THE "NILUS"

A new Leclerc four-harness rising shed "Jack-type" loom with an independant action of each harness-frame. When a treadle is depressed, the frames are pushed up from underneath by a special mechanism. The loom has 6 treadles, and each treadle can be tied to 1, 2, or 3 frames. The shed is always perfect, regardless of the tie-up.

This is particularly important when weaving double cloth, Bronson, waffle and so on. The loom is very easy to operate. It has a removable front beam, which makes threading easier, and it is built on the same loom-frame as the standard model "M".

EQUIPMENT is the same as for looms of the series "M".

<table>
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<th>Loom</th>
<th>Wire heddles</th>
<th>Loom</th>
<th>Flat heddles</th>
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HORIZONTAL WARPING MILL.

Half-automatic warping mill with a Heck-Block (a guiding device). The mill is turned by hand, but the weaver does not touch the yarn except when making crosses. All warp ends are of exactly the same length and they are all parallel to each other.

The beaming is done directly from the mill. A special brake supplies the desired tension. The whole operation of warping and beaming takes less than one hour for small warps (15 yds and 400 ends), and only slightly more for long warps. The weaver does not need a helper at any stage of warping or beaming.

Can be folded when not in use.

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<th>Height</th>
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<td>59&quot;</td>
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0-3    Without the Heck-Block, (warp guided by hand) ............... $27.50
0-34   With the Heck-Block............................................. 32.00
0-34A  With the Heck-Block and counter of crosses (portees)........ 39.50

NILUS LECLERC Inc.

L'ISLETVILLE QUE.
HUCAKABACK LACE.

The weave which we are going to describe has two advantages when compared with so called "Bronson" or "Swedish" lace. First - it has balanced tie-up and can be woven on any counterbalanced loom as easily as twill. Second - it will give the "lacey" effect regardless of the yarn used, when the former gives best results with linen and only after washing.

The best known huckaback is the 10 by 10 one (a repeat of 10 ends in threading and 10 picks i. e. treadling ) shown in Fig. 1. Nevertheless there are other huckabacks such as 6x6 or 14x14. The "6x6" one is probably the best for our lace (fig. 2).

It has horizontal floats on one side of the fabric, and only vertical ones on the other (fig. 3). When we "turn" it i.e. get floats in both directions on the same side of the fabric and in the same row, we shall get the fabric shown on fig. 4. In reality it will look quite different. What happens is that the ends: "a", "b", and "c" come very closely together, and so do the ends "d", "e", and "f". The same takes place in the weft: first three shots will separate from the next three. A hole right in the center of each repeat will appear even without washing.

Applying the principles of fabric analysis we shall get the full draft. It gives lace on the whole surface of the woven fabric. The edges will be rather poor. To improve them we may use either a plain threading (fig. 6), or tabby threading for huck (fig. 7).
Since we can weave tabby at the same time as the lace without additional heddle-frames, we can make simple one-block-plus-ground patterns such as in fig. 8.

Fig. 6  
\[
\begin{array}{cccccc}
\times & \times & \times & \times & \times & \times \\
\times & \times & \times & \times & \times & \times \\
\end{array}
\]  
Fig. 7  
\[
\begin{array}{cccccc}
\times & \times & \times & \times & \times & \times \\
\times & \times & \times & \times & \times & \times \\
\end{array}
\]

If we take as an example fig. 8 b - the corresponding profile is:
\[
\begin{array}{cccccc}
m & m & m & m & m
\end{array}
\]  
(lower line tabby, upper line - lace), and the full draft:
\[
\begin{array}{cccccccccc}
\times & \times & \times & \times & \times & \times & \times & \times & \times \\
x & x & x & x & x & x & x & x & x \\
5x & 20x & 5x & 5x & 20x & 5x & 5x & 20x & 5x
\end{array}
\]  
tie-up as in Fig. 5  
treading as-drawn-in

Should a coarse texture of the lace be required we can use as a basic draft a 10x10 huckaback. For instance fig. 8 "a" in a 10x10 huck will have the following draft (fig. 10):
\[
\begin{array}{ccccccccccc}
\times & \times & \times & \times & \times & \times & \times & \times & \times & \times \\
x & x & x & x & x & x & x & x & x & x \\
3x & 6x & 3x & 15x & 3x & 6x & 3x
\end{array}
\]  
the tie-up:  
\[
\begin{array}{cccccc}
\times & \times & \times & \times & \times & \times \\
x & x & x & x & x & x
\end{array}
\]  
treading: 2,3 (15x), 2424231313 (6x), 2,3 (15x) etc.

It is better not to go beyond the 10x10 huck since the weave is rather open, and there may be considerable slippage, but 6x6 and 10x10 hucks may be used in one draft. E.g.:
\[
\begin{array}{ccccccc}
\times & \times & \times & \times & \times & \times & \times \\
x & x & x & x & x & x & x
\end{array}
\]  
the treadling in the first case will be: 2424231313242313 and in the second: 242423131342423133242313.

The sett of warp depends on the ratio between the amount of the tabby and that of the lace in a woven piece. If there is mostly tabby and little lace, the sett should be as for tabby. If there is mostly lace, it should be slightly closer.

In pieces woven entirely in lace, the lace effect can be further enhanced by special slaying. For instance with 6x6 huck it should be: 3-0-3-0, and with 10x10 huck: either 5-0-5-0, or 1-3-1-1-3-1, as in Fig. 11.

Interesting colour combinations will be obtained by threading the frame 1 and 4 (fig. 5, 9, 10, 11), in one colour - rather neutral - and the
remaining frames in another more pronounced. The same colours must be used for weft: the neutral for tabby, and the other for the picks which form floats. Since however the effect we are aiming it is lace and not pattern, these two colours should belong to the same range, or in other words should be two shades of the same colours, for instance: beige and light brown, blue and navy, etc.

In weaving the beating must be adjusted to the pattern woven. Whenever there is a large amount of lace in one row, the beating must be light, and when there is comparatively little lace it is much stronger. The heaviest beating is for tabby alone. If there is a tabby border around the woven piece it is quite easy to check the strength of beating: the number of picks per inch should be always the same regardless of the part of pattern woven. The same of course applies to other weaves which give lace-effect.

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**DRAFTING - 3**

It often happens that the draft contains only the threading and the tie-up. Then the problem arises how to find out the treadling, or rather one of the many treadlings possible. When we speak about treadling drafts we must distinguish between drafts which give a square, symmetrical pattern, and fancy treadlings which can give any pattern at all. The number of the former is very limited.

When we speak about a square pattern we may remember that the best guarantee that we are dealing with a square is to have two diagonals, which cross each other at the center of the figure at a right angle. The treadling which will produce such diagonals is called BASIC treadling, and there is only one such treadling for each threading draft. The way to find it is to draw the diagonal first so that it would cover a square space right under the threading draft. In fig. 1 we have a 1:3 diamond twill draft.

Since each treadle is tied to only one frame, the weft will go only over one warp end. This is easy to check by making the draw-down of one shot of weft on each treadle. Then our diagonal will be made of single squares of the graph paper. The first step then in finding the treadling will be to draw a diagonal from the upper right corner to the lower left corner of the draft. Doing it we do not look at the threading draft
at all except to locate the beginning and the end of the diagonal. After the diagonale is drawn we can find out square after square which treadle produced each element of the diagonal.

We look up from the first square ("m") to the threading draft and see that immediately above the first square there is a heddle on frame 1. Since frame 1 is tied to treadle 4, then obviously treadle 4 is the first used. Consequently we make a mark on the threading draft right below treadle 4 and in line with the first square. The second square was made by a heddle on frame 2, which is tied to treadle 3, and the mark comes under treadle 3 in line with the second square. The third square: frame 3, treadle 2. The fourth: frame 4, treadle 1, and so on.

When we complete in this way the whole threading draft, we can compare it with the threading draft, and we can see that they are identical, except that the first is horizontal and the second vertical. From this observation comes the expression "woven as drawn in". It is an old term and means literally: threading the same as threading. In the above example the term "woven as drawn in" can be taken literally. But we shall see later on, that it is used often to mean that the treadling is only similar to the threading. The main point is not so much that both drafts are the same, but that they will produce a pattern as close to a square one as possible.

Fig. 2 gives an illustration of squaring a pattern in such a way that the diagonal will be absolutely straight although the treadling draft will be no longer identical with the threading.

Here two frames are tied to each treadle, and consequently the weft will go in most cases over TWO warp ends. The skips of weft which go over two or more warp ends are called "floats". Then we shall draw the diagonal with blocks of two by one (two squares long, one square deep). The blocks or floats will overlap each other by one thread of the warp. Otherwise the diagonal would not have the 45° angle necessary to produce a square pattern. Here again we draw the diagonal without looking at the threading draft, except to find the beginning and the end of the diagonal which must be in line with both ends of the draft. Then we look up from the first block of the diagonal, and we observe that it is produced by the combination of the first and the second frame. The treadle which is tied to these two frames is No 4. Thus the first mark in the treadling draft must be placed directly under treadle 4 and in line with the first block or float. The second block is made by frames 2 and 3. They are tied to treadle 3, so the treadling mark comes under treadle 3. The third block requires heddles on frames 3 and 4—tied to treadle 2—so the third mark is under treadle 2, and so on until the end of the diagonal is reached.
Here we can see that the treading draft is similar but not identical with the threading draft. Still we call it "woven as drawn in", because the pattern will be square.

Finally in fig. 3 we have the same method used for a different draft. Here the treading and the threading drafts are hardly similar, but still they produce a pattern as square as it can be, and this way of treading will be still called "woven as drawn in", although the original meaning has been nearly lost.

The same will happen in case of other pattern weaves. Although there will be still a diagonal composed of the blocks of pattern squared one after another, there will be no connection whatsoever between the threading and treading drafts. Here belong such weaves as crackle, summer-and-winter, cross-weaves, pile weaves, and with certain reservations: damasks, turned twills and double weaves. In this case we do not speak any more about following the threading draft, but simply about squaring the pattern.

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EFFICIENCY IN HANDWEAVING

One can learn the theory of weaving from books, or even by correspondence and become quite an expert in this line. But it is not so easy to become a skilled craftsman in the same way. The practical side of weaving is composed of so many elements besides the personal factors of the weaver that it is rather difficult to discuss the whole problem on paper. However that is exactly what we shall try to do.

First of all let us give a definition of skill. It is an ability to perform different weaving operations with a minimum of effort. This implies speed in certain cases, but is not speed only. Anybody can increase the efficiency of his work by increasing the effort, but a skilful worker will have a higher than average speed with a lower than average effort. This is of course on the understanding that the quality of the finished work will be the same in each case. What actually happens is that the work
performed at higher speed is of a better quality than the one done more slowly.

There are three reasons why high degree of skill is desirable in our work:

First, that the amount of satisfaction one can get out of a trade or hobby depends entirely on one's confidence in his own resources. One must be aware of his own skill to enjoy work, which otherwise becomes a source of frustration.

The second reason is that the quality of work, as we stated above, depends on skill, and cannot be duplicated by slow and deliberate processes. Good fabric must be woven at a certain speed.

The third reason is that many hand weavers sell their weaving. Here the importance of efficiency in weaving is obvious. The labour is the most important item in figuring out prices for woven articles. It is seldom less than 40% of the wholesale price. Consequently the faster the weaving and the less time wasted in preparing the warp and setting up the loom - the more reasonable will be our prices, and the more chance we shall have to sell our products. But here the speed cannot be achieved by an increase in effort, or we could not maintain the speed for any length of time - the skill is the only answer.

Then how to acquire this skill?
There is such a thing as an inborn ability to work fast without getting tired, and there is an inborn or acquired inability to do so. We cannot deal here with this side of the problem - it belongs rather to the field of psychiatry. But given an average ability to work, and dexterity there is still a lot to learn from other weavers' experience and from one's own mistakes.

We shall follow now all weaving operations from the beginning to the end, and at each stage point out the most common sources of wasting time and energy, as well as the proper techniques.

Planning. A warp should be as long as possible - short warps mean loss of time and of the yarn. This can be done in several ways: avoid small orders, or when accepting one, make at the same time more articles on the same warp to be kept in stock, or group several small projects on one warp.

Avoid weaving with too many shuttles. Whenever possible "turn" the draft so that the colours or different yarns are in the warp. For instance if we have to weave rather a long piece in Summer-and-Winter, it will be more reasonable to spend more time on warping and setting up the loom, than to weave with two shuttles all the time. After turning, the draft will require 6 frames, and two yarns in the warp, but only one shuttle.

The tie-up should be always made so that the feet work alternately.

Avoid all techniques for which you have no proper equipment; do not use unbalanced tie-ups on c.b. looms without shed regulator, do not try cross-weaves (leno) on jack-type looms, pile weaves with loops in weft, etc. And in connection with this - avoid pick-up of any kind. Use more heddle-frames, or a pattern harness. The only case when pick-up is justified is free weaving, tapestries etc.

Selection of yarns. Efficient weaving is hardly possible with unsuitable yarns. We may occasionally take pride in weaving with poor quality and consequently difficult yarns, but making it a habit is a great mistake. The warp ends should not break during weaving. If they keep doing
Now we measure the length of warp necessary for the lease-rods to reach the back of the loom, and tie the rest to the warping frame. Then the portion of warp from the lease rods to the tie on the frame between the slabstock and the harness. The latter should be lowered previously, or in case of a narrow warp it may remain in place with the heddles pushed as far away from the center as possible.

When the lease rods are in place we fasten the raddle on the slabstock (use open raddle, never a reed), spread the warp, and lace it to the apron either directly or over an additional steel rod. Now we remove the lease rods from the first cross, beam the warp with a helper, and insert the lease rods into the second cross. Use paper to separate the layers of warp when beaming. The best is either building paper, or heavy wrapping paper on roll.

2. Warping reel. Make the warp very carefully without piling the ends, and with very little tension. Again either 2 tubes or a larger number with a paddle can be used. Eight is a very good number. Then place the reel in front of the loom, and beam exactly as in case of warping frame. Never chain the warp. Each stage of beaming should be done without combing the warp - it is not necessary if the warp was properly made.

3. Warping mill. Follow the instructions supplied by the manufacturer.

In all three methods we can warp either from 2 or from a larger number of tubes or cones. Since making of single crosses at one end of the warp takes time, and since this time is the same for 4, 6, or 8 tubes, it is advisable to use the largest possible number of ends warped at the same time. However if we have for instance only 4 tubes, it won't pay to re-wind them on smaller ones to get 8 in all - the time gained in warping will be lost in winding. When we have 8 tubes of yarn we use all eight, but if we have less than that, we warp from only two at a time, without making single crosses.

The tension during beaming is not very important if we use heavy paper to separate the layers of warp. It can be always increased after the warp is threaded and tied-in, simply by turning the warp beam until the desired tension is reached.

Threading. It seems that there is not much difference in speed between many methods of threading and sleying. This depends much more on the weaver, than on the method. Some weavers achieve remarkable results. The average for both operations together should be somewhere around 400 ends per hour, but it depends a lot from the draft and the number of frames.

Where many weavers waste time is not the threading itself but the correction of mistakes, particularly rethreading of a part of the warp. This can be avoided completely by the following method.

First of all we do the threading and sleying at the same time, with a slightly longer hook than usual, and without helper. The best posture for this method is to sit sidewise quite close to the frames,
WEAVE TABBY

Draft No: 1

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REED NO: 9  ENDS PER DENT: 2  WIDTH: 32"
NUMBER OF THREADS: 576

WARP: Wool  COUNT: 2/8  COLOR: light grey
WEFT: Wool  COUNT: 2/8  COLOR: dark grey

PICKS PER INCH: 20

FABRIC: Clothing.

Note:

Finishing: The warp should have an opposite twist to the weft. Otherwise the fabric will have a slight crape effect, which will not disappear in ironing.

The best finishing can be done only in a fulling mill, give directions for a very slight shrinkage. At home use "Igepon" or similar scouring agent and follow the directions.
The names in Capital letters are also Leclerc looms suppliers.

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-54-
BOLTING CLOTH - Silk fabric, very fine and closely woven in Cross Weave (up to 200 threads per inch).

BONAPARTE'S MARCH - Colonial pattern (v) of the Cross-and-Table group.
Short draft:

\[
\begin{array}{cccccccc}
\text{6} & \text{4} & \text{4} & \text{4} & \text{7} & \text{4} & \text{3} & \text{4} \\
\text{3} & \text{4} & \text{4} & \text{4} & \text{4} & \text{4} & \text{4} & \text{4} \\
\end{array}
\]

BORDER - This part of a woven piece which lies along the edges, and which has a different pattern than the center.

BORDER PATTERN - Any pattern comparatively small may be used for borders. In articles with large central pattern the border may contain either the same pattern in miniature (v. Miniature Patterns) or any other as long as it harmonises with the main design. On the other hand when the main pattern is small, the border should be designed in as large pattern as possible. In other cases there is no pattern on the woven piece except in borders, or all the pattern is in the central part with plain borders. In such weaves as swivel or lace the border is nearly always plain.

BORE - The length of warp on the loom moved forward at a time. This may be anything from a fraction of an inch to several inches. The expression comes from the holes "bored" in the cloth-beams of old looms. A stick inserted in the holes served to turn the beam.

BORE STAFF - A stick which was used for turning either the warp-beam or the cloth-beam in old looms. These beams were of large diameter and have holes drilled near one end. The staff fits into these holes. The cloth beam has a ratchet wheel which prevents the beam from turning back. The warp beam has no ratchet but the staff is propped against a row of pegs in the frame of the loom, or there is a brake which maintains an even tension of the warp.

BOSOM - The main part of a woven piece as opposed to the selvedges or borders.

BOSS - (fr. AS bozan = to beat) Linen weft bleached and beaten flat.

BOTTOM BOARD - see Jacquard's Machine.

BOUCLE - (fr. = curled) 1. Yarn which has two or more strands, of which one is straight, the other forms loops. 2. Fabric woven with bouclé yarn.

BOUND WEAVE - The same as weaving on Opposite Sheds (v).

BOUT - (fr. AS bûgan) The same as Bight.

BOW CORD - A cord which connects a couper (v) with corresponding heddle-frame (R).

BOW-KNOT - Colonial pattern or component of a pattern. See Maple Leaf.

BOW-KNOT - A knot sometimes used to tie the warp in, i.e. to attach the warp to the apron.

BOX LOOM - One of the "no-harness" looms. It works on the same principle as a Frame loom. Its main part is an open box with the two long sides
much lower than the front and back. The warp is wound around the box. Due to its height the loom is suitable for weaving with a rigid heddle.

BOX BATTEN - A batten equipped for fly-shuttle weaving.

BOX-IN-THE-BUSH - Colonial pattern, the same as Dutchman’s Fancy.

BRAID - (fr. AS bragdan) A plaited work which is not considered as woven (no distinction between warp and weft), but which is often used for finishing the fringed edges of a woven piece. The braids are either knotted or plaited flat in which case they resemble weaving.

BRAKE - An optional part of a loom. It replaces the ratchet wheel. The disadvantage of a ratchet wheel is that it does not permit to control the warp tension in a continuous way, the tension being changed by steps corresponding to the dents in both the back and front wheel. Usually the brake is placed on the warp beam.

![Diagram](image)

There are two kinds of brakes: one gives positive braking action, and has to be released before the warp can be moved forwards. The other releases the warp whenever the tension becomes too great. In the first (fig. A) a cord (2) is attached to the frame (3) of the loom, then passed around the warp beam (1). Its free end is pulled down lightly by a weight or a spring (5). The brake is released with a treadle (4) which lifts the weight.

The second kind of brake (fig. B) has a very heavy weight (3) attached to the back end of a cord wound around the warp beam (1), and a smaller one to the front end (2). It works in a permanent way as long as the heavy weight does not touch the warp beam. Then it can be reset by lifting the small weight.

BREAKING - A process which follows the retting, and in which the flax stalks are broken so that the fibers are not damaged, and can be separated from the lignous parts of stalks in the next operation.

BREAST BEAM - The same as Cloth Beam.

BREAST PIECE - Part of the loom frame. The beam or board over which passes the cloth before it is wound on the cloth beam. In some looms particularly the old ones there is no breast piece: its place takes the cloth beam.

BREAST ROLLER - The same as Cloth Beam.

BRIDLE - (fr. AS bridel) A piece of cord tied to every Lash of a Draw-Loom (v).
BRILLIANTINE - (fr. Fr. brillantine) A fabric similar to Alpaca, very closely woven in tabby or twill. Cotton warp, and angora goat wool in weft.

BRITCH WOOL - Coarse wool from the hind legs of sheep.

BROADCLOTH - Woolen yardage of good quality. Originally woven wider than other fabrics.


BROCADING - A free weave of the Inlay type. Real brocading differs from other inlay weaves inasmuch as the pattern weft is cut to the proper length before it is laid in the shed. Every shed is filled in its entire length with pattern weft. The pattern floats are rather short. Short floats combined with very hard beating give a very firm fabric. When the ground or binder is woven in tabby, the brocading thread passes under one and over two warp ends. There is only one pattern shed, consequently the pattern texture is similar to cored fabrics. Usually a separate heddle-frame with long-eye heddles is hung in front of the standard harness:

\[
\begin{array}{c}
  x \ x \ x \ x \ o \\
  o \ o \ o \ o \ o \\
  \end{array}
\]

x - plain heddles

\[
\begin{array}{c}
  e \ e \ e \ e \ e \\
  \end{array}
\]

e - long-eye heddles

1,2 - tabby treadles

3 - pattern treadle

To avoid vertical stripes in the texture, at least two pattern sheds must be used. E.g.:

\[
\begin{array}{c}
  x \ x \ x \ x \ o \ o \\
  o \ o \ o \ o \ o \\
  \end{array}
\]

1,2 - tabby treadles

3,4 - pattern treadles

Sheds 3 and 4 are used alternately. The floats in this case will be longer (3 instead of 2).

The term Brocading is loosely applied to nearly all Inlay weaves.

BROCATELLE - (Fr.) A tissue weave (v) in which the ground warp is very tightly stretched, and the pattern warp rather loose. Thus the pattern is raised above the ground.

BROCHÉ - (fr. Fr. brocher = to brocade) One of the Tissue weaves (v) in which the ground is tabby. There are usually three pattern picks to one pick of binder. Every pick of pattern in three consecutive pattern sheds is of a different colour. Thus the general effect is of only one pick of weft of changing colour, between each two picks of binder. The three colours do not remain the same, but are changed according to the part of the design woven. Although the colours thus form horizontal stripes, these stripes show only at the back of the fabric, when the face of the Broché resembles Brocade.

BROKEN TWILL - A weave which has the same qualities as a biased twill but where the diagonals do not show, because they are "broken".

The twill can be broken by changing the tie-up as in the following examples or by changing the treading: 1243 instead of 1234 in a standard tie-up.
Twill woven on three heddle-frames (1:2) cannot be broken. Twills of the type 1: N are called Satins when N is 4 or more, and

\[
\begin{array}{ccc}
\text{broken 2:2 twill} & \text{broken 1:3 twill} & \text{broken herringbone.}
\end{array}
\]

when the breaking is performed so that no trace of the original diagonal remains. Thus: 1:4 twill may be:

\[
\begin{array}{ccc}
\text{m} & \text{m} & \text{m} \\
\text{m} & \text{m} & \text{m} \\
\text{m} & \text{m} & \text{m} \\
\text{m} & \text{m} & \text{m}
\end{array}
\]

biased broken satin

Sometimes the Dornick twill (v) is called broken twill.

BRONSON WEAVE - (Am.) Properly speaking this name should be applied to all Spot Weaves with a tie-up (A). As far as it is known this tie-up and consequently a whole class of spot-weaves has been mentioned for the first time in the English weaving literature by Bronson, although he did not claim it as his invention. Tie-up (B) has been used before then in England for what was then called Spot Weaves, and what we know now in handweaving as Swivel. To avoid confusion we distinguish now between: Spot, All-Over-Spot (or Barley Corn), Spot Lace - which all can be called Bronson, Bronson Lace, etc..., and Spot Swivel, or simply Swivel.

\[
\begin{array}{ccc}
\text{A} & \text{B} \\
\text{o} & \text{o} & \text{o} \\
\text{o} & \text{o} & \text{o} \\
\end{array}
\]

In the first case the pattern is formed by floats. In the second case the floats are cut off, and coloured weft must be used to make the pattern visible. See Spot Weaves.

BROWN YARN - The same as unbleached yarn. See Bleaching.

BRUSSELS TAPESTRY - (fr. Bruxelles in Belgium) Weft or warp pile fabrics with uncut loops. The better quality has weft pile. Some have the pattern printed on warp, and are woven as terry velvet.

BUNTING, or BUNTINE - (fr. G. bunt) Thin cotton or woolen fabrics used for flags, signals and so on.

BURLAP - (fr. Lat. burra = coarse hair) A coarse fabric woven in tabby from jute or hemp fibers.

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