Knot News

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Notes on Nested Grids (2) Components

Pieter van de Griend

Prologue

In previous articles we have seen Nested grids in a number of varieties [1, 2]. Some were single-stranded others were interweaves of Regular Grids. Some were symmetrical others asymmetrical. If a Nested Grid is not single-stranded, it must, by definition, consist of more than one component. We have seen how to detect single-strandedness by means of the Nested Grids Common Divisor Law [2, p4]. Here we start an investigation into general principles by means of which a multi-component Nested Grid can be decomposed. In the following we shall be concerned with *Symmetrical* Nested Grids (B,A,*x*,*y*).

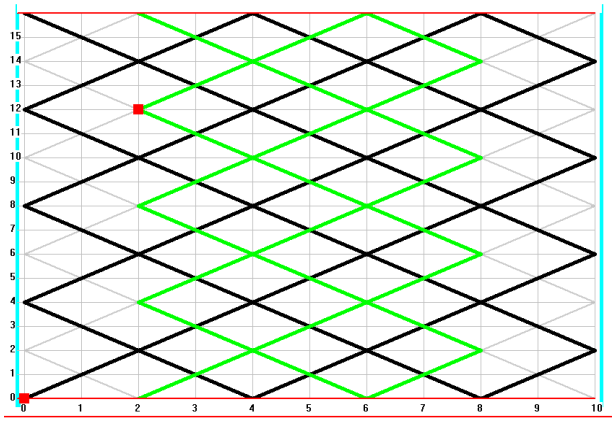
Components or interweaves are all the same sort of thing, except that interweaves refer to *coded* grids. Although components will grow to become grid-attributes in this article, we commence from an interweave starting point. Let us head off from the Regular Grids and pose progressively harder questions such as "*what determines a Nested Grid component*?" and "*which types of Nested Grid components can be found*?"

By breaking things apart (i.e. reductionism) you usually learn more about the aggregate and the way it hangs together. The approach in this paper is that we take somewhat arbitrary Nested Grids, pull them apart and discover *whether* they possess components and of *which* type they are. We thus gain understanding of possible component types. How to evidence completeness and correctness of our finds is left for a future Notes on Nested Grids paper. We first require a feel for the type of components an arbitrary Nested Grid can be broken down into. Therefore let us commence with the most obvious of Nested Grids; a super-positioning of some number of Regular Grids. We are at an advantage here, as we know which types of components we are dealing with.

Regular Grid Components

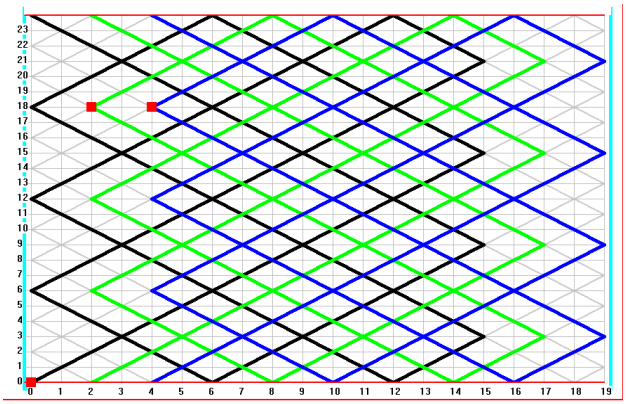
As is well-known, any *p/b* Regular Grid of more than one component is a composite of φ evenly spaced Regular Grids, where φ is given by the greatest common divisor of *p* and *b*. The positioning of these grids relative to each other is extremely important – as we shall see. What can we say about 2 arbitrary Regular Grids? Either they are identically dimensioned or they differ. In any case for them to interweave they must be of **permissible dimensions**. What does that mean and what does that imply?

Example 1: Consider (4,2,6,2). Note how a *p/b*=5/4 Regular Grid is compounded by pasting a *p/b*=3/4 Regular Grid on top of it. These two super-positioned Regular Grids yield (4,2,6,2). This is possible because *p/b*=5/4 and *p/b*=3/4 possess permissible dimensions.



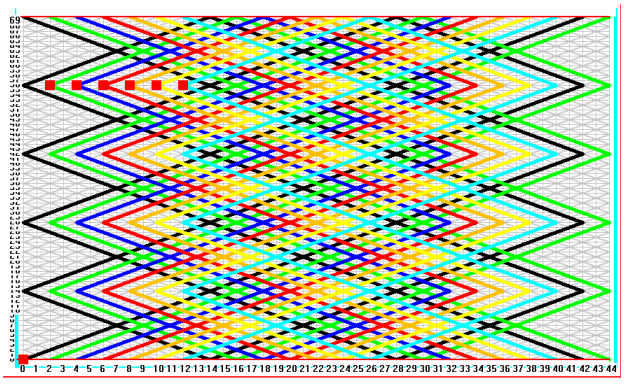
This leads to the question whether the process of centering grids can be repeated? We shall leave it to the reader to discover why multiple centering fails.

Example 2: Consider (4,3,11,3) in which skew-placement of the Regular Grid solves the previous problem of super-positioning multiple Regular Grids. This sample consists of three super-imposed Regular Grids *p/b*=5/4, which are non-centered.



Example 3: As (5,7,20,0) shows, a skewed overlap of 7 components, may be less domesticated than (4,3,11,3). Note the Regular Grid components.

Black	Regular Grid *p/b*=6/5
Red	Regular Grid *p/b*=4/5
Green	Regular Grid *p/b*=6/5
Blue	Regular Grid *p/b*=4/5
Light Blue	Regular Grid *p/b*=4/5
Yellow	Regular Grid *p/b*=4/5
Brown	Regular Grid *p/b*=4/5

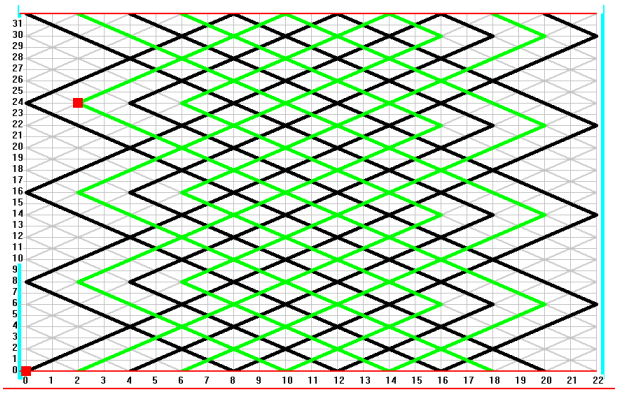


So, what have we learnt? That Regular Grids can be super-imposed in skew fashion to any level yet only in centered fashion to level 2.

Nested Grid Components

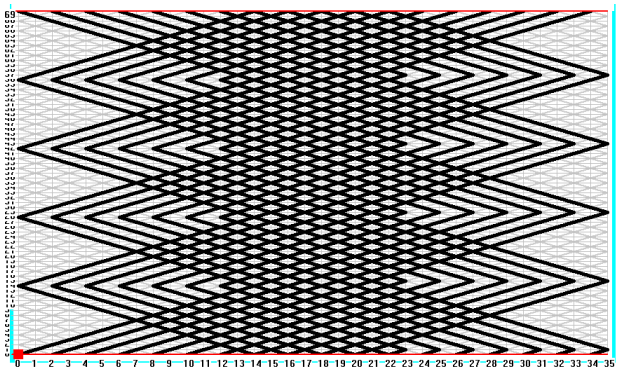
Skew-placement and super-positioning also works for Nested Grids, the illustration below shows that we can superimpose *permissible* Nested Grids to obtain another (larger) Nested Grid.

Example 4: Nested Grid (4,4,10,6) shows superimposed (4,2,*x*,*y*) and (4,2,*x*,*y*) along their centerline. Can you find an example Nested Grid based on a set of skew super-positioned Nested Grids?



Note that centering a Regular Grid along a Nested Grid will not work when nesting number *A*>1. Centering or skew-centering a single stranded Nested Grid along a Regular Grid will never work either, because the Nested Grid *y*-value must be some multiple of its nesting number *A*. Of course fitting Nested Grids can be found but they will, by construction, not be single stranded. Try to fit a Regular Grid onto the pure Nested Grid of Example 5.

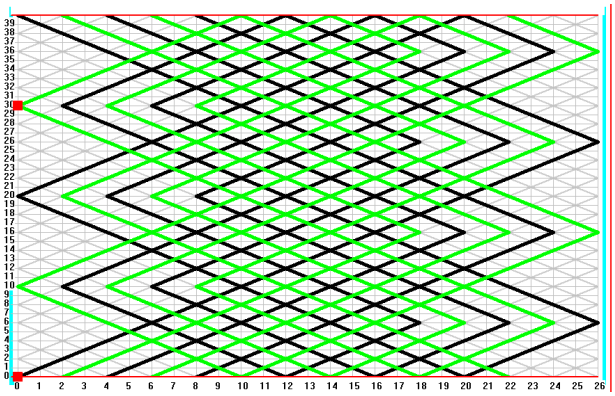
Example 5: (5,7,11,1) is a Nested Grid of one component.



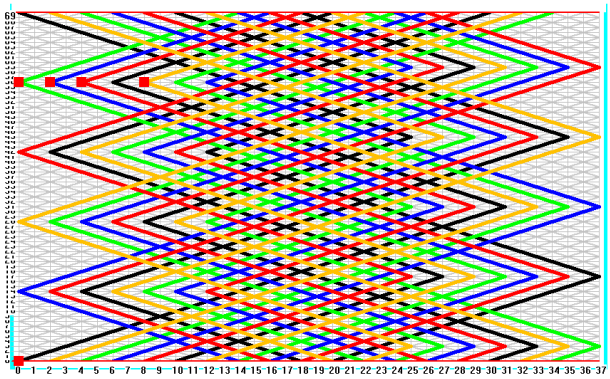
X Grid Components

We have considered neat components so far. Now be in for a few shocking surprises.

Example 6: In the image of (4,5,10,6) below, we find 2 skew placed components, one black and the other green. Verify that they are neither a Regular Grid nor a Nested Grid.



Example 7: Consider (5,7,13,3) given below. It is not single stranded and also boasts some of these weird components.



Some X Grid remarks

Note that X Grids have a peculiar form of symmetry in their left and right rims. This is especially remarkable as they feature as a component in a *Symmetrical* Nested Grid.

We found X Grids as a remainder class, being non-Regular Grids *AND* non-Nested Grids. X Grids are, in some sense, the superset of the Nested Grids, like Nested Grids being the superset of the Regular Grids. Put in other words, X Grids are the generic Regular Grids. So, that implies only one thing – you have gotten hold of a more generic item than Nested Grids. Is it the universal object? They certainly have a blaring classification problem. In the literature there are some notes on the classification of these grids by the late Georg Schaake (*et al.*) [3, p415].

We shall be having more to say on this component type in a future Notes on Nested Grids article. Here we merely note that they exist and lump all of these samples into one category and baptize them as X Grids.

Conclusions

We may list our findings as follows. For an arbitrary Nested Grid we can have a component-mix consisting of:

1. Regular Grid + Regular Grid (ex. 1, 2, 3)
2. Nested Grid + Nested Grid (ex. 4)
3. X Grid + X Grid (ex. 6, 7)
4. Pure Nested Grid (ex. 5)

Here we have taken the approach of classification by means of structure. After all, it is deemed bad practice to base a product classification on the manufacturing process.

Epilogue

What have we learned in school today? That we can decompose any Nested Grid! This leads to an interesting question. What is more important? Knowing *how many* components there are in an arbitrary Nested Grid or knowing *what kind* of components make up an arbitrary Nested Grid?

References

1. Pvd **Griend**, “Aspects of Sphere Covering Knots”, *Knot News*, issn 1554-1843, no. 57, pp1-6, September 2006.
2. Pvd **Griend**, “On Gridtype and Codingform Interplay”, *Knot News*, issn 1554-1843, no. 66, pp 1-8, March 2008.
3. AG **Schaake**, F **Masure**l, D van **Tassel**, “Nested Cylindrical Braids”, *The Braider*, nr. 19, p 415, August 1999.

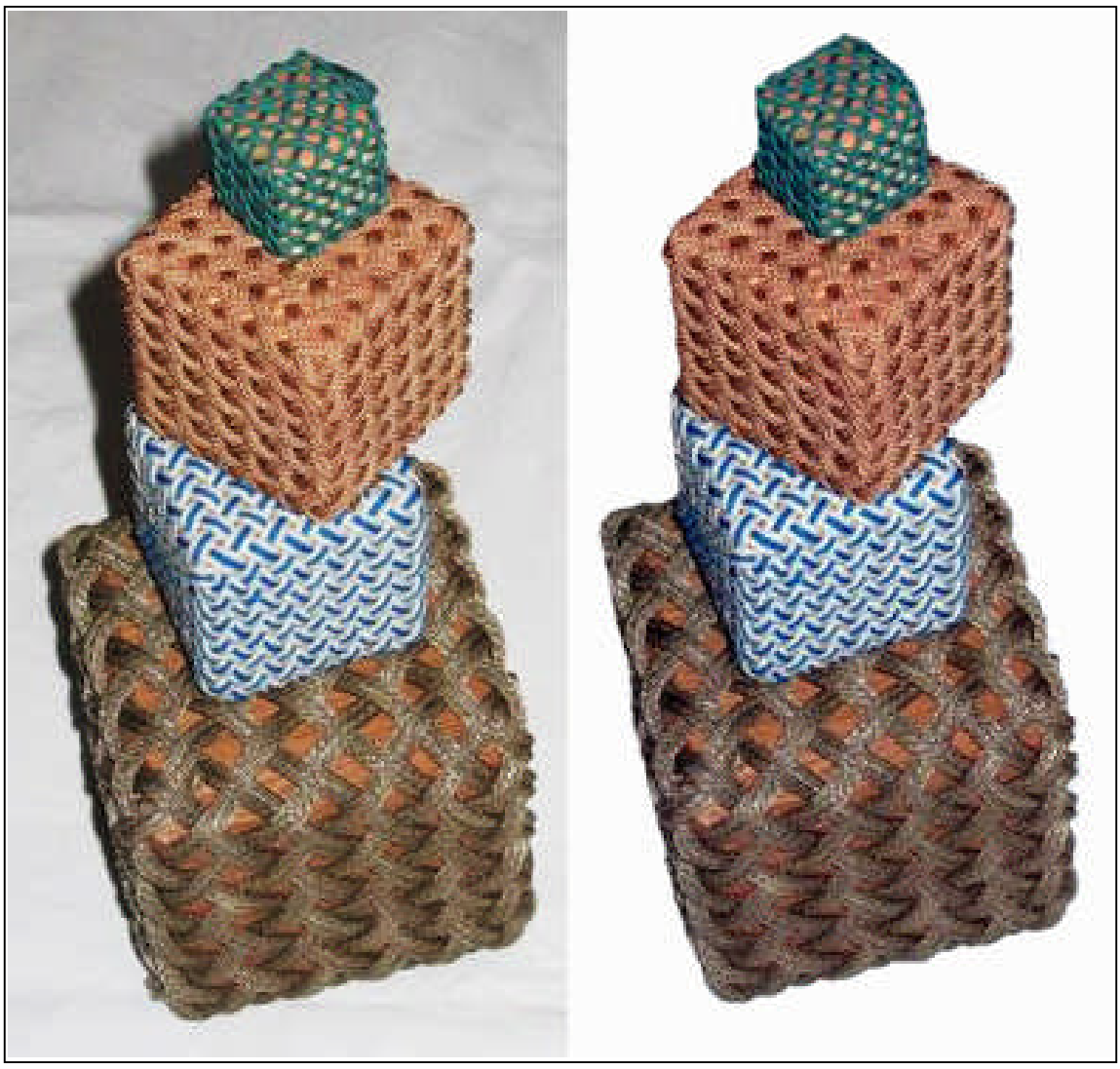
Stiphout September 2009

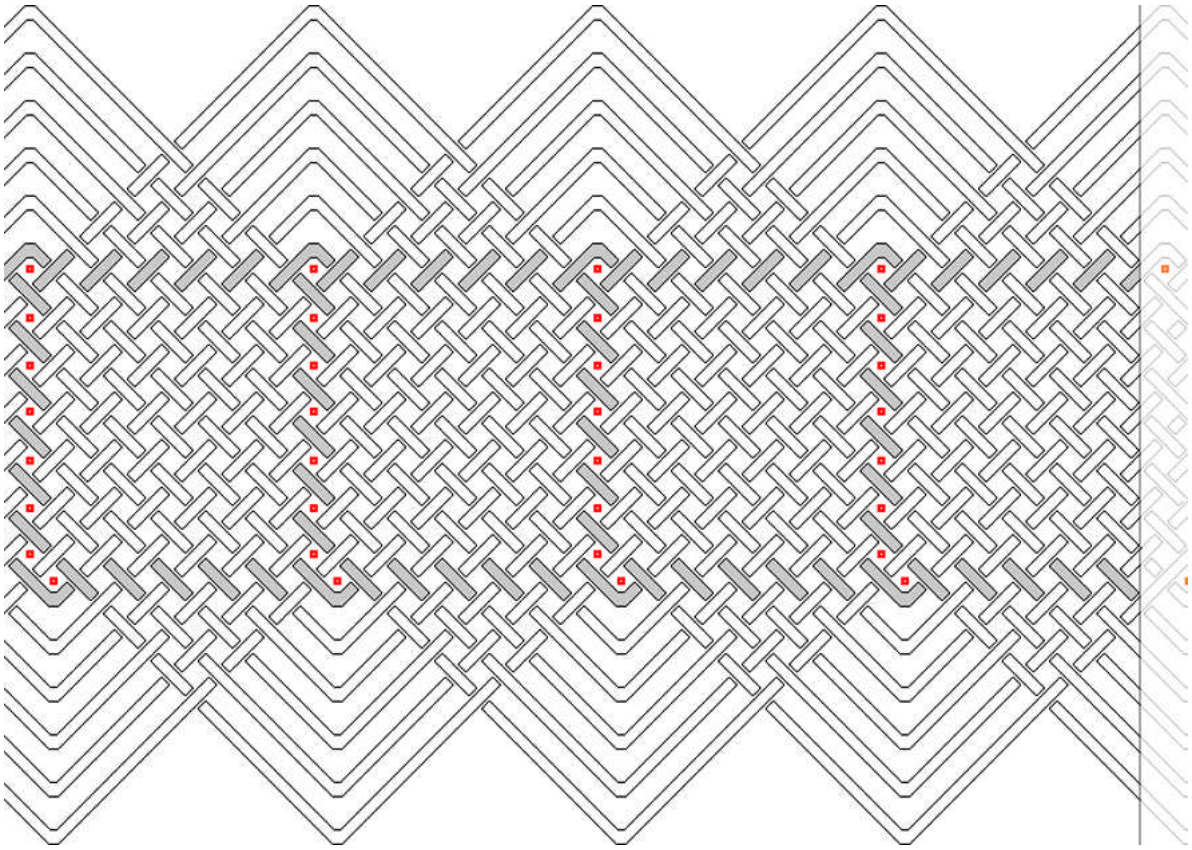
Coverings for Cubes

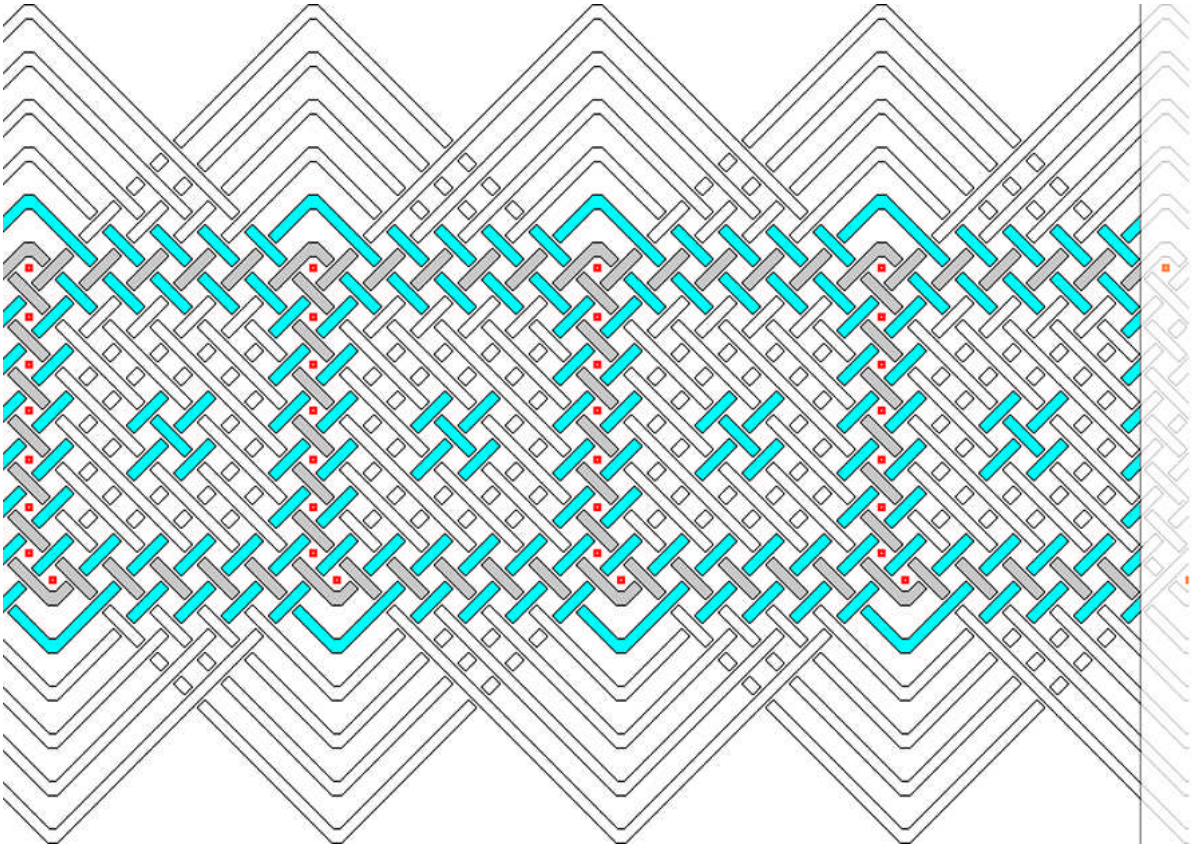
Norbert “Nono” Trupiano

I am sharing two grids of my inventions (I sent them in early March 2008 to Charles “Nautile” Hamel for his web pages). These grid are to be used as a flat template for the laying phase to be followed by the “putting it on” the cube and slowly faired and dressed.

For the top cube the cord is 1mm and the cube is 30mm on a side.







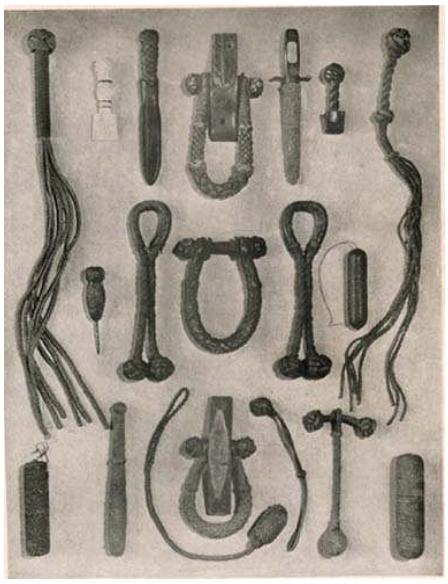
Knot Handicraft on the High Seas

Rita Vainius

This article first appeared in The Caron Collection and is reprinted here in part by kind permission of the author.

A favorite pastime for sailors when they got together was to swap “tall tales” and compare skills. A common well-worn phrase of nautical origin comes to mind. In making spun yarn from untwisted yarns of rope, it took two men to operate the winch. Working together in a sheltered spot, the pair enlivened their task with conversation. Hence the expression: “to spin a yarn or a twister”. For those who are staunch fans of the writings of Herman Melville, Patrick O’Brian and other period nautical literature, there are numerous references in these sea tales to sailors engaged in “fancywork”, as all these ornamental fiber crafts were collectively named.

Traditionally sailors had few entertainment diversions at sea except for some musicals instruments. While the vast majority of off-duty sailors would be content to chew their “quid of baccy” and rest their tired limbs, others took up some handicraft. A “down-to-earth” art developed at sea, among the simplest and poorest of men, whose only skill, aside from personal survival, lay in their hands and the use of shipboard material. The techniques employed in maintaining the ship’s gear were used, modified and adapted in countless variations for making and decorating personal items such as knives, telescopes, needle cases, work baskets, sewing boxes and sea chests. As illiterate and inarticulate as a sailor may have been until fairly recent times, he often had a sure eye and a steady touch while quietly at work on the watch below.



Perhaps no where in the maritime world do function and art meld more completely than in knot art. Like so much of maritime lore, knot making has been a cumulative development over millennia and almost every use to which a piece of rope can conceivably be put has its attendant knot or splice that centuries of use have indicated is most suited to the task. Sailors devoted much of their leisure time to contriving many beautiful and ornamental knot designs. Most of the knowledge on this subject was never published, but handed down man to man, and generation to generation.

Sailors often engaged in a special type of knotting worked with a number of cords suspended from a bar or a line. This type of knotwork was known as macramé. It can also be formed from a fringe of cords combed from the cut edge of a woven material. The origin of the word, macramé, may be traced to Turkey in the 13th century, when hand towels were knotted and fringed in this manner and called “makrama” from the old Arabic. It was already an established art in France in the 14th century and throughout the reign of Queen Victoria, cultured ladies found it to be an agreeable pastime. Simplicity of execution, requiring a minimum of skill, materials and space to be practiced, brought macramé into instant favor with seafaring men. By the 15th century they were using items made with macramé to barter with the natives of India and China and later with North American Indians. It is

considered by many art and craft experts to be unsurpassed as a diversionary form of activity which develops originality and initiative while providing recreational exercise.

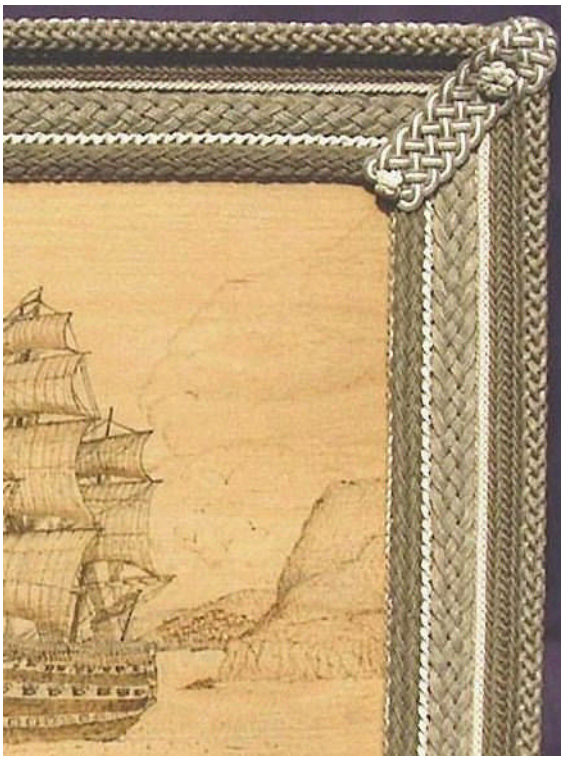
Aside from the functional aspect of knotwork, there is a good deal of aesthetic pleasure to be found in its application. The sailor could easily hold up his pants with a bit of twine, yet he spends hours fashioning a macramé belt from multiple strands, containing a dozen different patterns and colors; a mat is carefully woven and placed at the entrance to the companionway, when a few strips of rope would suffice; the entire interior of the admiral's barge and the captain's gig are, even today, sometimes completely covered with a kind of seagoing "lace" – fancy knotwork that took months to complete; the bosun hangs his "call" around his neck, not by a piece of cord, but by a sennit, (a plait or braid), encased in the whistle knot. The fact that this knot and sennit are invariably associated with this particular whistle would indicate a strong sense of ritualism – one of the earliest aspects of art.

Most of the old knots have a clear elemental beauty, which is often found in utilitarian objects whose shape has been refined by evolution to produce the best results from the simplest form. These ancient knots provide a fascinating, useful and inexpensive hobby, but are virtually unknown to many experts and teachers in other crafts that have developed from them, such as basketwork, weaving, crochet and macramé. Avid current day needleworkers and designers who favor a particular technique such as needlepoint, counted cross stitch, crewel etc. quite often discovered their interest in handiwork at a young age. Frequently, these preferences for a particular technique or method of self-expression were the outcome of much experimentation with other types of fiber crafts along the way, usually including macramé, weaving or crocheting, all derivatives of simple knotwork techniques.

What else did these sea-going "fiber artists" create onboard? They made handles for implements and chests, life preservers, blackjacks, handcuffs, needle cases, rope ladders, serving trays, bell pulls, decorative chains, lanyards, bracelets, cuff-links, shoes, moccasins and sandals, hats, quirts, table and floor mats, rugs, handbags, purses, necklaces, sashes, epaulets, belts, baskets, bottle and jar covers, even picture frames, and an almost limitless supply of buttons and toggles. The artist in each craftsman dictated that he experiment with different combinations of forms, fibers and colors. To him, the art of his creation lay in the marriage of different techniques and shapes into a harmonious whole. The more difficult the feat – the greater the art.

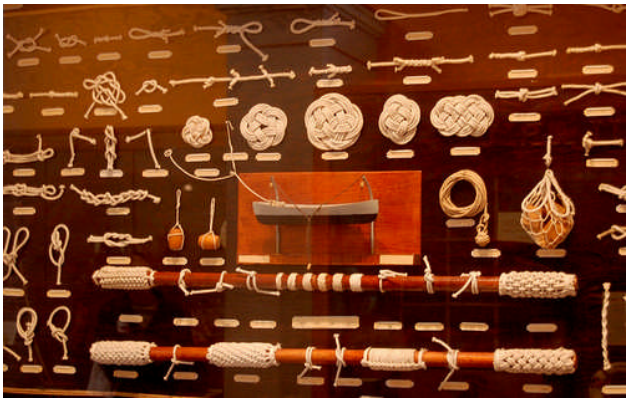
One of the best uses of fancywork was to provide handsome coverings for plain or even downright ugly objects thereby giving them a different look and a new life. Empty jars and pots could be converted into unique containers; bottles and flasks offered a wide range of styles for conversion. Even the caps and covers for these often sported Turk's Head or crowned Star Knots.

The two arts that belong almost exclusively to the sailor are scrimshaw, (carved etching on the jawbone or teeth of sharks and whales), which was particular to whaling, and knotting which belonged to all deep water ships. Of all the sailor's arts, it was knotmaking in its various guises and permutations that excelled in technical finesse and exceeded all other nautical arts in both quality and variety. Many of these remaining artifacts are interesting both as a record of things past and as authentic folk art.



Even though the halcyon days of knotwork disappeared with the advent of steam in place of sails, knowledge of marlinspike seamanship, as it is also called, still distinguishes to this day the true seaman from the man who merely ventures upon the water. No one can become a skipper or should aspire to distinction who has not mastered knots and the making of small objects on board as necessary.

The nautical theme has, in a way, come full circle from the sailors of yore who through their ingenuity created objects of practical use and consummate beauty with the barest of materials, which then evolved into other crafts that have survived the intervening years. Though the practice of many original seagoing crafts has all but disappeared, there are artisans who have kept some of this handiwork alive on land and perhaps the future will bring a resurgence of interest in others.



The Ropewalk

In that building, long and low,
With its windows all in a-row,
Like the port-holes of a hulk,
Human spiders spin and spin,
Backward down their threads so thin
Dropping, each a hempen bulk...

...Ships rejoicing in the breeze,
Wrecks that float o'er unknown seas,
Anchors dragged through faithless sand;
Sea-fog drifting overhead,
And, with lessening line and lead,
Sailors feeling for the land.

All these scenes do I behold,
These, and many left untold,
In that building long and low;
While the wheel goes round and round,
With a drowsy, dreamy sound,
And the spinners backward go.

Henry Wadsworth Longfellow

Knots 101

Part 1 of a Series about Teaching Knotting

A movement has begun in the Pacific Americas Branch to organize and standardize our knot tying teaching and training techniques. We have had many requests for us to pass along our knowledge and skills. Several of us have taught boy scouts, girl scouts, sea cadets, tall ship volunteers, college level classes and other interested parties of kids and adults. We have decided that there is a need to have a common way of teaching each of these groups, a common way of talking – a common thread.

It has been agreed to try and assemble a series of courses to "teach the teacher" so that we are all teaching in the same way. This has the advantage of producing uniformity of thought and technique. This system will build on past learning – we seek to generate a common lexicon that is consistent with one of our heroes, Charles Warner, who spoke of knotting structure more so than speaking of knotting names. Too often individuals are taught to memorize names and, in doing so, they forget what the knot looks like or its purpose. Worse still, they are not aware of the reasoning behind using such a knot structure in the first place.

All members are invited to participate by writing the PAB Secretary, President, Librarian or Editor about their topic of choice, a topic in which they feel skilled and knowledgeable – yet still able to recall the first time that they mastered that particular knotting technique or practice. If you remember what it was like when you first mastered a particular knot, bend or hitch, write down your experience and let us know. Tell us what that experience was like and what made it "click" for you.

Lindsey Philpott has worked on the first part of these courses – Knots 101 – the first part of a multi-part series and we would like to hear from you with your thoughts. (He has also got Knots 102, 103 and 104 – five each of knots, hitches and bends, respectively – ready for your critique.) Jimmy will be sending you the first part, Knots 101, by email (or regular mail by request) so that we can get your input on whether you think this will work. Also, please let us know if you think it will *not* work and why not, and is so, how it could be helped. Lastly, let us know what may be a helpful adjunct to the lesson provided, remembering all the while this is NOT the lesson for the learners but for you, the learned, who are passing on their wisdom.

Here is how Knots 101 begins:

How does someone begin to tie knots? Is there a language you have to know? Are there hints of which you should be aware? Will others think you are unprepared if you do not know the stuff they take for granted? How do we know which end of a cord or whatever it is called is which? Do the shapes have names and do we have to use them all the time?

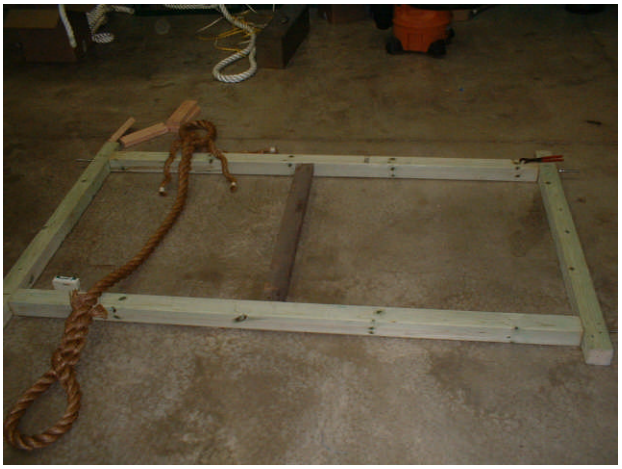
We each of us had these questions face us in our personal, professional or private lives from time to time when faced with tying knots. This is completely normal. Try telling your favorite niece or nephew, your own child perhaps, to tie a knot, without naming at least one part he piece of string they are holding. You cannot expect to enter what may be a relatively new world without first learning some of the language. If you went to a foreign country you would hardly expect to pick up a new language skill right away and so it is with mathematics, geometry, calculus or a whole mess of other things that are WAAAY more complex than knot-tying. Some knots are complicated, but the language stays relatively simple. We'll start with some terms for the parts of the line and then move on to what we call those various tangles of line. Then we'll discuss some basics of how to take care of what we are playing with. Lines may be referred to as line, twine, cord, rope, hawser or stuff, depending on the size and the use for the line. We'll try to stick to using the word line in this document.

These are the first paragraphs in the proposed course outline. It goes on to list the terms used for various parts of the line – the different kinds of knotting structure are also identified and then the structures are practiced using a piece of line. The underlying philosophy is one of starting with simple ideas that you keep in mind and then build upon. It is a method of learning that you all can use equally in any language, makes the most of the language of knotting and employs a method of learning that encourages repetition – relies upon learning structures by making and re-using them. Learning the use of a particular knotting structure, what it does and the places where it is useful and not useful as well. In this way students will be encouraged to start asking questions (one of the strongest bases for learning and understanding) and that as a teacher or instructor of learned knowledge, you will benefit by understanding the thoughts that go through your student's minds.

We need your feedback – is this going to help, hinder or simply be a waste of your time, or do you not care to be told how to teach? This is a part of the IGKT's overall mission of educating the public about knotting. Are there better ways of doing this? Do you want to be a part of this or apart from it? Inquiring minds need to know!

How to Make a Mat
Bob Solon

Start with 362 feet of 2 inch manila rope…



Spliced head rope and wood jig.

Bob measuring out the manila rope.

Laying out the necessary flakes.

Weaving the strands over two under two.

The finished rope mat.