

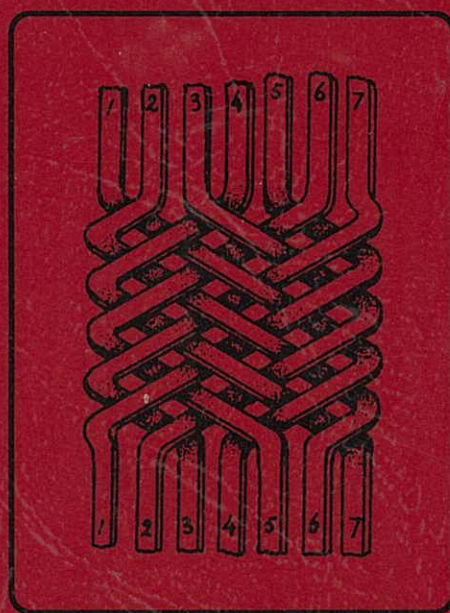


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BRAIDING

— REGULAR KNOTS

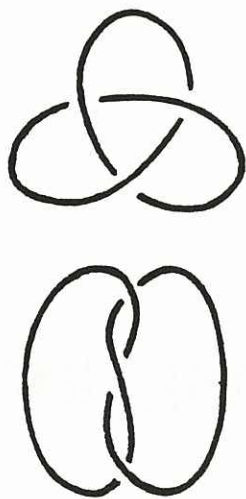


A Series of Books on Braiding

Book 1/1

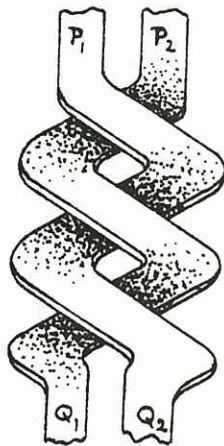
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New and Automatic Construction Methods

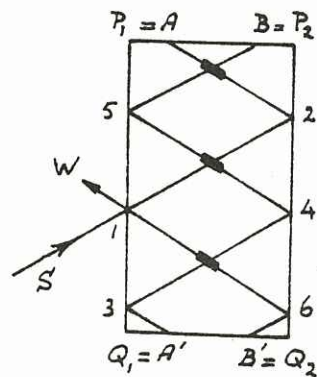


trefoil knot.

(a)

2 string—3 bight
u/o braid.

(b)

regular knot
2 part—3 bight
turk's head knot.

(c)

FIGURE 1. *Diagrams of a three-crossing knot and braid.*

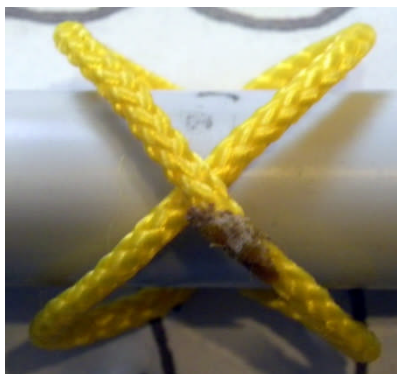
The diagrams (a) and (b) are well-known representations of the right-handed “trefoil knot” and braid respectively. Note that (a) is formed from a single closed string; whereas (b) is formed from two interwoven strings, one running from point P_1 to Q_2 , and the other from P_2 to Q_1 .

Next note that if a circular cylinder be placed *behind* the braid (b) with its straight-line generators parallel to P_1P_2 and Q_1Q_2 , then the braid can be wrapped backwards and around the cylinder until P_1 meets Q_1 and P_2 meets Q_2 .

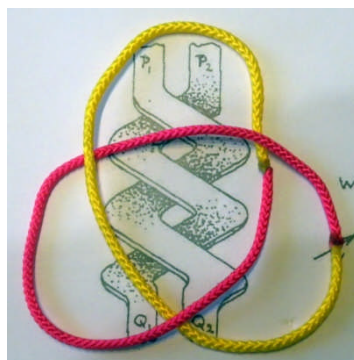
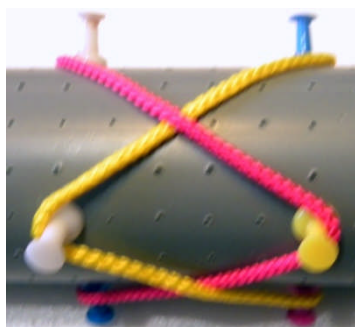
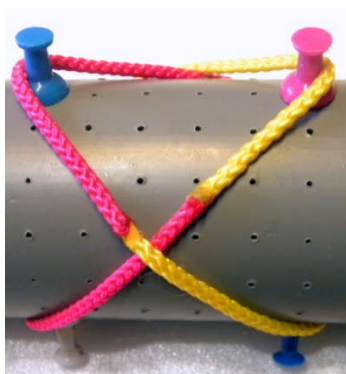
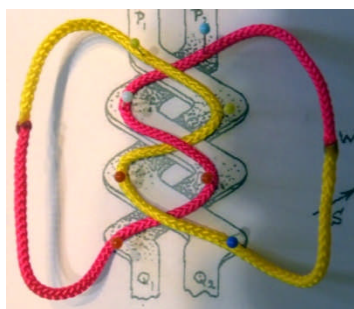
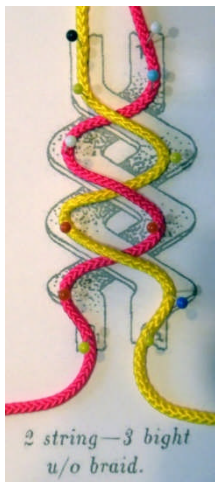
Let us assume this done, and that we have joined the ends P_1 and Q_1 , and also P_2 and Q_2 . We observe that we now have the one-string 2 part—3 bight knot (trefoil knot) tied around the cylinder. If we slip it off the cylinder, moving carefully in the direction $P_1 \rightarrow P_2$, we can then arrange it on a flat plane in the manner of diagram (a).

Now examining diagram (c) we see that it provides a clear picture of the 2 part—3 bight turk's head knot (trefoil knot) tied around a cylinder. The thick, short line-segments indicate where one string has crossed over another. In fact the diagram tells us much more: it provides full information as to how the *process* of tying the knot on the cylinder must be carried out if a 2 part—3 bight turk's head knot (trefoil knot) is to be achieved. To be specific, *diagram (c) is a complete visual algorithm for constructing the right-handed trefoil knot*. We shall call it the *grid diagram* for the knot. Let us analyze this algorithm by identifying six steps that have to be taken to complete the knot. The reader would best understand the algorithm if he or she were to take a wooden cylinder some two inches in diameter, a length of string, and two elastic bands to keep the string bights in place, and actually carry out the steps as described. Diagrams to illustrate the steps are given later, on pages 14 and 15.

(a)



(b)



(c)

