Stanley Bulbach

The Weaving Arts: An Ancient Technology

The New York Academy of Sciences

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STANLEY BULBACH came to his interest in weaving as an ancient technology through scholarship, receiving a Ph. D. in Ancient Near Eastern Studies from New York University in 1981. He has turned to craft to express artistically some of the impact of that period of history on subsequent civilizations.

Dr. Bulbach produces all his own materials for his carpets. He spins lustrous, durable yarns, colors them exclusively with natural rich dyes, then weaves them into large 3' x 6' expressionistic wall hangings relying solely on the techniques of the ancient Near East. The carpets are produced on a simple upright loom manipulated by hand.

His wool carpets have been widely exhibited, notably in: *Stanley Bulbach: Master Spinner, Dyer and Weaver* at the George W. O'Bannon Gallery, Philadelphia in 1988, and *Stanley Bulbach: Master Weaver* at the Evansville Museum of Arts and Sciences, Evansville, IN in 1986. He lives in New York and lectures throughout the country on textile arts.

Front: *Fire Water*, Carpet bed, handspun Lincoln wool, black oak, madder and cochineal dyes. 91 x 178 cm. Collection of Gregory Grant, Los Angeles.

The Weaving Arts: An Ancient Technology

by STANLEY BULBACH

In the early cuneiform records of the ancient Near East there is evidence that four millennia ago the textile arts were a highly sophisticated commercial activity requiring the mastery of broad scientific knowledge. The chemistry of dyeing, the husbanding of animals, the mechanics of spinning and weaving, the economics of business and trade contributed to the historical rise of technology. Through the textile arts, we can see the story of human existence unfold.

As a student of the ancient Near East, I reenact the age-old processes that transformed woolen fleeces and natural dyes and reinterpret them as a contemporary art form: hand-loomed carpets based on ancient technology. The inspiration is two-fold: the historical significance of textile development and the actual process of carpetmaking itself. The physical properties inherent in wools and dyes and the chromatic musicality of the ancient flatweave technique comprise the artistic medium I use to bridge an understanding of the ancient world with the present.

The economic and technological impact of textile making originated in the Near East and passed from civilization to civilization to our own time. Textiles have held economic importance throughout history including during the civilizations of Greece and Rome, medieval France, Renaissance Italy, and the British empire. In the United States, the agricultural South as well as the industrial North were significant textile economies until recently.

Art and technology have closely related origins. The ancient technology of dyeing evolved into our photochemical industry and that of weaving influenced machine engineering. Looms became more complex in construction to expand woven structure and design capabilities. By the 17th Century, jacquard looms incorporated wooden cards with punched holes for design automation. They were the precursors of punched card business machines and the modern computer. Looms were among the first pieces of production machinery that drew their power from other than human or animal sources when Europe entered the Industrial Revolution.

Likewise, because color has always been highly coveted, the processes of dyeing have spurred chemical research: in modern times dyes were among the first commercial products to be synthesized. Relatively inexpensive aniline dyes made color affordable to the masses for the first time and spurred a burgeoning chemical industry. Ironically, the chemical breakthrough that permitted synthetic dyes put natural dyes out of business just at a time when that science had the capability to analyze natural dyes and improve upon the techniques of their application. Nonetheless, natural and synthetic dyeing benefitted biological staining and led directly to our modern photochemical industry.

Historically, the largest industry in ancient Mesopotamia after food production and distribution was the textile industry, based originally on the far older domestic textile arts. We do not know the origin of the woven arts since the artifacts are relatively perishable. Evidence shows, however, that the first pots were clay-coated woven baskets, which indicates weaving skills definitely predate the advent of pottery. Physical materials were not only worked to solve material requirements but also to express artfully an understanding of those materials. Containers fashioned to hold foods were decorated to show their contents and functions.

The weaving arts precede written records, for at the dawn of history we find evidence in the earliest texts of complex textile production that goes well beyond solving the basic needs of survival. By 1900 B. C., surviving cuneiform tablets from the Sumerian city of Ur comprehensively document a huge production of about four million pounds of new wools into textiles annually. The records of the “Wool

Office" consist of debits and credits, inventories, controls for processing and personnel records. This created an inventory which exceeded local market demand. It produced excess for luxury and export. A light, storable commodity, textiles accelerated trade and generated capital for economic growth, encouraging development of the business skills of writing, mathematics and accounting.

In the mid-8th to 7th Centuries, B. C., the Assyrian Empire was the first to totally dominate the Fertile Crescent. Recorded in the cuneiform document, the *Assyrian Annals*, is the tribute gathered by the Emperor Tiglath-pileser III. Among the royal treasure of gold, silver, tin and iron were listed "blue and purple dyed wools." The "King of the World" cherished color as highly as the precious metals he needed to run his vast economy. Archaeological evidence of wool dyeing at excavation sites indicates the existence of material well-being.

To the craftsman working with fibers, the importance of selected wools, handspun yarns and tested natural dyes is familiar from surviving antique oriental carpets. The first step in producing woolen carpets is to select strong and lustrous fleece. There are over 200 breeds of sheep whose wools vary as significantly as do wood grains from differing strains of trees. The longest, strongest and most lustrous wools come from the Lincoln breed which is relatively uncommon in the United States. Viewed microscopically, the shaft of a wool fiber has shingled, flat plaques that reflect light: Lincoln fibers have very large plaques which create a bright luster in the wool. These plaques are also the dye sites, so dyed Lincoln yarns are characterized by their deep color, as well as by their brilliance, tensile strength and abrasion resistance.

Such wool qualities are not familiar to many Americans nowadays. During the past century, flocks in the U.S. had been culled to create a homogeneous stock of all-white sheep grown for both the wool and meat markets, an all-purpose sheep which then did not excel in either the wool or the market. Sheep with wool characteristics that were in any way non-standard cause problems for industrial processing. Today, sheepgrowers are working with scientists and handspinners to redevelop divergent genetic strains to breed specifically for unusual wool qualities for smaller markets.

After shearing fleece produced for handspinning, the wools are sorted according to the fiber qualities of the individual animal. They are gently washed or scoured, then teased open or carded, to align the fibers in preparation for spinning. By contrast, in industrial processing the wools cannot be so carefully sorted and the washing includes hot acid applications. In industrial spinning, the wools are heavily oiled and processed under tension.

While time-consuming and uneconomical, hand-spinning is highly prized: wool fibers with special qualities (and no chemical or machine damage) yield yarns designed to specific specifications. Handspun yarns should be even in construction; rarely should they look "homespun." Museums are filled with textile treasures made of perfectly formed handspun yarns. Spinning was first done on top-like "drop spindles." The prepared wool fibers were held in one hand, and as they were drawn out or attenuated, the spinning top action of the drop spindle would twist them to form the yarn. This is spinning — the drawing out and twisting of fibers simultaneously. During Roman times the more familiar types of spinning wheels were developed, which improved productivity.

Natural dyeing, likewise time-consuming and uneconomical, is also prized. The use of natural dyes is risky and delicate but it can yield colors of breathtaking beauty, richness and complexity which are irreproducible through most synthetic means. This ancient art is largely a two-step process. Most natural dyes do not adhere directly to the protein fibers of wools. The wools, therefore, are treated with metallic salts, such as alum, which combine readily with the wool fibers. These salts are called mordants, from the Latin referring to biting. The dyes then attach to the salts on the fibers.

Isti Mirant Stella, © 1986, Stanley Bulbach. All rights reserved. Collection: J. Patricia, NJ. Flying carpet, handspun Lincoln wool and mohair, indigo and cochineal dyes. 92 x 172 cm.

Plants, animals and minerals provide the sources of natural dyes, the major source being vegetal. The hue and quality of the color derived depend on many variables: with madder root, for example, the growing and aging of the root itself vary, affecting the relative proportion of dye-rich root sheath to dye-poor root core. Similarly, in applying the dye, the mordanting of the fiber as well as the pH of the dyebath, its mineral content and temperature, all play a part in determining color intensity.

The Old World kermes insect was the source of one of the major red purple dyes, hence the etymology of crimson. A richly colored New World variant, cochineal, is a cactus parasite used by native American dyers. Cochineal can be treated with various acids and/or mordants to produce a wide range of shades from scarlet through crimson to purples that rival the famous ancient royal colors from the Phoenician murex shellfish.

The blue dye indigo comes from the leguminous indigo plant after it has been permitted to rot in water. The indigo molecule is soluble only in alkaline solutions in the presence of a reducing agent. In this state it is colorless and can attach directly to the wool fibers. It needs no mordant.

When removed from the reducing dyebath, the colorless indigo on the wool fibers reoxidizes in the air, turns insoluble, and then a vibrant blue color appears. This complex procedure and the dye plant itself came to the Mediterranean world from the Indus Valley, as indicated by its Greek name indikos, meaning of India.

Yellow comes from many sources. My source is black oak bark; its dyeing chemical is quercitron, from the Latin quercus, or oak. When exposed to ultraviolet light, all natural yellows begin to oxidize and discolor. Like human hair, genetically colored wools will also lighten in ultraviolet light. Green, not available from any single source, is derived from dyeing first with indigo then yellow. The tendency of aged textiles to turn from green to blue over time when improperly cared for is due to the durability of dyes: yellow is the least light-fast and indigo the most light-fast, hence all those medieval tapestries with strange blue foliage. Colors from natural dyes, while intense, are not pure because of the many chemical constituents of the decocted plants or insects While these dyes produce colors within specific ranges, it is rarely possible to produce the exact color twice. The use of different dye batches results in subtle valued striations in the weaving called abrash, from the Arabic meaning mottled.

History deals with such an enormous expanse of time that few relics have the ability to convince us the past is indeed real. One of these relics, for me, is color: dark indigo always summons

forth the ancient Assyrians out of the shadows and into the broad light of day.

With the breed of sheep selected, the fleeces sheared and carded, the wools spun and dyed, now the materials are gathered to be transformed into an expressive art form, the carpet. Carpets to me can be mystical. When nomads stop at the end of the day's travels, they spread their carpets to soften and warm the foreign ground of their new encampment. In this they actually recreate a familiar, often hallowed, plot. The earthly materials changed into carpets as such transform the earth they cover. The cultural legacy of the carpet is rich. Carpets are used as beds. People are born on them. They conceive on them and they die on them. They eat and sleep on them. Many are special, reserved only for prayer.

To reflect these important aspects of life, powerful designs are woven into the textiles. Traditional designs are plant and animal motifs, some stylized almost beyond recognition. The designs of my carpets are contemporary but derive both from the iconography of the Near East and other non-Western cultures as well as from modern abstraction. In the flatweave, or weft-faced technique, the woven designs are not superficially applied but actually constitute the structure itself. The colored weft yarns perpendicularly bind together the hidden, underlying taut warp yarns. The horizontally woven weft yarns create the complex visible design, unlike with pile carpets whose placement of independent knots affords a freedom to depict almost any two-dimensional pattern.

Artistically, the carpets I design fall within three categories: bed carpets, flying carpets and prayer carpets. *Fire Water* is an example of a bed carpet. In the Near East people have always slept on such carpets, the design of which creates a supporting surface on which to lie.

The bold design of *Fire Water* calls forth a reflection on the water of autumn leaves. The surface of a woodland spring is invoked by subtle concentric ripples caused by a light rain. This geometric pattern has many ancient roots. In Japan, it is called oak leaf. It also appears throughout Near Eastern flatweaving in carpets of the kilim style. The interaction between design elements, between water and reflected leaves, parallels the dynamic relationship between foreground and background inherent in flatweave structure itself. The play between matter and illusion dances on the border between being awake and dreaming.

Historically, flying carpets exist only in legend. The ones I make are woven with designs that imply swift movement, either by emphasizing a strong rhythmic pattern or by depicting a flying image. Insofar as they also suggest flying from this world to the next, they incorporate a somber dimension. *Isti Mirant Stella* is the text which appears on the *Bayeux Tapestry* completed in 1066 A. D. at the time of the Battle of Hastings when King Harold of England was under siege from the conquering Norman invaders. It bears the first known illustration of Halley's comet, "They marvel at the star!" This flying carpet is woven with a special flatweave technique which permitted the development of two designs simultaneously. The bolder one is the more realistic image of the comet. The fainter image is a ghost of the historic illustration on the medieval tapestry. The overlapping designs appear on alternating weft lines: A sense of radial illumination was achieved by controlling whether this alternation took place horizontally or vertically. While flat-weave design capabilities at first seem simple and limited, they are actually complex. Using techniques developed and preserved through millennia in North African weaving tradition, the comet in this carpet was made to seem to glow.

In the prayer carpet, there is a focal point for the concentration of meditation and prayer.

A section is reserved for sitting or kneeling. In the Islamic world they are still used for daily prayers. *Sumac Auspices* expresses an ambivalent nature. A dense thicket of sumac has turned to brilliant autumnal hues. From this sitting or kneeling section, one can covertly watch the birds against a changing sky, a portent of the future. Autumn is bountiful, colorful and invigorating, yet it brings with it the end of the

annual life cycle. The divergent birds do not yet tell if the sky is storming over or clearing. The strength of the primitive flatweave technique is its ability to manipulate and vary basic patterns abstracted from nature, in *Sumac Auspices* the bars of clouds, geometric birds and triangular leaves.

Textiles evidence the contest of intimacy and mastery between the materials worked and the unique human hand. They reveal a detailed pedigree of inherited skills and knowledge willed across generations from the very beginnings of our history. The crafted structure beneath the weave tells us far more than the immediate surface appearance. Sub telis in Latin means beneath the weave, the etymology of subtle. The subtle information of flatweave dictates how the superficial appearance is achieved, how well it will function, how long it will endure. The knowledge of construction and the transformation of materials remains vital to us all. When skillfully and artistically worked, structure reveals nature and character. Of necessity then it expresses something of our destiny as well.

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Sumac Auspices, © 1983, Stanley Bulbach. All rights reserved. Prayer carpet, handspun Lincoln wool, cochineal and indigo dyes. 170 x 92 cm.