# Fiber, Yarn and Structure:

# The Trilogy of a Good Project

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# Fibers

- **Animals**
- **Plants**
- **Regenerated**
- **Man-Made**

# Animal Fibers

- **Wool**
  - **soft, warm, elastic, absorbent**
  - **Unless otherwise specified, commercially generic wool is from medium staple**
  - **Merino finer (picture by Cgoodwin, Wikepedia)**

# Animal Fibers

- **Hair, fur, down**
  - **Alpaca, angora, camel, mohair, cashmere, llama, qivuit, vicuna (Alpaca picture from Tony Hisgett, UK, Wikepedia)**
  - **Generally finer than wool with less crimp**
  - **Commercial yarns often mixed with wool or silk as they can be expensive**

# Animal Fibers

- **Silk**
  - **Luxurious and warm**
  - **Extruded as a single filament or spun for shorter fibers**
  - **Cultivated  Bombyx Mori most slick and shiny,**
  - **Wild silks coarser with more texture**

# Plant Fibers

- **Cotton**
  - **Strong, absorbent, not very elastic, some memory**
  - **Old World *Gossypium* lower quality than New World**
  - **Upland, Acala (*G. hirsutum*), Sea Island, Pima and Egyptian (*G. barbadense*) New World cultivars**
  - **Naturally colored cottons mutants of *G. hirsutum***

# Plant Fibers

- **Bast Fibers**
  - **Linen**
    - **Long fibers, strong, absorbent, dries quickly, wrinkles easily, inelastic with little memory**
  - **Ramie and hemp most common, nettle from Nepal**

# Regenerated Fibers

- **Slurry from material and then extruded**
- **Plant based**
  - **Rayon oldest, denser, not environmentally produced**
  - **Bamboo, banana, pina, modal**

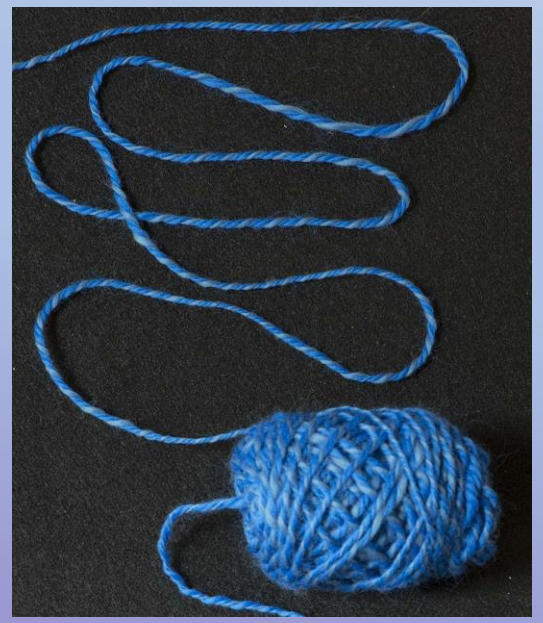
# Regenerated Fibers

- **Tencell®(lyocell) plant based, not classified as rayon, different process, better environmentally**
- **Azlon, protein based**
  - **Soy, corn, milk, peanut, seacell, sugar cane**

# Man-Made Synthetics (Yarns)

- **Originally poor qualities, now microfibers have improved them**
- **Nylon (polyamide), acetate, acrylic, polyester (Ecospun)**
- **Metallic:**
  - **aluminum most common, sandwiched with yarns**
  - **silver and gold old-time luxury**
  - **Stainless steal plied with yarns**

# Fibers to Yarns

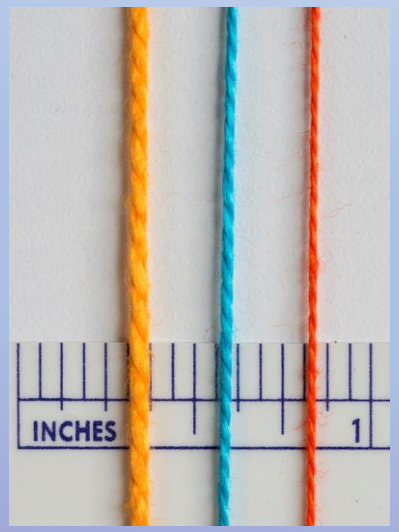


- Processed to ready for spinning
- Spinning method makes a difference
  - Woolen: soft, lofty, fuzzy and stretchy
  - Worsted (spinning, not size): strong and lustrous

# Fibers to Yarns

- **Post-Spinning treatment**
  - **Cotton (non-mercerized) combed, matt and soft**
  - **Mercerized, treated with alkali, more lustrous**
- **Super-wash Merino**
  - **Doesn’t felt, less strong, not as soft**

# Yarn Systems




- **First number: relationship between length and weight**
- **Second number = number of plies**
- **Cotton as an example: 3/2 yellow, 5/2 blue, 10/2 orange**
  - **For the same weight, 3/2 has 3 units of length, 10/2 has 10**
  - **10/2 is thinner than 3/2**

# Different Systems for Different Yarns

| Yarn System | First # (for 1 ply) | Conversion Factor | Second # |
|---|---|---|---|
| **Cotton (& extruded)** | Skeins / lb. | 840 yards (cotton count) | Ply |
| **Worsted Bradford** | Skeins / lb. | 560 yards (worsted count | Ply |
| **Woolen** | Skeins / lb. | 1600 yards (run) | Ply |
| **Linen** | Skeins / lb. | 300 yards (lea) | Ply |
| **Dernier Silk Filament** | Grams/length | 9,000 meter (Den) | Ply |

# Example: Comparison of 20/2

| Yarn | Yards/lb. | Warp Sett (epi) |
|---|---|---|
| **Linen** | 3,000 | **24 - 30** |
| **Silk (Spun Bombyx)** | 5,000 | **24 - 28** |
| **Wool (Worsted)** | 5,600 | **20 - 30** |
| **Cotton** | **8,400** | **30 - 48** |

# The Consequences of Different Yarn Systems

- **In a project we cannot substitute 20/2 cotton (blue) for 20/2 silk (red) without adjusting the sett**
  - **The number of total ends will change and thus the pattern may have to be adjusted**

# The Consequences of Different Yarn Systems

- **In a project we can substitute by sett, but we must pay attention to fiber density**
- **Both 5/2 cotton and 2-ply Shetland wool can be sett at 12 epi**
  - **Cotton has 2,100 yards/lb, the wool 1,800**
  - **Not a big difference but it can add up & cotton is denser**

# The Elusive Sett

- **Wrap a yarn around an inch, each strand close but not overlapping and count. That is the wpi or wraps per inch, sometimes called the grist**
- **The baseline sett or epi = ½ the wpi**
- **And then, the fun starts!**

# The Determinants of Sett

- **Grist of the yarn**
- **Project: a tablemat is sett closer than a scarf, for the same yarn**
- **Fiber: a slick the yarn needs a closer sett**

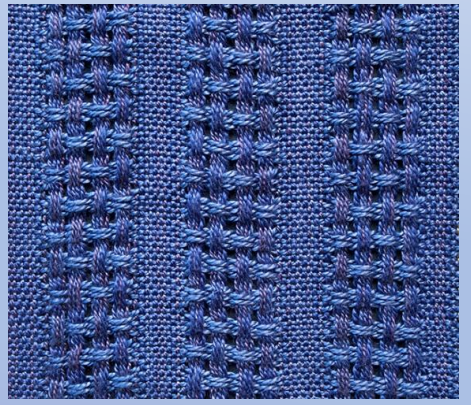
# More Determinants of Sett

- **Warp & weft interactions:**
  - **Continuum from weft-faced (open sett) to warp-faced (sett 2 times the grist)**
  - **Weft smaller than the warp? Sett warp closer**
  - **Weft larger than the warp? Open up the warp sett**

# The Role of the Weaver on Sett

- **Beat: if you beat hard, consider setting the warp a bit closer so the fabric doesn't become too stiff**
- **The narrower the piece, the harder the beat**
- **Draw-in: open up the sett slightly to avoid bunching warp threads at the edges and causing tension problems**

# Structure and Sett



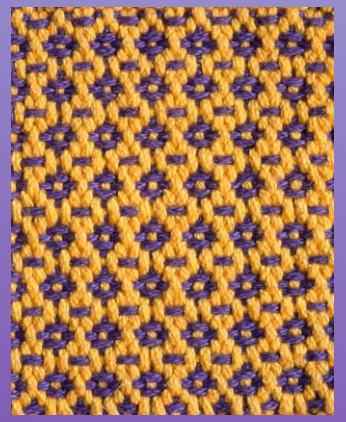
- **Sett = ½ grist is for balanced plain weave**
- **The longer the float, the closer the sett needs to be**
- **In structures with a combination of plain weave and floats, the sett is for the predominant portion**
- **In structures with two wefts, the background tabby is more open a tabby alone**

# Structure and Projects: Plain Weave

- **Cotton: placemats, rugs, anything that needs to be sturdy**
- **Wool: woolen warm blankets and afghans**
- **Linen: crisp napkins**
- **Any fiber: color interactions (think Pointillism)**

# Structure and Projects: Twills

- **Silk: luxurious scarves and shawls**
- **Woolen wool: warm scarves, blanket and afghan**
- **Worsted spun wool: fabric for garments (Scottish kilts)**
- **Linen warp and wool weft: rugs**
- **Cottons: accessories and fabric**



# Structure and Project: Rectangular Float Weaves

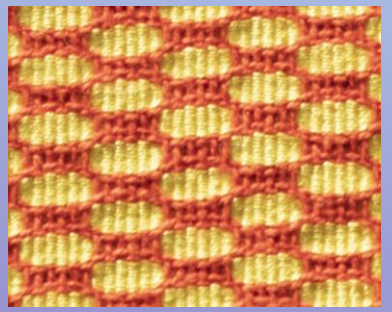
- **Cotton and linen**
  - **Household textiles (“huck toweling”)**
  - **Anything lacey**
- **Woolen wool: lofty blankets**
- **Silk: accessories (but drape less than twills)**

# Structure and Project: Compound Weaves

- **Linen or cotton ground, wool supplementary:**
  - **Coverlets (overshot, summer and winter, and double weave)**
  - **Pillow covers**
  - **Weft-faced rugs**

# Once You Know the Rules, Break Them!

- **A good cloth is one free of threading and treadling errors, good selvages and good beat; good craftsmanship, in other words, including appropriate finishing**



- **A great fabric is a good cloth woven with the materials appropriate for its end use, and warp and weft working well together, by adjusting the size of the yarn, the sett and the beat**
- **An excellent cloth is a great cloth with good design**

# Where Do We Go from Here?

- **What are your preferences on the loom? Adjust for beat, how you treadle, etc. Weaving comfortably means weaving more**
- **Know your preferences in the final product: do you like lofty? Sturdy? Drapey? Make that your goal, stay away from extremes and think about design**
- **Evaluate every piece that comes off the loom**

# Where Do We Go from Here?

- **Think about what I call**

  **Anita Luvera Mayer's baseball theory:**

  **"If you don't fail with 2/3 projects, you are not growing enough"**

- **With a batting average of 0.333 you are headed to the Hall of Fame!**

# Thank you for your Attention!