

THE TEXTILE COLOURIST.

No. 1.—JANUARY, 1876.

INTRODUCTION.

ALTHOUGH the Editor would prefer to let this journal speak for itself, it is evident that the plan laid out for it could not be fully developed in the single number now before the reader, and some preliminary explanations seem necessary.

The object of the Textile Colourist, is mainly to give an account of what is doing or has been done by practical or scientific men in connection with the dyeing, printing, bleaching, and finishing of textile fabrics or materials. The word "textile" is defined in the dictionaries as what is woven or can be woven, and it is here employed in that sense, and therefore includes not only calico, woollen cloths, linen, &c., but also yarns, hanks, and other unwoven materials when they fall into the dyers, printers, bleachers, or finishers' hands.

It is proposed to take a broad basis in the treatment of textile materials, and include in the scheme all that relates to the chemical, mechanical, and artistic operations bearing directly upon the colouring or finishing of them. Hence it will be seen, that such topics as engraving for calico printing, transferring of designs, purification of water, glossing of silks, construction of beetles, and other items remote from the every day routine of the manager of a printworks or a dyeworks, are held as properly falling within the province of the journal, and the justification for taking this wide range is that such

things, though seeming subsidiary, are really important to those in the trade, and many a valuable idea is developed in an intelligent mind by a knowledge of inventions which might at first seem too remote to be useful.

Beyond the current matter of the month, it is proposed at convenient times to take retrospective views of the history and literature of dyeing, printing, and bleaching, and as the publications upon these trades have been very limited in this country, it is hoped that a good deal that is novel and interesting can be laid before the general reader; and the Editor trusts he may receive assistance in this point from those now or lately in the trade, whose long experience would enable them to supply much that would be very valuable in the history of calico printing and dyeing in Great Britain.

Although some of the existing serials do give a little space to articles connected with textile colouring, this is the first attempt to establish a journal in this country entirely devoted to the subject; the Editor will endeavour to make it worthy of the support of those who take an intelligent interest in their business, and with these words submits it to their kindly consideration.

Manchester, January 1st, 1876.

1. Lime Juice and Argols: Citric and Tartaric Acids.

THE importance of lime juice to calico printers, and argols to wool dyers, induces us to draw their attention to a very excellent and exhaustive paper by Mr. Robert Warrington in the Journal of the Chemical Society for October, 1875. The author has been for several years chemist in a citric and tartaric acid factory, and this paper, which is confined to laboratory experience and processes, is published by the permission of the proprietor. Everyone who desires to see the extension of technical chemistry founded upon an accurate and scientific basis, while approving the liberality of Mr. Lawes, will re-echo the concluding words of the author of this lengthy paper when he says—"I venture to hope that the publication of these notes may lead to many similar communications. A large amount of information is acquired in the laboratories of our great manufacturing concerns: most of this might be published without any injury to the individual manufacturer. Especially is this true of analytical methods, and the publication and discussion of these would do much to remove the disgrace to which science is often subjected from the wide discrepancies of commercial analysis."

The following notes have been made of the contents of Mr. Warrington's article as bearing upon the objects of this journal, with some remarks of our own.

Lime juice is principally imported from Sicily and South Italy. Concentrated bergamot juice from South Italy is also imported for the citric acid manufacture; small quantities are also exported from Montserrat and Dominica. It is only the windfalls and damaged fruit which are used for the production of lemon or lime juice. About 13,000 lemons are required to make one pipe (108 gallons) of raw juice.

Lemon juice is concentrated by boiling down in copper vessels over an open fire till it is supposed to mark, when

cold, 60° on the citrometer, it is then the syrupy, dark brown liquid familiar to calico printers. The concentrated juice will occupy one-ninth or one-tenth the bulk of the raw juice.

The graduations of the citrometer, or hydrometer, by degrees, of which lime juice is bought and sold, has puzzled more than one inquirer. The citrometer used by Mr. Warrington was found to indicate for each degree a specific gravity corresponding to .004 (Twaddle's hydrometer indicates .005 for each degree) so that 60° are equivalent to a gravity of 1.240.

No reliance can be placed upon the indications of the citrometer, and lemon juice is now generally purchased on the basis of its acidity.

"In the case of concentrated juice, the acidity is conveniently determined by diluting 50 c.c. of the juice to 500 c.c., and then taking for the experiment 30 c.c. of the solution. Standard alkali is added in quantity, about five-sixths of that which will be required, the whole is then boiled for a few minutes, and when quite cold the titration is completed. With unconcentrated juice 10 to 20 c.c. of the original juice may be taken. Owing to the want of sharpness of the reaction of citric acid with litmus paper, the determination does not admit of very great nicety; experiments with concentrated juice cannot be expected to agree nearer than $\frac{1}{4}$ oz. of citric acid per gallon."

The average density of lime juice is about 48° Tw., and it may range from 41° to 51° Tw.: the standard quality contains 64 oz. of nominal citric acid per gallon, equal to 66.87 oz. of crystallized citric acid, and the extreme range is from 56.6 to 72.6 oz.

Besides the free acid there is combined acid in the saline state present, which is found to average about 10 per cent. of the free acid; the method of ascertaining the proportion of this combined acid is fully detailed in the paper. We may remark that for the calico printer's use, although it is desirable to have all the acids in the free state in lime juice, yet the combined acid exerts a resisting power not much inferior to the free, provided it be citric acid. To ascertain the amount of organic acid not citric, Mr. Warrington employs a process which pre-

supposes that these acids yield soluble lime salts, while the citrate of lime is insoluble. It would be desirable to have some further and more exact information upon the nature of the foreign organic acids likely to be contained in lime juice; for purposes of sophistication it would not be difficult to find some organic acids which give insoluble lime salts. However, by this process it is found that there may exist as much as eleven per cent. of the total acidity due to organic acids not citric, in some samples of Sicilian lime juice; while a sample of English pressed lemon juice shewed that 99.6 per cent. of the total acidity was really citric acid. The examination of the other acids is being carried on by Dr. Armstrong, but Mr. Warrington indicates malic, aconitic, formic, and probably acetic and propionic acids as existing in lime juice.

Mr. Warrington does not enter into a description of the manufacture of citric acid from lemon juice, and we may here give some results of our experience in this matter, directly applicable to calico printing. About the year 1853-4 the supply of lime juice was of a very inferior quality, and the price became very high. The acidity fell, though the specific gravity was maintained, and while ordinary good lime juice of the year before, marking from 48° to 54° Tw., yielded to the standard soda test from 30 to 36 per cent. of its weight of crystallized citric acid, we have notes of samples of a similar density which only indicated 18 per cent. Not only was the effective acidity reduced, but there was something in all the lime juice of those years which made it impossible to get good whites by means of it, so that for a time there were no covered or pad purples in the market of first-rate quality. Citric acid was purchased to use instead of lime juice, but the supply was limited, and the price became higher; a gallon of thickened acid strong enough to resist chocolate covers, and made from a mixture of citric acid crystals and lime juice, cost about seventeen shillings. In this difficulty it was determined to attempt the purification of the lime juice on the works, and after much labour, with perfectly satisfactory results, the process of adding chalk to the diluted lime juice to make citrate of lime, the decomposition of the citrate of lime by sulphuric

acid, and decolorization of the brown acid by animal charcoal, was found a process full of difficulty and loss, on account of vegetable matters going down with the citrate of lime, and adhering to it pertinaciously, producing a mass difficult to wash and decompose. But by applying the washed animal charcoal to the dilute lime juice in the cold, and keeping it in agitation at intervals for two or three days, and then drawing off the clear into a copper boiler and heating, it was found that it could be precipitated with chalk rapidly and effectually; the effervescence was within easy control, and the citrate of lime was nearly white, quite uniform, and very dense. This being washed and then decomposed by heating with a proper proportion of sulphuric acid, yielded at once a solution of nearly pure citric acid, very slightly coloured, and possessed of the highest resisting powers; so that there was no necessity for carrying the process any further, and it was worked until a better quality of lime juice was again obtainable. The cost of acid made from this liquor was about half of that made with citric acid crystals.

In the section upon tartaric acid, the materials are designated as lees, argol, and tartar.

“Lees is the solid matter collected from the bottoms of the fermenting vessels. Argol is the thin crystalline crust deposited on the sides of these vessels. Tartar is manufactured from the two former by a rough process of extraction with hot water and crystallization. Italy is the great producer of the tartar exported to England, a smaller quantity comes from France. Other European countries export no tartar, but lees and argol are obtainable from all wine-producing countries having easy communication with the sea. The quantity of tartar exported by a country depends not only on the extent of its home consumption, but very greatly on the fact whether the wine is plastered or not. If the wine is plastered, the lees contain tartrate of calcium, instead of acid tartrate of potassium, and consequently there is little material from which tartar can be made.”

Analyses of various samples of lees shew that Italian and Greek, and some French lees contain a large amount of bitar-

trate of potassium and a small amount of tartrate of calcium, while in many French and all the Spanish lees the tartrate of calcium is greater in amount than the tartrate of potassium. Detailed analyses of the whole constituents of these various lees are given, the other principal substances being vegetable matter, water, sand, silica, phosphoric acid, and earths.

There are various methods of testing the value of argol and lees given in great detail, but the preferable method may be generally described in the author's words:—

“The tartaric acid present as bitartrate of potassium is determined from the acidity of the sample. Another portion of the tartar is calcined, and the neutralizing power of the ash determined. By subtracting from the neutralizing power of the burnt tartar, that due to the potassium bitartrate previously determined, the amount of base corresponding to neutral tartrates is ascertained.”

This, however, is only a very general description, and for the numerous and valuable details and modified processes, reference must be made to the original paper.

In woollen dyeing argols are nearly always used, in conjunction with mordants more or less strongly acid, and it is probable that the tartrate of calcium may act nearly as efficiently as tartrate of potassium, but as it is an insoluble salt and can only be slowly attacked by alum or tin mordants, there must be a certain amount of risk of irregularity in using argols of an unknown and variable composition. The Italian argols, which are those mostly employed by dyers, are, however, when of good quality, very nearly the same as pure bitartrate of potassium for practical purposes, containing as high as 70 per cent. of tartaric acid, but the lower qualities, which show as low as 40 per cent., are very uncertain in their behaviour. Tartar is prepared from lees or argols, and may be looked upon as a preparation holding an intermediate place between argols and pure cream of tartar. Mr. Warrington's analyses shew that Messina and St. Antimo tartar contain respectively 76.65 and 74.00 per cent. of tartaric acid, while pure bitartrate of potassium contains 79.7 per cent. of tartaric acid.

2. *On the direct formation of Methylaniline Purple upon Cotton.*

UP to the present time, aniline black is the only useful colour which has been formed directly upon the cloth from the aniline products; its beauty and remarkable solidity have induced many chemists to try and produce some of the other aniline colours in a similar way, not without hope that if so produced they would be faster than they can be obtained by any known processes of applying the already fully formed colouring matter. The communication of Mr. Albert Dupuy to the Industrial Society of Mulhouse* upon the production of one of these colours, though it may not prove to be of any practical importance, is well worthy of attention as the first successful, though incomplete attempt in a direction where success would be of immense value. He observed that the method by which methylaniline purple (*Violet de Paris*) was obtained by the action of oxidizing agents, such as copper salts, chlorates, &c., had much analogy to the method of obtaining black from aniline, and he hoped that by substituting the methyl product and using the aniline black process he would obtain a purple; but only a grey without brilliancy was the result. This was explained by the knowledge that if the purple was ever formed it was at once in the presence of agents which would destroy it as soon as formed, if it had the same properties as the manufactured colour.

If, on the contrary, a neutral or basic chlorate of methylaniline (containing 3 to 4 per cent. of base) was printed and exposed for a length of time to a warm and moist atmosphere, a purple colour was developed, the quality of which depended upon the purity of the materials and the conditions of the experiment. But the formation of colour was very slow and irregular, requiring eight or ten days. By the addition of a small quantity of red prussiate, not more than one-quarter

* Bull., vol. xlv., p. 373.

to one-half per cent. to the colour, the purple was developed uniformly and completely in two or three days.

The colouring matter thus obtained directly upon the cloth possesses all the properties of Violet de Paris, allowing for the want of the purification to which the latter has been submitted. It is soluble in water, and if the cloth be exhausted with boiling water it leaves only a grey, which is a secondary product of the decomposition of the methylaniline, or the aniline which was in excess; but the affinity of the fibre permits the purple to be washed with cold water, and even to resist warm soaping. The author concludes by saying that although the process has no probable industrial application, it is adding one colour more to those which may be said to belong to the aniline black type, and that there is hope of extending this method of fixing directly other coloured derivatives of the hydrocarbons.

3. *On the Application of Eosine in Calico Printing.*

BY M. J. DEPIERRE.

THE new colouring matter called Eosine was discovered in 1871, but it has only recently become a commercial product. It is the potassium salt of an acid belonging to a series of compounds discovered by Baeyer.*

This chemist shewed that anhydrous phthalic acid combined with different phenols, giving rise to compounds—the phthalines—the production of which is accompanied by the elimination of a molecule of water. Various phenols give phthalines, as ordinary phenol, pyrogallic acid, pyrocatechine, resorcine, &c. Mellitic and oxalic acid, and other acids analogous to phthalic acid, give compounds which are analogues of the phthalines.

* *Berichte der Chemische Gesellschaft von Berlin*, viii., pp. 46—162. *Moniteur Scientifique*, 3me Series, v., pp. 291—355—395.

Resorcine, which is obtained by acting on assafætida with caustic potash, when acted upon by phthalic acid produces fluoresceine, and this latter under the influence of hydrogenizing agents is transformed into fluoresceine with fixation of four equivalents of hydrogen.

When bromine is added to a solution of fluoresceine it immediately forms a combination, and the addition of water precipitates a reddish-coloured substance, which is soluble in alkalis, yielding a characteristic yellowish-red colour. This bromine derivative is tetrabromated fluoresceine, which combined with potash yields Eosine.

Eosine occurs as a reddish-brown powder, with metallic reflection; when evaporated from its aqueous solution it has an appearance exactly resembling uncrystallized fuchsine. The water solution is strongly fluorescent; by transmitted light it has a yellowish-pink colour, and by reflected light it is green.

This substance is soluble in water, ethylic and methylic alcohols, alkalis and alkaline carbonates, glycerine and soaps; it is insoluble in ether, phenic acid, aniline, oil, or benzine. It is very soluble in water; 100 parts of cold water dissolving 40 parts Eosine, and boiling water dissolves 45.4 parts; its aqueous solution smells strongly of bromine when boiled. It does not dissolve so largely in commercial alcohol, requiring 11 parts of it to dissolve 1 part of Eosine. It is a very powerful colouring matter; 1 part in 250,000 of water gives a fine pink colour, and one part in a thousand million times its weight of water gives a pink tint discernible in a thickness of a few centimetres.

Eosine, which, as we have said, is a potassium salt, is decomposed by most acids which give an orange-red flocculent precipitate, especially in strong solutions; it is decomposed by acetic acid, but the liquid remains of a pink colour on account of the slight solubility of Eosine in that acid.

Nearly all the soluble metallic salts give lakes with Eosine; the brightest are those of tin, alumina, and lead, which are of a fine red with a yellowish hue. Zinc gives a more yellow lake; silver and mercury give purple lakes; and copper a brownish-red lake.

These lakes are somewhat soluble in water, especially in calcareous water, which probably decomposes them, reproducing Eosine with a lime basis.

This new colouring matter dyes silk, and wool, and all animal matters easily, by simply immersing them in a water solution of the colour. The characteristic yellow reflection of Eosine is not permanent upon silk and only visible in light shades. Dyeing in cold solutions gives brighter shades than dyeing in hot.

Eosine at its first appearance cost 1,000 francs the kilogramme, at present (1875) its price is much reduced ; it gives pinks and aurora shades of great beauty. Notwithstanding its high price it can be economically applied in silk and woollen printing, for its great power enables it to give a very good pink when used in the proportion of one part to one thousand of thickening (70 grains or about $\frac{1}{8}$ oz. to the gallon.) It is printed upon silk by simply thickening with gum water and fixing in the ordinary way. Upon wool it is employed either by printing or dyeing.

All the attempts to obtain a fast colour from it upon cotton have failed. It does not dye or fix with the usual mordants, as tin, tannin, alumina, iron, glycerine, and arsenic, or caseine ; it fixes with albumen, but loses its beauty whether dyed by means of it or applied as a steam colour. If cotton be padded with a solution of Eosine slightly thickened with gum, and then passed into a solution of acetate of lead and some other metallic salts, it forms very bright lakes which might be serviceable for some styles such as linings.

The lakes thickened with albumen give but dull colours ; if the lakes are dissolved in ammonia, thickened, and then printed upon cloth prepared in different ways the resulting colours are loose and wash off.

Eosine can however be fixed in various manners upon cotton, but whatever method be employed, if the colours are left in running water of a calcareous nature, the colour is almost totally washed off.

The various ways by which the colour can be temporarily fixed are as follows :

(1) Arsenite of alumina added to the thickened solution of Eosine and printed upon cloth prepared with tin, steamed and washed.

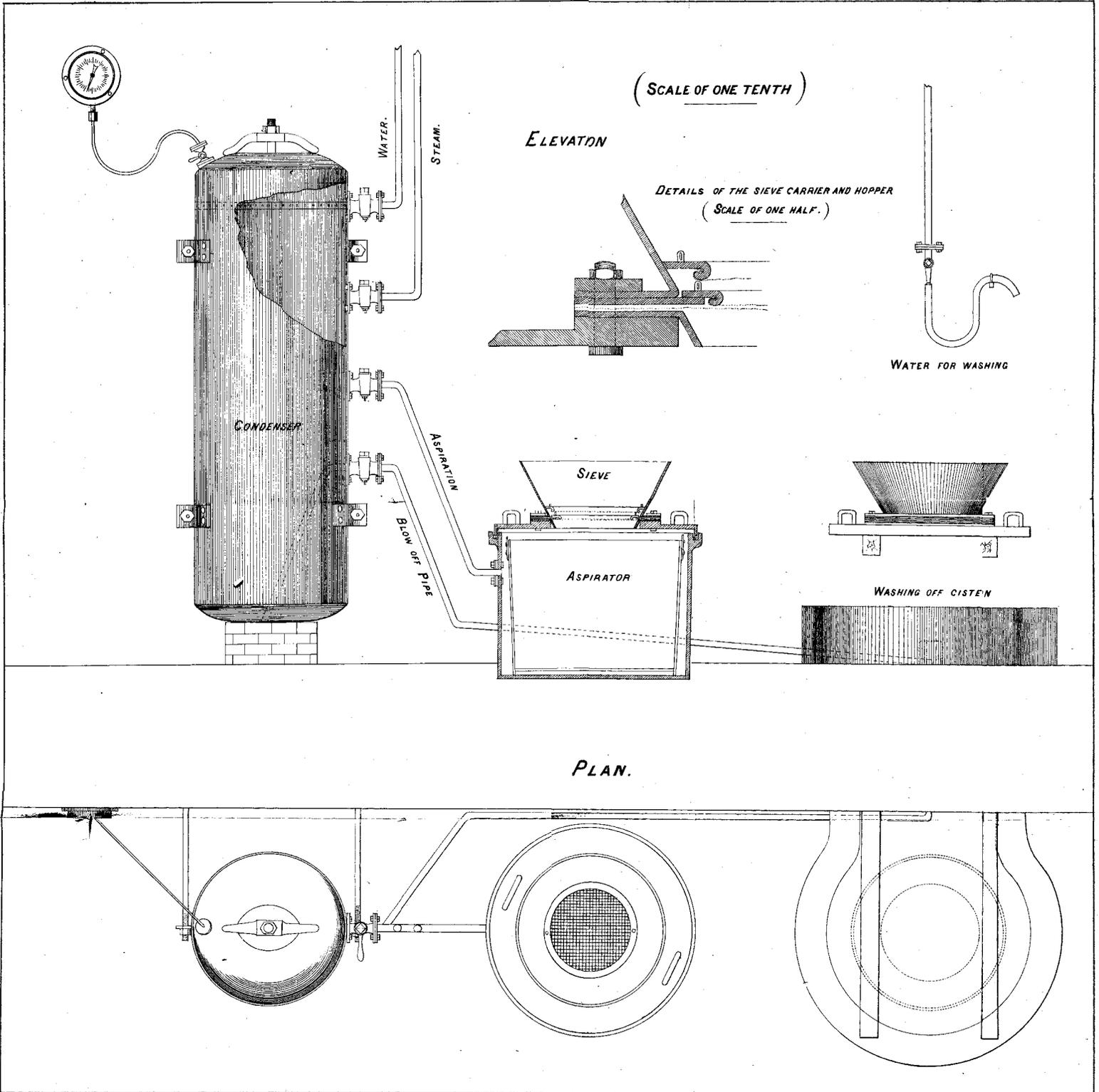
(2) Mix a solution of Eosine with its equivalent of acetate of lead, acetate of tin, or acetate of alumina thickened; print upon calico either prepared with tin or oiled, steam and wash. Upon oiled calico the shades are bluish.

(3) The best method is to prepare the calico with solution of glue or gelatine, print on a mixture of Eosine with three times its weight of tannin, steam and wash.

This brilliant colour, though not so fugitive as saffranine, will probably only have a very limited application upon cotton on account of its inability to resist the action of light, for if its name of Eosine (morning dawn, aurora) happily expresses the shade of colour it yields, it no less truly characterises its evanescence.—*Bulletin de la Société Industrielle de Rouen*, 3, Année, p. 163.

4. Upon Straining Colours by Atmospheric Pressure.

[The practical results obtained by this system of straining colour, as described in the papers of Rosenstiehl and Glanzmann, seem to justify the insertion of their memoirs at length; Mr. Rosenstiehl's observations have been translated nearly literally, and Mr. Glanzmann's with but slight condensation. The originals will be found in the Bull. de Mulhouse, xliii., p. 430, and in the Bull. de Rouen for June, 1875, p. 121. The plate is a reproduction of M. Glanzmann's drawing illustrating his paper. It is perhaps advisable to note that the method of straining colours by hand on the continent is quite different to the English method; the straining cloth has never been received with favour abroad, and the colours are all passed through sieves, the thicker colours being worked through by the rubbing of the hand or a brush; the colour thus strained or sieved is fine enough for the best printing, but the process is painfully slow, with a moderately thick colour it would take two men to keep a machine supplied; when



R. GLANZMANN. DEL.

VACUUM COLOUR STRAINING APPARATUS

Palmer & Howe, Manchester

Foldout reduced to 55% to fit on page.

brushes are used the presence of bristles under the doctor is often a trouble to the printer. The idea of straining by means of a vacuum is at least twenty years old, and was tried in Manchester and given up long ago, and though in the following pages it is described as being quite successful, it should be remembered that the continental printers never, as far as our experience goes, work colours so tough and stiff as those common in England, and it is very doubtful if a pressure of 15 lbs. per inch would force a colour of $2\frac{1}{2}$ to 3 lbs. of flour per gallon through fine wire gauze.—*Ed.*]

M. Rosenstiehl writes as follows: As often as I have seen workmen straining colours used in printing, by pressing those thick and viscous liquids with a brush against the strainer, I could not help regretting that this labour, purely manual, and frequently unhealthy, was done by hand, and not by a machine.

Many apparatuses have been devised to meet this end, some causing the colour to be pressed through a straining cloth or wire gauze by means of a piston, the basis of others being centrifugal force. These apparatuses have drawbacks which limit their application, and they are rarely used. So much time is wasted in cleaning them out, in order to strain a different colour, that they are justly condemned, and can only be usefully employed for straining large quantities of the same kind of colour.

The machine that is required in our industry is one that will rapidly strain colours, and will require no longer time to clean it than is necessary in the case of the ordinary sieve. The apparatus to which I wish to draw the attention of the Industrial Society, I consider as the first step towards this desirable object; it was constructed under my directions, and has been in use since the month of September last (1872) at the works of Thierry-Mieg and Co.

In this apparatus the colour is forced through the strainer, not by a piston or hand, but by atmospheric pressure, which acts upon the whole section as an imaginary piston, without impeding access to the strainer.

It is only necessary to indicate the principle of this machine in order that all who are acquainted with physical phenomena may comprehend its general arrangement. A vacuum is re-

quired to be made under the strainer, and to gain time it must be done quickly. The apparatus is composed of two portions easy to separate; the upper moveable part contains the straining cloth, which for that reason I shall call the sieve carrier, and covers like a lid the lower part, which is the vessel into which the colour will be drawn, I call it the aspirator; the two portions are connected by a joint, thus forming a space hermetically closed, and communicating with the exterior air only through the meshes of the strainer.

The joint should be of simple construction and little liable to injury, without needing special manipulation to secure it, for example without needing a screw.

The sieve cloth, through the meshes of which the colour is to pass, should be made in such a manner as to be easily removed, cleaned, and replaced, and also should be able to support the pressure of the atmosphere without bursting.

These are the general conditions of the problem ; I proceed to show how they can be fulfilled.

The sieve carrier is made of five circular pieces, in the following order, commencing from the top.

(1) A hopper by which the colour is poured into the machine ; it is of copper, tinned inside, and has an iron piece by which it is connected with the other pieces.

(2) A bronze ring, turned in the lathe, on which rests the strainer properly so called.

(3) A trellis of flattened brass wire about one-tenth of an inch wide, having meshes seven-tenths of an inch across; the trellis is intended to support the straining cloth or gauze and to prevent its rupture by atmospheric pressure. It forms a diaphragm in the interior of the sieve carrier which in this place has a diameter of 12 inches.

(4) A wide-mouthed funnel tinned inside, placed under the trellis in order to guide the colour in its fall, as it comes through the sieve, and prevent it from soiling the inside of the apparatus.

(5) A tinned copper connecting piece, having a diameter at the top equal to that of the hopper, and at the lower end to that of the aspirator, 12 inches. It is joined to the hopper by a bolt, which at the same time fastens all the intermediate pieces.

The lower part of this joining piece is an essential part of the joint, it is a steel ring turned in a lathe, fixed to the copper by rivets buried in solder. The whole of the sieve-carrier, which can be raised in one piece, weighs upwards of sixty pounds. It is the pressure exercised by this weight resting on the aspirator which forms the air-tight joint.

The strainer, properly so called, is made by stretching wire cloth over a bronze ring, turned in a lathe and fitting without friction into the sieve carrier; the portions of the ring coming into contact with the wire cloth are carefully rounded so as to prevent cutting. A supply of these rings is kept near the machine for the different finenesses of wire gauze. When the bronze ring is in position the wire cloth lies immediately upon the trellis in such a manner as not to suffer any stretch by the pressure, which would diminish its durability.

Finally, since it is highly important to be able to remove quickly the ring which supports the cloth to clean it or change it for another, it is provided with two small handles.

The aspirator is a cylindrical vessel of sheet iron, 22 inches in height, open at the top, which is furnished with a wide rim cast in metal, in which is cut a circular groove, in which the steel ring of the sieve carrier fits without friction. The bottom of this groove is provided with a ring of vulcanized india-rubber cemented to it by a solution of india-rubber in benzine.

By means of this groove and india-rubber ring the joint is completed by simple contact, without any screwing, and is further assisted by the pressure of the atmosphere, which adds to the weight of the sieve carrier. The aspirator has on the side a tap, which allows a vacuum to be made in it. To simplify the working, this vessel is fixed and does not directly receive the strained colour, which falls into a vessel of tinned copper, which fits easily into the aspirator, two handles permitting it to be raised with ease; its capacity is 17 gallons.

Having described the apparatus, it remains to shew how the vacuum is obtained. I had the choice of many methods. I could have chosen the filter-pump apparatus, recommended for laboratories by Bunsen, and by Scheurer-Kestner for industrial establishments; but that requires a reservoir placed at

least 33 feet from the ground, a condition I could not provide. Again, I could have employed the air pump, used in sugar manufacture to make the vacuum in the boiling apparatus, but that system requires a special arrangement which, perhaps, might be judged too costly for the end aimed at. Following the advice of our colleague, M. W. Grosseteste, I used the vacuum of the condenser of an engine of 25 horse-power, a great advantage, as it did not require any special apparatus, and experience has shewn to what limits it can be utilised without injuring the working of the engine. The air chamber of the condenser was bored, and a small tap one-eighth of an inch diameter was placed in it; a leaden pipe of small diameter was attached to this cock, and this was connected with a reservoir of sheet-iron, which in this instance was more than 200 feet distant, at the side of the straining machine. A vacuum gauge placed near the condenser, and a manometer near the reservoir allows the different degrees of pressure to be noted during the operation. The column of mercury generally shews from 24 to 27 inches vacuum. This degree of rarefaction is abundant for all purposes.

The reservoir is a sheet-iron cylinder of 52 gallons capacity, bored in three places, which are provided with taps. One placed on the top communicates with the condenser; the second with the straining machine; the third is placed in the lower part of the reservoir, it allows the water which collects to be drawn off. This vacuum reservoir is for the purpose of preventing too sudden variations of pressure in the condenser, and it allows an instantaneous vacuum to be formed under the sieve carrier. It could have been larger, but to lessen the expense of fitting up, I employed an apparatus already existing and not in use. The condensing pump makes a vacuum in ten minutes; but so as not to interfere with the working of the engine when commencing, the tap connected with the condenser should only be partially opened; when the pressure inside reaches about 12 inches it may be entirely opened. When the engine is working, the communications are left open so as to keep permanent vacuum in the reservoir, and the apparatus is thus always ready for use.

At the side of the straining machine is a water tap, under which is a tripod for washing the sieve on, and the sieve carrier also, if necessary.

I will suppose a straining finished, and another in preparation; while the strainer is being washed, the column of mercury rises from 16 to 26 inches. An empty vessel is placed in the aspirator, which is covered by the sieve carrier, and a sieve is put in; two men prepare for the hopper a maximum quantity of 17 gallons of colour; as soon as the sieve cloth is covered, the tap connecting the condenser and reservoir is shut; the tap which makes the communication between the reservoir and aspirator is opened and immediately shut again; the colour then flows with such rapidity into the lower vessel, that the workmen can scarcely pour it into the hopper quickly enough. It requires, in fact, more time to empty the colour into the sieve than for the colour to pass through the sieve. When all the colour has passed through and the sieve is empty, the air rushes with great force into the interior, and it is for this reason that the tap which communicates with the reservoir should always be kept shut, otherwise it becomes filled with air, and power is needlessly wasted. While air has entered the apparatus, the sieve and sieve carrier are taken out and washed under the tap; the tub full of colour is removed, and an empty tub substituted. While these things are being done, the vacuum has been re-established, and the machine is again ready for use. Many months experience has shewn me what can be expected from this machine; I again repeat that it sieves rapidly. I will now state its defects. It is almost useless for colours thickened with gum or albumen. These have the inconvenience of filling the cloth with grains of sand, skins, and other insoluble matters. But this inconvenience is a small affair, as these colours are generally liquid enough to allow of them being sieved by hand. Again, a hot colour, cannot be sieved, under the feeble pressure in the aspirator it enters into ebullition, and sometimes so violently that the colour tub overflows, and the air pipes get choked up.

This last defect, inherent to the very principle of the machine, is little felt as hot colour is rarely used,

On the other hand, on printworks there is a large consumption of colour thickened by starch, flour, and their commercial derivatives, also by gum tragacanth and caseine, all very thick and difficult to sieve by hand. These colours sieve with the greatest ease in this machine, and that is its real utility. It is always necessary that the wire cloth should be clean; and, for example, a colour uneven, or badly mixed, full of thickening not well stirred in, or containing skins from drying up by exposure to the air, the precaution must be taken of previously removing the skin, or of separating it by a second sieve of larger meshes, placed in the hopper stretched over a ring a little larger than that of the real sieve. The conical form of the hopper renders this arrangement easy. By this means the colour is forced to go through two sieves, it is twice sieved by one operation and neither of the sieves are choked up by the lumps which are broken up by the first sieve.

The advantages of the machine lie in the simplicity of its construction and the rapidity of its working, which is really effected by the steam engine. These qualities have made it a favourite apparatus which workmen will not readily part with. To shew to what extent this machine is a practical one I will cite an example: the machine was put in its place and I had scarcely begun some preliminary trials when I was called away for several weeks; I had previously intended to continue these trials later on. I was surprised on my return to see the workmen using it with great ease; the foreman who had assisted me in the trials had seized the ideas and during my absence had taught the men; for anyone who understands the habits of mind of our workmen this is the greatest compliment to my apparatus.



5. *On a Modification of Rosenstiehl's Straining Apparatus.*

By M. R. GLANZMANN.

(With a Drawing to Scale.)

M. G. WITZ suggested that the vacuum could be best obtained by the condensation of steam, the experiments upon this modification were made at the works of Mr. Henry Stackler and have proved perfectly satisfactory.

Here is a description of the modified apparatus, and there is added a detailed drawing of all the parts. (*See Plate.*)

The principal parts are as in Rosenstiehl's arrangement, a reservoir and an aspirator; but instead of connecting the reservoir with the condenser of the steam engine, which might often give rise to serious inconvenience, it is fitted up so as to be filled with steam, which is afterwards condensed by jets of cold water. This part may be called the condenser, it is made of rivetted boiler plate, and has a capacity of about 66 gallons. There are four taps arranged on its exterior one above the other. The first and highest is connected with a cold water supply, and is continued internally with a pipe extending horizontally and bored with holes. The second tap is connected with the steam supply; the third communicates with the aspirator to make a vacuum under the strainer and the fourth is a blow-off tap, and it must have a diameter equal to a three-quarter inch pipe at the least.

The condenser is supplied with a vacuum gauge. The aspirator is constructed very similar to that of Rosenstiehl's; it is a jacket of cast-iron, 26 inches diameter and 20 inches in depth, and can hold an empty tub or mug which may contain 13 or 14 gallons of colour.

The cover of the aspirator, which holds the hopper and sieve, is cast with a projection on its circumference which is fitted accurately to the groove in the aspirator, at the bottom of the groove is an india-rubber ring, and the bottom of the

groove and the corresponding projection are turned true by the lathe.

The copper hopper, fixed to the cover, is 9 inches high, 20 inches in diameter at the widest part, and 12 inches at the lower part. At the bottom of it is fixed a stout piece of wire gauze, with wide meshes, to support the fine strainer ; this latter is tightly stretched over a moveable copper ring and can be changed as required. Upon this is a second copper ring with a more open wire gauze which prepares the colour to pass the fine strainer by breaking up lumps and the little skins which may be in it. The copper rings have a deep recess in their lower part, as seen on the plate, by which the sieving material is secured by means of brass wire.

Near the aspirator there is a washing-off cistern, the whole top part is placed on the timber supports, and a jet of water guided by a flexible tube can be brought to bear on the sieves.

To work the apparatus the first step is to place the tub or mug which is to contain the strained colour into the jacket of the aspirator and then the cover is placed carefully on. The weight of the cover resting upon the india-rubber ring makes an air-tight joint ; but to be certain of this there are some precautions to be observed, the neglect of which will impede or entirely prevent the action of the apparatus. The projecting rib and the exterior of the groove must be perfectly clean, and, moreover, must be finally wiped with a sponge to completely remove adhering water, which prevents an air-tight junction. Impurities of a mechanical nature in the water must be avoided, for a single grain of sand in the groove spoils the joint and permits air to pass into the aspirator, so that it gets filled with air without a drop of colour passing through the strainer.

The colour is next poured into the hopper, and now the vacuum is to be obtained.

All the taps being closed, the operation is commenced by opening first the blow-off tap, and then the steam tap. The water in the condenser is expelled by the pressure of the steam, and as soon as steam appears at the blow-off pipe the

steam tap is shut, and the blow-off tap left open a moment to let off the excess of steam and then closed, this last precaution is important. The water tap is next opened; for four or five seconds the vacuum gauge shews no change, but after this interval, the vacuum is formed rapidly, and in the space of twenty or thirty seconds, the gauge indicates a vacuum of 26 to 28 inches of mercury, if the operation has been well conducted. The water tap is now shut, and the tap connected with the aspirator is opened. For thick colours it is fully opened, but for thin colours only partially, in order that the colour may not go through the strainer more quickly than it can be supplied by the hopper.

With a condenser of a capacity of 66 gallons, thin colour can be strained by intercepting the operation to the amount of from 26 to 32 gallons; but with thick colour, not more than 13 to 16 gallons can be strained by one exhaustion, because when the rarefaction is reduced to 12 or 15 inches in the condenser the thick colours do not go through, while thin colours pass down to a vacuum of 4 inches.

The great advantage is that the separate straining operations can follow one another very rapidly, for example, every five or six minutes for 13 gallons of starch or paste colour.

In extensive works where large quantities of different colours are required, two aspirators could be worked by a single condenser, or two covers with strainers could be provided, having one always clean and ready.

By this arrangement a single apparatus would be sufficient for the largest establishments, seeing that it is possible to strain 110 gallons of paste colour per hour, making eight or ten changes for different colours.

The cost of steam is insignificant, and the saving of sieves is so considerable that in most places it would in one year pay for the apparatus. A machine working daily for four months rendered only two sieves unserviceable of the value of three francs.

The apparatus is easy to work, there must be some considerable neglect or defect to prevent it operating.

We have only to praise the services which this ingenious

and useful machine renders to us daily, and it is very unlikely that we shall ever go back to the old system. All the former straining utensils have been abandoned, or are only used to strain those colours which must be worked hot.

This paper is followed by a report upon it by M. G. Witz, who corroborates the statements made by M. Glanzmann, but states that five or six minutes are required altogether to strain 12 gallons of very thick paste colour through a fine brass cloth, No. 80, when it had been previously strained through a coarser gauze by the same apparatus. Two such strainings of the same colour occupying ten to twelve minutes. He does not recommend the combination of the coarse and fine gauze in one straining operation, because the operation is much slower and not so perfect.

Very thick British gum-water strains much more quickly than starch paste, if the filling of the meshes of the strainer with crusts and undissolved gum is avoided.

He gives the following as the time occupied in the successive operations of working the apparatus :

Passing in of steam and expulsion of air and water.....	1 ½ min.
Stopping steam and waiting to stop blow-off tap	½ „
Introduction of water for condensing and obtaining a vacuum of 24 to 26 inches, about	¾ „
Straining of 11 gallons very thick paste colour, about...	¾ „
Taking out strained colour and remounting to start again, about	2 „

To prevent injury to the colour from drops of water forming on the interior of the iron cover, it is suggested to cover this with copper or to give it a conical form.



6. COLLECTED RECEIPTS.

BLACK COLOURS FOR PRINTING.

No. 1. Black for Delaine.—*Communicated. French.*

1 gallon logwood precipitate (below)—1 gallon water— $\frac{1}{2}$ pint acetic acid— $1\frac{1}{2}$ lbs. starch— $2\frac{1}{2}$ lbs. gum substitute—1 lb. alum— $\frac{1}{2}$ lb. salammoniac— $\frac{1}{2}$ lb. extract of indigo.

No. 2. Logwood Precipitate for Black.

4 gallons logwood liquor at 10° Tw.— $1\frac{1}{2}$ lbs. sulphate of copper— $\frac{1}{2}$ gallon water, dissolved and mix, then add $\frac{1}{2}$ gallon water containing 3 oz. bichromate of potash and 6 oz. crystals of soda—1 gallon water. Collect the precipitate and drain to $1\frac{1}{2}$ gallons.

No. 3. Black for Delaine.—*Communicated. French.*

3 quarts water—1 quart logwood liquor at 30° Tw.— $1\frac{1}{4}$ lbs. starch—1 lb. gum substitute—3 oz. alum, boil, and when nearly cool add $1\frac{1}{2}$ lbs. nitrate of iron— $\frac{1}{2}$ lb. acetate of iron—10 oz. neutral extract of indigo. Works best when one or two days old.

No. 4. Black for Blue Grounds, Delaine.—*Communicated. French.*

1 gallon logwood precipitate (see No. 2)—1 lb. alum dissolved in $\frac{1}{2}$ gallon water—5 lbs. gum substitute— $\frac{1}{2}$ pint acetic acid—6 oz. salammoniac—6 oz. extract of indigo.

No. 5. Black for Wool; Block.—*Communicated. French.*

8 lbs. gum substitute.— $\frac{1}{2}$ gallon logwood liquor at 30° Tw.—5 quarts water— $\frac{1}{2}$ pint peachwood liquor at 30° Tw.— $\frac{1}{2}$ gallon red liquor at 16° Tw.; when cold, 1 pint nitrate of copper—32 oz. nitrate of iron—1 pint iron liquor.

No. 6. Black for Delaine.—*Communicated. English.*

8 pints logwood liquor at 8° Tw.—1 pint wood acid—1½ pints bark liquor, 10°—2½ oz. extract of indigo—¼ oz. bichromate—2 lbs. flour—8 oz. British gum—boil, cool, and add 4 oz. salammoniac—½ pint muriate of iron at 80°—1 pint nitrate of iron at 80°.

No. 7. Black for Delaine.—*Communicated. English.*

8 pints logwood liquor at 8°—2 lbs. flour—8 oz. gum—½ pint muriate of iron at 80°—1 pint nitrate of iron at 80°.

No. 8. Black.—*Communicated. English.*

3 gallons logwood liquor at 12°—3 lbs. starch, boil and cool to 90° F. and add 1 quart nitrate of iron at 84°.

No. 9. Black for Rainbowing.—*Communicated. English.*

3 gallons logwood liquor at 12°—12 lbs. gum substitute—1 quart nitrate of iron at 84°.

No. 10. Black for Delaine.—*Communicated. English.*

9 gallons logwood liquor at 12°—3 gallons gall liquor at 9°—16½ lbs. flour—3 lbs. starch—3 lbs. gum—1½ lbs. calcined green copperas; boil, and add immediately 7 half-pints iron liquor—cool to 100° F. and add 5 half-pints nitrate of iron at 84°—3 pints extract of indigo—1 pint muriate of iron at 60°.

No. 11. Black for Delaine.—*Communicated. English.*

24 lbs. flour—2 lbs. British gum—7 gallons logwood liquor at 10°—2½ gallons gall liquor at 9°—2 quarts wood acid at 4°—3 pints red liquor at 18°; boil 15 minutes, cool, and add 5 half-pints extract of indigo—6 pints nitrate of iron at 84°—3 half-pints muriate of iron at 60°.

No. 12. Black for Delaine.—*Communicated. English.*

2 gallons logwood liquor at 16°—2 lbs. starch—4½ lbs. gum substitute; boil, cool to 100° F., and add ½ lb. alum, when cold add 3 pints nitrate of iron at 84°—1 lb. acetate or extract of indigo.

No. 13. Black for Delaine.—*Communicated. American.*

19 gallons logwood liquor at 12°—32 lbs. starch—5 lbs. gum substitute; boil, and cool to 150° F. and add 1¼ lb. chlorate of potash; cool to 100° F. and add 8 lbs. alum—28 lbs. red prussiate of potash—2¼ lbs. ground oxalic acid—1½ gallons sulphate of indigo.

No. 14. Gum Black for Delaine.—*Communicated. American.*

10 gallons logwood liquor at 12°—50 lbs. gum substitute—dissolve warm in 3½ lbs. alum—1½ lbs. chlorate of potash—8 oz. oxalic acid—then in 6 gallons of logwood liquor, dissolve 10 lbs. red prussiate of potash—5 quarts extract of indigo—mix.

No. 15. Black for Delaine.—*Communicated. American.*

16 gallons logwood liquor at 12°—90 lbs. starch—10 lbs. gum substitute; boil, cool a little, and add 5 lbs. chlorate of potash—cool down to 100° F. and add 10 lbs. alum—30 lbs. red prussiate of potash—1½ lb. oxalic acid—4 gallons extract of indigo.

No. 16. Black for Blotches, Delaine.—*Communicated. American.*

2 measures of No. 14 black—1 measure of No. 15 black.

No. 17. Black for Delaine.—*Communicated. American.*

8 gallons logwood liquor at 18°—13 lbs. starch; boil and add 3 gallons tragacanth gum water at 6 oz. per gallon—cool—2½ lbs. chlorate of potash—6 gallons iron liquor—8 gallons neutral extract of indigo—2 gallons acetate of copper at 15°—2 gallons muriate of iron at 36°.

No. 18. Acetates of Iron and Copper for No. 17 Black.

3½ lbs. brown acetate of lead—3 lbs. sulphate of iron.—1 gallon hot water. Use at full strength.

110 lbs. sulphate of copper—110 lbs. brown acetate of lead—30 gallons of water. Reduce to strength required.

No. 19. Steam Black for Calico.—*Colour Maker's Companion.*

3 gallons logwood liquor at 12°—1 gallon red liquor at 16°
1 gallon iron liquor at 30°—1 gallon acetic acid at 8°—7½ lbs.
flour—3 lbs. British gum.

No. 20. Black for Silk.—*Quarto. Anonymous.*

4½ pints logwood liquor at 7°—6 oz. acetate of copper at
40°—9 oz. red liquor at 18°—10 oz. starch; boil, cool, and add
4 oz. nitrate of iron.

No. 21. Black for all Wool.—*Quarto. Anonymous.*

8½ quarts logwood liquor at 6°—2¼ lbs. starch; boil, and
while hot add 4 oz. extract of indigo—5 oz. oxalic acid—
24 oz. neutralized nitrate of iron, made by adding 1 lb. acetate
of lead to 3 lbs. nitrate of iron.

No. 22. Black Calico or Delaine.—*Unknown.*

6 gallons logwood liquor at 12°—7 lbs. starch—7 lbs. gum
substitute—1½ gallons acetic acid—2 gallons thick traga-
canth jelly; boil well, and when quite cold add 2 lbs. red
prussiate dissolved in 1 gallon water—1½ quarts muriate of
iron at 70°—6 quarts acetate of iron (see No. 19)—4 quarts
acetate of chromium.

No. 23. Acetate of Chromium for Black.—*Unknown.*

1 gallon boiling water—4 lbs. bichromate of potash—8 lbs.
muriatic acid—28 oz. sugar. To each gallon add 1 gallon
acetate of lead liquor at 4 lbs. per gallon.

No. 24. Black for Delaine.—*Quarto. Anonymous.*

2½ gallons logwood liquor at 6°—36 oz. starch; boil and
add 4 oz. extract of indigo—4 oz. oxalic acid—24 oz. nitrate
of iron—1 lb. acetate of lead.

No. 25. Black for all Wool; Blotch; Block.—*Quarto. Anonymous.*

4½ quarts logwood liquor at 6°—4½ pints peachwood
liquor at 6°—18 oz. starch; boil, and while warm add 6 oz.

sulphate of copper—4 oz. sulphate of iron—6 oz. extract of indigo—12 oz. nitrate of iron.

No. 26. Black for all Wool; Merino.—*Quarto. Anonymous.*

6½ quarts logwood liquor at 8½°—4½ pints archil at 10°—36 oz. starch—14 oz. gall liquor at 8°; boil, and add 2 oz. sulphate of copper—12 oz. extract of indigo—1 lb. nitrate of iron.

No. 27. Black for Delaine; Blotch.—*Quarto. Anonymous.*

3½ gallons logwood liquor at 7°—1¾ gallons brazil wood liquor at 7°—divide the liquors into two equal portions, and boil one with 2¾ lbs. gum substitute, and the other with 2¾ lbs. starch—mix, and add 12 oz. sulphate of copper—4 oz. sulphate of iron—18 oz. extract of indigo—12 oz. nitrate of iron.

No. 28. Black for Delaine.—*Communicated. English.*

6 gallons logwood liquor—3 quarts wood acid—3 quarts bark liquor at 14°—12 lbs. flour—3 lbs. British gum—boil, and add ½ lb. extract of indigo—1 oz. bichromate of potash, and when cold 1½ lbs. salammoniac—3 pints muriate of iron—3 pints nitrate of iron.

No. 29. Black for Calico; Chromed.—*Communicated. Russian.*

2½ gallons logwood liquor at 16°—1¾ gallons red liquor at 16°—1½ gallons catechu liquor at 14°—¾ gallon water—2 oz. acetate of copper—7½ lbs. starch—3 lbs. olive oil—2 gallons of protonitrate of iron, made by taking 4 gallons water—42 lbs. nitrate of lead—36 lbs. sulphate of iron.

No. 30. Black for Delaine.—*Communicated. Russian.*

3½ gallons logwood liquor at 16°—3 pints archil at 24°—1 gallon water—½ gallon red liquor—6 lbs. starch—7 lbs. gum substitute—1 pint oil—boil and cool—1 lb. salammoniac ½ lb. nitrate copper at 80°—1 quart acetate or extract of indigo 18°—4 lbs. protonitrate of iron (as above) at 50°.

No. 31. Acetate of Indigo.—*Communicated. Russian.*

2 lbs. ground indigo—6 lbs. strongest sulphuric acid—6 lbs. fuming sulphuric acid—leave 24 hours—15 lbs. acetate of lead dissolved in $2\frac{1}{2}$ gallons water—use the clear brought to required strength.

No. 32. Black for all Wool.—*Communicated. Russian.*

$3\frac{1}{4}$ gallons logwood liquor at 15° — $\frac{1}{2}$ gallon archil 22° —1 gallon water— $\frac{1}{2}$ gallon red liquor 16° — $5\frac{1}{2}$ lbs. starch— $6\frac{1}{2}$ lbs. gum substitute— $1\frac{1}{2}$ lbs. stearine or tallow— $\frac{3}{4}$ lb. salammoniac—boil, cool, and add 4 oz. nitrate copper at 80° —6 lbs. protonitrate of iron (No. 29).

No. 33. Black for all Wool; Blotch.—*Communicated. Russian.*

$3\frac{1}{2}$ gallons logwood liquor at 15° — $2\frac{1}{2}$ gallons water— $5\frac{1}{2}$ lbs. starch— $8\frac{1}{2}$ lbs. gum substitute— $\frac{3}{4}$ lb. oil— $\frac{3}{4}$ lb. salammoniac—boil, cool, and add 4 oz. nitrate of copper—6 lbs. protonitrate of iron (No. 29).

No. 34. Black for Blotch, Delaine, or Wool.—*Communicated. Russian.*

13 gallons logwood liquor 15° —48 lbs. dark British gum—1 lb. chloride of copper—4 lbs. chloride of iron—8 lbs. nitrate of iron—4 lbs. extract of indigo.

No. 35. Black for Delaines; Block.—*Communicated. Russian.*

1 gallon logwood liquor at 15° — $\frac{3}{4}$ lb. alum—3 lbs. gum—10 oz. red prussiate of potash— $\frac{1}{2}$ gallon of lime juice at 48° .

No. 36. Black for Calico.—*Persoz.*

1 gallon logwood liquor at 8° — $1\frac{1}{4}$ lbs. starch—boil, and while hot add 6 oz. sulphate of iron—3 oz. oil—when cold add 12 oz. nitrate of iron.

No. 37. Black for Calico.—*Persoz.*

1 gallon logwood liquor at 8° —1 lb. starch— $2\frac{1}{2}$ lbs. dark British gum—1 pint nitrate of iron neutralized by acetate of

lead—boil ; thicken separately 1 gallon gall liquor at 8°—1 lb. starch—2½ lbs. dark British gum—1 pint nitrate of iron—mix the two together.

No. 38. Black for Calico.—*Persoz.*

1 gallon water—3 pints logwood liquor at 30°—3 lbs. starch—boil, and add 24 oz. wood acid at 7°—3 pints iron liquor at 20°—18 oz. oxalic acid.

No. 39. Spermaceti Black for Calico.—*Persoz. English.*

1 gallon logwood at 8°—1 quart iron liquor at 20°—1 quart red liquor—1 quart acetic acid at 11°—2 lbs. starch—boil and add 1 pint oil—1 pint turpentine—½ lb. spermaceti.

No. 40. Spermaceti Black.—*Persoz. English.*

1½ gallon logwood liquor at 14°—½ gallon iron liquor at 13°—1 pint red liquor—½ gallon oil—½ lb. spermaceti—4 lbs. starch—½ gallon acetic acid—½ gallon turpentine.

No. 41. Black for all Wool ; Block.—*Persoz.*

1 gallon logwood liquor at 30°—3 quarts ammoniacal cochineal at 1 lb. per gallon—1 quart acetate of indigo solution at 2°—dissolve in the liquors ½ lb. sulphate of copper—½ lb. alum—½ lb. oxalic acid—thicken with 6 lbs. dark British gum, and add 3¼ lbs. nitrate of iron at 84° Tw.

No. 42. Black for all Wool ; Block.—*Persoz.*

1 gallon logwood liquor 8°—10 oz. starch—1½ lbs. calcined farina—5 oz. alum—boil, cool, and add 1¼ lbs. protonitrate of iron (No. 29)—½ lb. extract of indigo—½ lb. acetate indigo at 15°—½ lb. archil at 18°—let stand two days before using.

No. 43. Black for Wool or Wool and Silk.—*Persoz.*

1 gallon boiling water—½ gallon peachwood liquor at 23°—1 gallon logwood liquor 38°—add gradually ¾ lb. bichromate of potash dissolved in ½ gallon water—thicken with 3¼ lbs. starch and 5 lbs. dark British gum—while hot, add 1¼ lbs. sal-

ammoniac— $2\frac{1}{4}$ lbs. acetate of copper—cool and add $1\frac{1}{4}$ lbs. oxalic acid—6 oz. turpentine— $3\frac{3}{4}$ lbs. protonitrate of iron at 84° — $3\frac{1}{4}$ lbs. acetate of indigo.

No. 44. Black for Silk or Wool; Blotch.—*Persoz.*

1 gallon hot water—1 gallon logwood liquor 38° —add gradually 10 oz. bichromate of potash dissolved in 1 gallon of hot water—1 lb. salammoniac— $2\frac{1}{2}$ lbs. acetate of copper—14 oz. starch—2 lbs. gum substitute—boil and add $2\frac{1}{2}$ lbs. oxalic acid— $\frac{1}{2}$ gallon molasses—3 lbs. protonitrate of iron at 84° .

No. 45. Black for Wool; Block.—*Persoz.*

1 gallon logwood liquor at 12° — $2\frac{1}{2}$ pints of archil at 18° — $\frac{1}{2}$ lb. extract of indigo— $1\frac{3}{4}$ lbs. starch—boil, cool, and add 6 oz. alum—3 oz. lard— $1\frac{1}{2}$ lbs. nitrate of iron at 110° —14 oz. acetate of indigo at 15° .

No. 46. Black for Wool; Roller or Plate.—*Persoz.*

1 gallon mixed gall and logwood liquor made from 7 measures of logwood liquor at 10 lbs. wood per gallon, and 3 measures gall liquor at 4 lbs. galls per gallon— $1\frac{3}{4}$ lbs. starch— $\frac{1}{4}$ lb. extract of indigo—10 oz. sulphate of iron—1 lb. nitrate of iron at 110° .

No. 47. Black for Wool; Block.—*Persoz.*

1 gallon logwood liquor at 10° — $\frac{1}{2}$ gallon sapan liquor at 5° — $2\frac{3}{4}$ lbs. starch—boil and add $\frac{1}{2}$ lb. sulphate of copper—5 oz. sulphate of iron— $\frac{1}{2}$ lb. sulphate of indigo—1 lb. nitrate of iron 84° .

No. 48. Black for Wool; Blotch.—*Persoz.*

1 gallon logwood liquor, 5° — $\frac{1}{2}$ gallon sapan liquor, 5° —18 oz. starch—boil and add $\frac{1}{2}$ lb. sulphate of copper, cool and add 1 lb. nitrate of iron at 110° — $\frac{1}{2}$ lb. sulphate of indigo.

No. 49. Black for Wool; Machine.—*Persoz.*

1 gallon logwood liquor at 14° —10 oz. starch— $1\frac{3}{4}$ lb. gum

substitute; boil and add $\frac{1}{4}$ lb. alum— $1\frac{1}{2}$ lb. nitrate of iron at 104° — $\frac{1}{2}$ lb. acetate of indigo, 14° ; leave 24 hours before using.

No. 50. Black for Wool; Machine.—*Persoz.*

1 gallon logwood liquor at 14° — $\frac{3}{4}$ lb. starch—2 lbs. gum substitute— $\frac{1}{4}$ lb. alum— $1\frac{1}{2}$ lb. nitrate of iron at 104° — $\frac{1}{2}$ lb. acetate of indigo.

No. 51. Black for Delaine.—*Persoz.*

1 gallon logwood liquor at 10 lbs. wood per gallon— $\frac{1}{2}$ gallon sapan liquor at 5° —2 lbs. starch—5 oz. sulphate of iron— $\frac{1}{2}$ lb. sulphate of indigo— $1\frac{1}{2}$ oz. nitrate of iron at 110° .

No. 52. Black for Delaine.—*Persoz.*

1 gallon logwood liquor at 14° — $1\frac{1}{4}$ lb. flour; boil and add 3 oz. alum—3 oz. sulphate of copper, and when cold 1 lb. protonitrate of iron at 110° —3 oz. fat dissolved in turpentine.

No. 53. Black for Wool and Delaine.—*Persoz.*

1 gallon logwood liquor at 14° — $1\frac{1}{2}$ lb. flour—while hot add 3 oz. alum—2 oz. fat or oil, and when cold, $1\frac{1}{4}$ lb. protonitrate of iron.

No. 54. Black for Delaine; Blotch.—*Persoz.*

1 gallon logwood liquor at 14° — $\frac{1}{2}$ lb. alum—3 oz. extract of indigo—1 lb. starch— $1\frac{1}{4}$ lb. protonitrate of iron when cold.

No. 55. Black for Delaine; Blotch.—*Persoz.*

1 gallon logwood liquor—5 pints bark liquor, 18° —1 lb. starch—1 lb. gum substitute; boil and add $\frac{1}{2}$ lb. sulphate of iron— $\frac{1}{2}$ lb. nitrate of copper at 72° —1 lb. nitrate iron at 110° .

No. 56. Black for Delaine; Blotch.—*Persoz.*

1 gallon logwood liquor at 8° —10 oz. starch— $2\frac{1}{2}$ lbs. gum substitute; while warm add $\frac{1}{4}$ lb. alum—3 oz. extract of indigo—1 lb. protonitrate of iron at 110° —3 oz. oil.

No. 57. Black for Silk.—*Persoz.*

1 gallon logwood liquor at 14° —10 oz. starch— $1\frac{1}{2}$ lb. gum substitute; boil, cool, and add 10 oz. crystals nitrate of copper— $\frac{1}{2}$ lb. nitrate of iron.

No. 58. Black for Silk.—*Persoz.*

$1\frac{1}{2}$ gallons of logwood liquor at 5° — $\frac{1}{4}$ lb. gall nuts; boil down to 1 gallon and take the clear— $1\frac{1}{4}$ lbs. starch— $1\frac{1}{2}$ oz. alum—5 oz. sulphate of copper— $1\frac{1}{2}$ oz. sulphate of iron—3 oz. nitrate of iron at 110° —3 oz. fat.

No. 59. Black for Silk; Blotch.—*Persoz.*

1 gallon of gall and logwood liquor as in No. 58—3 lbs. gum—7 oz. sulphate of copper—2 oz. alum— $\frac{1}{2}$ lb. nitrate of iron at 108° .

No. 60. Black; Calico, for Washing off.—*Communicated. Russian.*

4 gallons iron liquor—3 quarts vinegar—2 gallons logwood liquor at 12° — $\frac{3}{4}$ lb. acetate of copper—6 lbs. starch—3 lbs. gum substitute— $\frac{1}{2}$ lb. oil.

No. 61. Black for Warwick's Green.—*Communicated. Russian.*

1 gallon logwood liquor at 13° —1 quart strong red liquor—1 quart vinegar—3 quarts iron liquor at 15° —2 lbs. starch—8 oz. spermaceti— $\frac{1}{2}$ pint oil—1 pint turpentine.

No. 62. Black for Chroming.—*Communicated. Russian.*

1 gallon logwood liquor at 13° — $\frac{1}{2}$ gallon red liquor at 12° — $\frac{1}{2}$ gallon catechu liquor at $2\frac{1}{2}$ lbs. per gallon—3 oz. acetate of copper— $2\frac{1}{2}$ lbs. starch—1 pint oil—6 lbs. proto-nitrate of iron.

No. 63. Black for Padding for Logwood.—*Communicated. Russian.*

90 gallons red liquor at 10° —18 gallons acetate of iron at 10° —12 gallons water.

No. 64. Black for Calico.—*Communicated. Russian.*

3 gallons logwood liquor at 13° —2 gallons red liquor at 13°
— $1\frac{1}{2}$ gallons catechu liquor— $\frac{1}{2}$ lb. acetate of copper—11 lbs.
starch— $\frac{1}{2}$ lb. oil—6 lbs. protonitrate of iron at 52° .

No. 65. Black Outline for Delaines.—*Communicated. Russian.*

4 gallons logwood liquor at 15° — $4\frac{1}{2}$ lbs. starch—6 lbs.
gum substitute— $\frac{1}{2}$ lb. tallow or other fat—1 lb. alum—2 lbs.
acetate of copper below; boil and add—9 oz. acetate of indigo
—6 lbs. neutral nitrate of iron.

No. 66. Acetate of Copper for No. 65.

1 gallon boiling water— $2\frac{1}{4}$ lbs. sulphate of copper— $2\frac{1}{4}$
lbs. acetate of lead.

No. 67. Acetate of Indigo for No. 65.

$\frac{1}{2}$ lb. indigo in powder—2 lbs. fuming sulphuric acid; leave
forty-eight hours, and add 6 lbs. of acetate of lead dissolved
in $1\frac{1}{2}$ gallons of hot water.

No. 68. Black Spermaceti for Turkey Red.

Communicated. English.

5 quarts logwood liquor at 12° —6 quarts red liquor at 16° —
2 quarts acetic acid at 8° — $3\frac{1}{2}$ oz. yellow prussiate of potash
—28 oz. starch; boil, and when cooled to 130° , add 1 pint
olive oil—1 pint turpentine—10 oz. spermaceti heated to-
gether, and lastly 1 pint nitrate of iron at 80° .

No. 69. Black for Turkey Red.—*Communicated. English.*

1 gallon logwood liquor at 4° —2 lbs. prussiate of potash—
1 quart tragacanth gum water—2 lbs. flour—2 quarts iron
liquor at 30° ; boil, cool to 110° , and add $\frac{1}{2}$ pint nitrate of
iron at 80° .

No. 70. Black for Garancine. Block; for Handkerchiefs.

Communicated. Russian.

$3\frac{1}{2}$ gallons iron liquor at 11° — $\frac{1}{4}$ lb. sulphate of copper—
 $3\frac{1}{2}$ lb. starch— $\frac{1}{4}$ lb. verdegris,

D

No. 71. Black for Muslins. Steam. Communicated. American.

Prepare the cloth by padding in a hot solution of 2 lb. alum and 14 oz. soda crystals in 1 gallon of water, let stand one night and wash off—15 gallons logwood liquor at 12°—10 gallons water—22 lb. starch; boil, cool to 100° F., and add 1¼ gallons caustic soda at 70°—14 oz. red prussiate of potash.

[*To be continued.*]

7. *Upon a Purple-red Colouring Matter from Cyanogen.*

BY GASTON BONG.

THE red colour which is produced by adding solution of cyanide of potassium to an acid solution of a salt of copper has been noticed by several observers. It is very unstable in the solution where it is formed, being changed by acids, alkalis, cyanide of potassium, and even spontaneously, into a yellow substance. It is carried down with insoluble cyanides, as when acid is added to the solution the cyanide of copper is precipitated, and with it the colouring matter; if this precipitate be treated with sulphuretted hydrogen, it is decomposed and the substance set free. It combines with iron in a similar manner to the cyanides, masking the usual properties of the metal, and forms a stable compound which has been examined by the author. It is prepared as follows:—

Cyanide of potassium is added to an acid solution of copper salt until the red colour first developed is destroyed; a solution of iron salt is then added, which causes an abundant precipitation of Prussian blue, and the supernatant liquid has a deep purple-red colour. To separate the colouring matter from the alkali diluted acid is added, and it is carried down with the cyanide of copper; the whole precipitate, including the Prussian blue, is now boiled with a solution of carbonate of ammonia, in which the substance is soluble. Some cyanide of copper is dissolved at the same time, to separate which the

solution, is again precipitated by acid, and the precipitate treated with sulphureted hydrogen. The colouring matter still contains some ferrocyanic acid, which can be removed after neutralization by means of acetate of lead.

The colouring matter crystallizes in confused crystals; the precipitate formed in its solution by acetate of copper when dried at 212° gave upon analysis—

Carbon.....	24.31
Nitrogen	28.04
Hydrogen.....	1.88
Iron	13.66
Copper.....	17.67
Oxygen.....	14.44
	100.00

These numbers indicate the formula $\text{Fe Cy H}_4 \text{O}_4 \text{Cu}$.

This substance is precipitated by zinc, mercury, and silver salts giving beautiful pink or purple precipitates of remarkable brilliancy, which are soluble in alkalies. Iron salts and lead salts give no precipitate without addition of ammonia, which causes a violet-blue precipitate. The purple-red precipitates, when treated by sulphuretted hydrogen, yield an acid liquid, which undergoes decomposition in the air, especially if warmed, with production of Prussian blue. Neutralized with alkali the acid liquid gives a compound stable in air of a purple colour, very soluble in water, less soluble in alcohol, and insoluble in ether; it has remarkably strong colouring powers.

The colouring matter forms combinations with the prussiates which are very stable, withstanding the action of sulphuric acid, concentrated alkalies, and boiling dilute acids, but are immediately decomposed by chlorine and nitric acid.

If this colouring matter could be produced cheaply, it is probable that its stable nature and strong colouring powers would find profitable employment in industry. It does not dye fibrous matters without metallic mordants; when mordanted they are easily dyed in weak acid solutions.—*Muster Zeitung*, No. 40, 1875.

8. *Sulphur as a Mordant for Aniline Green.*

THE report lately made by Messrs. Schaeffer and Vaucher upon this mordant, necessitates a reference to Mr. C. Lauth's previous papers, which date respectively 15th June, 1872, and 16th April, 1873, and the whole may be found in the August number of the Bulletin of the Industrial Society of Mulhouse for 1875.

The first paper of Mr. Lauth was in a sealed packet deposited on the date given; he says in it that aniline green, which is usually obtained by the action of methyl upon rosaniline, was employed largely in silk and cotton dyeing. Up to that time it had not been much used in woollen dyeing for want of a good method of applying it. He discovered in November, 1871, that if wool was boiled in a mixture of hyposulphite of soda and a salt of zinc it acquired an affinity for aniline green, either alone or combined with picric acid. Some pieces were dyed by this process at Paris, but it was found that the mordanting was very uneven. The first intention was to fix sulphide of zinc upon the wool, this being known to act as a mordant in several cases, and the hyposulphite of soda seemed a proper agent for the purpose, and in fact it was ascertained that zinc was fixed upon the wool.

Upon closer examination he was assured that it was not the sulphide of zinc which was acting as the mordant, and the zinc salt was really useless except for its acidity, for hyposulphite of soda and sulphuric acid alone mordanted the wool better than any other preparation. As sulphur and sulphurous acid are the only results of the action of these bodies, one of these two must be the mordant. He found out that it was the sulphur, and demonstrated that sulphur intimately fixed on wool or combined with it was an excellent mordant for aniline green, and that recently precipitated sulphur was dyed by aniline green; and that shades of greater beauty and intensity were produced than it had been possible to obtain previously.

He believes that this is the first time that sulphur was shewn to be a mordant, and it appeared not inappropriate to recall the fact that in the making of aldehyde green the sulphur in the nascent state acts a very important part, and that there seemed to be some analogy between the two facts.

The specimen was dyed as follows :—

Crystallized aniline green, Poirriers	0·2 grammes.
Water	600 „
Picric acid.....	0·07 „
Acetate of zinc	0·60 „
Hyposulphite of soda	0·60 „

The wool was mordanted with—

Water	600 grammes.
Hyposulphite	3 „
Sulphuric acid	2 „

In the paper of 16th April, 1873, Mr. Lauth describes some modifications which were found necessary in practice. The sulphur gave the wool a peculiar feel; it became soft, lost its elasticity, and was sensibly contracted. To prevent this it is necessary to add a certain amount of alum or salt of zinc, which counteracts effectively this action of the sulphur. It is important that the wool should be quite free from metals, the least trace of which blackens the wool; a treatment with hydrochloric acid avoids this danger.

For dyeing bluish greens no addition is required to the water for dyeing, but for yellower shades obtained by means of picric acid, for example, good results are obtained by using acetate of zinc with the picric acid; the acetate of zinc is slowly decomposed, setting free sufficient acid to develop the yellow; when the yellow is risen, acetate of soda is added, and the green dyes. With acetate of zinc and acetate of soda the dyer can obtain at will all shades, yellowish and bluish, without at all emptying the vessel.

It would be wrong to suppose that any variety of sulphur deposited upon wool would serve as a mordant. Thus, a solution of flowers of sulphur in sulphuret of carbon, or a deposition of sulphur from a poly-sulphide, by means of acid, would only give poor results. The sulphur mordant is insoluble sul-

phur, electro-positive sulphur arising from the decomposition of hyposulphites. The following experiment proves it: when mordanted wool is exhausted with sulphuret of carbon it does not in the least lose its property of attracting aniline green, and on the contrary the wool prepared with this solution (even in a concentrated state) of sulphur in sulphuret of carbon, has no more affinity for the colour than wool which has not been submitted to any preparation.

Messrs. Schaeffer and Vaucher refer to the usual process of dyeing with green on wool, by first using an alkaline liquid, followed by an acid, and state that the result is inferior to Lauth's process. In most manufactories Lauth's process has been modified, but the principle is the same, and it is an operation requiring much care, and it is scarcely necessary to state that whatever vessels are employed must be free from copper or other metals which give coloured sulphurets.

To obtain good results it is important that no more than the necessary amount of sulphur should be deposited upon the wool, when an excess of hyposulphite is used the amount of sulphur fixed is naturally increased, but the shades obtained are dull, the wool contracts and requires a special feel; with proper proportions any desired depth can be obtained.

They found that to avoid unevenness in dyeing, it was preferable to boil the wool for fifteen minutes in the hyposulphite before adding the sulphuric acid; when the process is well conducted the liquor remains quite clear. When the sulphur has been deposited, the wool is washed and then dyed, as described by M. Lauth. The reporters believe they have proved that the sulphuret of zinc plays an important part in Lauth's process, especially in the dyeing, for nearly all the trials which were mordanted in the presence of zinc salts were superior in brightness to those mordanted with sulphur alone, and dyed without addition of a salt of zinc. The zinc salt is useful not only in preventing the softening of the wool in the mordanting, and in yielding acid in the dyeing, to permit the yellow developing, but it gives rise also to a small quantity of sulphuret of zinc, which is

essential for obtaining lively shades. Moreover, they analyzed some samples of merino which had been dyed by this process, and found a perceptible quantity of sulphuret of zinc fixed upon the cloth. They conclude by congratulating the inventor upon the excellent results obtained, and assert that he has proved his priority in a discovery which promises useful applications in printing as well as in dyeing.

9. *British and Foreign Patents, from the Commissioners of Patents Journal, November 16th to December 14th, 1875, inclusive.*

Singeing, Shearing, etc.

4009. AUGUSTE HYACINTHE BLANCHE, of Boulevard Saint-Denis, No. 1, at Paris, manufacturer, for an invention of "Improved machinery or apparatus for singeing woven fabrics."—Dated 18th November, 1875.—Provisional protection has been granted for this patent.
- 107,368. HUGOT, for "Emery or other hard cylinders or bodies for removing the felt from dried fabrics."—Dated 1st May, 1875.—French patent.
- 107,838. MANGIN and MONNOT, for "Improvements in shearing machines."—Dated 27th April, 1875.—French patent.
- 38,112. J. MONKS, a patent of improvement for "Improvements in shaving or shearing machines, &c."—Dated 27th October, 1875.—(Original patent, 7th May, 1875.)—Belgian patent.—See also French patent, No. 107,935; and English patent, 6th November, 1874.

Bleaching.

3954. THOMAS FLETCHER, of Newton, Hyde, in the county of Chester, for an invention of "Improvements in apparatus employed for bleaching cotton or other fibrous substances or fabrics."—Dated 13th November, 1875.—Provisional protection has been granted for this patent.
- 2918.—ALEXANDER MELVILLE CLARK, of 53, Chancery Lane,

in the county of Middlesex, patent agent, "An improvement in bleaching vegetable fibrous substances."—A communication to him from abroad by Charles Louis Joseph Coinsin-Bordat, of Paris, France.—Notice to proceed has been given.

107,185. SCHULTZ, of Rouen, for "Improvements in bleaching cotton fabrics."—Dated 1st April, 1875.—French patent; probably the same as the English patent No. 499, to Thomas Holliday, which see.

99,066. MICHEL, for "Improvements in firing bucking-apparatus, &c."—Dated 7th April, 1875.—Certificate of addition to French patent.

107,701. LECLERC, of Paris, for "A liquid called 'Panama spirit,' for cleaning and scouring fabrics."—Dated 21st April, 1875.—French patent.

107,280. PLANEAU, for "A cold process for obtaining concentrated bleaching liquid."—Dated 17th March, 1875.—French patent.

107,906. ROUSSEAU, of Paris, for "Bleaching and decolouring animal substances, silk, wool, hair, feathers, and down, by using ozone and oxygenated water, obtained by electricity."—Dated 1st May, 1875.—French patent.

108,018. COINSIN-BORDAT, for "A process of bleaching vegetable substances."—Dated 13th May, 1875.—French patent.

Drying.

4141. C. HAUBOLD, of Chemnitz, for "Improvements in centrifugal drying machines."—5 years.—Dated 17th August, 1875.—Saxon patent.

106,993. BIEN, of Sedan, for "A machine for drying cloth rolled on an horizontal cylinder."—Dated 25th March, 1875.—French patent.

100,288. MOISON, for "A machine for drying stuffs, thread, and textile substances."—Dated 11th May, 1875.—Certificate of addition to French patent.

Dyeing, Printing, and Staining.

3095. THOMAS HENRY REES, of Hexford Villa, New Barnet,

- in the county of Hertford, "An improved method of producing raised or sunken designs on sheet metal."—Notice to proceed has been given.
4177. MARK FRENCH ANDERSON, Licentiate Royal College of Physicians, Edinburgh, and Member of the Royal College of Surgeons, England, of 15, Priory Row, in the city of Coventry, and ALEXANDER ROTHERHAM, silk dyer, of Spon Street, in the city of Coventry, for an invention of "Improvements in dyeing silk and cotton, and in preparing silk and cotton for the manufacture of ribbons and for other purposes."—Dated 2nd December, 1875.
- 87,540. GRISON, for "Dyeing cloth and other material with mixed animal and vegetable substances."—Dated 10th May, 1875.—Certificate of addition to French patent.
- 105,528. GRISON, for "Dyeing stuff for fulling."—Dated 10th May, 1875.—Certificate of addition to French patent.
- 107,243. LEROCHER and SON, for "Obtaining stripes of different colour on stuffs dyed in pieces."—Dated 5th April, 1875.—French patent.
- 107,781. VAUTIER, for "Obtaining dyed stripes of various colours on presspoint and gauze."—Dated 8th May, 1875.—French patent.
- 107,146. PETITDIDIER, for "Dyeing silk fabrics."—Dated 10th March, 1875.—Probably the same as the English patent, No. 1094, 25th March, 1875, to the same name.—French patent.
- 108,034. MILLE, of Amiens, for "A dyeing machine with a continuous alternate motion."—Dated 11th May, 1875.
- 108,156. DUCOSTE, of Bordeaux, for "Colouring benzine and and mineral volatile oils for dyeing."—Dated 7th June, 1875.
4137. F. BARTELS and Dr. FREISE, of Gottingen, for "A new dyeing process."—5 years.—Dated 31st August, 1875.—Saxon patent.
- 168,991. JAMES HARLEY, of Lowell, Mass., for "Dyeing and calico printing."—Application filed 30th September, 1875.—American patent.

108,013. ANDRÉ and GANTILLON, for "A photo-galvanoplastic process for engraving plates and rollers for printing stuffs."—Dated 11th May, 1875,—French patent.

The following Patents have become void.

3545. AUGUSTE CHIFFRAY, of Maromme, department of Seine Inférieure, in the republic of France, merchant, for an invention of "An improved system of printing at the same time one or more colours on both sides of a cloth, and to produce simultaneously some ribs squaring with those colours."—Dated 26th November, 1872.

3616. JOHN CARTER RAMSDEN, of Smith House, Lightcliffe, in the parish of Halifax, in the county of York, manufacturer, and JAMES MARSLAND TANKARD, of Bowling Hall, Bradford, in the county aforesaid, worsted spinner, for an invention of "A new and improved method of and apparatus for staining or dyeing velvets and all other woven fabrics and for producing designs and figures thereon."—Dated 30th November, 1872.

3620. JOHN CARTER RAMSDEN, of Smith House, Lightcliffe, in the parish of Halifax, in the County of York, manufacturer, and JAMES MARSLAND TANKARD, of Bowling Hall, Bradford, in the county aforesaid, worsted spinner, for an invention of "New and improved methods or processes of and apparatus for staining or dyeing fibrous filaments when in the raw or when in a partly prepared state."—Dated 2nd December, 1872.

Colouring Matters.

2713. JOHN AUCHINVOLE, of Glasgow, in the county of Lanark, North Britain, merchant, for "Improvements in recovering surplus indigo from textile materials or fabrics."—A communication to him from abroad by Camille Bouhon, residing at Ensival, in Belgium.—Notice to proceed has been given.

4138. ALEXANDER MELVILLE CLARK, of 53, Chancery Lane, in the county of Middlesex, patent agent, for an inven-

tion of "Improved processes for the manufacture of artificial purpurine and other colouring matters, together with the application of such products."—A communication to him from abroad by William Jules Samuel Grawitz, of Paris, France.—Dated 29th November, 1875.

4208. GEORGE HILL UNDERWOOD, of Manchester, in the county of Lancaster, for an invention of "Improvements in the treatment of indigo for dyeing and printing.—Dated 6th December, 1875.
78. J. NOWAK, of Carolinenthal for "Obtaining the fine dye quercitrine from the raw quercitron-bark."—3 years.—(Secret.)—Dated 6th June, 1875.—Austrian patent.
- 105,130. GRAWITZ, for "Producing aniline black on tissues, &c."—Dated 29th April, 1875.—French patent.

Notice of Application has been given for Leave to bring in a Bill to continue and confirm &c., in Parliament, Session, 1876.

1802. SMITH'S Patent for "Improvements in the extraction of indigo and other similar substances from plants containing such substances."—Dated 15th June, 1872.

Water Purification.

2521. CHARLTON JAMES WOLLASTON, of 65, Westbourne Park Road, in the county of Middlesex, for "Improvements in the purification and decolorization of dye waters and waters which have been employed in washing lead minerals."—Notice to proceed has been given.
- 105,988. HENRY, for "A continuous apparatus for removing lime from water for industrial purposes."—Dated 25th March, 1875.—French patent.

Steaming.

117. C. THIERRY-MIEG, of Paris, for "Improvements in steaming, dyed, painted, or printed fabrics, being a new method of fixing and developing colours on tissues."—1 year.—Dated 24th May, 1875.—Italian patent.

109. C. THIERRY-MIEG, of Paris, for "Fixing colours on tissues, or improvements in steaming dyed or printed fabrics."—1 year.—(Secret.)—Dated 11th June, 1875.—Austrian patent.—Probably the same as the English patent to CLARK, No. 1587, 29th April, 1875, which see; also patented in France.
- 106,687. THIERRY-MIEG, for "Improvements in steaming prints."—Dated 26th April, 1875.—Certificate of addition to French patent.
- 107,890. CORDILLOT and MATHER, for "Improvements in apparatus for steaming prints."—Dated 1st May, 1875.—French patent.—(English patent, 9th February, 1875.)

Silk Treatment.

- 107,171. GILLET and Son, for "Means of increasing the gloss and softness to the touch of dyed silks."—Dated 19th March, 1875.—French patent.
- 102,560. FABRE, for "A machine for singeing silk stuff."—Dated 23rd March, 1875.—French patent.
- 169,377. WM. H. SEAMAN, of New York, N.Y., for "Processes for testing the purity of dye in black silk thread or fabrics."—Application filed 4th August, 1875.—American patent.

Brief.—"The silk to be tested is immersed in a liquid consisting of a saturated solution of oxalic acid, to which a portion of hydrochloric acid and camphor may be added. The dye is discharged from the fabric or thread in a degree proportionate to its purity, leaving the material paler in colour. The depth of colour in liquid and the colour of material after immersion are indicative of the purity of the dye."

Claim.—"The process of treating black silk thread and fabric by immersion in a chemical liquid of which oxalic acid is the base, as herein described, for the purpose of ascertaining the purity of the dye, as set forth."

Yarns, Hanks, &c.

3379. ROBERT FERGUSON, of the city of Manchester, thread manufacturer, for "Improvements in machinery or apparatus for applying size and colour to yarns or threads."—Notice to proceed has been given.
3979. GEORGE PATON, of the firm of Paton, Cook, and

Company, of Glengarnock, in the county of Ayr, North Britain, for an invention of "Improvements in dyeing and dressing or sizing and otherwise preparing warp yarns, and in apparatus therefor."—Dated 16th November, 1875.—Provisional protection has been granted.

168,932. JAS. SHORT, of New Brunswick, N.J., for "Yarn-printing machines."—Application filed 13th March, 1875.—American patent.

Brief.—"The yarn is wound upon the drum, when the car carrying the printing-wheel is automatically moved transversely to it."

Patent which has become Void.

3597. JOHN WILKINSON, the younger, SAMUEL FILLINGHAM, and JAMES PARDOE, all of St. Helen's Mills, Leeds, in the county of York, and WILLIAM GLOVER, of Balne Lane Mills, Wakefield, in the said county, Manager, for an invention of "Improvements in machinery or apparatus for scouring, preparing for printing, bleaching, cleansing, and drying worsted, woollen, or other yarns, and for beaming or winding the yarns on to bobbins."—Dated 29th November, 1872.

Treatments of Wool.

2480. EDWARD THOMAS HUGHES, of the firm of Hughes and Son, patent agents, 123, Chancery Lane, London, "Improvements in machinery or apparatus for washing and scouring wool."—A communication to him from abroad by Victor Weiss, of Langensalza, Prussia.—Notice to proceed has been given.

2587. JOSEPH JEFFERSON, CORNELIUS JEFFERSON, LAZARUS JEFFERSON, and MORDECAI JEFFERSON, all of Bradford, in the county of York, machine makers and iron and brass founders, "Improvements in machinery for washing wool and other fibres."—Notice to proceed has been given.

4088. EDWIN POWLEY ALEXANDER, of 14, Southampton Buildings, in the county of Middlesex, consulting engineer and patent agent, for an invention of "A new or im-

- proved mode or method of and apparatus for effecting the carbonization of vegetable materials contained in wool, woollen rags, or other animal substances."—A communication to him from abroad, by Daniel Michel, of Paris, in the republic of France, woollen waste manufacturer.—Dated 25th November, 1875.
4168. ALFRED FORD, of 19, Blandford Square, in the county of Middlesex, gentleman, for an invention of "Improvements in the method of cleansing wool and of recovering the products.—Dated 2nd December, 1875.
- 4211.—WILLIAM SHAW NICHOLS, of Globe Mills, Manningham, Bradford, in the county of York, engineer, for an invention of "Improvements in machinery or apparatus for scouring or washing wool or other fibres."—Dated 6th December, 1875.
- 102,319. CAMINADI, sen. SON, for "Apparatus and chemical agents for trying and sifting woollen rags, disaggregating vegetable substances, cleansing wool, and dyeing, &c."—Dated 24th February, 1875.—French patent.
- 107,045. RAULIN, of Paris, for "A chemical process of destroying vegetable substances in wool by means of liquids and gases, and especially of hydrochloric acid."—Dated 1st March, 1875.—French patent.
- 107,115. VAN HAECHT, for "Utilizing the magma or residues of wool-suds."—Dated 5th March, 1875.—French patent.
- 107,297. DAUDIER, sen. and jun., for "Cleansing stuffs by means of an oleic agent."—Dated 18th, March, 1875.—French patent.
- 107,297. DAUDIER, sen. and jun., for "Oleic cleansing of wool."—Dated 12th April, 1875.—Certificate of addition to preceding patent.
- 107,317. RAULIN, of Paris, for "Treatment of wool when liquids and gases are used chemically for cleansing."—Dated 18th March, 1875.—French patent.
- 107,366. GROSSELIN, sen. and jun., of Sedan, for "A double-action machine for teasing and smoothing woollen and cotton stuff."—Dated 28th April, 1875.—French patent.

- 107,560. CHAUDET, of Rouen, for "A combination of known machines for cleansing wool."—Dated 10th May, 1875." French patent.
- 107,615. TROTRY-LATOUCHE, Brothers, for "A machine for unburrring wool."—Dated 10th April, 1875.—French patent.
- 108,021.—DAUDIER, sen. and jun., for "Cleaning wool by dry steam."—Dated 11th May, 1875.—French patent.
- 108,153. CLOUGH, for "Improvements in apparatus employed for washing and cleansing wool and other fibres."—Dated 24th May, 1873.—(English patent, 30th November, 1874.)—French patent.

Paper, &c.

4134. JAMES HUMMERSTON, of Leeds, in the county of York, for an invention of "Improvements in machinery for printing on paper, floor-cloths, and woollen or other woven or felted fabrics."—Dated 29th November, 1875.
- 107,329. DESHAYS, of Rouen, for "A machine for bronzing and powdering printed and wall paper."—Dated 23rd April, 1875.—French patent.
- 107,527. CHOULIAC, of Paris, for "A guide-ruler for printing oil-cloth."—Dated 7th April, 1875.—French patent.

Finishing Processes.

3889. JAMES WALKER TATTERSFIELD, of the firm of George Tattersfield and Co., of Dewsbury, in the county of York, for the invention of "Improvements in machinery or apparatus for finishing woven fabrics."—Provisional protection has been granted.
4062. JAMES SMITH, of Oldham, in the county of Lancaster, for an invention of "Improvements in apparatus for plaiting fabrics."—Dated 23rd November, 1875.—Provisional protection has been granted.
4243. DANIEL NICKOLS, of Manchester, in the county of Lancaster, engineer, for an invention of "Improvements in machinery for plaiting fabrics."—Dated 8th December, 1875.

4108. To THOMAS BENJAMIN WILLANS, of Vale Mills, Rochdale, in the county of Lancaster, for the invention of "Improvements in finishing woollen fabrics and in apparatus therefor."—Provisional protection has been granted.

104,423. TORLOTIN, for "Size for thread and tissues."—Dated 13th March, 1875.—French patent.

107,055. BECK, sen., Son, for "Modifications in the construction of machines employed for glossing stuffs."—Dated 19th March, 1875.—French patent.

107,423. BERTIER, for "A machine for bronzing gilt and silvered paper, for smothering fancy paper, and for glossing tissues."—Dated 26th March, 1875.—French patent.

107,434. FROMM, for "An apparatus for damping fabrics for printing and dressing."—Dated 26th March, 1875.—French patent.

107,435. GARNIER, for "A process for dressing tissues."—Dated 27th March, 1875.—French patent.

107,445. MARCADIER, for "A tenter for tissues."—Dated 30th March, 1875.—French patent.

107,477. MARTIN, of Lyons, for "Improvements in machine for dressing stuff."—Dated 27th April, 1875.—French patent.

107,544. PIERRON and DEHAITRE, for "An apparatus for damping fabrics for dressing."—Dated 5th April, 1875.—French patent.

107,763. FOURNIER, of Sedan, for "A carriage for tenting cloth."—Dated 18th May, 1875.—French patent.

169,054. LEOPOLD STERNBERGER, of Philadelphia, Pa., for "Starching machines."—Application filed 10th July, 1875.—American patent.

Brief.—"Two rollers revolve in a suitable frame, the lower one being longer than the upper one, and having a groove at each end. The journals of the rollers have their bearings outside of the frame."

107,938. PALMER, for "Improvements in apparatus for tenting, drawing, drying, and finishing cloth and other stuff."—Dated 3rd May, 1875.—French patent.

108,010. RHODES, SCHILLITO, and SPEED, for "Improvements in finishing woollen, yarn, and other filamentous substances."—Dated 11th May, 1875.—French patent.

108,027. JURIE, of Paris, for "A mechanical and capillary process of finishing or sizing tissues."—Dated 12th May, 1875.—French patent.

3836. WILLIAM WALTON URQUHART and JOSEPH LINDSAY, of Dundee, in the county of Forfar, North Britain, engineers, for an invention of "Improvements in machinery or apparatus for calendering, mangling, or finishing woven fabrics."—Dated 18th December, 1872.—The stamp duty of £50 has been paid upon this patent.

Abstracts from complete Specifications of Patents.

[These abstracts are confined to patents for which application was made in the year 1875; the full titles of all patents connected with colouring sealed in the year 1875 will be found in the next number of the Textile Colourist. These abstracts will be continued as the specifications appear, and it is further intended to give condensed abstracts of patents dating from 1866, unless the Commissioners of Patents should publish a third volume of Abridgements.]

Bleaching.—Schultz's patent, No. 499, communicated to Holliday, is for bleaching cotton goods without the use of caustic lime. The fabric to be bleached, after being wetted, is submitted to the action of a weak solution of an acid, say hydrochloric acid at 2° Beaumé (about 3½° Twaddle). It is then afterwards washed with water and boiled in a liquor containing soap, preferably resin soap, and then in some cases again boiled with soda or potash and washed. The fabric is submitted to the action of chloride of lime and sours in the ordinary way. "By these means," says the patentee,

“the use of lime is rendered unnecessary, and the formation of lime soap is thereby avoided, but the various after processes herein referred to may be considerably varied.”

Bleaching.—Wirth's communication from Van Baerle, No. 1382, is for bleaching various fibrous substances, as “flax, hemp, jute, cotton as fibre, yarn, cloth or in the crude state.” The process, which is described in rather imperfect English, consists in leaving the articles to steep in a cold solution of silicate of soda; if the strength of the silicate be 1° B. three days' steeping is required, but if the strength be 5° B. twenty-four hours' time suffices. After steeping, the excess of silicate is pressed out, the material washed with cold water, and placed in a weak solution of chloride of lime or bleaching powder. The patentee declares “it will be seen that the thus treated material bleaches much quicker, and is rendered more beautiful without that the fibre is attached (*sic*) as much as with the processes hitherto known.”

Designs.—Guerin's communication to Clark, No. 707, is for enlarging or reducing designs. The design to be enlarged is drawn on a circular sheet of india-rubber, thickened around its circumference to form a beaded edge, which is firmly clamped between two metal rings, forming a circular frame. The point in the apparatus is in uniformly stretching the india-rubber sheet, by which correct reductions or enlargements can be obtained.

Steaming.—Cordillot and Mathers' patent for steaming, No. 479, is applicable to that class of colours which do not require high steam, and it is of what may be called the semi-continuous sort. The steaming chamber is fixed, with a curved steam-chest roof, and the drawing shews six waggons in it, running on rails, having their entrance and exit on opposite sides. The goods to be steamed are fed into the chamber over a feed roller, and two small guide rollers, at full width, the piece traverses the chamber two or three times, and is then deposited as it may fall into one of the waggons; when the waggon is full both end doors are opened, and by introducing another waggon the full one is propelled a step further and the filling is resumed in another, and so on until

the first waggon has been sufficiently long in the steam, when it is expelled by the exit door, an empty one being introduced at the entrance door, and so on. The point here is, that it is found that some styles can be safely steamed in a heap (alizarine styles), provided they are thoroughly hot before heaping and not too densely heaped, and these conditions are fulfilled by passing the goods through a considerable space in a steam atmosphere before they fall into the waggon, and not having the waggons too large. The danger from drops of condensed water is guarded against by having all the rollers heated, &c.: provision is made for saturating the steam with moisture before it enters the closed chamber.

Felted Fabrics.—Tavernier and Matheson's patent, No. 361, is for a method of obtaining mixed colours by combining naturally dark coloured wool with light coloured wool, and when felted dyed in any suitable manner. Supposing it is dyed red, then the black or dark coloured wools not being affected by the red dye, remain black or dark coloured, and the light coloured wool becomes red, forming a black and red mixture without the necessity of two separate dyeings before felting, as was hitherto the case.

Finishing.—Gartside and Bradbury's patent, No. 2492 refers to what is sometimes known as the Irish beetle, that is, where the cloth or fabric to be finished is wound on a roller or cylinder, and it relates to the fallers and "consists in various improved arrangements and combinations of wrought-iron or Bessemer steel and anti-concussion materials, in order to prevent the excessive wear and tear of the fallers, and to enable them to resist the usual breaking action caused by the incessant concussion when in use." The construction of the improved faller cannot be explained without drawings further than to say, that it is composed of two wrought-iron (or Bessemer steel) straps, welded or cast at the bottom, and forming an angle-joint at top, these are filled in with wooden blocks, and between the bent-in end of the tops of the bars, and the upper clamp there is a piece of leather, india-rubber, or other anti-concussion material.

Floor-cloth Printing.—Nairn's patent, No. 35, is for pre-

paring floor-cloths for printing, and consists in an arrangement of apparatus to facilitate the trowelling, or applying paint to the surface of the cloth, and the subsequent rubbing and drying of such cloth. The cloth is drawn off a roller through colour, and passes under a straight-edge, or doctor, which causes it to receive an even coating of the pigment, the cloth is then carried forward by endless chains provided with clips and hooks. When dried, the cloths are rubbed down with pumice-stone or other suitable rubbers, either by hand or machinery. Details can only be described in conjunction with the drawings.

Flocking.—Rhodes' patent, No. 16, is for an apparatus by which a more uniform distribution of the flocks is obtained in the "milling machine;" the "confining spout" is made shorter, and the distance from it to the "throat" enclosed so as to keep the fabric warm; there are also various modifications in the distributing apparatus.

Finishing.—Laycock's patent, No. 572.—No full specification was lodged of this patent, and it is therefore void; the patentee employed the milling machine for stiffening and staining; for stiffening he employed flour, which may be thrown on to the material either in the dry or wet state.

Colouring Matter.—Holliday's patent, No. 1031, is for obtaining colouring matter by heating chlorinated or brominated anthrachinon with strong sulphuric acid, until the compound obtained is soluble in water. "One part of chlorinated or brominated anthrachinon, or a mixture of them is heated in an enamelled iron or other suitable vessel with about four times its weight of fuming sulphuric acid for two or three hours, at a temperature of about 250° C., until a little taken out and added to water shews no precipitate. After letting the mixture cool, it is poured into about forty times its weight of water, then neutralized with lime and boiled. The clear liquor is separated, and carbonate of soda or potash added to it till no more lime precipitates, it is then filtered or decanted, and the filtrate evaporated to about 20° Baumé. The product obtained is then mixed with about one and a half times its weight of dry caustic soda in a pan, in which it is agitated and

heated to a temperature from 190° to 215° Centigrade for three or four days, or until such time as it is judged by frequently taking out samples therefrom, that the greatest quantity of colouring matter has been formed. The mass is then dissolved in water and precipitated by an acid, such as sulphuric and muriatic, and then filtered; and the precipitate, after being well washed with water, constitutes a colouring matter suitable for dyeing and printing."

Silk Dyeing.—Petitdidier, in his patent, No. 1064, states that silk tissue loses its elasticity and crispness if moistened with water, and he proposes to banish water from silk dyeing altogether, employing instead either alcohol, benzine, spirit of turpentine, sulphuret of carbon, ether, or wood spirit, as the vehicle for dyeing. As the mineral mordants formerly used in silk dyeing will not dissolve in these fluids, he takes a mordant composed of 6 lbs. resin and 3½ oz. stearic acid dissolved in about 7 pints of benzine. The silk is padded in the dye-stuff, steamed, and then washed off three times in benzine.

Oxidized Fatty Matters.—Gatty's patent, No. 124, is for preparing fatty matters to use instead of oil in Turkey-red dyeing, and the fatty matters produced are called oxidized fatty acids. Soap is dissolved in water, and solution of chloride of lime added until the fatty matter is precipitated; 10 to 12 gallons of chloride of lime, at 12° Twaddle, are sufficient for one hundredweight of good soap. After some hours the precipitate is collected on a filter, and then boiled with muriatic acid; the liberated fatty acids are washed with water, and are fit for application as a substitute for oil in "different processes of dyeing and printing Turkey-reds and other colours on cotton fabrics and yarns, in which fatty acids are combined with alumina as is well understood by dyers and printers."

Indigo as Steam Colour.—Holliday's patent, No 498, is for a steam colour from reduced indigo and oxide of tin. The indigo is reduced to indigo white by any of the known processes, the paste is then mixed with gum and oxide of tin, the quantity of the latter depending upon the percentage of pure indigo present; for 10 parts pure indigo in the paste

add 1 part oxide of tin and gum water to shade required. Salts of tin with alkali may also be used, but the oxide of tin produced by precipitating tin crystals with carbonate of soda is preferred. After printing, the cloth is steamed for a sufficient length of time, and washed and treated as may be required by colours associated with it. The patentee concludes, "what I claim is the fixing of indigo on cotton and other fabrics by the action of steam on a combination or mixture of oxide of tin and indigo white, substantially, as described."

Bronzing.—Thackrah's patent, No. 608, is more directly applicable to those fabrics having a piled or fibrous surface, and which have been previously dyed in the ordinary manner. The process consists in first treating with a solution of tannic acid, then a bath of picric acid, thirdly in a bath composed of nitrate of tin and muriate of copper, and lastly "boiled in a solution of aniline of sufficient strength to give body or tone to the colour which, when dry, presents a metallic or bronzed appearance."

Purification of Colouring Matters.—Versmann's patent, No. 1038, is for the use of bisulphide of carbon or petroleum spirit of sp. gr. 700 to 720, for extracting phosphine from the crude aniline dye, commonly called the melt, or from any bye-products, residues, or refuse, resulting from the manufacture of rosaniline. The patentee does not claim any particular form of apparatus for treating the melt, but gives a description of one which may be used without confining himself to that particular form, and employs the liquids under ordinary circumstances, or under pressure with or without the aid of heat. He states that these fluids separate the phosphine and some of the resinous impurities of the melt, but do not dissolve any sensible quantity of red colouring matters, which have to be separated from the original material in the usual manner.

Finishing.—Mitchell's patent, No. 1019, is for stretching calico in length, and is intended to compensate for the taking up of the warp in weaving. The improved machine consists chiefly of two or more series of roughened rollers, over and under which the cloth is caused to pass, and as the second

series of rollers is driven rather faster than the first, and the third (if more than two) rather faster than the second, and so on, the cloth is pulled and stretched in the direction of its length as it passes through the machine.

Finishing.—Stark's patent, No. 370, for breadthening and drying woven fabrics, does not seem to have any novelty in the parts, being accomplished by well known methods, but there is a combination of the grooved rollers and the drying machine which seems new and ingenious, and which is said to render the breadthening more effective and permanent than when not used in conjunction. The description and drawings claim and shew the use of "counterpart circularly grooved rollers, the ridges of which enter more or less into each other's grooves" placed in the frames of the drying tins; or the grooved rollers may be themselves hollow and heated by steam. The point of the whole is that the breadthening takes effect on the fabric when it is in the proper state of moisture, neither too wet nor too dry, and the subsequent complete drying prevents it going back.

MISCELLANEOUS.

Defects of the Printing Machine.—In a report made to the Industrial Society of Mulhouse, 9th June, 1875, M. Camille Koechlin makes the following observations: When cloth passes between a lapped cylinder and an engraved metal roller charged with colour, it receives by the pressure an imprint of the single colour. If cloth thus impressed passes on without any intermediate drying a second time between similar cylinders, in order to receive another colour, this second passage crushes the colour from the first roller, and produces what is called *laminage* (lamination or splitting).

This lamination is not confined to the effect of a simple crushing or forcing the colour into the fibre at the expense of

the tissue, but at the same time there is a division of the colour between the surface of the metal and the cloth, and the plain parts of the second roller take colour from the cloth, and are actually printed with an impression of the first roller. What becomes of this colour, torn, so to speak, from the cloth? The revolution of the roller carries it into the colour box; and there what is not rubbed off by the furnisher is caught by the doctor, and in reality mixes with the colour which ought to be free from it. In order to appreciate the importance of this fact, suppose the first colour is black and the second pink, the black on the cloth marks off upon the pink roller in a continuous manner, so that after a while the pink is so injured as to be no further usable.

This defect occurs not only in the case of visible colours, but is felt in other cases less perceptible to sight, where the compositions are of a nature to coagulate one another, cause precipitations, or otherwise neutralize or destroy one another, and is repeated for every roller of the pattern, however many there may be.

In the present arrangement of machines, printing several colours, there are therefore two serious inconveniences; the crushing and consequent impoverishing of an impression and the mixing of different colours.

To guard against the loss of effect by crushing, it is necessary to make the colours stronger than they would otherwise be required, and this to an extent of 50 per cent.

To palliate the injury of colours by one working into the other, they should be arranged in the order of their sensitiveness, but this is not always practicable, and for several years past recourse has been had to the intervention of plain rollers upon which the cloth could mark off its excess of colour one or more times.

These intermediate cylinders, called gum-rollers (in French water-rollers), practically diminish the size of the machine by taking the place of engraved rollers.

Their adoption consequently necessitates the use of larger machines. The gum or water-roller may be made of any non-oxidizable metal provided it is of the same size as the

engraved rollers it is required to work with. These rollers were used in 1864, at Koechlin Frères, by M. Assenmacher.

Although the present printing machine is the most advantageous in every respect for quickness and accuracy of impression, the inconveniences above-noted are so serious, and the remedies so costly and imperfect, that the Society has instituted a prize, with the sole aim of removing them, at the risk of seeming to ask for a perfection which is impossible and absurd to expect.

Mordant, or Preparation for Indigo Dyeing.—In the "*Moniteur de la Teinture*," pp. 201, 254, and 261, allusion is made to a secret process of preparing wool and cotton for indigo dyeing, by which 18 per cent. of indigo can be saved, and the dyeing performed in less time than ordinary. The mordant is called "Mordant Schmidt," and the discoverer wishes to dispose of his process to dyers at the rate of £40 sterling per vat, or he will sell his mordant at the price of 7½ francs the kilogramme. He states that supposing indigo to cost 20 francs the kilo., say 6s. 6d. the pound, there will be a saving of more than £4 sterling in dyeing 900 lbs. weight of wool, which can be accomplished in one day in one vat. The specimens of loose wool and of calico in the "*Moniteur*" shew a darker shade in the prepared than on the unprepared specimens, such as might be produced by copper salts, or manganese salts employed by the old methods, and which were at one time thought to require less indigo in dyeing.

Heavy Black.—An advertiser in the *Färber Zeitung* desires to communicate among other receipts the newest process of dyeing silk black to any weight up to 350 per cent. of the raw material.

Marking Ink for Bleachers.—The following is from the *Muster Zeitung*, No. 42, p. 335: one part by weight of cinnabar or vermilion, and one-eighth part of sulphate of iron are intimately mixed, and then ground up with linseed oil; this is the marking composition with which the unbleached goods are stamped. This ink (it is stated) remains unchanged through all chemical bleaching operations.

Caviar as a Substitute for Albumen.—An esteemed Russian

correspondent writes to us that the common yellow yolk caviar (ikra) is now being extensively used as a substitute or assistant for blood albumen. This caviar costs from 80 copecks to 1 rouble for a pood, in the raw state, that is less than one penny per pound, it is ground into a thick paste and used in conjunction with blood albumen in printing; for pigment orange, 2 measures of caviar and 1 measure of blood albumen solution; for pigment green, 2 measures of blood albumen to 1 measure caviar; for aniline purples, equal measures. It works well in the machine and withstands all necessary soaping, in fact, there is no difference between the mixture and pure blood albumen as regards the fastness of the colours. We may add that the possibility of applying the roe of fish as a substitute for albumen had not escaped the attention of chemists, and Leucht obtained the reward of a gold medal from the Industrial Society of Mulhouse, for a paper upon the subject; Cordillot also, in 1863, examined a product sent by Bernard (Bull. de Mulh., xxxiv., 48.) Leucht's paper may be seen in the same journal (xxx., p. 306,) or an abstract in "Le Technologiste," xxii., 22. It was, however, never brought into general use until Mr. W. McCallum, of Shouya, applied it last May, in the shape of caviar; he uses 15 cwt. per month, and it is employed on every works in Russia. An attempt is being made to monopolize the discovery, by a patent, in Russia, which it is hoped will be frustrated.

REVIEWS.

La Teinture Moderne, par Max Singer (Modern Dyeing, by Max Singer). Paris: Lacroix, 1875.

THIS is a bulky volume of 800 pages; and, as the writer declares himself upon the title-page to be the author of a work upon practical dyeing, and to have formerly been

manager of several dyeworks, it was not unreasonable to expect that we should find in it, we will not say anything new, but at least some original writing and practical treatment of the subject of the work. We regret to say that our notice of this book will be confined to the unprofitable and ungracious, but still necessary task of shewing that there is nothing original from the beginning to the end of the volume, that it might have been written by a man who had never been inside of a dyeworks, and that a considerable portion of the matter has only the most distant connection with the art of dyeing.

On the last page of the work the author recommends his readers to peruse the treatises of Dumas, Grison, Van Laer, Girardin, Schützenberger, and one or two other authors, and states that he has himself derived much assistance from these writers in completing his book. This is a saving postscript, which partly disarms criticism by tardy acknowledgment, but it only faintly represents and suggests what is the true state of affairs, and that is that almost the whole book is copied word for word from the writings of these and other authors. It is true that in the Preface the author says he has sought in modern books for anything of interest to the dyer, and that perhaps the matter will not seem new to those who are acquainted with the literature of the subject; but when a practical dyer undertakes to write a book upon dyeing, it should be something more than a mere transfer of unchanged matter from well-known books, and should have something of the man himself in it; if Mr. Max Singer be a practical dyer, it can only be said that he has kept himself carefully outside of his book.

The author plunges boldly into the subject, and commences with a delightful abruptness upon logwood; this is better than a good many writers upon dyeing who prepare us for the art by half-learned disquisitions upon the specific gravity of gases, or the absorptive powers of boxwood charcoal for ammonia; 154 pages are taken up by the description of dye-stuffs, the sources from which drawn will be shewn afterwards.

The next part of the book is upon the chemical agents

employed in dyeing, and fills 310 pages, the applicability of this matter to dyeing will be best illustrated by stating that there are 14 pages upon the manufacture of alum from schists, clay, cryolite, &c.; 17 pages upon the manufacture of soda-ash; 13 pages upon the extraction of sulphur from its ores, and preparation of flowers of sulphur; 41 pages upon the manufacture of artificial ultramarine; 13 pages on the manufacture of nitric acid, and a large part given to the extraction of tin, zinc, antimony, and mercury from their ores; preparation of calomel, composition of manganese ores, &c.; and all without any originality of treatment, and with hardly any reference to dyeing.

Then follows 100 pages upon the products derived from coal, with here and there a few threads of dyed worsted gummed on the page, without the remotest allusion to them in the text, nor any statement that they represent shades to be obtained from the colouring matters of which the manufacture is described with formal verbosity.

There then follow 50 pages upon the adulteration of drugs and dyestuffs, which it is acknowledged are taken from Bolley's work, translated by Gautier, and of which nothing more need therefore be said.

Then come 40 pages of a bald and meagre history of dyeing, and at length we come to practical dyeing, which concludes the book, and occupies 114 pages. We do not accuse M. Max Singer of plagiarism, because at the foot of each process there is a single word as *Dumas*, *Girardin*, *Grison*, which is an acknowledgment of the authorship of the matter; we have referred to all these writers, and find that they have been copied word for word by Max Singer without any attempt at condensation or adaptation. It is little creditable to a practical dyer writing upon his own art that he should transfer without change, and without remark, 22 pages more or less upon mordanting and dyeing from such a book as Girardin's *Leçons de Chimie*, which is an elementary treatise upon the science as well known to French as say Miller's Chemistry is to English readers. The remainder of the 114 pages is taken with similar fidelity from other authors, and

nowhere in them can we find anything which has not been long, some of it forty years, in print.

The section on dyeing materials is to be found every word in Dumas, Schützenberger, and Girardin, with such changes as *Caesalpina echinata* into *Caesalpina echinatos*; the bulk of the section on chemical agents is not taken from any of the books mentioned by the author but may be found in Barreswill and Girard's "Chemie Industrielle" and other books; we do not mean found in general terms, but word for word as in the following extract:

Max Singer, 1875; p. 171.

Dès longtemps, l'ancienne Académie des sciences avait fondé un prix de 2,400 fr. pour la conversion du chlorure de sodium en carbonate de soude. Le premier, le P. Malherbe, en 1777, avait cru posséder la solution industrielle du problème; il proposait de convertir d'abord le sel en sulfate de soude, puis de chauffer celui-ci avec du charbon et du fer. Etc., etc.

Dictionnaire de Chemie Industrielle, 1861; i., p. 213.

Dès longtemps, l'ancienne Académie des sciences avait fondé un prix de 2,400 fr. pour la conversion du chlorure de sodium en carbonate de soude. Le premier le P. Malherbe, en 1777, avait cru posséder la solution industrielle du problème; il proposait de convertir d'abord le sel en sulfate de soude, puis de chauffer celui-ci avec du charbon et du fer. Etc., etc.

And so on for many pages. In the section upon the derivatives of coal the same process of transcription has been adopted (with a too brief acknowledgment), as may be found upon comparing p. 511 of Max Singer with Gautier's translation of Bolley and Kopp, upon the derivatives of coal-tar, p. 161, and following pages.

If we could have found anything at all in this book which is not in older books, we should have been glad to give Mr. Max Singer the proper credit; we have found nothing but an unskilful putting together of old materials by a process which is unworthy even of the name of compilation.

The Dyers' Hand Book, by F. J. Bird.—Manchester: John Heywood. London: Simpkin, Marshall, and Co. 1875.

If the author of this work had confined himself to garment dyeing, we should have simply recommended his production to the useful class of garment dyers, as a cheap and practical collection of receipts and processes; but he has been more ambitious, has been tempted out of his depth, and has not been above conveying the matter of other authors into his book without mentioning their names. The article on bleaching, p. 12, is taken from Crookes, p. 48; and on following pages he has copied verbatim from the same author, who had previously taken his matter from the "Dictionary of Calico Printing," p. 26, and all without any acknowledgment. There is one sentence, however, given by both Bird and Crookes, which is not in their original: "the soap is that made from prepared resin, and having the specific effect of improving the whites during the subsequent process of dyeing." This is, of course, pure nonsense; prepared resin is resin soap and it has nothing to do with improving whites during dyeing. It would, perhaps, scarcely be fair to minutely criticise the language of the receipts and processes given; many of them are perfectly good; we feel quite sure Mr. Bird could dye better colours than the illustrations contained in his book, and have no doubt that altogether it will be very welcome to a large class of readers.
