In Depth Study Permission and License

By signing and submitting this agreement, I grant Olds College the non-exclusive license to archive and make accessible my Master Spinner Program In Depth Study in whole or in part in all forms of media now or hereafter known for educational, research, and scientific nonprofit uses during the full term of copyright. I retain all other ownership rights to the copyright including the right to use in future works (such as articles or books) all or part of my work.

I represent that the submission is my original work, and that I have the right to grant rights contained in this license. I also represent that my submission does not, to the best of my knowledge, infringe on anyone’s copyright and that I have obtained written permission from the owner(s) of any third party copyrighted matter included in the work.

I understand that my In Depth Study will be placed in the Olds College’s library for access to the public. I will understand that I will clearly be identified by name as the author of the submitted work and that Olds College will not make any alteration other than as allowed by this license to my submission.

Signed:  
Gaille Vallance

Date:  
August 14, 2019
EARLY CANADIAN SPINNING & WEAVING

Gayle Vallance

Candidate for Master Spinner Certificate
INDEX

1. ABSTRACT

2. THE DYES
   Fibers
   Mordants
   Dyestuffs

3. THE FIBERS
   Flax
   Cotton
   Wool
   Silk

4. THE WEAVES
   Clothing
   Carpeting
   Linens
   Blankets
   Coverlets

5. SAMPLES
ABSTRACT

While doing research for the Basic Level of the Master Weaver Program of the Canadian Weavers Guild, I became aware of the historical significance of the weaves being tested. Weavers have been using them in this country for about 300 years to produce essential clothing, bedding, linens and carpeting; and handspinners have prepared the fiber and spun the yarns the weavers required. Much of their work is admired today for the skill and expertise with which it was crafted.

My fascination with these productive pioneers resulted in my decision to try to create fabrics similar to those produced in the 17th, 18th and 19th centuries. The first step in my research was to locate photographs and written descriptions of the historical fabrics. But I realized that before I could duplicate these fabrics, I first had to understand the fibers, dyes and yarns that formed their basis. It was impossible to duplicate exactly the yarns of early spinners without being able to study actual samples of the yarns and their constituent fibers, and this placed a severe limitation on my study, but I was able to find some written descriptions on which to base my experimentation.

My research showed that fabric design was greatly influenced by the availability of spinning fibers, and early weavers used what would now be considered unconventional mixes of yarn, due mainly to the shortage or relative abundance of specific fibers. It was interesting to discover that wool did not become abundant until the mid-19th century. The fiber most readily available to early spinners was the
domestically produced and processed flax, and linen yarns were often used to extend the small amounts of wool. Linen was later supplemented with cheap mill-spun cotton yarns when they became available from cotton mills in the U.S. and Canada. The wools that were available came primarily from four (4) breeds of sheep: the Southdown, Leicester, Lincoln and Scottish Blackface, and their crossbreeds.

Today spinners use mainly synthetic chemical dyes to colour their yarns, but before the mid-19th century, spinners had to use dyes from natural sources. Native dye sources were used to a limited extent, but usually dyes were purchased. I experimented with natural dyes to get an idea of what colours were available to early spinners, but I did not duplicate early dyeing procedures which have since been replaced by faster, safer, and more dependable chemicals and procedures. While natural dyes do not produce the bright, clear colours of synthetic dyes, they do produce a surprisingly extensive palette from which to design fabrics.

While most fiber preparation and spinning was done in the home by the distaff side of the family, it seems clear that most domestic weaving was of a fairly simple type, with more complex weaving being done by professional weavers who were, more often than not, male. In this study I have placed the emphasis on the domestic dyeing, preparation of the fibers, and spinning of yarns which would be suitable for fabrics woven in Canada over the last three centuries. I have woven samples to show the appropriateness of these yarns, but I have not tried to duplicate the wide variety of fabrics. I have instead chosen a few fabrics which I feel represent general categories of early weaving.
My study of pioneer spinning and weaving is far from complete. However, even within its limitations, I have greatly increased my understanding of the subject.
In colonial North America, dyeing was a craft, dependent on imported dyestuffs. Many professional dyers were trained in Europe and operated dyehouses in Canada, but pioneer women also did some dyeing domestically. They too seemed to depend more on imported dyestuffs than local plants.

Dyeing with nature dyes could be a long, involved process, sometimes taking days to achieve a desired colour, but with a supply of different mordants and a knowledge of how to use them, the home dyer could achieve a most extensive palette from which to design her woven cloth.

**Fibers**

For dyeing, all fibers must be very clean and thoroughly wetted. Most protein fibers require only soap and warm water to remove natural oils, grease and dirt, but cotton must be boiled in soapy water with washing soda added. Most fibers should be soaked in warm water for at least one hour before dyeing to allow plenty of time for penetration.

While flax was the only fiber available to spinners, there was very little dyeing, possibly due to the fact that flax does not dye readily. Linens were usually woven in the natural or bleached state, but those that were dyed were dyed with indigo. Care must be taken when dyeing linen so that it does not boil hard. Boiling can damage flax and make the yarns hairy. Strongly acid solutions can also be damaging to flax.
The cotton yarns which were imported from the U.S. were also generally used in their natural colour. They were also relatively difficult to dye with natural dyes. But there are examples of cotton which were dyed red, brown, black, yellow and blue. In general, cottons should be dyed with plants which yield strong dyes, and often repeated dippings are necessary to achieve good colours. Flowers do not work well for cotton.

Silk could be dyed into a wide range of colours using natural dyes. This is a good thing since in pioneer days, silk yarn was used primarily for embroidery. High temperatures should be avoided with silk as they can damage the fiber and destroy the luster. Alkaline solutions can also be damaging, so vinegar should always be placed in the first rinse after dyeing.

Wool is the fiber which dyes most readily, and the wide use of coloured wools in early weaving is impressive, including colours from every part of the colour wheel.

Wool was usually dyed in the fleece, but yarns or fabrics were also dyed. For example, flannel was generally woven in the grease in factories to produce a closer cloth and to have less yarn breakage on the loom. The cloth was then scoured using soap, hot water and old urine, plus or minus hog dung. Then it was dyed.

If we held true to the old methods, we might add hog's lard to the hot dye to render cotton and linen yarns softer, or we might grind indigo in an iron pot, rolling a cannon ball around the inside of the pot for an hour.
Care must be taken to keep the dye pot at 190°F. as higher temperatures can damage wool and felt it. Agitation should be kept to a minimum, and care must be taken to avoid sudden temperature changes since both can cause felting in wool.

Mordants

The mordants available to the pioneers are the same as we use today with the exception of chrome. Because chrome was not available to them, I have not included it in my study. Today’s mordants are, however, much more refined and free from impurities.

The form in which the mordants were available could also be different from today. For example, tin was available as block tin. Before it could be used, it had to be grained by melting it and pouring it from a distance into cold water. This separated it into small pieces that would dissolve more easily. The grained tin would then be dissolved in spirits of nitre (dilute nitric acid) or aqua fortis (nitric acid). It was used for dyeing scarlet, crimson and yellow.

Copper was available as blue vitriol, made by combining oil of vitriol (concentrated sulfuric acid) and copper. It was used to dye black and other colours, and also for fix ing or saddening colours.

Iron was available as copperas or green vitriol, a sulphate of iron. It was used to dye black and other dark colours, and for darkening colours.
Tin, copper and iron were also available to dyers from the pots in which they brewed their dyestuffs.

Alum was an important mordant for many colours, but was much less pure than the alum we buy today.

Other materials which early dyers added to their dye pots are: sugar of lead, chalk, wheat bran, soap, salt petre, starch, pot and pearlash, cream of tartar (argol), salamoniac, aqua-fortis, sulfuric acid, and verdigris (rust of copper).

My research into the modern use of mordants revealed a wide disparity in the amounts recommended for use with one pound of wool. They varied from 10 to 14% dry fiber weight for alum, from 1 to 3% for tin, from 3 to 6.6% for iron, and from 3 to 8% for copper. Generally, I used the smaller quantities both for economy and to avoid damaging the wool. The proper amount of mordant is essential for good colour bonding and excellent fastness to washing and light.

All of my fibers were premordanted. Although it is said the best results are obtained when mordanting wool right in the dyebath, I was pleased with my results and it certainly made sampling a lot quicker. The wool was soaked in warm, soapy water for one hour before mordanting. It was then rinsed and added to the bath in which the mordant had previously been dissolved. The temperature was raised slowly to 190°F. and held for one hour. The wool was cooled in the bath, then rinsed and dried. I generally worked with one quarter of a pound of wool at one time.
For mordanting silk, I used alum at 10% of the dry fiber weight, tin at 1%, and copper at 2%. I did not use iron as a mordant since it is said to damage the fiber. The silk samples were soaked in warm, soapy water for 1 hour. Then they were added to the mordant bath and the temperature was raised to 180°F and held for one hour. The silk was cooled in the bath, then rinsed and dried.

My cotton and linen samples were mordanted with alum at 25% plus washing soda at 14%, tin at 3.5%, copper at 25%, iron at 25% plus tartaric acid at 12% and Glauber's salt at 34%, and finally alum at 25% plus washing soda at 6% and tannic acid at 6%. However, since I was unable to purchase concentrated tannic acid, I resorted to extracting it from natural sources. In one gallon of water I placed 22 used tea bags (I felt this would reduce the amount of dye in the tea) and 1/2 gallon of bark from willow stems. This mixture was boiled for two hours. The resulting 'tea' was astringent, and dyed the yarn a light brown.

I mordanted the cotton as unspun sliver, and the flax as spun yarn. They were soaked well in hot soapy water for 2 hours, then added to the mordant baths and simmered for two hours. They were cooled in the bath, then rinsed and dried. The only exception to this method was the alum/tannic acid bath. This is a 3-step method which involves boiling the fiber for one hour in the alum/washing soda mixture, then cooling the mixture overnight. The fiber is then removed and rinsed, and the solution saved. In step two, the fiber is simmered for one hour in the tannic acid solution, then left in the bath overnight. The next step is to place the fiber back into the
first alum bath. It is left to soak for at least 12 hours, then rinsed and dried. In most instances, the alum/tannic acid mordanted fiber gave the strongest colours.

Dyestuffs

Pioneer dyers used some local plants, but they depended mostly on imported dyestuffs. The only local plant which I used in my study was onion skins. The imported dyestuffs that I used were indigo, cochineal, madder, brazilwood, logwood, annatto, osage orange, and fustic. I used a variety of premordants and afterbaths to obtain a wide range of colours. I worked with indigo last so that I could do overdyeing for greens and purples.

The most common colour by far in pioneer textiles is indigo blue. It was the least expensive dyestuff and required no mordant. The second most common is madder red which is identified by its characteristic brownish tone. Both of these dyestuffs produce colours which are fast to washing and light.

The only dyestuff which I would be reluctant to use on its own is logwood. In order to ensure colourfastness, it must be overdyeed with some other dye.

The first synthetic dye was aniline dye which was extracted from coal tar. It was discovered in 1856, patented in 1869, and was generally available after 1897. It was first used to dye silk a mauve colour, then, with tannin as the mordant, it was used to dye cotton.
Mauve became the fashion statement of the era. The first synthetic dyes tended to run and fade in the sun, but they were bright, inexpensive and fashionable, and within a few decades, the market for natural dyestuffs collapsed.
Flax

Settlers tended to plant flax and hemp as soon as their land was cleared so they would have a source of spinning fiber to satisfy their immediate family needs. Other fibers were not available since the Canadian climate is not suitable for cotton and the colonies were still too inhospitable for sheep.

Flax and hemp were successfully grown in Quebec and Acadia in the 17th century, and the early Scots in Cape Breton grew flax in the eighteenth century in spite of the fact that Britain discouraged domestic manufacture in its colonies. Flax production grew until the 19th century when it became a staple crop in Quebec for seed and fiber. Rural Quebecers supplied almost all of their textile needs until the 20th century.

At first linen was seldom sold, since only sufficient was raised and processed for the family's own needs. Early production was coarse, but the quality gradually improved until linen of superb quality was produced. Coarse yarns were woven into feed bags and rough outer clothing, and in the Maritimes, linen sailcloth may have been woven by hand. There were no carpets woven with flax since they could only be produced when there was a surplus of wool available. Similarly, rag rugs were produced only after mill-woven cotton textiles became easily available.
Fine flax was made into household linens, and the earliest fabric for clothing was all linen, with the finest yarns used for undergarments for trousseaus and special-occasion shirts.

Blankets were not made of linen, but linen was the preferred material for sheeting and it was used for this well into the 19th century. Most sheets were perfectly plain with simple hems at both ends.

Flax was used as the ground tabby for overshot and summer and winter coverlets in very early days. It was also used as warp, and sometimes pattern weft, in cataloque coverlets, and as pattern weft for overshot coverlets and table cloths in Scottish areas of the Maritime provinces.

Most flax was spun and used as singles, but some was plied for warp. As a rule, simple linens were woven of unbleached yarns and the finished article gradually became white over time with repeated washings and drying in the sun. It was not normally dyed, but when it was, it was usually dyed with indigo.

Fiber Preparation and Spinning

I experimented with line linen and commercial roving to decide which would produce the best product for my purposes. I wanted to spin warp and weft yarns in the 16 to 20 lea-range; and I wanted these yarns to be smooth, strong and lustrous.
I examined commercial yarns and discovered that 16/1 yarn was spun z with 6 t.p.i. It contained line flax that was 12 to 20 inches long. The 16/2 yarn contained singles spun z at 9 to 10 t.p.i. and plied s at 7-1/2 t.p.i. It also was spun from a long line flax. I examined one tow linen yarn which was almost twice the diameter of the 16/1. It contained singles that were spun z at 4 t.p.i. and plied s at 3-1/2 t.p.i.

I decided that line flax was absolutely necessary for my warp because of its greater strength and smoothness. Yarn spun from roving was more hairy, even when wet-spun. This was probably due to the fact that the fiber in the roving measured only 2 to 7 inches in length. However, fiber in the roving was much finer than that in the strick. I decided that line flax was probably better for weft as well since it required less twist and was therefore more lustrous. I spun a sample warp yarn at 6 t.p.i. with a count of 12 lea, but I found it too fragile for warp. It could not resist the abrasion of the loom. I then spun a finer sample with a count of 16.3 lea and added 10 t.p.i. This seemed to work fine. I spun the weft yarn with the same grist and 6 t.p.i.. All of my yarns were wet-spun to reduce hairiness.

I decided to work with singles since most of the old linens were woven with singles, and singles flatten better in fabric giving it more luster and a smoother surface. I think, however, that if I were to spin for table napkins, I would use a plied yarn for a softer feel and greater absorbency.

The easiest and quickest way to spin line flax is to divide the strick into lots of no more than one ounce. The lot should be shaken to loosen fibers and the root end combed to remove the fiber fluff.
which accumulates there. The fiber is then wrapped in a towel with the root end protruding by about four inches. As spinning proceeds, the root end is combed periodically to remove accumulating fluff which can cause bumps in the yarn. From each lot of strick there will be two qualities of yarn. The first fiber to come off the strick will be longer and noticeably coarser than the last fiber which is quite fine.

To finish the yarns I wrapped them on pvc pipe, soaked them in warm water for two hours, then simmered them for one hour in water to which I had added Calgon, Palmolive dishwashing detergent and washing soda. Washing soda should be added at a rate of one ounce for six ounces of fiber. I then washed and rinsed the yarn, still wrapped on the pipe, and repeated the simmering process a second time. The second boiling was to guarantee the yarns' absorption of dyes.

**Cotton**

Very little cotton was handspun in Canada. Commercial machine spun z-singles were imported from the U.S. soon after the first cotton mill was established at Slater's Mill in Pawtucket, Rhode Island in December of 1790. As soon as it was available, it immediately replaced the use of linen as warp in most drugget, coverlets and blankets. The first Canadian cotton mill was established in 1845 in Sherbrooke, Quebec. Canadian mills eventually filled the domestic needs and there was no longer any need to import the American yarns.

The original imported cotton singles measured approximately 8400 yards per pound, about a 10's count. It was used as warp in light blankets, winter sheets and clothing, but it was difficult to work with and it was usually starched before weaving. The presence of a
singles cotton warp is often an indication that the weaver had been trained as a muslin weaver before emigrating to Canada. Most domestic weavers plied the singles for warp for added strength and ease of handling. The handplied yarn could be identified by the smooth, controlled spinning, and the looser, sometimes uneven, ply. Older Canadian coverlets are identified by the handplied cotton warp combined with the singles tabby weft.

By 1840, a commercial 3-ply warp yarn appeared. In 1850, a 2-ply tabby weft emerged, and around 1875, a mill-produced 4-ply carpet warp became available. It was used as warp and weft in woollen warp-faced rugs and as the ground of some late overshot coverlets.

Fiber Preparation and Spinning

My concern in this exercise was to discover a good combination of fiber form, preparation and spinning so that a clean, consistent, fine yarn could be spun with a minimum of time and difficulty. I worked with two common forms of cotton, the raw, ginned fiber, or lint, and the commercially prepared sliver.

The sliver is beautiful with its lustrous parallel fibers, but I found that spinning directly from the sliver, either from the end or from the fold, did not give adequate control of the grist and the resulting yarn was quite hard and lifeless. I achieved a better result when I carded the sliver and rolled it into punis. The resulting yarn was softer, of a more consistent grist, and more relaxing to spin because it was possible to use a long woollen draw. I decided that it was not economical to pay the extra cost for sliver, only to have to recard it for ease of spinning. However, sliver is
invaluable when it is used to dye the lint before spinning. Three strands should be braided together so that the sliver will not break up in the dyebath. I have found that recarding is still necessary before spinning but this process saves having to spin and boil the yarn before dyeing.

I also worked with raw, ginned Pima lint. Pima cotton is named after Pima, Arizona, where it was developed by crossing Sea Island with Egyptian. It has a 1-3/8 to 1-1/2 inch staple and a creamy-brown or white colour. Its fiber is fine with a high luster, and its yarns have a silky smoothness.

I had to spend some time removing unwanted bits of vegetation and some discoloured pieces, before I could card the lint, but this time was minimal. Carding the ginned cotton took a bit longer than carding the sliver, but again, the time was insignificant. The carded lint was rolled into punis, and it was easily spun using a long draw.

I found that thin punis spin more easily than thick ones, with an optimal weight of 0.3 grams per puni, and carding is much more effective when using cotton carders rather than wool carders.

In determining twist per inch, I examined commercial yarns and measured their twist. I found that 10/2 yarn had 10 to 11 twists per inch in the ply, and 8/2 yarn had 9-1/2 to 10 twists in the singles and ply. A singles thread which I unravelled from some commercial cotton fabric had 18 twists per inch and was sett at 56 ends per inch.
I had decided to spin a z-singles yarn with an approximate count of 10 (8400 yards per pound) to match the commercial z-singles which were available to early weavers. I spun several sample yarns and decided that a singles warp yarn would require 16 to 18 twists per inch to give it durability on the loom, and a 2-ply with 10 twists in the singles and the ply was fast to spin, had a soft handle, and yet was strong enough for warp. Both the singles and the plied yarn appeared extremely over-twisted when removed from the bobbin, but the excess twist disappeared with finishing.

To finish the yarns, they were wrapped on pvc pipe and boiled for one hour in water that contained a small amount of Calgon, Palmolive dishwashing detergent, and washing soda at 24% of the dry weight of the fiber.

It was interesting to note that the Pima yarns took on a decidedly beige tint after boiling, whereas the sliver yarns remained much whiter.

Wool

Wool was not available in large amounts until the middle of the 19th century. There were a limited number of sheep kept during early settlement, but these were kept primarily for meat. Some sheep were recorded in Quebec in 1619, but French companies encouraged the population's dependence on France for everything, including clothing, and a negligible amount of wool was produced through the 17th century. In 1749, it was reported in Quebec that imported sheep degenerated due to inbreeding and poor winter feed, thereby producing less and less wool of inferior quality.
Elsewhere the situation was no better. In 17th century Acadia, it was reported that a three pound fleece yielded about 1-1/2 pounds of clean wool. In the late 17th century, Acadian clothing fabrics consisted of coloured wools on fine cotton warps, linens and heavier woollen materials.

In the 18th century, when Scottish immigrants started to arrive in Cape Breton, flocks were established, but it wasn’t until the middle of the 19th century that wool and the production of woollen cloth became a major item in the economies of Quebec and Ontario.

The first woollen clothing was made of a fabric called 'drugget'. It had a linen or cotton warp with a wool weft. This type of cloth was common until wool became more available, and then flannel, or russetting, and fulled cloth became more common.

Cloth was fulled by hand at first, and the fuller often received three times as much per yard as did the weaver. It was a full day’s work to reduce cloth woven to a width of one yard to 27 inches. Fulling mills were established early in the 19th century in Ontario, and possibly earlier in Quebec. There was a far greater production of fulled cloth in Quebec, where a particularly popular outdoor garment was a fulfilled and napped twill hooded coat.

The most characteristic fabric in Ontario was woollen flannel. It was frequently checked and it was used in dresses, workshirts, underwear and children’s clothes.
The earliest woollen blankets were woven in tabby to conserve wool, and the light summer blankets that doubled as winter sheets often had a fine cotton warp. Wool carpeting could only be produced when there was a surplus of wool and the earliest were warp-faced with a wool warp and a partially or completely hidden weft of cotton yarn or rags.

Most of the woollen yarns were spun from carded wool. Most of the wool was carded on hand carders, but in the late 19th century hand-operated carding machines were being used in Ontario. Few wool combs have been found in Canada, and the presence of combed wool implies a date prior to the middle of the 19th century. Most wool was processed at home until carding mills were established shortly after 1800. By 1840, there were thirty mills in Lower Canada.

Wool was the fiber most often dyed. It was usually dyed in the fleece, and the most common colour was indigo blue.

The Sheep Breeds

The sheep brought to P.E.I. and those usually found in Ontario in the mid-19th century were the fine wool Southdown and the long wool Leicester, and their cross breeds. There are also records of Scottish Blackface and Lincoln sheep being imported into Canada.

Scottish Blackface

This breed is the most important in the United Kingdom today. The very long fleece is the result of selective breeding since Medieval times when its ancestors grew a short, coarse, wool. Scottish Blackface wool is coarse and exceptionally hardwearing. This
combined with a natural springiness make it ideal for carpet manufacture. Many of the best Axminster and Wilton carpets are made from this wool. Some grades can be used in the manufacture of tweeds such as Harris and Donegal, and other grades are prized for mattress filling. The staple length is 20 to 30 cm. The fleece weight is 1-3/4 to 3 kg.

The fleece which I bought had some black fiber which would contribute to the tweedy appearance of a yarn. Locks were combed to remove short fibers, spun worsted at 6-1/2 t.p.i. to a count of 3.2's and plied at 3-1/4 t.p.i. to form a durable warp yarn. Because the Blackface wool has been used historically for carpeting, a strong, durable 2-ply would be its most useful yarn.

The short fibers that were removed during combing were carded, rolled woollen and spun woollen at 6-1/2 t.p.i.

Lincoln

This breed originated in Lincolnshire, England. It is one of the largest breeds of wool sheep in the world and has been used extensively in crossbreeding. Lincoln's were used as a foundation breed for both Corriedales and Columbias. It was a favourite breed in colonial times for grazing heavily-timbered, wetter regions where it adapted readily to grazing on recently burnt-over forests. The strong wool resisted snagging.

Lincoln wool is long, coarse and lustrous. It is used for products requiring luster and a soft handle. It is being used increasingly as a blend with mohair. Lincoln yarns have no elasticity, should not pill, and will dye brilliantly. The staple length is 17 to 25 cm. and fleece weight averages 5 to 7 kg.
Individual locks were combed and spun worsted at 6-2/3 t.p.i. for warp and 5 t.p.i. for weft to a count of 5.6's. I spun only singles because I wanted to use the yarn in a sample which would be suitable for a shawl.

Leicester

The English Leicester was a pioneer breed, well-suited to watter regions and rough grazing. It is a big sheep which will thrive under a variety of conditions. In Britain, it is a long-established breed and has had an important influence on the development of British Longwool breeds. It improved dramatically in the 18th century when animal genetics pioneer, Robert Bakewell, began breeding for a smaller, earlier maturing carcass and shorter legs. It has since been used to improve other Longwool breeds.

Its wool is long, curly and lustrous with a staple length of 20 to 25 cm. and a fleece weight of 5 to 6 kg. The wool is used for braids, linings for suits, coats and costume cloths, furnishing fabrics and rugs.

The Border Leicester evolved on the English-Scottish border, by crossing the English Leicester and Cheviot. It has been used to develop such breeds as the Coopworth and the Borderdale. The wool is long and lustrous. Its staple length is 15 to 20 cm. and its fleece weight is 4.5 to 6 kg. The wool is used for upholstery, dress fabrics, lining materials and hand-knitting wools.
My fleece was from a Border Leicester. The locks were flick-carded, then spun worsted. Singles were spun at 6 t.p.i. for weft at a count of 2.2’s. I would add at least one more twist per inch for warp. To achieve a relatively soft 2-ply, I put slightly more twist into the singles (6.6 t.p.i.) and 3.3 t.p.i. into the ply.

Southdown

The Southdown has one of the finest wools of all the British breeds, and over the last 200 years it has played an important role in the improvement of many other Down breeds. In the late 18th century, John Ellman of Glynde began to select from and improve the short-wooled sheep native to the hills of Sussex and the Southdown was the result. Today it holds records for exports from Britain to other major sheep farming countries. It is used in the manufacture of a wide range of high quality fabrics including hosiery, hand-knitting wools, dress fabrics, flannel, light tweeds, and felt. It makes a light-weight underwear in which soft texture, elasticity and insulating properties are combined. The staple length is 5 to 8 cm. and the average fleece weight is 2 to 2-3/4 kg.

I had difficulty obtaining a Southdown fleece. I had to phone several breeders of purebred stock before finding one with fleeces on hand. Unfortunately, the fleece had many of the problems associated with sheep kept for meat with little consideration for the fleece. There were many second cuts and 3/4 of the fleece had to be discarded because of the chaff. As I worked on it, I consoled myself with the knowledge that pioneer spinners often used wool which was of poor quality due to poor nutrition and inbreeding within the farm flock.
The fleece was hand carded using flexible wool carders and rolled to form woollen rolags which were spun using the long draw. Singles were spun at 10 t.p.i. to a count of 6.3's. The singles required a fair amount of twist for the fine grist, and the resulting yarn would be suitable for a durable weft. But it was not soft. Plying at 5 t.p.i. restored softness and added strength. The plied yarn was very spongy and elastic, not suitable for warp but adequate for weft or for the pattern weft in overshot.

Corriedale

The Corriedale is a Merino/Lincoln crossbreed which was developed in New Zealand. The sheep are hardy and adapt to most climates. It was not one of the sheep imported into Canada in pioneer days, but I decided to use it in this study because I needed a crossbred sheep that was similar to those that may have resulted from the crossbreeding of Leicesters and Lincolns with Southdowns. The Corriedale has a staple length of 10 to 18 cm. with an average fleece weight of 10 pounds. The wool is excellent for knitwear because it has good elasticity, loft and luster, but it is also suitable for weaving.

Corriedale wool is soft, strong and lustrous and has a heavy grease content, but the grease can be easily removed with hot temperatures and sufficient soap.

Adult Corriedale was carded, rolled into a worsted rolag and spun worsted at 5 t.p.i. at a count of 5’s for weft. A plied yarn was created using singles with 6 t.p.i. that were twisted together at 3 t.p.i.
Lambswool was carded with flexible wool carders, rolled into a
woollen rolag, and spun woollen using the long draw. A durable
singles 4 warp was spun at 10 t.p.i. A softer but durable weft
singles was spun at 9 t.p.i. and plied at 4 t.p.i.

Fiber Preparation

All of the fleeces were washed in the same way. Each was soaked
for 2 to 3 hours in hand hot water (120° F.) containing Calgon (1
tbsp. per gallon) and Palmolive dishwashing detergent (1 cup per 10
gallons).

The fleece was drained and placed in a second wash containing
slightly cooler water, Calgon and 1/2 as much Palmolive as the first
wash. The fleece was then rinsed in warm water containing a small
amount of vinegar, and given a final rinse in warm water. The wool
was finally spun in a washing machine to remove excess water, then
air-dried on old window screens away from direct sunlight.

After spinning, all the yarns were washed and rinsed, then dried
under tension to make them easier to handle during weaving.

Silk

There is little information available on the hand-spinning of silk
by early Canadian spinners. I was able to find mention of only one
fabric containing silk thread, and that was a gauze wedding dress
woven in 1863. In this instance, a thin line of white silk alternated
with a blue woollen stripe on a weft of very fine combed grey wool.
Aniline-dyed silk was also used as an edging on the dress' frills. Aniline dyes had been discovered in 1856.

The only other mention of silk yarn is as an embroidery yarn. I could find no information on whether it was handspun or purchased.

I have included silk in the dyeing portion of this study because colour would be an important characteristic of embroidery yarns.

Fiber Preparation

I used a tussah brick for this exercise. The yarn was spun as a z-single at 6 t.p.i., with a count of 2.7 denier, to approximate the thickness of six-stranded embroidery floss. It was finished by washing in warm water and dried under light tension.
Clothing

Relatively few examples of pioneer clothing have survived. As they wore out, they were discarded, or they disappeared into hooked rugs, rag rugs or coverlets.

Textile fibers were in short supply in all areas of colonial Canada at first and settlers had to depend on what little they had brought with them. The earliest locally-grown fiber to be used in clothing was flax, because it could be grown as soon as a plot was cleared. Once sheep were established, small mounts of wool became available, and weavers produced drugget (linsey-woolsey) which had a linen warp and wool weft. When mill-spun cotton yarn became available, it replaced the handspun linen warp. When wool became abundant, it was used as both warp and weft in flannel (russetting) and fulled cloth.

Characteristic pioneer clothing of Quebec and Acadia would be the full-pleated skirts which were woven in weft-faced tabby with a z-singles cotton or linen warp and multi-coloured z-singles wool weft. Grey hooded coats made of double-fulled woolen twill cloth and the capotes made from Hudson Bay blankets were the two most usual outdoor garments for men throughout the 19th century.

The most characteristic clothing material of Ontario was woollen flannel. Most was woven in tabby from z-singles wool yarns. It was used in dresses, children’s clothing, men’s workshirts, and underwear.
The fabric was frequently checked. In Early American Weaving and Dyeing, which was published in 1817, the instruction for weaving flannels for fulled cloth is that it should be as solid as possible, with 1/4 more filling than warp so that it would require less fulling. If woven too thinly, too much fulling would be required and the threads would become crooked and knotty. The authors also suggest that when preparing the yarns for weaving, the best quality wool should be used for the weft yarns which should be spun as loosely as possible to facilitate finishing the cloth. The warp, on the other hand, should be spun with as much twist as the thread will bear without breaking.

Fulling was done by hand at first, but then fulling mills were established early in the 19th century. Cloth was often fulled to make it more weather proof. Most fulled cloth was woven from singles wool yarns and the weave was either tabby or twill.

All qualities of linen cloth were produced and they were sewn into shirts and dresses, with the finer linens being used in undergarments for trousseaus and special-occasion shirts. Most of the cloth was woven tabby and contained z-singles in warp and weft.

Shawls were worn as overcoats by both men and women. A man’s shawl was not as wide as a woman’s, but it was much longer (3 to 4 yards), and resembled the Scottish shepherd’s plaids. Since shawls were expected to last a lifetime, the yarns were spun extremely fine and the weaving was carefully done. Many shawls were woven in 2/2 twill, possibly to improve their drape, and the yarns were fine z-singles.
Carpeting

Carpets could only be produced when there was a surplus of wool available. The earliest type and the usual handwoven floor covering in Ontario and the Maritime provinces contained a multicoloured wool warp (2, 2s) which covered a cotton weft either partially or completely. The weft was either cotton yarn (usually 2, 4s) or cotton cloth strips. Conventional rag rugs were not woven early on because of the scarcity of mill-woven cotton textiles. Very few all-wool carpets have survived, but these were woven in twill or tabby with z-singles in warp and weft.

Linens

The earliest piece of dated linen found in Canada is dated to 1799. It was woven in tabby with z-singles yarn.

Linens were usually woven of unbleached yarns and the finished product was gradually bleached over time. Most were not dyed, although the German tradition of weaving blue and white checked linen tabby for pillow cases and sheets was continued in this country. Typical of the French tradition in Quebec was a tabby table cloth woven in a check of indigo blue wool (z-singles) and natural cotton or linen (z-singles).

Some linens were woven in tabby while others were woven in twills, huck, m’s and o’s, and overshort. All that survive used z-singles yarn in warp and weft. For towels and tablecloths a small,
over-all pattern such as huckaback was often used to make them more absorbent. Huckaback almost became synonymous with linen towelling in the late 19th century. A similar cloth was woven for baby wear. Cloth woven in such a way was called 'diaper'.

Blankets

Early blankets were woven in tabby to conserve wool. Twill was more usual at a later period, but it requires a closer sett and the weft packs down more firmly.

The usual decoration was simple coloured bands across the ends, although Scottish blankets often had the stripes down the sides because the blankets were to be used on box beds. Simple checks were also popular.

It was normal in both English and French culture to weave the blanket in two widths and join the two with a seam down the center.

Tabby was the usual weave since blankets were usually domestically produced and the basic loom had only two shafts. But broken herringbone was normal in traditional Scottish blankets, and 2/2 twill was used when 4-shaft looms became more general.

Linen was the preferred material for sheeting until well into the 19th century. Most sheets were perfectly plain with simple hems at both ends. Often the finest wool was put aside for really light, soft blankets that doubled as winter sheets. Many were plain and they were often woven on a fine cotton warp. In Waterloo County, winter sheeting were always of wool and often checked.
Coverlets

The earliest settlers had minimal household effects. The bed was a prominent feature in the home, and the bedspread was regarded as a way to brighten an otherwise spartan household. Many brought bed coverings with them but these would be replaced as they wore out and as the necessary fiber and yarns became available to reweave them.

In the settlers' households, every scrap of material was used and reused, and old coverlets reflect this, displaying a variety of combinations of homespun and commercial yarns and fabrics. The very earliest coverlets used a ground of linen, but this was replaced with cotton after 1790. The 2-singles commercial cotton yarns were usually plied for warp but used a singles in the weft. Heavier pattern wefts were usually handspun wool yarns. This unusual combination of yarns gave an interesting character to Canadian coverlets.

There were three types of coverlets woven domestically and professionally on shaft looms. These were catalogne (2 shaft), overshot (4 to 6 shaft), and summer and winter (also including diaper and doublecloth, 6 plus shafts).

Catalogne coverlets could be produced on a 2-shaft loom and therefore were the most likely to be produced domestically. Most of those surviving consist of a linen or cotton warp (usually z, 2s) with a weft of strips of woollen or cotton cloth or woollen yarn. The pattern usually consisted of simple coloured banding on a tabby
structure, but in Quebec special pattern sheds were created using a 'planché' or thin board, or loops of secondary wefts were pulled up to form a pattern or 'boutonne'.

Overshot coverlets may also have been produced domestically. However, most were woven by professional weavers who could maintain an even beat, thereby matching the pattern down the inevitable center seam. Overshot coverlets are the best known and most widespread. They, and pieced quilts, were the main bed coverings in rural Canada outside of areas of French traditions. The overshot coverlet was popular because it was very warm and used half the amount of wool required for a blanket of equivalent size. Most were woven on 4 shafts but some were produced on 8 or 10 shafts.

The oldest dated overshot coverlet found in North America was woven in the U.S. in 1773. The earliest recorded in Canada dates around 1800. The overshot weave was probably brought to Canada by Scottish immigrants since the appearance and spread of overshot weaving coincided with Scottish settlement. Handweaving was an important industry in southwest Scotland. In most Scottish communities, women spun their own yarn and professional custom weavers wove the yarn into cloth. Because of the Scottish Clearances which started in the 1760's, and because of the industrial revolution which threw many highly trained muslin and shawl weavers out of work, many Scottish weavers emigrated. The Canadian census of 1951 recorded many professional weavers in rural areas of Canada.

The earliest overshot coverlets contained a linen ground. This was replaced in the late 18th century with a white, hand-plied cotton warp and a 2-singles commercial cotton tabby weft. About 1840, a
commercial 3-ply warp became available and after 1850 this warp was often combined with a commercial 2-ply tabby weft. By the end of the 19th century, a 4-ply carpet warp was sometimes used with a plied tabby weft. The use of cotton singles as warp was rare.

The pattern weft was usually a z, 2s handspun wool, although sometimes a singles pattern weft was used. The use of linen as a pattern weft was rare in Ontario, but occurred more frequently in Scottish areas of the Maritime provinces. In the 1840’s, an entirely white cotton bedspread became fashionable in response to "Marseilles" bedspreads which were being imported from Europe. It had a 3-ply cotton warp and pattern weft. It was, however, rare except in Eastern Ontario. Few all-wool coverlets have survived possibly because, being lighter and warmer, they were worn out with use.

It should be noted that the overshot coverlets brought from Scotland differ from Canadian coverlets in several important ways. The Scottish coverlets have a commercially-spun 2-ply cotton yarn as warp and weft. This yarn is finer than the hand-plied warp used in Canadian coverlets. The Scottish coverlets also have a distinctly heavier pattern weft and the red dye used is less fast than, and lacks the rust tones of, madder.

Well over half of the surviving Canadian coverlets have an indigo pattern on a white ground. The second most common colour is madder. Dark indigo and rust red were the favourite colours in Ontario, while bright red was the most common in Cape Breton. The ground was almost always white, although some rare coloured grounds are found in all-wool coverlets. By the time synthetic dyes were common, overshot coverlets had almost ceased.
By the end of the 19th century, overshot coverlet weaving had almost died out due to the accessibility of commercial goods. It all but ceased during World War I.

The third group of coverlets contains complex weaves that required more than four shafts. They were, without doubt, woven by professional weavers, and they include such multishift weaves as double weave and diaper. Summer and winter coverlets using 6 shafts are also part of this group and although uncommon in Canada, they were produced in communities with a Loyalist tradition. Summer and winter produces a more serviceable fabric than overshot because no float extends over more than 3 warp ends, but overshot produces a warmer coverlet using the same amount of wool. Like overshot, summer and winter usually used a hand-plied cotton warp, a singles cotton tabby weft and a plied handspun woollen pattern weft. There is no record of these coverlets being made after 1835, and their decline is possibly due to the increased popularity of the overshot coverlets.
Sample No. 1: Overshot Coverlet

For this sample I have used an 8/2 commercial cotton yarn as warp and a handspun z-singles cotton tabby weft. This tabby weft was spun z at 16 t.p.i. to a count of 9. To weave overshot so that the web is 50/50 and the pattern units square, it is necessary to use a tabby weft which is slightly finer than the warp. The combination of a z, 2s cotton warp with the z-singles tabby weft and a z, 2s handspun woollen pattern weft is standard for Canadian coverlets.

The pattern weft should be about two times as large as the tabby weft, but it should be soft so that it will pack closely. In this sample I have used three different indigo-dyed fleeces to see how each performs compared to the other two. The Southdown and Corriedale lambswool were both carded woollen and spun with the longdraw. The Leicester wool was carded and spun worsted. The Leicester yarn definitely has more luster than the other two, but the yarns seem to full better in the woollen-spun yarns.

The pattern that I have selected is Monmouth. It has been found widely throughout eastern Canada, and occurs more commonly than any other coverlet design. The warp was sett at 20 e.p.i. It has been woven 'as-drawn-in'.

I used indigo blue on white since this is the colour of well over half of all the coverlets produced.
Sample No. 1: Overshot - Monmouth Pattern.

Pattern Wefts:
Leicester, Corriedale, Southdown. Woven "tromp as writ."

Black = Southdown yarn
Red = Corriedale
Green = Leicester

1, 2 (8x)
2, 3 (8x)
3, 4 (8x)
1, 4 (4x)
3, 4 (4x)
1, 4 (4x)
3, 4 (8x)
2, 3 (8x)
1, 2 (8x)
1, 4 (4x)
1, 2 (3x)
2, 3 (3x)
3, 4 (3x)
1, 4 (4x)

Source of Pattern: Keep me warm one night.
Sample No. 2: Summer and Winter Coverlet

The yarns used for summer and winter coverlets are similar to those used in overshot coverlets. The earliest coverlets had a linen ground (yarns were used as z singles) and wool pattern weft. I have woven this sample using a handspun linen warp, spun at 10 t.p.i. to a count of 16 lea. This was an excellent yarn as it held up very well during weaving. It was sett at 24 e.p.i. The tabby weft is also handspun linen but it had only 6 t.p.i. The pattern weft was a 2-ply, spun semi-worsted from Corriedale fleece that had been dyed in brazilwood with an alum mordant.

The pattern that I have chosen is identical to one in the Abercrombie Collection from Prince Edward County. It requires 6 shafts, as do all the surviving examples of summer and winter coverlets, but I have adapted it to 4 shafts by using only a portion of the pattern.

Summer and winter is traditionally woven "in pairs" and therefore I have woven this sample in that way.
SUMMER AND WINTER
Sample No. 2: Summer and Winter

Treading "in pairs" - Rising Shed.

Block A
1, 2
2, 4
3, 4
1, 4
1, 2
1, 4
3, 4
2, 4

Block B
1, 2
2, 3
3, 4
1, 3
1, 2
1, 3
3, 4
2, 3

Source of profile: Draft: "Keep Me Warm On Night"
Sample No. 3: Warp-faced Carpet

The earliest and most popular carpeting had a closely set multi-coloured wool warp (z, 2s) and a cotton weft (usually z, 2s used double or z, 4s) in grey, brown or white. The weave was a warp-faced tabby.

I chose Scottish Blackface fleece for this sample because it has been used historically for carpeting. I spun 2 singles at 6-1/2 t.p.i. (6.4's) and plied them at 3-1/4 t.p.i.

The colours I chose were obtained from dyebaths of fustic and indigo with several samples overdied.
WARP-FACED CARPET
Sample No. 4: Drugget

The most common fabric in early Canadian clothing was called 'drugget' or linsey woolsey. It evolved from the necessity to conserve scarce wool supplies. It had a linen or cotton warp with a wool weft. The yarns were usually singles. Drugget was used in all types of clothing.

The woollen weft was usually dyed. It could be a solid colour, as in many pieces of underwear, or multicoloured as in the banded skirts so popular in Acadia and Quebec in the 19th century.

I chose a z-singles handspun cotton warp, spun at 16 t.p.i. to a count of 9, and as weft I chose a variety of singles wool yarns, spun quite firmly for durability.
DRUGGET

NON-DRUGGET: COTTON TABBY

DRUGGET: WEFT-FACED SKIRT MATERIAL
Sample No. 5: Shawl

Most shawls were woven with fine singles spun from long staple wool which was often combed.

I used combed Lincoln, some of which had been dyed with indigo. The warp was spun at 6-1/2 t.p.i. and the weft at 5 t.p.i.

The sample was woven in a 2/2 twill.
SUMMARY OF YARNS

SAMPLE # 1
WARP - COMMERCIAL 8/2 COTTON; SLEYED 20 e.p.i.

TABBY WEFT - HANDSPUN COTTON - 'Z', 16 t.p.i. 9's

PATTERN WEFT - INDIGO DYED, HANDSPUN

SOUTHDOWN ZZ (10 t.p.i.) S (5 t.p.i.)

CORRIE DALE ZZ (6 t.p.i.) S (3 t.p.i.)

LEICESTER ZZ (6.6 t.p.i.) S (3.3 t.p.i.)

SAMPLE # 2
WARP - HANDSPUN LINEN - 'Z' 16 LEA 10 t.p.i.; SLEYED 24 e.p.i.

TABBY WEFT - HANDSPUN LINEN - 'Z' 19 LEA 6 t.p.i.

PATTERN WEFT - CORRIE DALE ZZ (6 t.p.i.)

SAMPLE # 3
WEFT - COMMERCIAL 8/2 COTTON

WARP - SCOTTISH BLACKFACE ZZ (6½ t.p.i.)
INDIGO S (3½ t.p.i.) SLEYED 20 e.p.i.

FUSTIC / IRON

ALUM / FUSTIC / INDIGO

INDIGO / FUSTIC / IRON

COPPER / FUSTIC

INDIGO
SUMMARY OF YARNS

SAMPLE # 4
WARP AND WEFT - NONDRUGGET: WARP - DRUGGET
HANDSPUN 'Z' COTTON, 16 t.p.i. 9's SLEYED 24 e.p.i.
WEFT - 'Z' SOUTHDOWN AND LAMBSWOOL
TIN / ONIONSKINS
COPPER / LOGWOOD
ALUM / MADDER / AMMONIA

SAMPLE # 5
WARP AND WEFT - COMBED LINCOLN, 'Z'
SLEYED 22 e.p.i. - WARP - 6 1/2 t.p.i. - WEFT 5 t.p.i.
AS FOR 5. INDIGO DYED
REFERENCES


