BRAID OR NOT BRAID THK or NOT THK* .

***THK = Turk's Head Knot**

Original text by Charles Hamel

Putting ideas kept private for over a quarter of a century into an argumentation for publication began in www.khww.net forum with giving the reference of Noemi Speiser's in-depth study of braiding, then adding :

--- it should make easy the realisation that Turk's Head Knots (THK) are not braids.

After that, « de fil en aiguille » / « from thread to needle » I had to put up some reasoned points to explicit my views which are :

- Turk's Head Knots are NOT braid.

[Braid (US) Plait (UK)]

In **Part one** I offer points, to be examined, telling why I think that a THK is anything but a braid.

- Turk's Head Knot is a label that should be strictly reserved for what in my perspective is the ORIGINAL BRAND.

This type of configuration of cordage has been labelled TH **KNOT**, not TH BRAID ; not that this proves anything given the present state of names nomenclature.

I try in **Part two** to put the simple, regular single strand THK with O1-U1 or U1-O1 crossings, complying with the common divisor rule as being the only "original" brand THK.

THK, just as "bowline", is in my opinion a much mis-used label. « Mis à toutes les sauces » as they say in France « served with all sort of sauces »

Fallacies that are best avoided are most often fallen into :
-- appeal to the People or bandwagon
-- appeal to tradition or common belief
-- appeal to authority
-- faulty comparison and jumping to conclusion just to name few.
.... In short faulty or absent reasoning.

Part ONE : THK ARE NOT BRAIDS

At first I directed the interested person to my web page. http://tinyurl.com/38mrcp

Main points made there were :
… single strand or multi-strand THK are not braids in their process of construction.
Even if, once they are finished, they can be, if one accept and except the circularity, mistaken for a braid.
They can too, when destroyed by cutting,take the appearance of a legitimate braid.
Still that does not make them braid or plait.

Descriptive definition of a braid :
Imagine a set of vertical strands equally spaced from each other two by two, suspended by their upper extremities, pulled downward by their own weight.
These strands are only allowed to modify their course by going laterally so as to cross one or several of the other strands**.**
Never will they go upward or follow a previously set segment of the braid
.
It is **impossible** for any one of the strands **to cross itself**. No strand may even be along side itself as that is no longer braiding but doubling.

When the braiding process is finished the final move is to fix in place the lower extremities of the strands.
Using separated strands that are fixed at both extremities (**#2954**) before commencing the process is braiding.
As in the defined braid no strand is ever allowed to cross itself **#2254** - and others Platted mats - are not quite aptly labelled.
#2955 , **#2958** are "false" braids.

If this general description of a braid is accepted it follows that it must also be accepted that a THK, single or multi-strand, cannot be considered to be a braid.

At the cost of its destruction a THK becomes 'something' indistinguishable from a braid.
A discontinuity created in the single strand transforms it into several individualised segments making strands of second order which disposition in space takes the visual appearance of braid.

A braid shows on both its outer limits small arcs that are akin to the bights of a THK.
This common aspect makes it easy to reach the mistaken equation : braid = THK

If a THK has to be destroyed to make the "braid inside" appears it logically shows that the THK is not a braid prior to destruction.

Application of morphological criteria without due precaution is faulty morphological ordering.
This ordering on external appearance is based on a postulation : degree of 'likeness in appearance' is equal to degree of genetic kinship.
It is doing 'phenetics'and that is as good as abandoned in biology because it is faulty.

That is the gist of it (slightly reformulated.)

I have yet to meet someone of the 'THK equals braid' persuasion who goes beyond throwing a Jupiterian bolt out of the blue to my brain : «THK are but braids» and who then takes pains to give me a suite of reasoned and articulated argumentation.
Having no wish to fall into that pit I want to built a case backed by logical arguments against the unsurveyed use of the word "braid " around THK.

For run of the mill way of expressing notions in an everyday context it is of no import if someone is to say that a THK is a braid and it is not one really ;
or say they are not but that indeed they are.

Nonetheless, with a classification of knots in mind, it is in fact a point that should not be discarded out off hand nor should it be considered settled by a peremptory statement.

Brian opposed this argument : « all those criss crosses would represent a form of braiding. »

If patterned criss-crossing is the criterion retained to identify something as a braid then it will be necessary (only a few examples) to identify as being braids :
- flat or two dimensional knots such as Prolong Knot **#2242** or **#2249 to #2251**,
- **#2259** Twelve strand Knot

This does not figure in my envelope of possible: in a braid as I conceive it *no strand is ever allowed to cross itself*.

Cambridge (UK) Dictionary :

plait (braid in American-English) = *to join 3 or more length of material by putting them over each other in a special pattern.*

This is building layers by direct superposition.
Each new segment is immediately added to the length of braid already laid . This makes the braid appear in a fully finished state like the road surfacing appears complete behind the self propelled paver engine.

Let us have a look at the process by which the structures or the patterns are materialised (there are nuances between the 2 concepts structure / pattern).

I am making use of 3 Strand braid and of a 3 Lead THK but this is generalizable to greater numbers of Strand and Lead.

--- in a braid the collection of strands is worked upon as a group, successive crossings follow one another immediately in a very short span of time and space (we will accept the approximation of saying "in a continuous flow")
.
This proximity in time goes with a closeness in space (that is a really important point as will be shown latter)
Each successive move brings to existence adjacent consecutive crossings.

-- while a THK is worked on in such a manner that spatially neighbouring crossings are not made in temporal succession ; this temporal succession is disjointed when compared with the spatial one .
(we will accept that rather than « continuous » it is a 'discrete' process, going 'by step or jump')

BRAID 3 stands algorithm or code	THK 3L 5B O = Over crossing U = Under
1 2 3	Over
\ 1 Over 2 2 1 3:	Over
/ 3 Over 1 2 3 1	U O cross bights
\ 2 Over 3 3 2 1	U O
/ 1 Over 2 3 1 2	U O Wend meet Spart
\ 3 Over 1 1 3 2	
/2 Over 3 1 2 3	

After starting with parallel strands the making of a braid is the repetition of a fixed sequence.

A sequence of putting strands upon others without any direct threading.
In a braid repeating the sequence adds to the existent crossings : **quanti**tative change without **quali**tative change.

No such sequence iteration exists in a THK.
Following the leader into doubling or tripling a same, unique THK does not count.
It does not count because it does not change the succession of crossings made, just repeat it.
Neither **quali**tative nor **quanti**tative change of crossings is made then.
During the making of the THK each added crossing brings **quanti**tative and **quali**tative change.

(Note that 1, 2 , 3 here are 'name' by function 'Nominal' and not 'Order' or 'Interval' or 'Rank' Take that as a first lesson about distinguishing a structure/pattern from the function it serves).

If that notion of using digits as names distress you please just replace the digits with the name of colours.

Just looking at the code should help convince the reader of the existence of a profound difference of intrinsic nature between a braid and a THK

With this discussion I hope to dispel an almost complete mental blindness to concepts that are different from each other :
STRUCTURE Vs FUNCTION ;
PATTERN Vs PROCESS.

First point to examine is the existence, of a degree of confusion, or at least of some absence of clear distinction, made between the pattern, which is obtained, and the process through which it is obtained

Some examples taken from ABoK (Chapters : Chain and Crown Sinnets ; Plat Sinnet and Decorative marlinspike) will illustrate :

--- **#2960** though aping a braid is not a braid as far as pattern is concerned, *and* is not a braid in process as one of the strand is made to cross itself, which is not admitted in the definition of "braid"

--- **#2959** though sporting a braid pattern is not strictly a braid in process as one of the strands is passive and immobile, it is the lateral strands that do the changing of direction.

--- **#2868** Monkey Chain, or **#2871** Trumpet Cord, or **#2872**, or **#2873** : though those 'sinnet' fairly mimicry a braid pattern they are not braid in process as their unique strand cross itself

#3486
Railroad Sinnet : approaching but not attaining the braid pattern and is not a braid in process anyway.

This should be enough to accept the importance of making a clear distinction between the PATTERN of a knotting and the PROCESS by which it was materialised ?

Now others examples introducing another distinction I feel important to make :
STRUCTURE and its FUNCTION.

#2952 A Round Twist Sinnet : braid pattern but it is one unique strand. Structure is one unique strand, but this strand implements a 3 strand-like function.
So I can count it as a braid.

#2953 : Idem. braid pattern. Structure : single strand. This strand functions as 5 strands that are processed by braiding.

#2950 Trumpet or Bugle Cord : braid pattern and braid process ; not by a 3 strands structure as it is a unique strand, but this unique strand perform a 3 strands function. I accept it as a braid

I do hope that the distinction between a material STRUCTURE (here one strand) and the FUNCTION that it performs (here functioning as several strands) will be kept in mind as of now.

Commutativity does not always exist between braid and THK.
(6 * 3 = 3 * 6 , that is commutativity, but you may not have 6 - 3 = 3 - 6 as there is no commutativity in this operation)

I mean you cannot take a braid of 3 Strand 21 Bight and make it into a single strand 3 Lead 21 Bight THK.
You must leave it as a 3 component strands THK.

To make a braid into a THK that could be made with a single strand you have to make sure the braid is obeying the common divisor rule. This compliance it is not an obligation for braids.

A 3-strand flat braid may be made with 6 or 9 or 12 "bight" but that is impossible for a simple regular single strand THK.
That point alone makes two different types : braid on the one hand and THK on the other.
A flat braid put in a circle and then closed on itself does not automatically become a single line THK. It is possible in some particular cases but mostly it is not as will be seen latter (Part 1 – Drawing 1)

Single line THK, if destroyed by a cut from rim to rim will regenerate phoenix-like as braid looking.
A braid of as much Strand that there were Lead in the THK
(By the way LEAD = STRAND = PART = TURN and BIGHT = CROSS = SCALLOP)
Yet the process of its apparition will not have been braiding.
I recognise one has to have been present at the making to know that after the fact.

Process, a dynamic phase, is an evanescent moment in time that, after its completion,is not readily accessible to direct observation.

Pattern (or structure) is a "steady-state" or static phase following the end of the process.
After the completion of the process and till its destruction it stay readily accessible to direct observation.

I suppose that is one reason why the creed of the equality or equivalence between THK and Braid is so often held as true.
Superficial observation makes it believable.

Squarerigger asked :
« What is the difference if I make a THK from a single line, doubled and then braided with the third pass (#1381 I think) to form a braid from a THK? Is that not still a THK? The distinction becomes less clear for me.. »

It can never be a braid allowing to the definition.

It can be an inter-twining, or an inter-weaving, or an inter-threading. (nuances should be studied in order to get the right word ; weaving does not seem to apply as process here).
It can never be a THK according to what I put in the diagnosis flow charts (Part Two)

I did my best with this illustration (Part 1 – Drawing 1) to make it easy to ascertain that :

--- When put into a circular form (cylinder of revolution) a braid does have several types of behaviour , some of them being illustrated.

Only one type of behaviour (13B and 14B in the particular case of this illustration) among those several types is comparable with a THK made with as much strands/lines (here 3) as there are in the braid.
Compulsory condition : this THK can be done with a single length of cordage.

Analyse the way colour meet colour and observe the number of Bight in each case.
Do your own experimenting.

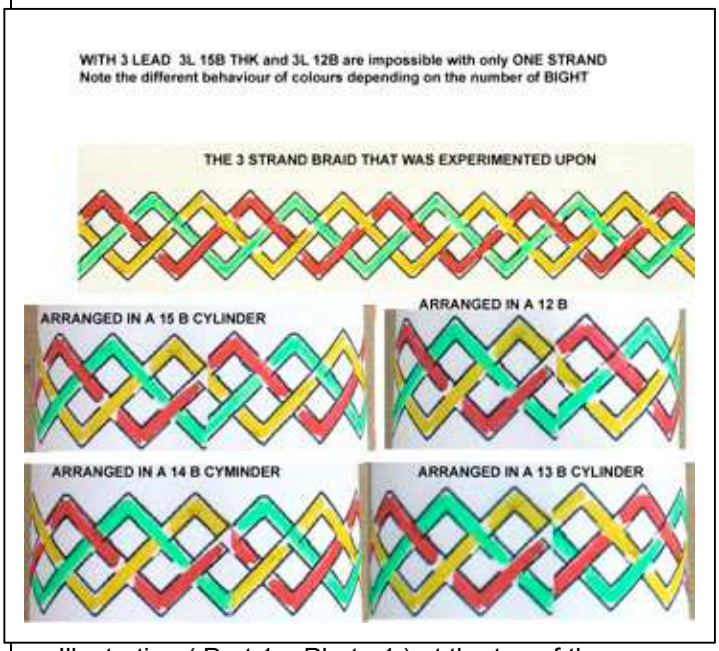
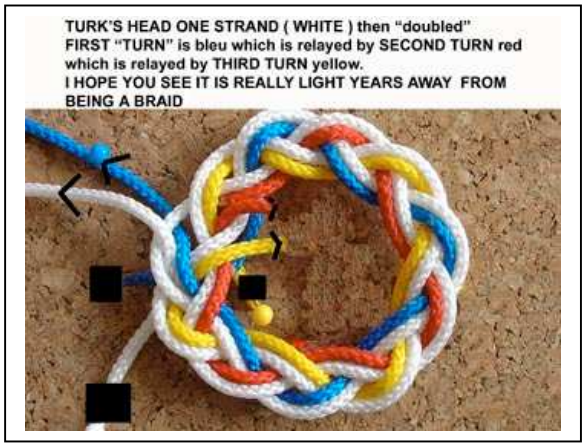


Illustration (Part 1 – Photo 1) at the top of the next page :

A single line 3L THK in white cordage is doubled it with 3 different colours, changing colour each time the one being threaded in has completed one ‘turn’.
(I find TURN much more adapted than LEAD or PART and I hope that it is 'graphically' evident here).



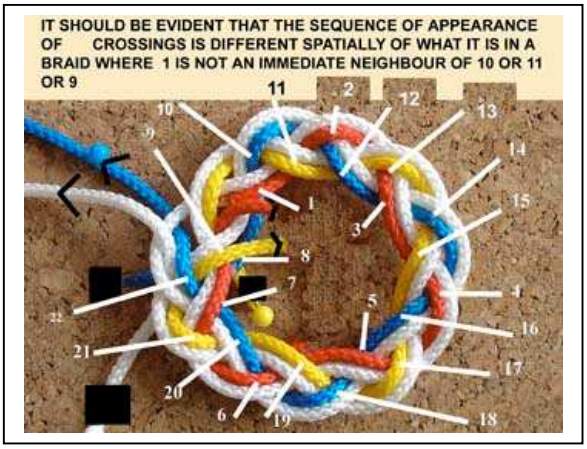
3 Lead THK are special cases on the particular point of the enlargement process but that does not enter into play here.

Discarding the white trace and looking only at the coloured figure, it is tempting to see a circular Braid.

That is a no-no !

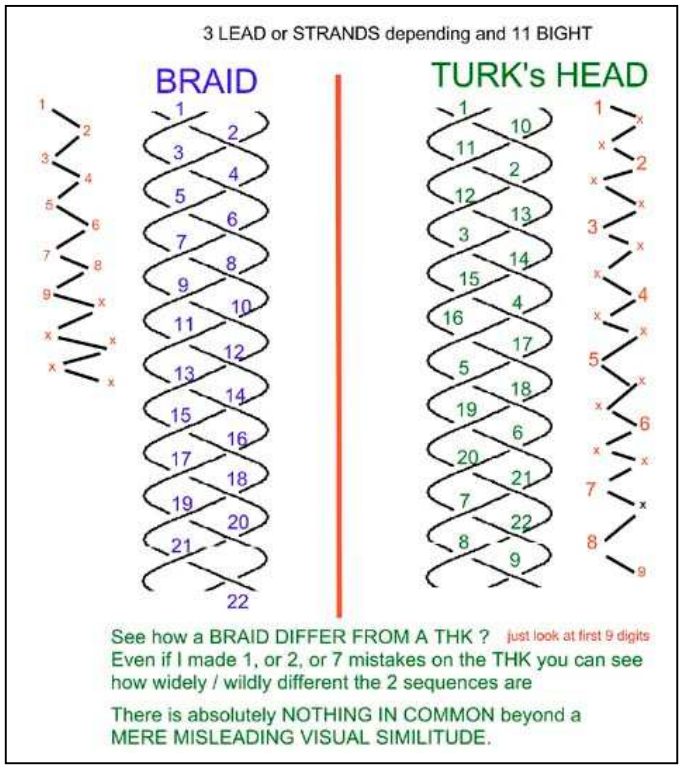
Process applied to thread in the coloured lines is not a braiding process : it is threading in and and not putting on each other by superposition.

In the next illustration (Part 1 – Photo 2) :



I numbered the crossings taking care to follow the order in which they appear when the THK is being materialised.
This is the sequence used for comparison purpose in the next illustration

It should be evident by now that the braiding process and the making of a THK are indeed 'incomparable' one with the other.
Comparison is not possible at a level deeper than mere visual outward appearance.



Examine the order in which the crossings appear in the dynamic phase, in the process : this point alone suffice to make the final structures (static phase) : Braid, THK, quite different one from the other if one resist being mislead by the external appearance of the pattern seen without analyse of the way crossings are put in there. (Part 1 – Drawing 2)

Spatial position of the crossings and their time sequence of apparition :

--- Braid = **Time proximity plus spatial closeness** : 'continuous flowing', without any 'jump' in the sequence.

--- THK = **Time proximity with spatial remoteness** :
a fox's run.

This remark about crossing sequences is not a moot theoretical point, it does have practical implications.

--- This is what makes it easy to understand why it is so simple to 'enlarge' the length of a braid : the steady sequence of apparition of the crossings, ordered both in time and space, can be continued' without any difficulty.

It does not have to obey to any particular rule as far as the Bight / Strand ratio is concerned. One may add to Bight without having to add to Strand. Nor have one to use any other process than the one implemented to make the first length of braid that is now being lengthened.

--- This also shows why THK to be 'enlarged' demands the mastery of more 'know how'. Enlarging a THK you very well may end with your knickers in a knot as Australians put it. Adding to Bight imply adding to Lead and vice versa, and that in a precise ratio. This entails that a particular process be known and applied.

If the final Lead/Bight ratio or its inverse (R or 1/R) is an integer then there is a common divisor and either the THK cannot be a single strand one or it is an 'irregular' one.
Therefore it cannot be a true "ORIGINAL" brand THK.

One exception is the 3L THK family which accept to have bights added without having to pay in leads added.

We are at the end of this first part :
someone will almost surely have already uttered : So what ?

If that empty reaction is of no consequence in the everyday life of a knot tyer or a braider, if pushed in the technical discussion it will leads to "jargon" that will be strictly endemic to small groups. Others, not in the know, will be shut out just by lack of common ground enabling them to partake to the exchanges.

It is compulsory in order for any communication to be successful to built an explicit common ground based as far as possible on objective argumentation with fallacies weeded out and not founded on habit, usage, hand-down tradition left unexamined. Beware of implicit common ground.

When we are attempting to transmit our enthusiasm and our knowledge about knotting I think advisable for a given volume (quantity) to put as much signal as possible (quality information to be turned into knowledge) and as little as possible of noise .
Noise = unexamined and unguarded way of expressing a state of mind left encumbered with belief, creed, prejudice, fallacies instead of examined and validated knowledge.

(Part 1 – Drawing 3) **CONCLUSION**

TURK'S HEAD KNOTS ARE NOT BRAIDS FROM WHICH, BEYOND MERE VISUAL ASPECT, THEY ARE INDEED DIFFERENT

BRAID :
a given pattern + a given process.
During the process phase the pattern 'emerges' continuously and fully 'finished' in the small part already done.

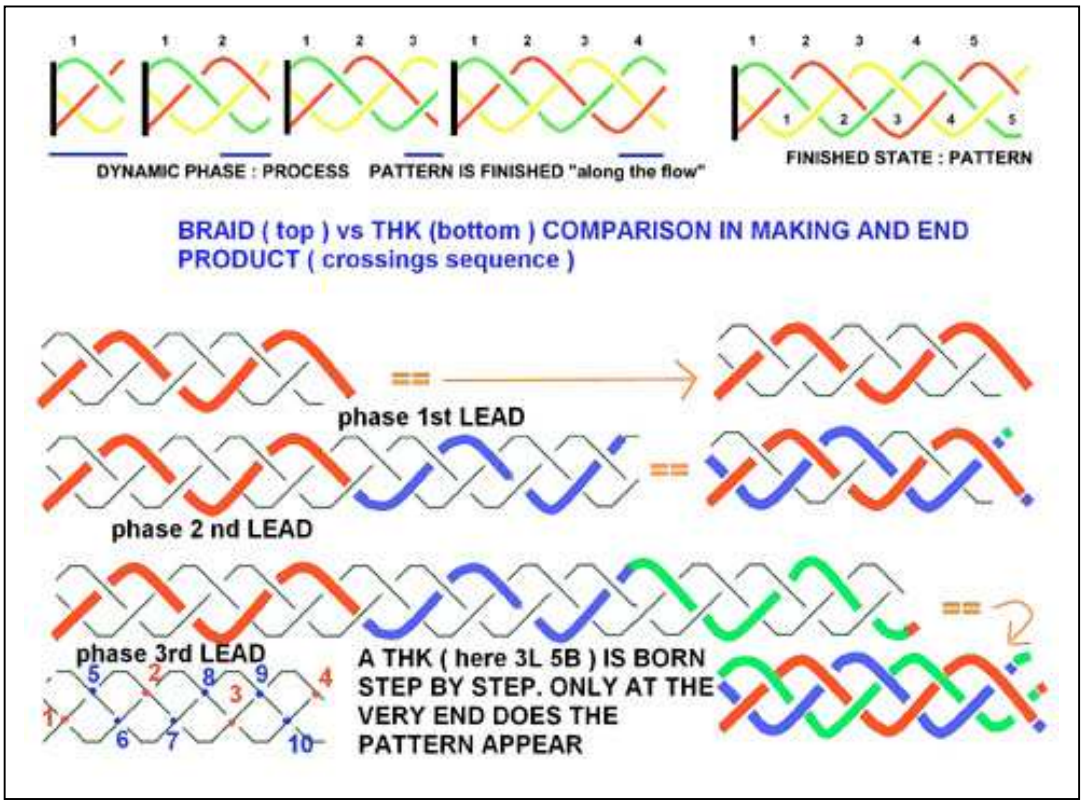
While the process goes on it does not bring any QUALITATIVE change to the braid but only a QUANTITATIVE one (length added).

This is building **layers by direct superposition**.
Each newly made segment is immediately added to the length of braid already laid which makes the braid appear in a fully finished state like the road surfacing appear complete behind the self propelled paver engine.
Even the first meter laid on is a "finished road".

TURK'S HEAD KNOT :
a given pattern that may be strikingly looking alike the one of a braid but is put into existence by a process that is *not* the one used in a braid.
The pattern will emerge as 'finished' only when the dynamic phase, the process, has ended.

All along the way there are QUANTITATIVE AND QUALITATIVE changes brought up.

The THK appears quite progressively by **successive threading** a bit like the latent image on a photographic film treated in the adequate chemical bath appears progressively.
You get the complete image only at the end of the process ; you cannot form a judgement about it before the process is at its end.



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