the most suitable materials originally furnished can make good for any neglect at that stage.

How to mix, to get good sound yarn, is one of the first principles to study when learning the practical end of woolen manufacturing. While a technical education, with reference to being able to distinguish the various textile fibres from each other is desirable, at the same time practical experience, i.e., a knowledge of the properties of fibres in all its sub-varieties, is required of the superintendent. For instance, cotton, as extensively used in the manufacture of these low grade woolens, refers to a fibre which is strong, fine and capable of being spun, if it was used by itself, in a comparatively fine count of a yarn. For this reason a cloth made from it is naturally strong and firm, but unkind in touch and unsuitable for heavy clothing purposes.

In opposition to such a structure, a cloth made from shoddy alone, besides the yarn running bad in carding, spinning, winding, warping and weaving, the resulting cloth would be tender, present a coarse appearance, since shoddy would permit only the spinning of very low counts of yarn; the fabric at the same time would be fairly warm and soft.

The characteristics of these two cloths are totally different, neither being of any value for the purpose desired. Again, either cloth presents valuable features, which if combined with each other will result in a firm, warm, salable fabric. For this reason, the cotton and the shoddy are mixed together at the mixing picker, previously to carding, the latter process being the back bone of successful woolen manufacturing, no matter what class of wooden goods this assertion refers to. The shoddy, mungo or extract used may be short or possibly short and tender, a deficiency which however, is counterbalanced by the strength of the cotton.

As will be readily understood, there are at the same time all the different sub-varieties of each fibre met with in the manufacture of low counts of yarns, for instance, if dealing with an extra hard, harsh feeling cotton, select a soft shoddy, mungo or extract, so as to destroy the harshness of the one material by the softness of that combined with it. The same also refers to the strength of the resulting yarn, and when a strong, fair staple cotton must be used if dealing with mungo as the wool fibre to use with it. A thorough knowledge of mixing can only be obtained by practical experience, for the fact that these low grade materials vary to such extent in quality, etc., amongst themselves, that it is only by handling, testing and experimenting with them, that a knowledge of good mixes can be obtained.

In all cases do not expect too much from shoddy, mungo or extract, since you must remember that these fibres have previously done duty in better classes of wooden goods, and where they must have spent a large percentage of their good properties. For this reason do not spin your yarns a higher count than absolutely required, and wherever such a thing is possible, add a percentage of good wool, noils, wool card waste, etc. Although the cotton could be spun to rather a high count, do not calculate on this, but fix the count of the yarn to be spun to suit the shoddy, mungo or extract used in the mix, relying on the cotton to assist in good work in the card room, the spinning room as well as the weave room, so as to impart to the fabric its required strength. Remember that if overdrawing an inferior mix; the cost of such work will be a most costly experiment to the mill, resulting in bad work in every department of the mill, and at the end prove more expensive than if a better stock had been used.

In connection with these mixes for low grade woolens, a most important item to be taken into consideration by the superintendent, is the amount of waste made in the card room, spinning room, winding and warping department as well as the weave room, for the fact that excessive waste made in these departments (and they work alike—excessive waste in one means excessive waste in all the others) may result in a more expensive fabric than if we would have used a better grade of stock.

For example, if an inferior stock used only produces 90% of what a better stock used will produce, it is rather questionable whether we gained anything by using the cheaper stock. Now if in turn we should see by the reports of the overseers that in connection with the production in the card room there is a difference of say 20%, in the spinning room a difference of say 30% and a similar difference in the weave room, between the two mixes, we are convinced that the ultimate result would be in favor of the better stock.

Do not combine two materials of great disparity in quality, since more satisfactory results are obtained by fibres of closer relation with each other. For example, it will be found a poor judgment on the part of the superintendent to mix a large percentage of inferior shoddy with a small percentage of good wool; he certainly will get more satisfactory results by improving the quality of the shoddy and lowering the quality of the wool, or to put in a larger percentage of a rather lower grade of wool, obtaining in this way a greater uniformity in the component parts of the mix, a more perfect amalgamation of the various fibres, with the result of less waste made.

It has been the writer's experience, while superintendent in a Massachusetts mill running on these low woolen goods, to get along with a very small percentage of wool, in fact, in many instances the same was often conspicuous by its absence, noils, wool waste and chiefly cotton being used in place of it. Cotton and shoddy had been the materials mainly at our disposal, and although the yarn was not as elastic and soft, that if good wool fibre had been used, in place of the cotton, quite as strong and serviceable yarn was produced by our carder, clearly showing that the selection of the proper overseers is a most important item in connection with these low grade woolen yarns.

Mixing the various materials to be used in the manufacture of these yarns requires care on the part of the operator, since an imperfect mixing will produce an endless amount of trouble to the mill. Different ways of mixing are practised by different mills,
however, they all aim at the same final result—to in-
sure a perfect amalgamation of the fibres composing
the mix.

A good plan is to weigh out the different propor-
tions of wool, shoddy and cotton; run the wool through
the mixing picker, i.e., wool picker, oil it, and pick it
again and place it in a pile in one part of the mixing
room. Run the cotton in the same way through the
mixing picker in order to loosen up its matted condi-
tion. Now spread a portion of the wool over as
large an area as possible on the floor, in one section
of the room, place on top of this a similar layer of
shoddy, to be followed in turn by a layer of cotton;
continue to place layers and layers of materials in rotation
quoted until all the stock is used up. The smaller

![Plan showing mixing of three different materials; shown respectively light, medium and dark](image)

the percentage of one of these materials as used in the
mix, the thinner its layers, again we may mix extra
small percentages first separate with a portion of the
larger percentage, using this preparatory mix after-
wards as one of the materials to be used in the final
mix. Try and work the individual lots composing the
mix up as evenly as possible. When the pile is finished,
and the stock is to be fed into the mixing picker, al-
ways break in the pile vertically downward, so as to
put at the same time on the feed apron of the wool
picker, or in its self-feed, part of each layer compos-
ing the pile. Some carders prefer to run the wool in
a dry state through the picker, oiling it afterwards
on the pile when building up the latter. If using cotton
waste and mungo for a mix, as may be the case
with extra low counts and grades of yarns, a similar
process is adopted, the cotton forming the basis for
the blend.

It is very important that the different layers of
the various materials used in the mix are spread evenly
and thinly in the pile, also that the cotton gets as little
oil as possible. It will be advisable to run the mix
at least twice through the mixing picker, three times
will not hurt but only help the amalgamation of the
various kinds of materials used in the mix.

Although our Mainland Cotton forms the bulk of
the cotton used in the manufacture of these fabrics,
it remains for what is known as Rough Peruvian cot-
ton to be well adapted for the manufacture of these
fabrics. This cotton has a strong, rough, woolly,
crinkly staple, about 1½ to 1½ inches long. The by-
name given to this cotton is vegetable wool, for the
fact that its resemblance is so close and its character-
istics so strikingly similar to wool, that it passes, to
the naked eye, as wool and cannot be determined with
any certainty except by using the microscope chemical
tests.

TESTING OF CHEMICALS AND SUPPLIES IN TEX-
TILE MILLS AND DYE WORKS.

General Method of Testing Dyes, Dyestuffs and Colors.

(Continued from page 112.)

Epsom’s Salt: The filtrate from the silver chloride
solution can be tested for magnesium. If magnesium
is found, Epsom’s salt was present.

To test for magnesium in this solution, add hydro-
chloric acid to precipitate the excess of silver nitrate
which was added to estimate the salt that was present.
Filter and save the filtrate for testing for mag-
nesium and the precipitate may be thrown away. To
the filtrate add a little ammonium chloride and am-
monia to alkaline reaction. Then add a solution of
sodium phosphate; if magnesium is present, a white
crystalline precipitate is obtained. This precipitate is
collected on the filter paper and is carefully washed.
The precipitate is then dissolved off the paper with a
few drops of nitric acid. The solution is caught in a
clean, weighed porcelain crucible. Care must be taken
that all the precipitate is dissolved off from the filter.
The solution is then carefully evaporated so that there
will be no splashing. After all the water is evapo-
rated, the crucible is strongly ignited. Magnesium
pyrophosphate remains in the crucible. The num-
erical value of magnesium pyrophosphate (Mg₃P₂O₇) is 222.
The numerical value of anhydrous magnesium
sulphate (MgSO₄) is 120. But it takes two parts of
magnesium sulphate to furnish sufficient mag-
nesium to form one part of magnesium pyrophosphate.
So that for every 222 parts of magnesium pyrophos-
phate formed, there must be 240 parts of magnesium
sulphate present. The quantity of magnesium sul-
phate present can then be estimated from the follow-
ing equation:

\[ 222 : 240 :: x : y \]

\[ y = 240 \times \frac{x}{222} \]

In this equation \( x \) is the weight of the magnesium
pyrophosphate found; \( y \) will then be the weight of
the magnesium sulphate present in the sample taken.
The above formula is always used when the amount of
Epsom’s salts is to be estimated from the amount of
pyromagnesium phosphate obtained; from this the per
cent can be readily calculated. Multiply the weight of
the magnesium sulphate found by 100 and divide it
by the total weight of the dye taken. This will give
the per cent of magnesium sulphate present.

Glauber’s Salt may also be present as an adulter-
ant. To test for and to estimate this, add a warm
solution of barium chloride to a solution of the dye,
which has been made acid with hydrochloric acid.
Barium sulphate is precipitated and barium sulphonate
if organic, sulphon compounds are present. The solu-
tion is filtered. Barium sulphate and sulphonate re-
main on the filter. Wash the filtrate with a solution
of ammonium carbonate. The barium sulphonate is
converted to barium carbonate, while the barium
sulphate is unchanged.

The precipitate on the filter is now treated with a
weak hydrochloric acid solution. The acid dissolves
the barium sulphonate while the barium sulphate is
not acted upon. The barium sulphate is washed with warm distilled water, three or four times. The precipitate is then dried, the precipitate separated from the paper, and placed in the crucible. The filter paper is folded, held over the crucible with a platinum wire and ignited so that the ash will fall into the crucible. A few drops of dilute sulphuric acid are added, the excess of acid is then carefully evaporated to prevent any spitting or splashing, so that there is no loss of precipitate. After the precipitate is dry, it is ignited; the crucible is then placed in a desiccator to cool and then weighed. This gives the weight of the barium sulphate. The numerical value of barium sulphate (BaSO₄) is 233; the numerical value for anhydrous glauber's salt (Na₂SO₄) is 142. From this the following proportion is obtained:

\[
233 : 142 : : x : y
\]
\[y = \frac{142 \times x}{233}\]

Here \(x\) is the weight of the barium sulphate which has been precipitated; \(y\) will therefore be the amount of sodium sulphate which was in the sample. The per cent is easily calculated. Multiply the weight of barium sulphate obtained by 100, then divide the product by the weight of the sample used in making the test.

In testing for Glauber's salt and Epsom's salt, it is best to test with barium chloride. If no precipitate is obtained, both Epsom's salt and Glauber's salt are absent, for each act on barium chloride to form barium sulphate; so that when the weight of barium sulphate is determined, it gives the amount of Glauber's and Epsom's salt present. To find how much of each is present, subtract the amount of magnesium sulphate present, as determined from the magnesium pyrophosphate, from the amount of Glauber's salt present, determined from the barium sulphate. The difference will give approximately the amount of Glauber's salt present. The presence of any Glauber's or Epsom's salt in a dye proves that it has been adulterated.

Carbonates may be present in a dyestuff. These are tested for by adding a few drops of hydrochloric acid to the dye; if carbonates are present, an effervescence or bubbling takes place. The amount of carbonates present can be determined by collecting the gas and measuring its volume.

Dextrine and sugar are sometimes found as adulterants.

Dextrine is estimated by weighing out about two grams of the dye into a weighed beaker with a glass rod. This dye is dissolved in a small amount of water, a little absolute alcohol is added (absolute alcohol is alcohol which contains no water), when the dextrine is precipitated. The dextrine sticks to the glass. The solution is poured out and the beaker glass is washed with small quantities of alcohol until no color remains. The glass is then dried and weighed and the difference in weight is the weight of the dextrine.

Sugar is determined in a similar manner, except that the alcohol used should have in solution as much sugar as it will dissolve, so that it will not dissolve any of the sugar in the dye.

Starch is frequently found in dyes. It is not used as an adulterant, but is used to prevent the dye from absorbing moisture from the air and cakings, because when starch is present, it absorbs the water, without caking. It may be detected by dissolving a small quantity of the dye in water. Allow the solution to stand for a while, then pour off the supernatant liquid. The residue is starch, this is washed with water, the solution allowed to settle and the water is poured off; this operation is continued until there is no color in the wash water. The residue is then tested with a drop of a solution of iodine in alcohol; if starch is present, a blue color is formed where the iodine touches the starch.

It is often desirable to make comparative tests of dyes. Frequently two or more dyes give a similar color and the dyer wishes to compare them, so that he may be guided as to what dye he should use. He will be led in his selection of a dye, by finding out the comparative amounts of dye used, the price of the dye, etc.

Comparative dye testing in case of silk and wool (animal fibres) is carried out in the following manner: A weighed amount of the yarn or fabric is placed in the solution of dye. Two solutions of each of the dyes which are to be compared are made. The quantity of dye used in one solution is one per cent of the weight of the fabric or yarn to be dyed; in the other solution, the amount of dye used is five per cent of the weight of the fabric. The dye is dissolved in the same amount of water, about one quart, and about one ounce of the fabric or yarn is used. The material previously wetted is introduced in the dye bath, which is heated to its boiling point. The material is allowed to remain in the bath thirty minutes, the solution being allowed to boil. The bath at the end of that time is usually exhausted of color; the samples are then taken out, washed and dried, and the shades compared.

To obtain the relative dyeing value of two dyes. The dye solutions are made up of equal strength and equal portions of the materials which are to be dyed and are introduced into the dye baths, the baths being brought to a boiling point. As fast as the dye solution in the dye bath is used up, fresh solution is added until no more dye is absorbed. The difference in the volumes of the dye solution used, shows the relative dyeing value of the dyes.

When the dye is to be tested with cotton goods or yarn, the sample as a rule must undergo some treatment which will cause the dye to penetrate and stick to the fibre. This previous treatment, known as mordanting, may be carried out in the laboratory in the following manner: The cotton, in the form of yarn or fabric, is boiled in water, and then placed in a five per cent solution of tannin, where it is allowed to remain for about twelve hours, after which it is transferred to a bath of tartar emetic. The strength of this solution of tartar emetic is two and a half per cent. It is allowed to boil in this tartar emetic solution for about one-half or three-quarters of an hour. It is then removed, washed with fresh water and dried and is now ready for dyeing.

These tests are for the artificial dyes which occur
in powder form. The natural dyes which occur on the market as extracts, dye woods, etc., must be tested differently. The way to test these is to make comparative test of the woods and extracts.

*(To be continued.)*

**New Dyestuffs.**

The following New Dyes have been lately brought into the market by the Farbenfabriken of Elterfeld Co.:  

**SULPHON ACID BROWN 2 R AND 4 R.** They are wool dyes producing a dark brown, fairly fast to washing and falling when dyed simply acid (direct). They are moreover fast to steaming and stoving, properties which are the best recommendation for colors offered for dyeing fast shades on wool. Both leave white cotton effects in wool pieces perfectly clean. On silk, they yield fine brown shades, although not perfectly fast to water; when dyeing wool and silk mix, the latter is dyed a weaker shade than the wool. White silk effects in wool pieces are left almost untinted, especially by the 4 R brand, when working with an addition of acetic acid only. Both brands may also be used to advantage as shading colors in the dyeing of half wool, as they are well absorbed by the wool in a neutral Glauzer's salt bath. They are also very useful for printing dark brown shades on wool and silk.

**ALCOHOL PINK R PASTE,** on account of its superior fastness to light, is very useful for dyeing pink shades on all classes of goods. It is used particularly in worsted manufactories, and also on burlap and other materials intended for curtains, upholstery cloth, etc. It is also very suitable both for padding and direct printing on cotton (shirtings).

**NACRE 4 G EXTRA** is a wool dye, used chiefly in combination with Alizarine Saphgrol, Anthera Cyanine, Fast Light Yellow, etc., for fashion, olive, and brown shades on ladies' dress goods. When dyeing acid, white cotton effects in wool pieces remain untinted, also white silk effects, if the material is dyed in a long liquor with an addition of acetic acid. The new color is also suitable for producing bright pink or red shades on silk, provided fastness to water is not stipulated.

**ANThRA CYANINE 3 G L** is a wool dye recommended for dyeing of dress cloths, upholstry cloth, etc., as also for carpets and esphyrn yarns required fast to light. White cotton effects in wool pieces remain perfectly pure. On silk it produces clear blue shades very fast to light.

**PLUTO BROWN V EXTRA** is useful for dyeing brown shades on loose cotton material, yarn and piece goods, also half wool. It may also be used for artificial silk and half silk; in the latter case the cotton is dyed deeper than the silk.

**BENZO NEW BLUE 5 B AND 2 B.** The 5 B brand gives a fine medium blue, and the 2 B brand a bright navy blue on cloth. On account of their dyeing easily and fastness very soluble, they are also very suitable for combination shades such as olive, brown, etc., as also for dyeing in machines. Both cotton and wool effects are also useful for dyeing silk and artificial silk, particularly fine full shades being obtained on Glanzstoff. When dyeing half silk with an addition of Glauzer's salt and olive oil soap, the silk is dyed considerably weaker than the cotton. Both dyestuffs are also of considerable importance for calico printing.

**KATIGEN BLACK 2 B EXTRA CONC. AND DEEP BLACK B G.** Katigen Black 2 B extra conc. gives a greenish black blue, Katigen Black B G a deep black with a greenish tone down hand and over hand, which from practical trials has been found to give the nearest approach to the shade of Aniline Black. They may likewise be employed for dyeing any cotton material required to be exceedingly fast. They are not only well suited for self-shades, but also for dyeing in combination with other colors, for the production of fast gray, reds, olive brown and other shades.

**BENZO FAST YELLOW 4 G EXTRA** is noted, in connection with cotton material, for its clear greenish yellow shades and excellent fastness to light. On account of dyeing very easily, 4 G is especially adapted for combining with other colors fast to light, for the production of mode shades on loose material, yarn and pieces. It yields a very fine fine yellow shade on artificial silk; in respect to fastness to water, the shades on silk will meet ordinary requirements. The color is also of importance for dyeing half silk, as both fibers can be used uniformly in shade. It may further be stated that the new color is not susceptible to copper or iron, and it also withstands a weak acid treatment with chemic. It is also adapted for dyeing light shades in the padding machine as well as for direct printing on cotton. On account of its

Fastness to caustic soda, the new color is suitable for crimpo styles.

**PARA BROWN V EXTRA.** Cotton cloth is dyed with it in the jug or in the dye beek with Glazer's salt and is rinsed, dried, then developed with diazotized Paranitramine in the padding machine or in the Paranitramine dyeing machine. Very full shades are therefore obtained with this cotton and a very pure white with hydro-sulphite preparations. With tin crystals the shades give but poor discharges, whilst with chloride discharge, fine chocolate effects are obtained. On account of its productiveness and good dischargeability, it will be found important for the manufacture of raised material, cotton cloth and satins.

**PARA GREEN 2 B L.** Cotton cloth is dyed with it in the jug or in the dye beek, with the addition of 20% Glazer's salt crystal, and 2% soda ash, and after rinsing and drying it is developed in the padding machine or in the Paranitramine dyeing machine with diazotized Paranitramine. It discharges a pure white, with hydro-sulphite preparations.

**GALLO FAST BLACK PASTE** is used for calico printing with an addition of acetic of chrome. To the print colors it is advisable to add a little Kongoalte C and formic acid. The prints obtained are remarkable for their very bloomy shade, good fastness to soap and light, and for their satisfactory fastness to chlorine. In light shades, the color yields a very fine gray.

**NAPHTHYLAMINE BLACK 5 G L AND 4 B L.** Both colors are used chiefly for dyeing ladies' woolen dress material, but they are also employed for esphyrn yarn. They leave white cotton effects in wool pieces fairly clean, also giving good black shades on silk, which however, are not fast to water. These colors are also well adapted for direct wool printing. 4 B L gives bluish and 5 G L very greenish shades of black of good fastness to washing.

**DIAMOND RED 3 G AND 5 B.** On account of their splendid properties, they are suitable for dyeing all kinds of woolen goods required to be fast to wear. They are specially recommendable for blanket yarns, blends and effect threads for gentlemen's and ladies' fancy colored clothes, as well as for selvedges of white goods which are stowed in the piece. On account of its very good solubility, Diamond Red 3 G especially, is adapted for machine dyeing. Both brands leave white cotton effects in wool pieces perfectly clean; white silk effects are not tinged by the 3 G brand. Both dyes also important for slubbing, printing; with acetic of chrome and fluoride of chrome, well defined print effects are obtained, excellently fast to fulling and hot water.

**BRILLIANT CHROME SCARLET 2 B DF,** is a homogeneous, easily soluble color, which, when printed on cotton with acetate of chrome, yields very bright red and pink tones. The printed is a rich fastness to light and cold soda, and withstand also a slight soaping. The new color can be combined in various proportions with other chrome mordant colors. It is a dye of importance in all cases where simple and cheap methods of production have to be taken into account, for instance, cheap blouses and dress material, raised cloths, etc.

**Important Patent Litigation.**

Suits have been begun in the United States Circuit Court for Massachusetts by the Draper Company against The Stafford Company of Readville, Massachusetts, on patents to G. O. Draper, No. 527,014, and 994,587, alleging infringement by the fleecer mechanism in the Stafford looms. Counsel for the Draper Co., we are informed, have been instructed to prosecute these suits vigorously, in order to obtain injunctions against further infringement.

The Trotter Mill, of South Manchester, Conn., which has been acquired by Cheney Brothers, will be used for the enlargement of their weaving department. Ninety-eight additional looms are being installed, the company being so rushed with orders that its various mills have begun to operate on an overtime schedule, the plant running until 11 o'clock at night.
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or spray nozzles.

LASTING QUALITIES ARE UNEQUALLED

JOHN W. FRIES
45 Lafayette Street - New York
China-Clay for Cotton Finishing.*

With the exception of adhesive substances, the material used most extensively in the finishing of cotton goods is china-clay, a hydrated silicate of alumina. It derived its name from the fact that it was at one time brought from China as ballast. It occurs in several parts of the world, the chief localities being Cornwall and Devon, England.

Pure china-clay is quite white, of low specific gravity, very porous and has a greasy feel when rubbed between the fingers. It is used in finishing almost exclusively as a weighing agent, and is largely employed in light fabrics.

It is also used in warp sizing, and together with blue, to enhance the whiteness of the better class of bleached goods, as it is cheap and has a good body. This property, however, prevents its use for colored goods under all circumstances.

China-clay must be used in combination with a powerful adhesive, such as one of the various kinds of starch, to bind it to the fabric and to prevent it from dusting or being too easily washed out. The methods of applying china-clay are very simple, and yet there is a constant complaint that fats separate out on cooling, the china-clay sinking to the bottom. Even experienced finishers are of the opinion that this separation is sure to happen, and that it is unsafe to use the material again once it has cooled. Nothing is, however, more certain than that this separation never occurs provided the size has been properly boiled and made in the proper proportions.

China-clay is a very porous body, and readily absorbs fat and holds it if it is not hindered from doing so by the presence of starch. The china-clay and the fats should first be boiled together by themselves, and the starch and its water added afterwards. The china-clay must, of course, be mixed with water first of all. If as much fat is used as the clay can take up, and if the latter is pure, the heaviest dressing can be applied without any fear of giving a hard feel to the goods.

The degree of loading must be regulated by the amount of adhesive, for no more clay can be used than can be fixed to the fabric by the starch. Attention to this rule involves waste of the clay, and makes the goods dusty.

In bluing the finishing mass, regard must be had not only to the covering power of the clay, but to the degree of transparency of the starch paste, and it is a mistake to use merely ordinary coal-tar dyes, as is so often the case.

To bring up the white of the china-clay and to make the starch opaque, nothing is so suitable as a body color, and ultramarine should be used if the mass is alkaline or neutral, and Prussian blue if it is acid.

For coloring the size, dyewoods are best—logwood for grey and black, quercitron alone or in combination with logwood for bright blacks, and combinations of quercitron and cuinch for mode shades.

To waterproof cloth, the latter is often impregnated with solutions of metallic salts. These are apt to corrode the fibres. For this reason, when inspecting rain cloths, umbrella cloths and rubber coated cloths, examine the same carefully with reference to any corroding.

THE NEW BRUNSWICK CHEMICAL COMPANY
New Brunswick, N. J.
Manufacturers of Sizing and Finishing Compounds for all Kinds of Fabrics, Gums, Softeners, Soluble Oils, Etc.
Special Preparations for Mercerized, and Silk and Cotton Mixed Goods.
17 Cents a Day Buys an Oliver

The

OLIVER

Typewriter

The Standard Visible Writer

Can you spend 17 Cents a day to better advantage than in the purchase of this wonderful machine?

Write for Special Easy Payment Proposition or see the nearest Oliver Agent.

The OLIVER TYPEWRITER CO.
Walnut & Tenth Streets, Philadelphia, Pa.

For the purpose of ascertaining if a parity cannot be established between the price of cotton and the selling price of yarn a committee representing the North Carolina cotton manufacturers left for New York City November 11th to hold a conference with the yarn commission men. The mill men believe that the commission men, who hold a strategic position between the manufacturer and the buyer, can aid the Southern mills in putting yarns on a more profitable basis, the selling price at this time being ruinous to the manufacturers.

VICTORIA SIZES

A Pamphlet containing Descriptive Matter and Receipts

for the SIZING of Cotton, Woollen and Worsted Warps, and the FINISHING of Cotton, Silk and Mercerized GOODS

Will be forwarded, complimentary, postage paid, to persons interested. Address

H. A. METZ & CO., 122 Hudson Street, New York City

THE “L” MODEL NORTHROP LOOM

for Broad Sheetings.

Orders and shipments of this loom for the last year aggregate 6,000 and when all are delivered, a large proportion of the wide sheetings of this country will be woven on Northrop looms; the mills thus equipped reduce the cost of weaving, and the weavers at the same time can make the same or increased pay under improved conditions.

The object of sizing warp yarns is to smoothen its surface, i.e., lay protruding fibres to the body of the thread, at the same time strengthening the thread so that it will weave well in the loom.

The elasticity of a yarn depends on the length of its staple, the evenness of the thread, the twist per inch, whether the yarn is sized or not, and if so, quality and quantity of size added, and finally the per cent of moisture the yarn contains, while being tested.

In last month’s issue, we illustrated and explained on pages 101 and 102 a novel “Sweep Stick Adjusting Attachment.” The same is the invention of Mr. J. H. Malley of Harrisville, R. I. We had a chance this week to inspect the attachment more in detail and the same certainly has several points of merit over former similar devices, one of them being that it is the first device of this kind ever invented whereby the power on the stick can be conveniently regulated while the loom is running.

Mercerizing, if properly carried on, increases the tensile strength of the cotton, i.e., if care is taken to keep the temperature of the liquor below 70 deg. F.

A. W. BUHLLMANN, TEXTILE ENGINEER, New York
487 BROADWAY, (Silk Exchange Building)

Importer of

TEXTILE MACHINERY

Specialty:
Installation of FINISHING PLANTS for Cotton, Woolen, Worsted, Plush, Velvet, Corduroy and Silk Fabrics:

MERCEORIZING INSTALLATIONS
**MILL NEWS**

Philadelphia. The Globe Machine and Foundry Company, of Frankford, is experimenting with perfecting their warpers for the regular Worsted Trade. The affair promises to become a big success and in this way will somewhat revolutionize the making of worsted warps.

Thomas E. Brown, of the Brown Knitting Co., has sold his interest in the company to D. F. Harrington, of Harrington & Waring, 22 Leonard street, New York, the concern's selling agency. Mr. Gustav Kumpf, president of the Brown-Aberle Co., succeeds Mr. Brown as president of the Brown Knitting Co. W. Park Moore, treasurer of the Brown Knitting Co., has also assumed the duties of general manager, and has removed his office to the mill.

Mr. Brown will hereafter attend to selling direct the product of the Glen Knitting Co. and that of Thomas E. Brown & Son, both of which concerns have been sold heretofore through Harrington & Waring, who heretofore will sell the Brown-Aberle Co.'s product, as well as that of several other large full-fledged worsted mills.

H. Britton Co., Philadelphia's most prominent builders of Knitting Machinery, are the only concern in its line which has run complete and on full time during the last two or three years, a fact which speaks volumes for their machinery.

The Glasgow Mills, of which A. H. Burham is the General Manager, is adding new Warming Machinery to its plant. Jacob E. Altemus, Fourth & Souterrain Sts., is rushed with orders. He is perfectioning an Improved Winder, which when in the market will fill a long felt want in the Textile Industry.

The Roxford Knitting Co., Randolph and Jefferson streets, manufacturing men's flat balbriggan underwear, have purchased additional properties located on North Randolph street and joining their plant, upon which they will erect a large addition to the present plant. The new structure will consist of a seven-story building, 135 by 90 feet, with basement, of concrete construction and brick facing. Philadelphia's well-known construction firm, The William Steel & Sons Co., have the contract for the erection of the new plant.

Operation has started by the Boulevard Knitting Mills, with fifty knitting machines on 188 to 200 needle cotton goods.

The C. H. Madland & Sons Carpet Mills will erect a 70 by 134 brick addition to their present plant.

Marshall Bros., Manufacturers of Spools and Bobbins, Adams & Frankford Aves., are over their orders. They are known all over the country for their superior products.

The Schadewald Mills are adding 50 looms to their plant of 520 looms. They are manufacturing a new line of serge and twill linings, made in 54-inch goods; instead of 32 inches wide, as is usually done.

Firth & Foster, America's most prominent Dyers and Finishers of Piece Goods, have all the work they can possibly handle. Besides their regular line of Woolen, Worsted, Silk and Uniforms, this firm is known all over the country for the dyeing and finishing of Novelties, in which line the concern has a world wide reputation.

Allentown, Pa. The charter of the Standard Knitting Company, of this city, has been received. The incorporators are: De Forrest F. Bast, Elmer S. Hinkel, William S. Schlegel and Amos C. Krasley.

Chester, Pa. The Chesaqua Silk Co. is installing additional looms, and it has been but a short time since other additional machinery was installed. There is still plenty of space in the mill to double the present capacity, and as the demand increases it becomes possible to get the help, the force will be increased until the entire plant is occupied.

(Continued on page 20.)
GET 'EM FROM THE DYE STICK KING
Different from the usual junk.
Natural Round Water-Grown Cedar and Special Hardwoods
We have cultivated and manufactured millions during 25 years and can
save you money. Satisfied customers everywhere. We have "something"
for you. Mr. Dyet—write us;

KILBURN, LINCOLN & COMPANY
LOOMS FOR
COTTON AND SILK WEAVING
FALL RIVER, MASS.

Howson and Howson
Attorneys at Law
West End Building, 32 S. Broad Street
Philadelphia
Solicitors of Patents
New York, 38 Park Row
Washington, 913 F Street

The number is ever increasing,
There is a good reason why.

THE SCHAELIBAUM GRID
The grid with a comb is getting
in general use all over the coun-
try. It does the work. You get
better cleaning and lose less
cotton in the process than by
any other grid.

The ROB. SCHAELIBAUM CO.
288 Dyer Street, Providence, R. I.

Manufacturers of
Bobbins and Spools
For Cotton, Woollen and Silk Factories
Adams and Frankford Aves.
Philadelphia

Chemicals and Apparatus
For the Dye Trade
J. & H. BERGE
Best Bohemian Chemical Glassware and German Porcelain.
C. P. Chemicals and Reagents. Chemists' Supplies of all kinds.
95 John Street.

Oswald Lever Co., Inc., Builders of
Lehigh & Mascher Sts.

This is the Most Suitable Machine for Winding Fine Cotton, Worsted, Dupion and Silk
On Paper Tubes or Quills Equally Successfully
CIBA DYES

CIBA BLUE CIBA BORDEAUX
CIBA VIOLET CIBA SCARLET
CIBA RED CIBA HELIOTROPE

Vat Dyes for Cotton Dyeing and Printing—also for Wool and Silk.

CIBANON YELLOW, BROWN, ORANGE

Vat Dyes for Cotton Dyeing—Fast to Light, Chlorine and Washing.

Made by SOCIETY of CHEMICAL INDUSTRY, BASLE


Fleetwood, Pa. Fleetwood is to have another hosier mill, of which Frank R. Ritter will be the proprietor.

New Cumbernd, Pa. The working force of the Susquehanna Woollen Company has been doubled, bringing the total number of employees up to 127.

Day and night relays will soon be arranged.

Norristown, Pa. The Phoenix Knitting Co. has increased its capitalization from $5,000 to $30,000.

Northampton, Pa. The Allen Silk Company has been incorporated with a capital of $50,000.

Camden, N. J. Howland Craft Sons & Co., manufacturers of worsted yarns, have installed another new electric engine.

The company now has a battery of three big electric engines.

Jersey City, N. J. The Republic Cotton Mills has been incorporated with a capital stock of $300,000, for the purpose of manufacturing cotton fabrics.

Newark, N. J. The Newark Textile Co. has been incorporated with a capital stock of $100,000; they will manufacture Silk and other Textile Fabrics.

Camie, N. Y. The Silk Mill of this place has received a consignment of new silk throwing machinery from abroad. The Camie silk factory has been run almost continuously since its establishment four years ago.

Jamestown, N. Y. The two-story addition to the Empire Worsted Mills will be completed by December 1. Sixty-two new looms, 20 spinning frames, 6 twisting frames and a set of drawing machines will be added to the present plant.

Ogdensburg, N. Y. The Silk Company of this place is to add new looms to its plant, giving employment for about one hundred additional operatives.

East Dephalt, Mass. The Merchants' Woolen Mill property has been sold by Edwin D. Thayer, Jr., of Worcester, to the Hodgson Finishing Company, Hon. Charles O. Brightman, of New Bedford, president, with a capitalization of $100,000. The assessed valuation of the entire plant is $200,000.

It has been idle for several years, but the new owners will thoroughly equip them with the latest and most improved machinery, and will on January 1, 1907, inaugurate the new enterprise of bleaching, dyeing, mercerizing and general finishing of cotton piece goods. One hundred and fifty hands will be employed at the start.

Fall River, Mass. The Bourne mill have started on the addition to their No. 1 mill, 105 feet long and 40 feet wide, three stories in height.

Preparatory cotton spinning machinery will be installed.


Lawrence, Mass. The new million-dollar worsted spinning mill of the Arlington Mills has been erected in, and the work of installing the machinery commenced.

Work was started October 15th on the foundation of an addition to the cotton department of the Arlington Mills, which will be used for winding, quilting, warping and finishing of cotton yarnd. It will extend north from No. 4 cotton mill and will be 140 feet long by 100 feet wide and four stories high, costing about $75,000.

Lowell, Mass. The Bigelow Carpet Company will build three new mills along the edge of the Pawtucket Canal to replace a long stretch of old buildings. The mills are to be numbered 17, 18 and 19.

Mill number 17 is to be a dye-house, two stories high, 275 feet by 40 feet.

Mill number 18 will join mill 17, but will be five stories, 124 feet by 46 feet.

It will be a laboratory, dye, paint and belt shop and storage house.

Mill number 19 is to be another dye-house, three stories, 285 feet by 46 feet.

W. H. Jenks, Mass. The Atlas Manufacturing Company of this place and North Salem, N. H., has been incorporated in the State to manufacture and sell all kinds of yarns, cotton and woolen goods. The capital stock is to be $50,000.

New Bedford, Mass. Plans have been drawn and work started on the construction of the plant for the Amite Manufacturing Company, to be located at Clark Point. The charter granted to this $500,000 corporation suggests a wide departure in the variety of goods to be manufactured.

Salem, Mass. The Naumkeag Steam Cotton Company will not curtail its production; it has a large supply of stock on hand and its product is sold ahead.

Wilmington, Mass. The Army & Navy Cotton Duck Company is to erect a new dye house 100 by 40 feet.

Wilmington, Mass. The mill of the John S. Boyd Company, formerly the Boston Finishing Works, has started and by the middle of next month it is hoped to have the plant in full operation. The concern will manufacture corduroys and velvets of all kinds and when running at its full capacity will employ (Continued on page xvi)
BOOKS ON TEXTILE SUBJECTS.


Wool Dyeing (Part 2), by Gardner and Knapp. $3.00.

Table of Contents: Classification of Color Matters; Notable Colorants; Logwood, Woodcocks, Madder, cochineal, Kermes and lac-dyes; Oxydol; Goudron and Allied Coloring Matters; Vegetable and industry; Artificial Dyes; Classification of Coal-tar Dyes, Artificial Mordant Dyes, Acid Mordant Dyes, Acid Dyes, Direct Cotton Dyes, Dyes Suitable for Wool, Base Dyes, Dyes Applied by Oxidation, Reduction, and other Special Processes, Metallic Dyes, Methods of Dyeing Wool in Various Forms, Suitability of Dyes for Different Classes of Work, The Theory of Wool Dyeing.


Table of Contents: Fibre; Dyeing; Bleaching; Dye Blocks and Fancy Colors; Weighting; Dyeing Mixed Fabrics; Printing; Dyeing and Finishing Machinery and Processes.

Dyeing of Textile Fabrics, by Hummel and Hasluck. Price $2.00.

Three Volumes Bound in One.


Table of Contents: Raw Materials; Preparatory Processes; Carding, Drawing, Spinning and Twisting; Weaving, Weaving Machinery, and Supplies; Knitting Processes and Machinery; Dyeing, Bleaching, Mercerizing, Processes and Machinery; Finishing Processes and Machinery; Heat, Power, and Transmission.


Table of Contents: Different parts of the Jacquard Machine and its Method of Operation; The Jacquard Harness; The Camber and the Jacquard Harness for all kinds of Fabrics, Modifications of the Single Lift Machine; Stamping, Lacing and Repeating of Jacquard Cards; Practical Motions of Jacquard Designing.


A Guide for the Manufacturer and Large Purchaser, who observes definite specifications to insure standard material; giving a collection of tests, both of physical and of chemical nature.

Woolen Spinning, by C. Vickerman. Price $1.75.

Table of Contents: Fibre, Supply, Sorting, Sorting and Dyeing, Bleaching and Extracting, Dyeing, Bleaching, Mercerizing, Spinning, The Mule, Miscellaneous.


Silk Throwing and Waste Silk Spinning, by H. Hayner. Price $2.00.

A Treatise on the Principles of Silk Throwing and Waste Silk Spinning, with Illustrations and Descriptions of the Processes.

Textile Calculations, by E. A. Fossell. Price $2.00.


K-A Electrical Warp Stop
IS ACTIVE AND UP TO DATE

STERLING SOFTNER
has no equal for Cotton Goods—Knit or Woven

NATIONAL SOAP MFG. CO.
Sedgley Avenue West of 17th Street, PHILADELPHIA
upward of fifty hands. The entire plant has been equipped with new machinery. The looms are the Draper Co.'s latest pattern.

Woodstock, Vt. The capacity of the French Worsted Spinning Mill will be more than doubled when the plans for which the firm has arranged are completed. The firm, which has been located in Woodstock only a little more than a year, plans to build an addition in the rear of the present factory on Fairmont street, which will be larger than the present buildings. When completed it is estimated that 20,000 spindles will be operated and between 500 and 1000 hands employed.

The two-story brick factory formerly owned by the Perforated Pad Company has been purchased by Jarrett & Spence, two practical mill men of this city. They are to operate the plant in the manufacture of worsted yarn by the Bradford process.

Derby, Conn. The Pangasset Mills, operated by the executors of Charles B. Alling, have resumed work after having been closed for two and a half months.

Mystic, Conn. Work on the new bleacher of the Royal Linen Mills is being rushed along, and it is hoped to have the plant ready for running by December 1. As soon as the bleacher is completed, work will be commenced on the main factory on the Royal Linen Mills, which will be a four-story brick building, 400 feet by 50 feet.

Staffordville, Conn. The Garland Woollen Company has acquired the property of the Amidon Machine Shop, which it will use in connection with its present plant.

Winsted, Conn. The Winsted Hosiery Company Inc., is having plans drawn for an addition to its plant. A four-story brick structure, 32 by 90 feet, will be erected.

Manchester, N. H. During the last several weeks the Amskeag Manufacturing Company has been incorporated with a capital stock of $10,000,000. The company will operate a woolen mill in Manchester, N. H.

Winooski, Vt. A vote of the town of Winooski the projected worsted spinning mill of the American Woollen Company, to cost $300,000, will be exempt from taxation for five years from April 1, 1901. The location of the mill will commence at once, and building materials are on the way. The mill will spin worsted yarn, and when constructed will make the Burlington Mills one of the most complete manufacturing plants in the country.

Ahrens, Md. Emil Dick, formerly assistant superintendent of the Bates, of Lewiston, is acting as agent of the Barker Mill here.

Norfolk, Va. A Knitting Mill Corporation has been chartered with a capital stock of $5,000 by G. P. Peck, W. L. Lamerdon and H. R. Farr.

Suffolk, Va. The Bell Hosiery Mills has been incorporated with a capital stock of $10,000 by R. H. Rawles, J. H. Mitchell and A. Woolford.

Virginia, Va. The Virginia Hosiery Mills has been organized. They are to manufacture men's half hose and employ 30 operatives.

Burlington, N. C. The Morgan Hosiery Mill Co., has been incorporated with a capital stock of $50,000 to establish a hosiery mill.

Gaston, N. C. D. J. Carpenter and associates are reported in connection with forming a company with a capital stock of $50,000 to build a knitting mill here. Mr. Carpenter is the owner of the Newton Hosiery Mills, operating 350 knitting machines, dyeing and finishing equipment, etc., at Newton, N. C.

Concord, N. C. The Magnolia Mills Company will build a 50 by 70-foot addition and install additional machinery.

Greensboro, N. C. The Standard Hosiery Mills Company will increase its capacity.

Durham, N. C. The Pearl Cotton Mills will build an additional structure and install looms for weaving wide sheetings. This building will be one story high, 50 by 100 feet.

Graham, N. C. The River Falls Cotton Mills Company has been incorporated with a capital stock of $20,000 by J. W. Menefee and associates. It will build a plant to be operated by water power from the Haw River.
The Graham Hosiery Mills Co., has been incorporated by Messrs. Blackmon, Hadley and Thompson.

Jamestown, N. C. The Oakdale Cotton Mills is reported to erect an addition and install machinery to double capacity.

Warrenton, N. C. The Peck Manufacturing Company has begun the erection of its warehouse and will soon begin its mill building, 132 by 195 feet, with monitor roof and tar concrete floor.

Wilson, N. C. The Rummyne Mills No. 3 has purchased a building and is installing 100 knitting machines, 20 loopers, ribsers to suit and other necessary machinery.

Anderson, S. C. The Anderson Cotton Mills will expend $50,000 for new additional machinery, this to include 2,000 spindles, revolving flat cards, drawing machinery, fly frames, etc.

Blackburg, S. C. The Whitaker Cotton Mills has resumed work, new machinery having been installed during the shutdown.

Edgewood, S. C. The addition to the Beaver Dam Mills is near completion; 3,000 spindles are being installed.

Greenville, S. C. The Union Bleaching & Finishing Company is to increase its capacity to about 80 per cent; contracts for machinery having been awarded.

Greer, S. C. Work on the building of the Greer Mfg. Co., is steadily progressing. 10,240 spindles and 200 looms are being installed.

Orangeburg, S. C. The number of spindles now in operation at the Orange Cotton Mills is 15,000, and, although the mill has been hampered before the addition of the 1,500 spindles, it is now enabled to supply the looms of the mill. Sixty-two yards of woven cloth per day is the average production of each loom in operation at this mill.

Rock Hill, S. C. The Flint Mill is installing 2,000 spindles, 6 cards, and 2 cone winders.

Union, S. C. The Monarch Cotton Mills will hold its annual meeting November 12, and when then the increase of its capital stock from $600,000 to $1,150,000, in order to be able to enlarge the plant, will be considered.

Ludlow, Tenn. Work has been started by the Ludlow Hosiery Mill for a $100,000 addition to its plant. The mill has been running day and night of the night, in order to fill orders.

Nashville, Tenn. The Warioto Cotton Mills will add machinery to increase equipment to about 25,000 spindles and 675 looms.

Newport, Tenn. C. M. Cooke, Jr., of Brevard, N. C., and W. C. Cooke, Spartanburg, S. C., have leased the Bellevue Cotton Mills here. This plant contains 1,800 spindles for yarn production, and the loomers will install machinery for knitting hosiery.

Winchester, Tenn. The Davis Hosiery Mills have begun the erection of their mill, which is to be a two-story structure, 40 by 120 feet.

Canton, Ga. The Canton Cotton Mills is contemplating the erection of an addition and will then install 10,000 spindles and 300 looms.

Chattoosbee, Ga. The Whittier Mills Co. are erecting a building which will accommodate 5,000 spindles and its complimentary machinery.

Columbus, Ga. The Columbus Manufacturing Company is building a new mill, somewhat larger than its original building in which 30,000 spindles are now turning.

The Hamburger Cotton Mills are practically doubling their capacity.

The Bibb Manufacturing Company has installed new machinery and has placed new orders for about $25,000 more of equipment.

The Georgia Manufacturing Company is expending for machinery $50,000 or more.

The Perkins Hosiery Mill has built an addition.

Covington, Ga. D. A. Thompson, C. G. Smith, T. C. Calloway, J. E. Phillips and others of this city intend to form a company with a capital stock of $100,000 to build a cotton mill.

Fort Valley, Ga. The Fort Valley Yarn & Hosiery Mill, it is rumored, intends to increase its equipment of machinery.

Greensboro, Ga. The Mary Leila Cotton Mill contemplates enlarging its plant at an approximate cost of $100,000.

Gonzales, Texas. The Gonzales Cotton Mills contemplate adding 2,000 spindles and 30 looms to their present equipment.

Marinette, Wis. The Marinette Knitting Mill Co. will build a new two-story factory, the same to be located on the corner of Pierce Ave. and Daggett Street.
WOONSECKET YARN GASSING MACHINES

THE WIND

Woonsocket Machine & Press Company,

WOONSECKET, R. I.
Builders of Cotton and Woolen Machinery

GRAN-CARB-SODA
THE HIGHEST GRADE OF SODA CRYSTALS MADE
"The Best is Good Enough."
THE HOLBROOK MFG. CO.
470 Washington Street
NEW YORK
MILL SOAPS

Fast Colors for Cotton and Wool Helena Colors
Indigo M L B
H. A. METZ & CO.
New York, 122 Hudson Street

Boston, 140-142 Oliver St. Philadelphia, 104 Chestnut St.
Providencc, 23 S. Main St. Chicago, 317 N. Clark St.
Charlotte, 210 S. Tryon St. Atlanta, 1418 Empire Bldg.
San Francisco, 589-582 Howard St. Montreal, 170 McGill St.

Laboratories: Newark, N. J.
SOLE AGENTS IN U. S. AND CANADA FOR
Farbwerke vorm. Meister, Lucius & Bruening

FARBENFABRIKEN OF ELBERFELD CO.,
IMPORTERS OF ANILINE & ALIZARINE COLORS
NEW YORK

117 Hudson Street

New England Butt Co.
Providence, R. I.

Braiding Machinery, both American and German types, for making Dress Braids, Shoe and Corset Laces, Underwear, Trimmings, and all kinds of Round and Flat Braids.
TRADE MARKS RELATING TO THE TEXTILE INDUSTRY.

REGISTERED OCTOBER, 1909. (Complete)

1. Piece Fabrics of Silk, Linen, Cotton, Wool or Admixtures of these Fibres.—Augustus H. Sands, New York.
2. Negligees and Stiff Skirts, Undershirts, Drawers, Night Shirts and Pajamas.—Hamburger, Wolf & Weiller, Baltimore, Md.
5. Silk Piece Goods.—The Valentine & Bentley Silk Co., Newton, N. J.
6. Corsets, Corset Waists, Brassières and Under-waists.—The H & W Company, Newark, N. J.
9. Wool Blankets.—German-American Co., Draper, N. C.
17. Canvas used for Interlining Garments, said Canvas being made of Flax, Linen, or Jute.—Wm. Allberg & Co., New York.
20. Rugs, Art Squares, Mattings, Wall Coverings, Box Covers and Furniture Covers made wholly or in part of woven Goods in which Flax, Wool, Cotton and Jute may be employed.—American Flax Matting Co., Lawrence, Mass.
22. Fish Lines.—Chafee Manufacturing Company, Waltham, Conn.
27. Diaper Cloth.—Albert D. Smith, Orange, N. J.
29. Dyestuffs.—Badische Anilin & Soda Fabrik, Ludwigshafen-on-the-Rhine, Germany.
30. Coal Tar Coloring Matters.—Badische Anilin & Soda Fabrik, Ludwigshafen-on-the-Rhine, Germany.
31. Chemicals used in Reducing, Discharging and Bleaching.—Badische Anilin & Soda Fabrik, Ludwigshafen-on-the-Rhine, Germany.

By request of Manufacturers and Commission Merchants, all "New Trade Marks Relating to the Textile Industry" will appear monthly in this Journal; compiled in concise form for handy reference.
EXPLANATIONS FOR THE CHART OF WEAVES ON

“Textile Designing Simplified.”

The object of this chart is to show how easy weaves for all classes of Textile Fabrics can be constructed; it will be a real light in the misty matters in the field of designing Textile Fabrics. Keep this chart of weaves for reference. Millions of new weaves can be obtained by it.

All weaves for Textile Fabrics have their foundation in Plain Twills and Satins.

PLAIN.—This weave and its sub-divisions are explained on the chart in the top row by 16 weaves, the sub-divisions covering common, fancy and figured Rib and Basket weaves.

TWILLS.—The foundation of constructing regular (45°) twills is shown by rows 2 and 3 with twenty-six weaves, covering twill weaves all the way from 3 harnesses up to 13 harnesses. The sub-divisions of twills are quoted next on the chart, being Broken twills, Skip twills, Corkscrews, Double twills, Drafting twills. Curved twills, Combination twills warp drafting Combination twills filling drafting, 63° twills, 70° twills, Wide wale twills, Entwining twills, Checker-board twills, Pointed twills, Fancy twills, thus covering every sub-division of twill weaves possible to be made.

SATINS are next shown, giving also their sub-divisions, viz.: Double satins and Granites.

HOW TO PUT A BACK FILLING on single cloth is shown below the satins by two examples, and at its right hand is quoted the principle of

HOW TO PUT A BACK WARP on single cloth.

On the bottom line are given the four steps for:

THE CONSTRUCTION OF DOUBLE CLOTH, 2 @ 1; and above the same example, with the arrangement 1 @ 1.

THREE-PLY CLOTH is shown by one example.

HOW TO BACK SINGLE CLOTH with its own warp is shown by two examples.

WEAVES FOR SPECIAL FABRICS are quoted: Tricots (warp, filling and Jersey effects), Rib fabrics, Honeycombs, Imitation Gauze, Velveteen, Condurou, Chinilla Silks Plush, Double-plush, Tapestry, Crape, Terry, Worsteds coating stitching, Hucks, and Bedford cords

HOW TO WORK THIS CHART OF WEAVES.

CAPITAL letters of references refer to the plain weave and its sub-divisions.

SMALL LETTERS of references refer to twills and their sub-divisions.

NUMERALS of references refer to satins and their sub-divisions.

EXAMPLE.—How to ascertain the construction of the weave at the right hand top corner of the chart: being the figured rib weave marked C C ( ). These two letters of reference mean that said figured rib weave is nothing else but the combination of the 2-harness 6-picks common rib weave warp effect C, and the 6 harness 2 picks common rib weave filling effect C.

EXAMPLE.—The letter of reference c, underneath the first broken twill indicates that the same is obtained from the 3 4 harness twill c (third weave on the second row); in other words, letter of references below each weave of any of the various sub-divisions refer always to the corresponding foundation weave.

EXAMPLE.—Twills ø, ø, ø, are the foundation for the eight combination twills filling drafting, said common twills are drafted 1 @ 1, the different designs being obtained by means of different starting.

EXAMPLE.—The wide wale twill ø ø, has for its foundation the 63° twills, marked ø ø ( ) respectively ø and ø; the latter two weaves have again for their foundation respectively the common twills marked ø and ø.

EXAMPLE.—Granites marked ø ø have for their foundation the 8-leaf satin, such as marked ø ø the 13-leaf satin.

EXAMPLE.—Slacked by filling ø ø, means the common 4 4 harness twill ø ø (fifth weave on second row) and the 8-leaf satin is used in the construction of this weave.

EXAMPLE.—The complete design of double cloth, marked ø ø ø ø A, means that the common 4 4 harness twill ø ø, the common plain ø ø and the 8 leaf satin ø ø are used in the construction.

EXAMPLE.—Rib fabric ø ø, indicates that the plain weave forms the foundation.

It will be easy to substitute different foundations in constructing weaves for heavy weights. In reference to single cloth weaves we only want to indicate that by following rules shown in the chart, millions of new weaves can be made up from it.