a clean coating of etching-varnish or beeswax, then trace the figures upon it through the wax. Pour over it a strong solution of nitrate of silver. Let it remain a short time, then remove it and the wax by hot water. The design will be left in black lines upon the ivory or appear on exposure to the sun.

To Gild Ivory.

Immerse it in a solution of gold in nitro-muriatic acid, and while yet damp expose to hydrogen gas. Or immerse in a solution of ferrous sulphate and afterward in a solution of chloride of gold.

To Silver Ivory.

Immerse the ivory in a strong solution of nitrate of silver and let it remain in the dark until the nitrate of silver has given it a deep yellow color. Remove to a fresh bath of clear water and expose under water to the direct rays of the sun. In about 3 hours the ivory becomes a deep black, but on being rubbed soon becomes a brilliant silver.

To Clean Ivory Ornaments.

When ivory ornaments get yellow or dingy-looking, wash them well in soap and water and a brush to clean out the carvings, and place them while wet in clear sunshine; wet them several times a day for two or three days with soapy water, still keeping them in the sun. Then wash them again and they will be beautifully white.

Artificial Ivory.

Tablets for photographers' use are made of gelatine or albumen mixed with finely-powdered sulphate of baryta, or heavy spar, compressed into sheets and dried. The most successful imitation of ivory seems to be made by dissolving India rubber (caoutchouc) in chloroform, passing chlorine through the solution until it is of a pale yellow tint, next washing well with alcohol and adding, in fine powder, either sulphate of baryta, sulphate of lead, alumina, or chalk, in quantity proportioned to the desired density or tint, kneading well, and finally subjecting to heavy pressure. A very tough product is obtained, capable of receiving a high polish.

APPENDIX

LIST OF DYESTUFFS, MAKERS, AND METHODS

From METZ & Co.'s Yearbook, 1907, by permission.

ABBREVIATIONS USED TO INDICATE DYESTUFF MANUFACTURERS AND THEIR AGENTS.

A. Berlin Anilin Works, 213–215 Water St., New York, N. Y.; 122 Walnut St., Philadelphia, Pa.; 124 Pearl St., Boston, Mass.; 220 E. Kinzie St., Chicago, Ill.; 9 E. Pearl St., Cincinnati, O.; 23 S. Tyron St., Charlotte, N. C. American agents for the Actiengesellschaft für Anilinfabrikation in Berlin.

At. F. E. Atteaux & Co., 176 Purchase St., Boston. Mass.; 176 Fulton St., New York, N. Y.; 17 E. Kinzie St., Chicago, Ill.; West Fulton St., Gloversville, N. Y.; 53 E. Colbourn St., Toronto, Ontario; 15 Lamoine St., Montreal, Canada.

B. Badische Co., 128 Duane St., New York, N. Y.; 86 Federal St., Boston, Mass.; 80 South Water St., Providence, R. I.; 238 Arch St., Philadelphia, Pa.; 228 Randolph St., Chicago, Ill.; 6 Lamoine St., Montreal, Canada. Former designations K.P., P.K., Con. Agents for B.

Bs. C. Bischoff & Co., 451–453 Washington St., New York, N. Y.; 229 N. Front St., Philadelphia, Pa.; 124–

126 Purchase St., Boston, Mass.; 10 Weybosset St., Providence, R. I.; 196 Michigan St., Chicago, Ill.; 416 St. Paul St., Montreal, Canada.

By. Farbenfabriken, vormals Fried. Bayer und Co., Elberfeld, Barmen, Scheploh, Leverkusen, Germany; Flers, France; Moscow, Russia. American agents, Farbenfabriken of Elberfeld Co., 117 Hudson St., New York, N. Y.; 32 India St., Boston, Mass.; 27 Pine St., Providence, R. I.; 9–11 N. Water St., Philadelphia, Pa.; 133 E. Kinzie St., Chicago, Ill.; 509–513 Trust Building, Charlotte, N. C.; 14 Front St., East, Toronto, Canada.

K. Kalle & Co., Inc., Biebrich-am-Rhein, Germany; 530 Canal St., New York, N. Y.; 145 Pearl St., Boston, Mass.; 37 Letitia St., Philadelphia, Pa.

Klp. A. Klipstein & Co., 122 Pearl St., New York, N. Y.; 50–52 N. Front St., Philadelphia, Pa.; 283–285 Congress St., Boston, Mass.; 136 Kinzie St., Chicago, Ill.; 13 Mathewson St., Providence, R. I.; 24 Catherine St., North, Hamilton, Canada; 17 Lamoine St., Montreal, Canada.

Math. Cassella Color Co., 182–184 Front St., New York, N. Y.; 126–128 Front St., Philadelphia, Pa.; 68 Essex St., Boston, Mass.; 64 Exchange Place, Providence, R. I.; 47 N. Pryor St., Atlanta, Ga.; 86–88 Youville Square, Montreal, Canada.

Mz. H. A. Metz & Co., 122 Hudson St., New York, N. Y.; 140–142 Oliver St., Boston, Mass.; 104 Chestnut St., Philadelphia, Pa.; 23 South Main St., Providence, R. I.; 4 N. Clark St., Chicago Ill.; 210 Tyron St., Charlotte, N. C.; Empire Building, Atlanta, Ga.; Dock & Brown Sts., Newark, N. J.; 1025 Bryant St., San Francisco, Cal.; 55 St. Francois Xavier St., Montreal, Canada; 28–30 Wellington St., West, Toronto, Canada. Hamburg, Germany.

This list of dyeware-makers and their agents is far from a complete one, but is deemed quite sufficient for the requirements of the users of this book.

Dyeing Methods.

For economy of space, in order that the information may be more readily found, the dyeing methods are given by certain suggestive letters, in accordance with the following:

W A indicates wool is dyed in acetic-acid bath.
W N means that wool is dyed in a neutral bath.
W G indicates that wool is dyed in a bath containing Glauber salt.
W G S means that wool is dyed with Glauber salt and sulphuric acid in the bath.
W G S Ch indicates that wool is first dyed with Glauber salt and sulphuric acid in the bath, and the color then developed with chrome (bichromate of potash or soda).
W A Ch means that wool is first dyed with acetic acid in the bath and chrome added to develop the color.
W Ch indicates that chromed (mordanted) wool is dyed in the bath.
S A means that silk is dyed in the bath acidified with acetic acid.
S S means that silk is dyed in a bath acidified with sulphuric acid (oil of vitriol).
C T indicates that the dyestuff is used on cotton mordanted with tannin.
C D means that cotton is dyed direct in the bath.
C Dv indicates that the color is developed on cotton by subsequent treatment after direct dyeing.
C A L indicates that cotton is dyed with alum and Glauber salt.
C W D indicates cotton and wool mixed goods (unions) dyed in one bath.
S U L P H U R denotes one of the class of sulphur dyes requiring special treatment.

These extremely brief directions are used for the further reason that the dye-manufacturers themselves prefer that specific directions be obtained from their offices. Paste dyes are entirely omitted from the following list.

Dyestuffs, Makers, and Methods.

Acetopurpurine, 8 B	A	C D
Acetylene Blue, 6 B, 3 B, Bx, 3 R	Klp	C D
Acetylene Pure Blue	Klp	C D
Acid Alizarine Black 3 B, 3 Bex	Mz	W G S Ch
Acid Alizarine Black R, A C, R H	Mz	W G S Ch
Acid Alizarine Black S N, S E T (powder)	Mz	W G S Ch
Acid Alizarine Black T	Mz	W G S Ch
Acid Alizarine Blue B B	Mz	W G S Ch
Acid Alizarine Blue G R, S V	Mz	W G S Ch
Acid Alizarine Blue Black B, 3 B	Mz	W G S Ch
Acid Alizarine Brown B, B B, R H, R P	Mz	W G S Ch
Acid Alizarine Dark Blue S N	Mz	W G S Ch
Acid Alizarine Garnet R	Mz	W G S Ch
Acid Alizarine Gray G	Mz	W G S Ch
Acid Alizarine Green B	Mz	W G S Ch
Acid Alizarine Green G	Mz	W G S Ch
Acid Alizarine Grenade R	Mz	W G S Ch
Acid Alizarine Red B, G	Mz	W G S Ch
Acid Alizarine Violet N	Mz	W G S Ch
Acid Alizarine Yellow O, R C	Mz	W G S Ch
Acid Anthracine Brown T, G, R H Extra	By	W G S Ch
Acid Anthracine Red G, B B	By	W G S Ch
Acid Black	Mz	W G S
Acid Black B E	Klp	W G S
Acid Black 5 B, 8 B, F L	By	W G S
Acid Black C, 3 B L, T	Klp	W G S
Acid Blue F S, 466, G S	Mz	W G S
Acid Blue Black 3 B	By	W G S
Acid Brown D	Math	W G S
Acid Brown G	A	W G S
Acid Brown R	A	W G S
Acid Cerise	Mz	W G S and S S
Acid Cerise O, ii	Mz	W G S and S S
Acid Chrome Black B G, W S, T C	By	W G S Ch

Acid Chrome Brown T	By	W G S Ch
Acid Crimson	Bs	W G S
Acid Cyanine B, B D, B F, G, C D, G F	A	W G S
Acid Cyanine B R	By	W G S
Acid Eosine G	Mz	W G S
Acid Fuchsine	Mz, Bs, Klp	W G S
Acid Fuchsine S B	B	W G S
Acid Green	By, Klp.	W G S and S S
Acid Green 3 B, 6 B	By	W G S
Acid Green Conc	Mz	W G S
Acid Green Conc. D	Mz	W G S
Acid Green Conc. G, M, ii	Mz	W G S
Acid Green E C	Mz	W G S and S S
Acid Green 5 G	Math	W G S
Acid Green M	Mz	W G S and S S
Acid Green M, 5-fold conc	Mz	W G S
Acid Green O	Mz	W G S
Acid Green 780	Math	W G S
Acid Indigo Blue	Mz	W G S
Acid Magenta	Mz, B, SS..	W G S and S S
Acid Magenta B	Mz	W G S and S S
Acid Magenta Crystals	Mz	W G S and S S
Acid Magenta O	Mz	W G S and S S
Acid Marine Blue A	Math	W G S
Acid Maroon O	Mz	W G S and S S
Acid Methyl Violet S 7 B	B	W G S
Acid Phosphine G O, B R O	Mz	Leather
Acid Ponceau	Klp	W G S
Acid Rhodamine R, 3 R	Klp	W G S
Acid Rosamine A pat	Mz	W G S and S S
Acid Rubine S B	B	W G S
Acid Rubine B B R	Klp	W G S
Acid Ruby	Klp	W G S
Acid Sky Blue	At	W G S
Acid Violet 3 B extra B W	By	W G S
Acid Violet B N, 2 B N	B	W G S
Acid Violet 4 B extra	By, A	W G S
Acid Violet 4 B N	B, Klp	W G S

Acid Violet 4 B S	Math	W G S and S S
Acid Violet 4 B X	By	W G S
Acid Violet 5 B F, 5 B F I	Mz	W G S
Acid Violet 5 B S	At	W G S
Acid Violet 5 B X	Math	W G S
Acid Violet 6 B	A, By	W G S
Acid Violet 6 B F	Mz	W G S
Acid Violet 6 B I N	Mz	W G S
Acid Violet 6 B N	Klp, B.	W G S and S S
Acid Violet 6 B S	Mz	W G S
Acid Violet 7 B	Mz, Klp, B	W G S and S S
Acid Violet 7 B N	Mz	W G S
Acid Violet N	Mz	W G S
Acid Violet R conc	Mz	W G S
Acid Violet R extra	By	W G S
Acid Violet 2 R extra, 3 R extra	By	W G S
Acid Violet 3 R A, 3 R S	Mz	W G S
Acid Violet 4 R	Klp, B	W G S
Acid Violet 4 R N	Mz	W G S
Acid Violet 4 R S	Mz	W G S
Acid Violet S 7 B, S 4 R	B	W G S
Acid Violet ii	Mz	W G S
Acid Yellow	Mz, A, Klp, Math	W G S
Acid Yellow Crystals	Mz, Math	W G S
Acid Yellow A T	Math	W G S
Acid Yellow D	A	W G S
Acme Brown	Math	C T
Acme Yellow	Mz	W G S and SS
Acridine Orange	Mz	S A and C T
Acridine Orange N O, R extra	Mz	C T
Acridine Red B, 2 B, 3 B	Mz	C T
Acridine Scarlet R, 2 R, 3 R	Mz	C T
Acridine Yellow	Mz	S A and C T
Argol Blue C F, 3 G	By	Vat
Argol Green B	By	Vat
Argol Red B	By	Vat
Alizarine Anthrol Blue N R	Mz	W Ch
Alizarine Astrol B	By	W G S, W Ch

Alizarine Black Bayer F B, N G, G A.	By	W G S Ch
Alizarine Black 4 B, 4 B N.	Math	W A
Alizarine Black 4 B R.	Math	W A
Alizarine Black 6 B.	Math	W A
Alizarine Black 6 B, C T.	Mz	W G S Ch
Alizarine Black D.	Math	W A
Alizarine Black P.	Mz	W Ch
Alizarine Black R.	Bs, Math	W Ch
Alizarine Black S	Mz, Math, B,	W Ch
Alizarine Black S R A.	B	W Ch
Alizarine Black T.	Math	W Ch
Alizarine Black T B R.	A	W G S Ch
Alizarine Black W B extra, S W	B	W Ch
Alizarine Black W X extra.	B	W A Ch
Alizarine Blue A.	Mz	W Ch
Alizarine Blue Black, 3 B, B.	By	W Ch
Alizarine Blue Black W B extra	B	W Ch
Alizarine Blue A S R.	B	W Ch
Alizarine Blue B R 3 G.	By	W Ch
Alizarine Blue C S.	Math	W Ch
Alizarine Blue D B, D B X, D E, D E T, D G.	Mz	C D
Alizarine Blue D N, D N W, D N X	Mz	W Ch
Alizarine Blue D R, D 2 R, D 4 R.	Mz	C D
Alizarine Blue E, A, G	Mz	W Ch
Alizarine Blue G S.	At	W Ch
Alizarine Blue G W, J R.	By	W Ch
Alizarine Blue N G G (powder)	B	W Ch
Alizarine Blue N S (powder)	By	W Ch
Alizarine Blue O D R.	At	W Ch
Alizarine Blue R, R R.	Mz	W Ch
Alizarine Blue S A P, S K Y, S A E	By	W G S, W Ch
Alizarine Blue S (powder)	B	W Ch
Alizarine Blue S B W (powder)	Mz	W Ch
Alizarine Blue Black B, 3 B.	By	W Ch
Alizarine Bordeaux P.	Mz	W Ch
Alizarine Bordeaux G, G G.	By	W Ch

Alizarine Brown	Mz, By, B	W Ch
Alizarine Brown A S	Klp	W Ch
Alizarine Brown D B, D B D, D D	Mz	C D
Alizarine Brown D G, D 2 G, D 3 G O, D 3 G I	Mz	C D
Alizarine Brown D M, D R, D X	Mz	C D
Alizarine Brown G	Mz	W Ch
Alizarine Brown G N, A W, A T	By	W Ch
Alizarine Brown O, D R	At	W Ch
Alizarine Brown (powder)	Mz, By	W Ch
Alizarine Brown O, F, N, R	Mz	W Ch
Alizarine Brown R B	By	W Ch
Alizarine Brown S O	B	W Ch
Alizarine Brown Y	By	W Ch
Alizarine Carmine Blue B, G	By	W Ch
Alizarine Claret B D, D G	Mz	C D
Alizarine Coelestol R	By	W G S, W Ch
Alizarine Cyanine Green 3 G	By	W G S Ch
Alizarine Cyanine R, 2 R, 3 R, R A extra	By	W Ch
Alizarine Dark Blue	B	W Ch
Alizarine Dark Blue D, D R, D 3R	Mz	C D
Alizarine Dark Blue S	Mz	W Ch
Alizarine D G, G I	B	W Ch
Alizarine Emeraldole G	By	W G S
Alizarine Fast Black S P (powder)	By	W Ch
Alizarine Fuchsine B D	By	W Ch and W G S
Alizarine Green B	A	W A
Alizarine Green C, S S	By	W Ch
Alizarine Green C E (powder), C G, C K	By	W G S, W Ch
Alizarine Green D W	B	W Ch
Alizarine Green F	A	W A Ch
Alizarine Green S E	Mz, B	W Ch
Alizarine Green S Pat	Math	W Ch
Alizarine Grenat R	Mz	W Ch
Alizarine Indigo D O	Mz	C D
Alizarine Irisol R	By	W G S, W Ch
Alizarine Lanacyl Blue B B, 3 B	Math	W Ch.

Alizarine Lanacyl Navy Blue B Pat	Math	W A
Alizarine Lanacyl Blue R	Math	W A
Alizarine Lanacyl Violet B Pat	Math	W A
Alizarine Olive O D	At	W Ch
Alizarine Orange D F, D G, D R	Mz	C D
Alizarine Orange G	Mz, By	W Ch
Alizarine Orange N O	Mz	W Ch
Alizarine Orange (powder) and Orange P	Mz	W Ch
Alizarine Red D 4 B	Mz	C D
Alizarine Red G G	B	W Ch
Alizarine Red P S	By	W Ch
Alizarine Red R G, R X	Mz	W Ch
Alizarine Red S	Mz, B	W Ch
Alizarine Red S D G	Mz	W Ch
Alizarine Red W B	By, B	W Ch
Alizarine Red W S, X	Mz	W Ch
Alizarine Red No. 1 Powder, 2 A, 2 A B L, 2 B W, 1 W, 1 W S, 2 A W, 2 W, 2 W S, 3 G W, 3 W, 3 W S, 4 F W, 4 W S, 5 W S	Mz	W Ch
Alizarine Rubinol R	Mz	W Ch
Alizarine Saphirol S E and B	By	W G S
Alizarine Scarlet D G, D 2 R	Mz	C D
Alizarine Sky Blue B	By	W G S
Alizarine Violet extra	At	W Ch
Alizarine Yellow D G, D R, D 3 G, D O O	Mz	C D
Alizarine Yellow D R	Bs	W Ch
Alizarine Yellow F S	Klp	W Ch
Alizarine Yellow G G, G G W, N	Mz	W Ch
Alizarine Yellow G G	A	W A Ch
Alizarine Yellow L W	B	W Ch
Alizarine Yellow R, R W (powders)	Mz	W Ch
Alkali Blue	A, B, Bs, Klp, Math	Dyed with sal-soda and developed by acid.

Alkali Blue B, 2 B, 3 B, 4 B, 5 B, 6 B, 7 B, B B R, R conc. extra	Mz		Dyed with sal-soda in the bath and developed with an acid.
Alkali Blue B, 2 B, 3 B, 4 B, 5 B, 6 B, 6 B 90 per cent, 6 B 100 per cent, R, 2 R, 3 R	Math		
Alkali Blue D	A		
Alkali Brown	Bs	C D	
Alkali Green B, G, 3 B	By	W G S	
Alkali Fast Red B, G	Mz	W G S	
Alkali Red	Bs		Dye with sal-soda in the bath and develop with acid.
Alkali Red B R	Mz		
Alkali Violet C A	B		
Alkali Violet R	By		
Alkali Yellow R	Bs		
Alsace Brown B, B B, M R, L L, R	At	C D	
Amaranth	Mz, Math	S S	
Amaranth B	Math	W G S, S S	
Amaranth E, O	Mz	W G S, S S	
Amine Black 4 B, S 4 B, 6 B, 10 B A		W G S	
Amido Acid Black B, 4 B, 6 B, B L, B L G	A	W G S	
Amido Black 10 B	Mz	W S	
Amido Naphthol Black 4 Bex, 6 B, S, R	Mz	W G S	
Amido Naphthol Red 2 B, 6 B, G	Mz	W G S	
Aniline Green	Math	W G S, C T	
Aniline Orange	Math	C T	
Aniline Yellow N T	Math	C D	
Anthra Alizarine Bordeaux	At	W A Ch	
Anthra Alizarine Carmoisine	At	W A Ch	
Anthra Alizarine Green C G	At	W A Ch	
Anthra Alizarine Red B	At	W A Ch	
Anthra Alizarine Yellow G	At	W A Ch	
Anthracine Acid Black C	Klp	W Ch	
Anthracine Acid Black L W, S F, S T, S W	Math	W G S Ch	
Anthracine Acid Brown B, G, N, R, S W pat. V	Math	W G S, W Ch, S A	
Anthracine Blue C	Math	W Ch	

Anthracine Blue S, S W X, W B, W G, W R, S W G G extra	B	W Ch
Anthracine Blue Black C	Math	W G S Ch
Anthracine Chrome Black F, 5 B, F E, P F B extra	Math	W G S Ch
Anthracine Chrome Blue B B, F, G (F R,)	Math	W G S Ch
Anthracine Chrome Blue D, S W N	Math	W Ch
Anthracine Chrome Green	Math	W Ch
Anthracine Chrome Red A	Math	W Ch
Anthracine Chrome Violet B R,	Math	W Ch
Anthracine Dark Blue	B	W Ch
Anthracine Green or Cormaline B	B	W Ch
Anthracine Red	By, Klp	W G S
Anthracine Yellow B N, C, G G, R	Math	W G S, W Ch
Anthracite Black B R	Math	W G S
Anthracyanine B L, D L, F L, 3 F L	By	W G S, W Ch
Anthragallol or Anthracine Brown	Math	W Ch
Anthramine Yellow	At	W Ch
Anthraquinone Blue S R	B	W G S Ch
Anthraquinone Green G, G extra	B	W G S, W G S Ch
Anthraquinone Violet	B	W G S
Archil Substitute N Powder	Math	W G S
Archil Substitute G Powder	Mz	W G S
Archil Extract 1, 2, 3, 4	Math, Mz	W G S
Atlas Scarlet	By	W G S
Auracine G	By	C T
Auramine G, O, I, II conc	Klp, Mz, B	W G, C T
Aurantia	A	S S
Aureoline	Klp	C D
Aurophenine	Mz	C D
Aurophosphine G	A	S A
Azindon Blue G, R	Mz	C T
Azin Green G O, B O, T O	Mz	W G S, C T
Azo Acid Black B, B L, G, G L, 3 B L, R, T L extra conc., T L No. 2 extra, S S, S S conc	Mz	W G S
Azo Acid Blue B, 3 B conc., 3 B O	Mz	W G S

Azo Acid Brown	By	W G S
Azo Acid Carmine B	Mz	W G S
Azo Acid Fuchsine B, G	Mz	W G S
Azo Acid Magenta B, G, B conc., G conc	Mz	W G S
Azo Acid Red B, B A, 5 B	Mz	W G S
Azo Acid Ruby 2 B	Bs	W G S
Azo Acid Violet A L, 2 A B	By	W G S
Azo Acid Violet R extra, 4 R	By	W G S
Azo Archil R	A	W G S
Azo Benzol Fast Crimson	B	W G S
Azo Black O	Mz	W G S, S S
Azo Blue	Mz, By, A	C D
Azo Bordeaux	By	W G S
Azo Brown N	Bs, Math	W G S
Azo Brown O, V	Mz	W G S
Azo Carmine G	A	W G S
Azo Cardinal G	A	W G S
Azo Coccine or Cloth Red, Tropaeoline 0000	A	W G S
Azo Coccine 2 R	A	W G S
Azo Cochineal	By	W G S
Azo Coralline	Bs	W G S
Azo Crimson L, S	By	W G S
Azo Eosine	By	W G S
Azo Flavine	Bs, B	W G S, S S
Azophone Black	At	C D
Azophone Green B, G	At	C D
Azo Fuchsine B, G, G N, S	By	W G S
Azo Green	By	W Ch
Azo Grenadine S	By	W G S
Azo Merino Blue 3 B, G	Math	W G S
Azo Merino Dark Blue R	Math	W G S
Azo Navy Blue B, 3 B	Math	W G S
Azo Orange R	Klp	C D
Azo Orseille B B	Math	W G S
Azo Orseille R	A	W G S
Azo Patent Black, 3 B K, 4 B K, 3 B K N	K	W G S
Azophloxine 2 G	By	W G S

Azo Rubine A	Math	W G S
Azo Rubine S G	A	W G S
Azo Ruby S, 2 S	A	W G S
Azo Violet	Mz, A, By	C D
Azo Wool Blue B, S E,	Math	W G S
Azo Yellow	Mz, Klp	S S
Azo Yellow conc	Mz	W G S
Azo Yellow M	Klp	W G S, S S
Azo Yellow O R	Mz	W G S, S S
Basel Blue B B, S	Klp	W G S, C T
Bengal Pink	Klp	W G S
Benzoazurine G, 3 G, R, 3 R	Mz, A, By	C D
Benzo Black	Mz, By	C D
Benzo Black Blue G, 5 G, R	Mz, By	C D
Benzo Black Brown	By	C D
Benzo Blue B, B B, 3 B, B X	By	C D
Benzo Bordeaux 6 B	By	C D
Benzo Brown G, 5 R, R C, N B, M C	By	C D
Benzo Chrome Black B	By	C D
Benzo Chrome Black Blue B	By	C D
Benzo Chrome Brown B, B S, 5 G, R, 3 R	By	C D
Benzo Copper Blue B, 2 B	By	C D
Benzo Cyanine B, 3 B, R	By	C D
Benzo Dark Green B, B B, G G	By	C D
Benzo Fast Black 3 B, G	By	C D
Benzo Fast Blue B, Bn G, 5 R	By	C D
Benzo Fast Gray	By	C D
Benzo Fast Orange S	By	C D
Benzo Fast Pink 2 B L	By	C D
Benzo Fast Red L, G L, F C, 9 B L	By	C D
Benzo Fast Scarlet 4 B S, 8 B S, 5 B S	By	C D
Benzo Fast Violet R, N	By	C D
Benzo Fast Yellow 5 G L	By	C D
Benzo Gray	By	C D
Benzo Green G, C	By	C D
Benzo Indigo Blue	By	C D

Benzo Nitrol Brown G, N, 2 R	By	C D
Benzo Olive extra	By	C D
Benzo Orange R	A, By	C D
Benzopurpurine B, 4 B, 6 B, 10 B	Mz, By, A	C D
Benzopurpurine 4 Bex conc	Mz	C D
Benzopurpurine 4 B double	Mz	C D
Benzo Red S G, 10 B, 12 B	By	C D
Benzo Rhodamine 3 B	By	C D
Benzo Rhoduline Red B, 3 B	By	C D
Benzo Sky Blue	Mz, By, A	C D
Benzo Violet R L extra	By	C D
Benzyl Acid Black B B	Klp	W G S
Benzyl Black B, 4 B	Klp	W G S
Benzyl Blue S	Klp	W G S
Benzyl Bordeaux B	Klp	W G S
Benzyl Blue S	Klp	W G S
Benzyl Green G, B	Klp	W G S
Benzyl Violet 4 B, 10 B, 5 B, 5 B N	Klp	W G S
Berlin Blue A	A	W G S
Bismarck Brown	A, Math, B, and others	C T
Bismarck Brown B, G, T	Klp	C T
Bismarck Brown E E, F F G, G G, Y S 8049	Math	C T
Bismarck Brown R, Y Rex	Mz	C T
Black Black O, Black Blue O	Mz	S S, W G S
Blue Black B	B	W G S
Blue Black G R, 5 G	Klp	W G S
Blue B S	Math	W G S
Blue for Silk	Math	W G S
Blue Green Shade	Mz	W G S, S S, C T
Blue Red Shade	Mz	W G S, S S, C T
Blue T conc	Mz	W G S, S S
Blue 2111	At	C D
Body Blue O	Mz	W G S, S S, C T
Bordeaux B L	Math	W G S, S S, C T
Bordeaux B X	By	W G S
Bordeaux C O V	A	C D
Bordeaux D H	Klp	W G S

Bordeaux Diamine B, S	Math	C D
Bordeaux extra	By	W G S
Bordeaux R extra	Bs, By	W G S
Bordeaux S	A	W G S
Bright Blue extra	Mz	C D
Bright Yellow T	Mz, B	C D
Brilliant Acid Green 6 B	By	W G S
Brilliant Alizarine R R, 5 R	By	C D
Brilliant Alizarine Blue D, G, R, 3 R powder	By	W Ch
Brilliant Alizarine Blue E M	Mz	W Ch
Brilliant Alizarine Bordeaux R		W Ch
Brilliant Alizarine Cyanine G, 3 G	By	W Ch
Brilliant Alizarine Vividine F	By	W Ch
Brilliant Azurine 5 G	Mz, A, By	C D
Brilliant Azurine B, R	A, By	C D
Brilliant Benzo Green B	By	C D
Brilliant Black B	B	W G S
Brilliant Bordeaux S	A	W G S
Brilliant Carmoisin O	A	W G S
Brilliant Cochineal 2 R, 4 R	Math	W G
Brilliant Congo G, R	Mz, A, By	C D
Brilliant Cotton Blue Greenish	By	C T
Brilliant Crimson B, O, N	Mz	W G S, C T
Brilliant Crocein Blue and Yellow	Mz	W G S, S S, C A
Brilliant Crocein A Z	Math	W G S
Brilliant Crocein B, B B	Mz	W G S, S S
Brilliant Crocein 3 B	Mz, By, Math	W G S, S S
Brilliant Crocein B O O	Math	W G S
Brilliant Crocein M O O and M	Math	W G S
Brilliant Cyanine Blue R	By	W Ch
Brilliant Dianil Red R, R conc	Mz	C D
Brilliant Direct Navy Blue	Bs	C D
Brilliant Firn Blue	Klp	C T
Brilliant Geranine Blue 3 B, B	By	C D
Brilliant Lake Scarlet G, R, 2 R	Mz	W G S, S S
Brilliant Orange G, O. R	Mz, A	W G S, S S
Brilliant Orcelline pat	Math	W G S

Brilliant Orseille C	Math	W G S
Brilliant Ponceau 4 R	By	W G S
Brilliant Ponceau 5 R	B s, B y, Math	W G S
Brilliant Purpurine 10 B	A	C D
Brilliant Purpurine R	Mz, A, By	C D
Brilliant Red D	Klp	W G S
Brilliant Rubine O	Mz	W G S, S S
Brilliant Scarlet G, G G, R, R R, 3 R, 4 R, 6 R, T	Math	W G S
Brilliant Sky Blue G	Bs	C D
Brilliant Sky Blue G, 5 G	By	C D
Brilliant Sulphon Azurine R	By	C D
Brilliant Sulphon Red B	By	W G A (acetic)
Brilliant Wool Blue B extra, G extra	By	S S, W G S
Brilliant Yellow	Mz, By, A	W G S, S S
Brilliant Yellow S	B	W G S, S S
Bronze Diamine G	Math	C D
Cachou Diamine	Math	C D
Campanuline	A	C D
Carbozol Yellow	B	C D
Carbide Black B O, R, R O, E, E R, R extra, S, S E, S O	Klp	C D
Carbon Black B, B D, B W, 4 B, G A T	Mz	W G S
Carmoisin and Carmoisin conc	A, By, B	W G S
Cashmere Black B, 6 B, T	Klp	W G S
Cashmere Blue T G	By	W G S
Cashmere Brown	By	W G S
Cashmere Green B	By	W G S
Cerise	Mz, Klp, Math, B.	W G, S A, C T
Chestnut Brown	A	C D
Chicago Blue B, 4 B, 6 B, R, 2 R, 4 R, R W	A	C D
China Blue	Mz, A, By	W G S, S S, C T
Chinoline Yellow	By, Mz, B	W G S
Chloramine Brown C G	By	C D

Chloramine Orange R	By	C D
Chloramine Red 8 B S	By	C D
Chloramine Violet	By	C D
Chloramine Yellow G G, C, F F, W extra	By	C D
Chlorantine Violet, Blue, Red, Lilac	Klp	C D
Chromanil Black, R F, B F, 2 B F, 3 B F	A	C D
Chromanil Brown G G, R, 2 G	A	C D
Chromate Black 6 B, T B 4 B	A	W G S Ch
Chrome Black B, T	Mz	W G S Ch
Chrome Blue	By, Math	W Ch
Chrome Blue B	Mz	W Ch
Chrome Bordeaux	By	W Ch
Chrome Brown B O, R O	Mz	W Ch
Chrome Cyanine G, T	By	W A Ch
Chrome Fast Black B, F	A	W Ch
Chrome Fast Black F, P, PWWR	Klp	W G S Ch
Chrome Fast Blue B, 4 B	A	W G S Ch
Chrome Fast Brown A, B C, G, R	Klp	W G S Ch
Chrome Fast Cyanine B	Klp	W G S Ch
Chrome Fast Green G	Klp	W G S Ch
Chrome Fast Red B, G R	A	W G S Ch
Chrome Fast Yellow G, 2 G, R	A	W Ch
Chrome Orange	By	W Ch
Chrome Prune	By	W Ch
Chrome Yellow D, G	By	W Ch
Chromogen I	Mz	W G S Ch
Chromotrop 2 B, 6 B, 8 B, 10 B, 2 R	Mz	W G S Ch
Chromotrop D W, F B, S, S B, S N, S R, F 4 B	Mz	W G S Ch
Chromotrop Blue A, W B, W G	Mz	W B S Ch
Chrysamine	Mz	C D
Chrysamine G	Mz, A, By	C D
Chrysamine G G	By	C D
Chrysamine R	Mz, A, By	C D
Chrysoidine	Mz, A, By, B	W N, S A, C T
Chrysoidine A G, F F	Math	W N, S A, C T

Chrysoidine G	Klp	W N, S A, C T
Chrysoidine Y, Y Y	Mz, Math.	W N, S A, C T
Chrysoidine Brown	Math	W N, S A, C T
Chrysphenine R	Mz, A, By	W Ch, C D
Chrysophinine G	Mz	W Ch, C D
Chrysophenine conc. and extra conc	Mz	W Ch, C D
Citronine	Mz, Klp	W G S, S S
Claret Red B, 3 B, G, G R, R, B extra, O, S	Mz	W G S
Cloth Blue O	Mz	W G S, S S, C T
Cloth Brown, Reddish and Yellowish	Mz, By	W Ch
Cloth Orange	Mz, By	W Ch
Cloth Red	Mz	W Ch
Cloth Red B	Mz, By, Bs	W Ch
Cloth Red B A	A	W Ch
Cloth Red 3 B extra	By	W Ch
Cloth Red G, G extra, 3 G extra	By	W Ch
Cloth Red G A, 3 G A	A	W Ch
Cloth Red O	Mz	W Ch
Cloth Red R	Bs	W Ch
Coccine 2 B	A	W G S
Coccinin B	Mz	W G S
Cochineal Red A	B	W G S
Cochineal Scarlet P S	By	W G S
Cochineal Substitute	Klp	W G S
Coelestine Blue B	By	C T
Coeruleine A, B, S, B W R	Mz	W Ch
Coeruleine S Powder	B z, B y, Klp, B	W Ch
Coeruleine S W Powder	Mz, By	W Ch
Cold Black B R	A	C D
Columbia Black B, B B, F B, R, F F	A	C D
Columbia Black F F extra, F F strong, F 2 B, 2 B X, 2 B W, E A extra, W A extra	A	C D

Columbia Black Green D	A	C D
Columbia Black Blue G	A	C D
Columbia Blue G R	A	C D
Columbia Bordeaux	A	C D
Columbia Brown R, M	A	C D
Columbia Chrome Black B B	A	C D
Columbia Fast Black V extra	A	C D
Columbia Fast Blue 2 G	A	C D
Columbia Fast Red F and Fast Scarlet 4 B	A	C D
Columbia Green	A	C D
Columbia Red 8 B, 6 B, 4 B, 2 B	A	C D
Columbia Yellow	A	C D
Concentrated Cotton Blue R, 2 R, 1, 2, 3, 4 B	Mz	W G S, S S, C A L
Congo	A, By	W N, C D
Congo B B, G R	A, By	C D
Congo Blue B X, R, 2 B, 3 B, 2 B X	A	C D
Congo Brown G, R	A	C D
Congo Corinth B, G	A, By	C D
Congo Fast Blue B, R	A	C D
Congo G R	A, By	C D
Congo Orange G, R	A	C D
Congo Red	Mz, Klp, By, A	C D
Congo Rubine and Violet	A	C D
Copper Black S, B, B extra	Mz	W G S
Cotton Bordeaux	B	C D
Cotton Brown	B	C D
Cotton Brown N	Math	C D
Cotton Brown R, G	B	C D
Cotton Green C G	A	C D
Cotton Orange G, R	B	C D
Cotton Red 4 B	B	C D
Cotton Scarlet	B	C D
Cotton Scarlet O	Mz	C D
Cotton Scarlet Yellowish	Math	S A, C T
Cotton Yellow G, G B, R	B	C D
Cresotine Yellow G, R	Mz, A, By	C D

Criterion Blue G	At	W G S
Croceine Scarlet 3 B	By	W G S, C D
Croceine Scarlet 7 B, 8 B, 10 B	By	W G S
Crow Black	Mz, B	C D
Crystal Scarlet 6 R	Mz, Math.	W G S, S S
Crystal Violet 5 B O	Klp	W N, S S, C T
Crystal Violet O	Mz, B	W N, S A
Crystal Violet P	By	W N, S A
Curcumine S, S extra	Mz, A, By	C D
Cutch Brown D, G	Mz	W G, S A, C T
Cyanine B	Mz	W G S, S S
Cyanol extra, B B, F F, C	Math	W G S
Cyanole Fast Green G	Math	W G S
Cyanole Green B, C G, 6 G	Math	W G S
Dark Brown M, M B	Mz	W G, S A, C T
Dark Green	B	W G S
Deep Wool Black 2 B, 3 B	A	W G
Delphine Blue B, B conc	Mz	W Ch
Della Purpurine 5 B, 7 B, G	By	C D
Diamine Azo Black B, B B pat	Math	C D
Diamine Azo Blue 54, 55, R, R R pat	Math	C D
Diamine Benzol Blue G, R	Math	C D
Diamine Black B, B H, B O, H W, R O, B X, R M W	Math	C D
Diamine Black Blue B, Green N	Math	C D
Diamine Blue B, 2 B, 3 B, B G, B X, C 4 B, 6 G, C 4 R, L G, C 2 R, L R, N C, R W, 3 R, S R X, 50, 52, 53, 55, A B, A Z	Math	C D
Diamine Blue Black E, 72529, R, R L	Math	C D
Diamine Bordeaux B, S	Math	C D
Diamine Brilliant Blue G, Bordeaux R, Scarlet S	Math	C D
Diamine Bronze B, C, S F	Math	C D
Diamine Brown B, G G, 3 G, M, O O, Q Q, V, 31, 32, 34, 35, 36, 37	Math	C D
Diamine Catechine B, G pat., 3 G, Catechu, Cutch	Math	C D

Diamine Cyanine B, 3 B, R, Dark Blue B. R.	Math	C D
Diamine Dark Green, Deep Blue R B	Math	C D
Diamine Deep Dark Blue B, R, Fast Black L	Math	C D
Diamine Fast Blue C, F F B, F F G, G	Math	C D
Diamine Fast Brown G, Fast Red F, Fast Scarlet B B, 4 B, 6 B, G G, 4 B N, 6 B S, 8 B N	Math	C D
Diamine Fast Yellow A, A R, B, F F, M, 3 G	Math	C D
Diamine Gold, Gold Yellow, Gray G, Green B, G, C L, Heliotrope G	Math	C D
Diamine Milling Black B, F G extra	Math	C D
Diamine Jet Black C R, O O, 4 D, R B, S E, S 000, J E I	Math	C D
Diamine New Blue G, P, R	Math	C D
Diamine Nitrazol Black B	Math	C D
Diamine Nitrazo, Brown B, B D, T, G, R D	Math	C D
Diamine Orange D, D C, G, G C, R, B	Math	C D
Diamine Red B, 3 B, 10 B, D, No. 72732	Math	C D
Diamine Rose R D, B extra, B G, G D, G G N	Math	C D
Diamine Scarlet B, 3 B	Math	C D
Diamine Sky Blue F F, Steel Blue L	Math	C D
Diamine Violet N, Violet Red	Math	C D
Diamineral Black, Blue, Brown	Math	C D
Dianil Brilliant Black B, G, 2 G, R, 2 R	Mz	C D
Dianil Brilliant Yellow S	Mz	C D
Dianil Brown B, B D, B H	Mz	C D
Dianil Brown D	Mz	C D

Dianil Brown G, 2 G, 3 G O, 3 G I, 3 G A	Mz	C D
Dianil Brown M, M H	Mz	C D
Dianil Brown R, 3 R	Mz	C D
Dianil Brown X	Mz	C D
Dianil Chrome Brown G, R	Mz	C D
Dianil Claret B, G	Mz	C D
Dianil Crimson B, G	Mz	C D
Dianil Dark Blue R, 3 R	Mz	C D
Dianil Dark Green B, X, X conc	Mz	C D
Dianil Deep Black B conc., F F conc., T V conc., B R extra conc	Mz	C D
Dianil Direct Yellow S	Mz	C D
Dianil Fast Red F	Mz	C D
Dianil Fast Scarlet 8 B S	Mz	C D
Dianil Green G, B, B N, B B N, G N	Mz	C D
Dianil Indigo O	Mz	C D
Dianil Orange F, G, O, B M	Mz	C D
Dianil Pink B D	Mz	C D
Dianil Red 4 B, 6 B	Mz	C D
Dianil Scarlet G, 2 R	Mz	C D
Dianil Violet H	Mz	C D
Dianil Yellow G, 3 G, R, O O, M B	Mz	C D
Diazethyl Black B, R	By	C D
Diazine Black B R S	K	C D
Diazine Brown	K	C D
Diazine Green	K	C D
Diazine Black	K	C D
Diazyl Black	Bs	C D
Diazyl Brown G, T	Bs	C D
Dimethyl Orange	Bs	C D
Diphenylamine Blue	Mz	C D
Direct Black B F G	A	C D
Direct Black G B N K & G	Klp	C D
Direct Black X	Bs	C D
Direct Black B K	Klp	C D
Direct Black D R, X	Bs	C D

Direct Black No. 5062	At	C D
Direct Blue B	Mz, K, Klp.	C D
Direct Blue 3 B N	K	C D
Direct Blue G R	Mz	C D
Direct Blue R	Mz	C D
Direct Blue Black 2 B	By	C D
Direct Brilliant Blue B M	Mz	C D
Direct Brown B B	Bs	C D
Direct Brown G G	By	C D
Direct Brown G X	Bs	C D
Direct Brown J	Klp	C D
Direct Brown N X	Bs	C D
Direct Brown T B	Mz	C D
Direct Brown T S, T S B	Klp	C D
Direct Brown V X	Bs	C D
Direct Dark Green	Mz	C D
Direct Deep Black E, R, R W, T, E extra, R W extra	By	C D
Direct Deep Red P	At	C D
Direct Fast Brown B, G G	By	C D
Direct Gray B	Klp	C D
Direct Gray Reddish	Klp	C D
Direct Green C P	Klp	C D
Direct Green C, C B	Mz	C D
Direct Green P, A	Klp	C D
Direct Green Y	Klp	C D
Direct Indigo Blue A, B N	Klp	C D
Direct Indigo Blue R B	At	C D
Direct Indigo Blue B K	Klp	C D
Direct Lemon Yellow	Klp	C D
Direct Orange 2 R	K	C D
Direct Safranine B	By	C D
Direct Salmon	At	C D
Direct Scarlet B conc	K	C D
Direct Scarlet G	K	C D
Direct Scarlet R	K	C D
Direct Yellow C P	Klp	C D
Direct Yellow B S R, B L R	At	C D
Direct Yellow T	Klp	C D
Discharge Black A F	Mz	W G S, S S

Double Brilliant Scarlet 3 R	By	W G S
Double Green S F	K	W G S
Double Ponceau 2 R, 3 R, 4 R	By	W G S
Double Scarlet	K	W G S
Double Scarlet extra S	A	W G S
Ebony Black	Klp	C D
Elgene Base B	A	C D
Emerald Green Cryst	B, B, By	W G, S A, C T
Ermin Red	A	W G S
Empire Black B, G	A	W A Ch
Eosine A	B	W A, S A
Eosine 2 A, A G, A 6 G	Mz	W A, S A
Eosine B, B B	Klp	W A, S A
Eosine 3 B	Mz	W A, S A
Eosine 10 B, B F	Math	W A, S A
Eosine B N	Math, B	W A, S A
Eosine D H, D H V	Klp	W A, S A
Eosine Extra, Extra Yellow, Yellow, Extra conc., Extra B B, A G, A 3 G, A 5 G, D	Mz	W A, S A
Eosine G	Math	W A, S A
Eosine G G B, G G F, G G G	Math	W A, S A
Eosine J	B	W A, S A
Eosine 3 J, 4 J extra	Mz	W A, S A
Eosine J J F	Math	W A, S A
Eosine S	B	W A, S A
Eosine 2110, 5765	Math	W A, S A
Eosine Scarlet B	Mz, Math	W A, S A
Eosine Scarlet B B extra	Mz	W A, S A
Erika B, B N, B ex	A	C D
Erika G, G ex	A	C D
Erika 3 G N, 2 G N	A	C D
Erythrine	B	W G S
Erythrine X	B	S A
Erythrosine	Mz, B	W A
Erythrosine A conc. pure	Mz	foods
Erythrosine A G	Mz	W A
Erythrosine B, B B	A	W A
Erythrosine Yellow Shade	Mz, Math	W A

Ethyl Blue B F	Mz	C T
Ethyl Green	B	W G S
Excelsior Lake Scarlet J N, 2 J C N	Math	W G S
Fast Acid Black 3 B, R, T	Mz	W A
Fast Acid Blue B	By	W G S
Fast Acid Blue R, R conc	Mz	W G S, S S
Fast Acid Eosine G, G extra	Mz	W G S
Fast Acid Green B, B N, B S, B Z	Math	W G S
Fast Acid Green B B extra	Mz	W G S
Fast Acid Magenta G, G conc	Mz	W G S
Fast Acid Phloxine	Mz	W G S
Fast Acid Ponceau	Klp	W G S
Fast Acid Red A, B	Mz	W G S
Fast Acid Scarlet	Klp	W G S
Fast Acid Violet A 2 R, B, B E	Mz	W G S, S S
Fast Acid Violet 10 B	By	W G S
Fast Acid Violet R, R B E, R G E	Mz	W G S, W Ch
Fast Azo Grenat	Mz	W G S
Fast Blue B for wool	Mz, A, B	W G S
Fast Blue 5 B Greenish	Mz	W G S
Fast Blue B, B A, 3 B, 6 B, for wool	A	W G S
Fast Blue D	Mz	W G S
Fast Blue Extra Greenish	Mz	W G S
Fast Blue G extra	Mz	W G S
Fast Blue 6 G	Math	W G S
Fast Blue O, O O	Mz, Klp	W G S
Fast Blue R	Mz, A, Math, B	W G S
Fast Blue R, R A, for wool	A	W G S
Fast Blue 2 R, 3 R, 5 R, No. 60	Mz	W G S
Fast Blue R D, R R D	Math	W G S
Fast Bordeaux O	Mz	W Ch
Fast Brown	Mz	W G S
Fast Brown 3 B, G	A	W G S
Fast Brown N	B	W G S
Fast Brown O N T yellowish	Mz	W G S, S S
Fast Brown R	Mz, B	C D

Fast Brown 25	A	W G S
Fast Claret Red O	Mz	W G S, S S
Fast Cotton Orange 6 R extra	Bs	C D
Fast Cotton Yellow 10 G	Mz	W G, S A, C T
Fast Dark Blue B	Mz	W G S
Fast Diamine Yellow A R R	Bs	C D
Fast Direct Brown B B, G	Bs	C D
Fast Fulling Blue R R	Bs	C D
Fast Gray B R	Klp	W Ch
Fast Green Crystals O	Mz	W Ch
Fast Green Extra, Extra Bluish	By	W G S
Fast Green B, C R	By	W G S
Fast Green B	Math	W G S
Fast Green C R	Bs	W A Ch
Fast Green M, S S	By	W G S
Fast Light Green	K	W G S
Fast Light Orange G	By	W G S
Fast Light Yellow G, 2 G, 3 G	By	W G S
Fast Mordant Blue, B R	Mz	W Ch, W G S Ch
Fast Mordant Yellow G	By	W G S
Fast Navy Blue M	K	W G S
Fast Pink B	At	W G S
Fast Pink for Silk	Klp	C D
Fast Red	A, By, B	W G S
Fast Red A, B	B	W G S
Fast Red B T	By, Klp	W G S
Fast Red C, D, E	B	W G S
Fast Red E, B	Bs	W G S, S S
Fast Red N S	By	W G S, S S
Fast Red O	Mz	W G S
Fast Red R R, R Y	B	W G S, S S
Fast Scarlet B	K	W G S
Fast Silk Gray O	Mz	S S
Fast Violet	Klp	W Ch
Fast Violet B	Mz	W Ch
Fast Violet Bluish, Reddish	By	W G S
Fast Wool Blue A	A	W G S
Fast Wool Blue R L	By	W G S
Fast Yellow	By, Math, B.	W G S
Fast Yellow Greenish	Bs	W G S

Fast Yellow R	K	W G S
Fast Yellow S	Mz, Math.	W G S
Fast Yellow T S	Mz	C D
Filling Blue	Klp	W Ch
Firn Blue	Klp	W G S, S S, C T
Flavazine S, L, T, R L	Mz	W G S
Flavazol	A	W G S
Fluorescine G, R, 6836	Math	W G S, S S
Formyl Blue B	Math	W G S, W G S Ch
Formyl Violet 4 B, 6 B, 8 B, 10 B, S 4 B, S 5 B	Math.	W G S, W G S Ch
Fram Blue G	By	W G S
Fuchsine	M z , B y , Klp, Math, B	W G, S S
Fuchsine F C O O B	Math	W G, S S
Fuchsine S	Mz	W G S, S S, C T
Full Blue O	Klp	W Ch
Fulling Black	K	W Ch
Fulling Blue G, R	Mz, Bs	W G S
Fulling Blue J B	Mz	C Dv
Fulling Brown J B, J R	Mz	C Dv
Fulling Red B	Math	W G S
Fulling Red B, F G G, F R, G	Bs	W G S
Fulling Red J B	Mz	C Dv
Fulling Red R	Bs	W Ch
Fulling Yellow J G, J R	Mz	W G S
Fulling Yellow O	Math	W G S, W Ch
Fulling Yellow O O	By	W Ch
Gallanil Green	Klp	W Ch
Gallanil Indigo R, P S	Klp	W Ch
Gallanil Violet	Klp	W Ch
Gallocyanine B S, D H	Mz, By, B	W Ch
Geranium G N	By	W N, C T
Geranine B B, G	Mz, By	C D
Glacier Blue	Klp	W G S, S S, C T
Gloria Black B	Math	W S A
Gold Orange	Bs, By	W G S, C T
Gold Yellow	By	W G S, S S
Grenadine	Mz	W G, S A, C T
Guinea Bordeaux B	A	W G S

Guinea Carmine B	A	W G S
Guinea Fast Green	A	W G S
Guinea Fast Violet 10 B	A	W G S
Guinea Green B, G, B extra	A	W G S
Guinea Red 4 R	A	W G S
Guinea Violet 4 B	A	W G S
Half wool Black L S	By	C W D
Half wool Black S	Math	C W D
Half wool Blue B, B D	Mz	C W D
Half wool Blue G	Math	C W D
Half wool Black S, 2 B, 3 B	Math	C W D
Half wool Black W	Mz	C W D
Hat Black F C, M C	Math	W G S
Heliotrope and Heliotrope B, 2 B	Mz, A, By	C D
Hessian Bordeaux	Mz	C D
Hessian Brilliant Purple	Mz, A, By	C D
Hessian Brown B B, M M	Bs	C D
Hessian Purple B, D, N	Mz, A, By	C D
Hessian Violet	Mz, A, By	C D
Hessian Yellow	Mz, A, By	C D
Hoechst New Blue	Mz	W G S
Imperial Black	At	W G S
Imperial Scarlet	By	W G S
Imperial Violet Crystals	At	W G S
Indamine Blue A, N B, N extra R	Mz	C T
Indian Yellow	By	W G S, S S
Indian Yellow G, R, F F	Math	C D
Indigen Blue B B, R	Klp	C D
Indigo Blue N	Math	W G
Indigo Blue B N K	Klp	C D
Indigo Blue R B	Math	W G S
Indigo Substitute B, B S pat	Mz	W G S, S S
Indigo Synthetic 100% powder	Mz	Vat
Indigotine L No. 150	Math	W G S
Indigotine extra L and No. 1	Klp	W G S
Indocyanine B, B F, 2 R, 2 R F	A	W A
Induline 2 N, 2 N Greenish, S V	Mz	W G S, S S
Intense Blue	By	W G S
Janus Black O, 1, 2, D	Mz	S A
Janus Blue B, R	Mz	S A

Janus Brown B, R	Mz	S A
Janus Gray B, B B	Mz	S A
Janus Green B, G	Mz	S A
Janus Yellow G R	Mz	S A
Kermesine Orange	Mz	W G S
Ketone Blue B 4 N, G, R	Mz	W G S, S S
Ketone Green N N	Klp	W G S
Kimensi Orange G, R R	At	C D
Kiton Blue	Klp	W G S
Kiton Green	Klp	W G S
Kiton Red	Klp	W G S
Lake Scarlet F R, F R R, F R R R, G G, 2 R	Math	W G S
Lake Scarlet G R I I, C R C L, R L, 2 R L	Mz	W G S
Lanafuchsine S B, S G, 6 B	Math	W G S
Lanaglaucine W	Mz	W Ch
Laundry Blue B, 1, 2, 3	Math	W G S, S S, C T
Lazuline Blue	By	W G S
Light Green S F, Bluish, Yellowish	B	W G S, S S
Luzon Black	At	W G S
Madison Blue V	At	C D
Madras Blue R R	At	W G S
Magdalia Red	Mz, Klp	S A
Magenta	Math	W G, S A, C T
Magenta extra large crystals, extra yellow, large crystals, small crystals, double refined	Mz	W G, S A, C T
Magenta large crystals B	Math	W G, S A, C T
Magenta I	Klp	W G, S A, C T
Malachite Green	A, K, Klp, Math	W N, S A, C T
Malachite Green B B, 4 B and crystals	Mz	W N, S A, C T
Malachite Green G	B	W N, S A, C T
Malachite Green Ia, Superior and No. 12	Mz	W N, S A, C T
Malachite Green Powder	Mz	W N, S A, C T
Manchester Brown E E, P S	Math	C T

Mandarine G extra, G R	A	W G S
Mandarine Orange G extra	Mz	W G S
Marine Blue B I, 2 R X, R I	Mz	W N, S A, C T
Maroon S	Mz, B	W G S, S S
Mekon Yellow G, R	Klp	C D
Meridian Green B	At	C D
Meridian Violet 51	At	C D
Meridian Yellow O O O	At	C D
Metanil Red 3 B, 3 B extra	By	W G S
Metanil Yellow	Mz, A, Bs, K, Math, B	W G S
Metaphenylene Blue B, B B	Math	W G S
Methyl Alkali Blue	Mz, K, Klp, B	See Alkali Blue
Methyl Blue	Math	S S, C T
Methyl Blue for Cotton	Mz	W G S, S S, C A
Methyl Blue for Silk	Mz	S S
Methylene Blue B	Mz, B	W N, S A, C T
Methylene Blue B conc., B B, and B B conc	Mz	W N, S S, C T
Methylene Blue B B extra	Mz	W N, S S, C T
Methylene Blue D, D B, D B B extra, D B B conc., D B B extra conc	Mz	W N, S S, C T
Methylene Blue G	Math	W N, S S, C T
Methylene Blue 3 R, 5 R, 6 R, D 3 R, D 5 R	Mz	W N, S S, C T
	Mz	W N, S A, C T
Methylene Blue Zinc free, pure	Mz	W N, S S, C T
Methylene Dark Blue 3 B N, R B N pat	Mz	W N, S S, C T
Methylene Gray B, B F, G, N D, N F, O, R	Mz	W N, S S, C T
Methylene Green B	Mz, By	C T
Methylene Green G, G G, O extra Yellow conc	Mz	W N, S S, C T
Methylene Heliotrope O	Mz	W N, S S, C T
Methylene Violet B N, R R A, 3 R A extra	Mz	W N, S S, C T
Methyl Eosine	A, Klp	W N, S S, C T

Methyl Violet 2 B, c, p. 2 B N ....Mz.....W G, S A, C T
Methyl Violet B O.....Math....W G, S A, C T
Methyl Violet 3 B D, 4 B O,
4 B, 5 B, 6 B.....Math....W G, S A, C T
Methyl Violet 6 B, crystals and
extra.....Klp, B..W G, S A, C T
Methyl Violet B S C.....Math....W G, S A, C T
Methyl Violet R, 2 R, 3 R, 4 R, 5 R Mz, Math..
S W, W G, S A, C T
Methyl Violet R O, R S J .....Math....W G, S A, C T
Methyl Violet Superior.....Mz.....W G, S A, C T
Methyl Water Blue.....B.....W G, S A, C T
Mikado Brown.....Mz, Bs.... C D
Mikado Gold Yellow 2 G, 4 G, 6 G,
8 G.....Mz, Bs.... C D
Mikado Orange G, R, 2 R, 3 R,
4 R, 5 R.....Mz, Bs.... C D
Mikado Yellow 2 G, 4 G, 6 G.....Mz, Bs.... C D
Milling Blue 2 Rex.....Mz.....
W G S, W G S Ch
Milling Red F F G, F R, G, R.....Math..... W G S
Milling Scarlet 4 R conc., 4 R O..Mz.....W A, W A Ch
Milling Yellow I I, O, O O.....Math..... W G S
Moline.....At..... W Ch
Mordant Yellow G, 3 R.....B..... W Ch
Nako Black O, O P, D B .....Mz..... Fur
Nako Brown D, P, P S, D D .....Mz..... Fur
Nako Red O.....Mz..... Fur
Nako Yellow O.....Mz..... Fur
Naphthalene Acid Black S.....By..... W G S
Naphthalene Blue B, 5 G, D L....Mz..... W G S
Naphthalene Green conc. V.....Mz..... W G S
Naphthalene Pink or Scarlet .....See Magdalia Red.
Napthalene Yellow.....Mz, Bs, Math. W G S
Naphthazurine Blue O.....Bs..... W G S
Naphthogen Blue 2 R, 4 R.....A..... C Dv
Naphto Rubine.....By..... W G S
Naphthol Black B, B D F.....Math..... Printing
Naphthol Black B D, 3 B, 4 B, 6 B,
12 B.....Math..... W G S

Naphthol Black D	Mz	W G S
Naphthol Black P, N Y, S G, 4 R	Math	W G S
Naphthol Blue 2 B	B	W G S
Naphthol Blue G R	Math	W G S
Naphthol Blue Black A	Math	W G S
Naphthol Green B, O O	Math	W G S
Naphthol Orange	A	W G S
Naphthol Red C	Math	W G S
Naphthol Red O	Mz	W G S
Naphthol Red S, G R	P K	W G S
Naphthol Yellow	Klp	W G S
Naphthol Yellow S	Mz, By, Klp, Math, B	W G S
Naphthol Yellow S E	Mz	S S, W G S
Naphthylamine Black 4 B K, 4 B N, 6 B N, 10 B, E S N	By	W A
Naphthylamine Black 6 B D	Math	W G S
Naphthylamine Brown	B	W G S
Naphthylamine Pink	Klp	W G S
Naphthylamine Yellow	K	W G S
Naphthyl Blue	K	W G S
Naphthyl Blue 2 B	B	C D
Naphthyl Blue Black (M N Y), N, R, S B, S 2 B, S 3 B, F B B, F B	Math	W G S
Naphthylene Red	By	C D
Navy Blue, B W, H	Klp	W G S
Navy Blue V	Mz	W G S, S S, C T
Navy Blue B G, R	B	W G S
Nerol Black B, B B, 2 G new, 4 B, 2 B G, 4 B G	A	W A
Nerol Blue Black	A	W A
Neutral Blue R, 3 R	Mz	W N, W G S
Neutral Violet O	Mz	S A, W N
Neutral Wool Black B, G	Math	W N, W G S
New Acid Green G X, 3 B X	By	W G S
New Blue O	Mz	S S, W G S
New Croceine O	Mz	W G S, S S
New Croceine R	A	W G S
New Croceine	B	C D
New Direct Blue B	A	C D

New Fuchsine	Klp	W G S, S S, C T
New Gray	By	W G S, C T
New Green	By	W G S, S S, C T
New Indigo	Klp	C D
New Magenta O	Mz.	W N, W G, S A, C T
New Metamine Blue M	Mz.	C T
New Methylene Blue B B, F, G G, N, N X, N F, R, 3 R, 70221	Math.	C T
New Patent Blue B, 4 B, G A	By.	W G S
New Patent Silk Blue	By.	S S
New Red L	K.	W G S
New Victoria Blue B	By.	W G S, C T
New Yellow	B.	W G S, C T
Night Blue	Klp, B	W G S
Nigrosine Gray Blue 1, 2, 3, 4	Mz.	W N, S S
Nyanza Black B	A, Mz.	C D
Oananthinine	Klp.	W G S, S S
Oil Black, Blue, Brown, Green, Orange, Red, Violet	Mz, Math.	Varnish
Old Scarlet	By.	W G S
Opal Blue	Mz, Math.	W G S, S S, C T
Oramine Blue R	B.	C D
Orange A, I, II, III, IV	Mz, Klp., Math.	W G S, S S
Orange E N L, E N Z extra, 2 G	Math.	W G S
Orange G, G G, G G crystals	Math.	W G S
Orange G R X	K.	W G S
Orange G T, R O	By.	W G S
Orange M, M N, N	Klp.	W G S
Orange R	M z, K l p, Math, B.	W G S
Orange R R	Math.	W G S, S S
Orange 4	Mz, Math.	W G S
Orange 4 L L	Mz.	W G S, S S
Orchil Crimson (powder)	B.	W G S
Orchil Substitute G pat	Mz.	W G S
Orseille Red A	B.	W G S
Orseille Substitute N extra	Math.	W G S
Orseilline B B	By.	W G S

Orseilline B, R	A	W G S, S S
Ortho Black 3 B	A	W G S
Ortho Cerise B	A	W G S
Ortho Cyanine B, 6 G, R	A	W G S
Oxamine Black B R, M B, M D, M T	B	C D
Oxamine Black B H	B	C Dv
Oxamine Blue 4 B, R	B	C D
Oxamine Blue 3 R, R X, 4 R	B	C D
Oxamine Brown G, G R	B	C D
Oxamine Copper Blue R R	B	C D
Oxamine Dark Brown G, R	B	C D
Oxamine Fast Bordeaux	B	C D
Oxamine Fast Red F	B	C D
Oxamine Green B	B	C D
Oxamine Maroon	B	C D
Oxamine Pure Blue A	B	C D
Oxamine Red B, M T	B	C D
Oxamine Violet B B R, G R, G R F, M T, R R	B	C D
Oxblood 8851	Bs	C D
Oxy Diamine Black A, A M, A T, B, B G, B M, B Z, B Z S, C B S, D, N, N F, N R, S O O O O, N S A, T, R, R R, S O O O, W, F F C extra, F F G, A F F, J E, J E I, J B, J W	Math	C D
Oxy Diamine Blue 3 R, G, 3 G, 5 G	Math	C D
Oxy Diamine Brown R M, R O	Math	C D
Oxy Diamine Orange G, R	Math	C D
Oxy Diamine Violet B, G, R	Math	C D
Oxy Diamine Yellow G G	Math	C D
Oxy Diaminogen G D, E F, E N, E M, F F, F F G	Math	C D
Oxydianil Yellow O	Mz	C D
Palatine Black 4 B, M M	B	W G S
Palatine Chrome Black S	B	W G S Ch
Palatine Chrome Blue W 2 B, 2 B	B	W A Ch
Palatine Chrome Bordeaux	B	W G S Ch
Pluto Black B, G, R, A, 3 B, C R,		

L conc., T G extra conc., A extra, C F extra, F extra, B S extra, S S extra	By	C D
Pluto Brown R	By	C D
Pluto Milling Black B	By	C D
Pluto Orange G	By	C D
Ponceau B extra	Mz	W G S
Ponceau B O extra, B O, B O G	A	W G S
Ponceau Brilliant 4 R	Math	W G S
Ponceau G	Mz, Math.	W G S
Ponceau 2 G, G R, G R 2, G R C L	Mz	W G S, S S
Ponceau 4 G B	A	W G S, S S
Ponceau H P	By	W G S
Ponceau J, J J	Math	W G S, S S
Ponceau R	Mz, A, B	W G S, S S
Ponceau 2 R, 3 R, 2 R C L, 3 R C L	Mz	W G S, S S
Ponceau 3 R B, 4 R B, 6 R B, 10 R B, S extra, S S extra	A	W G S, S S
Ponceau 5 R, 6 R Crystals, Y B	Mz	W G S, S S
Primula B, R	Mz	W G, S A, C T
Prune (powder)	Mz	W Ch
Prune (pure)	Mz, Math.	W Ch
Pure Blue B S J	Klp	W G S, S S
Pure Blue O conc., double conc	Mz	W G S, S S, C T
Purple Blue O	Mz	W G S, S S, C T
Pyramine Orange Y, 3 G	B	C D
Pyronine B, G	Mz, Bs.	W G S, S S, C T
Pyrotine Orange	Bs	W G S
Pyrotine R R O	Bs	W G S
Quinoline Yellow	Mz, A, By, B	W G S, S S
Red B	Math, B	S W, C D
Red Violet R S, 4 R S, 5 R extra, 5 R S	B	W G S, S S, C T
Red Y, Y B, Y G, Y 2 G	Mz	W G S, S S
Regina Violet, alcohol and water soluble	A	W G S, S S
Resorcine Brown	A	W G S
Resorcine Yellow	A, K	W G S

Rhodamine B, B extra, 3 B, G, G extra	Mz, Klp, B.	W A, S A
Rhodamine 3 G, 5 G, 6 G	Klp, B.	W A, S A, C T
Rhodamine 6 G, 6 G D, 6 G extra, 6 G D extra	Mz	W A, S A, C T
Rhodamine 4 G, 5 G	By	W A, S A, C T
Rhodamine extra B, O, R	Klp	W G S, S S
Rhodamine S	Klp, B	W G S, S S
Rhodinduline Red B	By	W G S, S S
Rhodinduline Red G, S	By	W G S, S S
Rhodinduline Blue R, G S extra	By	C T
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Rose Bengal	Math, B	W A, S A
Rose Bengal A T	A, B	W A, S A
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Rose Bengal N	Math	W A, S A
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Safranine B conc	Mz	C T
Safranine B S	Math	S A, C T
Safranine F F extra, No. O	By	S A, C T
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Salacine Yellow G, 2 G, D	K	W G S Ch
Salacine Red	K	C D
Scarlet B extra	Mz	W G S, S S
Scarlet E C, F R, F R R, F R R R for cotton	Math	C A I
Scarlet G, G G, G L, G R 11, G V	Mz	W G S, S S
Scarlet B R	A	W G S, S S
Scarlet G R C L	Mz	W G S
Scarlet R	Mz, By	W G S, S S
Scarlet R B C	Mz, Math.	W G S, S S
Scarlet R L, 2 R	Mz, Klp	W G S, S S
Scarlet 2 R C L, 3 R C L	Mz	W G S
Scarlet R R L, R V L, 3 R, 3 R L, 4 R, 5 R, 6 R crystals	Mz	W G S, S S
Scarlet S	Math	W G S, S S
Silk Blue	Mz	S S
Silk Gray O	Mz	S A
Silk Induline	Mz	S S, C T
Solamine Blue B, R, F F	A	C D
Solid Blue B D, B R D, 2 B D, 3 R D, 6 G	Math	W G S
Solid Blue R, 3 R	Math	W G S
Solid Brown O yellowish L, N T	Mz	W G S, S S
Solid Green J J O, O	Klp	W G S, S S, C T
Solid Violet	Klp	W Ch
Soluble Blue	Mz, Bs, Math.	S S
Sorbin Red G, B B	B	W G S
Soudan Brown	A	C D
Substantive Pink C R	B	C D
Sulfamine Brown A, B, D 93	Bs	W Ch
Sulphin	B	C D
Sulpho Black G, R	By	W G S
Sulpho Cyanine, G, 3 R, 5 R, G R	By	W G S, W Ch
Sulpho Cyanine Black B, 2 B	By	W G S
Sulphon Acid Blue B, R, 3 R extra, G	By	W G S
Sulphon Azurine D	Mz, By	W A, C D
Sulphon Orange G	By	W G S
Sulphon Yellow G, 5 G, R	By	W G S

Sulphur Black T, T extra, A, A W extra, 2 B extra, T B extra, 4 B.	A.	Sulphur
Sulphur Black L, N, S T.	Mz.	Sulphur
Sulphur Blue L extra.	A.	Sulphur
Sulphur Bronze.	Mz.	Sulphur
Sulphur Brown G, 2 G.	A.	Sulphur
Sulphur Brown T B G, T B M.	Mz.	Sulphur
Sulphur Corinth B.	Mz.	Sulphur
Sulphur Cutch R.	A.	Sulphur
Sulphur Indigo B.	A.	Sulphur
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Tabora Black R extra.	Mz, A.	C D
Tannin Brown B.	Math.	C T
Tannin Heliotrope.	Math.	C T
Tannin Orange R, Paste and Powd.	Math.	C T
Tartrazine.	Mz, Klp, B.	W G S
Thiazine Brown G R.	B.	C D
Thiazine Red G, R.	B.	C D
Thiazol Yellow 3 G, G L.	By, A.	S A, C T
Thio Brown 2 B, R.	Bs.	C D
Thio Brown R, Paste and Powder.	Math.	W G S, S S
Thio Flavine S.	Math.	C D
Thio Flavine T.	Math.	C T
Thionine Blue G O, O, O O, O O O.	Mz.	W N, S A, C T
Thio Orange G.	Bs.	W G S
Thio Ruby.	Bs.	W G S
Thio Yellow G, R M, R.	Bs.	C D
Tobacco Brown G, R.	Math.	C T
Tolamine Green, Violet.	Klp.	C D
Toledo Blue O.	Bs.	C D
Toluidine Blue O.	A, B.	C D
Toluylene Orange.	Mz.	C D
Toluylene Orange G, R, R R.	A.	C D
Violamine B, 3 B, G, R, A 2 R, B E, R G E, R B E.	Mz.	W G S, S S
Violet 5 B, 6 B.	By.	C T
Violet 5 R.	By.	W G S, S S, C T
Violet 4 R N.	Klp.	W G S, S S, C T
Walnut Brown A, B.	Math.	C T

Water Blue B, B S, R, B B	Math	S S, C T
Water Blue R, R C, 2 R, A D R, 4 R W, 5 R W, L	A	S S, W G S, C A L
Water Blue O O	K	S S, C T
Water Rose B	Klp	W G S, S A
Water Soluble Eosine	Klp	W G S, S A
Wood Violet S	B	W G S, S S
Wool Black	A, B	W G S
Wool Black B, 4 B, 4 B F, 6 B, 6 B W, G R	A	W G S
Wool Black D G, D N	K	W G S
Wool Black W C	At	W G S
Wool Blue B, 2 B, R, 5 B	A	W G S
Wool Blue F S	Mz	W N
Wool Blue K	B	W G S
Wool Blue N, R extra, 5 R, B extra, S R extra	By	W G S
Wool Blue S	B	W G S
Wool Fast Blue B L, G L	By	W A
Wool Gray	Bs	W G S
Wool Gray B, B double, G, R	Klp	W G S
Wool Green B, B S	By, Klp	W G S
Wool Green S	Klp, B	W G S
Wool Jet Black 2 B, 3 B	A	W G S
Wool Red B	Math	W G S
Wool Red extra	K	W G S
Wool Red R, G	B	W G S
Wool Violet R	K	W A
Wool Yellow	B	W G S
Xanthine	Mz, Klp	S S
Yellow A T	Math	W G S
Yellow T	Klp	W G S, S S
Yellow W	By	W G S, S S
Yellow W R	Klp	C D
Zambesi Black D	A	C D
Zambesi Blue B, B X, R	A	C D
Zambesi Brown G 2 G	A	C D
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