Paulus Gerdes [1]

A Nuer dance rattle (South Sudan): Plaiting an octahedral shape

In the book *Geometry from Africa* (Gerdes, 1999, pp. 148-153) I analysed the **decahedral** shape of the 'bamboyo' plaited rattle bells among the Bassari in the border region of Senegal and Guinea. In the book *Otthava: Making Baskets and Doing Geometry in the Makhuwa Culture in the Northeast of Mozambique* (Gerdes, 2010, 2012, pp. 153-189) and elsewhere (Gerdes, 2004, 2005) I analyse the **nonahedral** shape of the 'nirrosula' plaited rattle capsules. Each of the 'bamboyo' and 'nirrosula' capsules is made from only a single plant strip. Recently I encountered on the web photographs of a Nuer dance rattle from South Sudan. Its capsules seem to display an **octahedral** shape. In the following article this shape will be analysed and it will be shown how one can produce the octahedral shape by plaiting the capsule with a single strip of cardboard paper.

Nuer dance rattle

Photograph 1

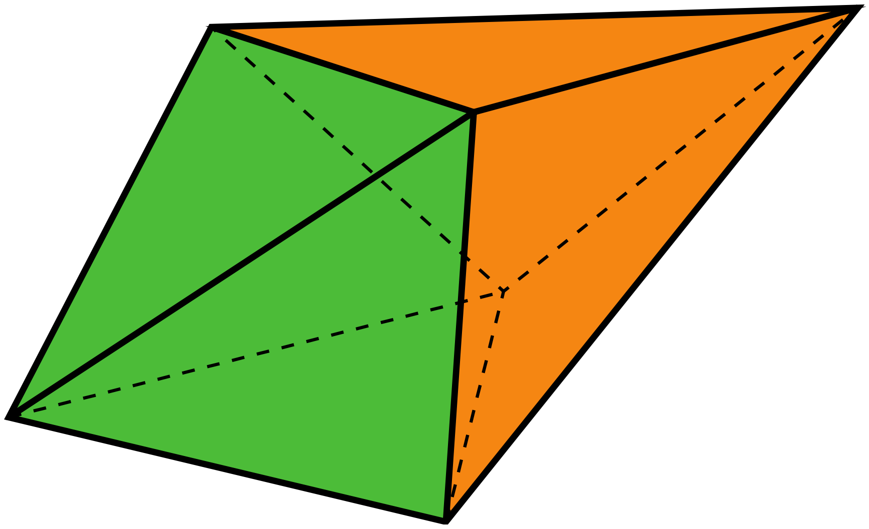
[1] Ethnomathematics Research Centre & ISTEG, Boane, Mozambique (paulus.gerdes@gmail.com)

Among the objects collected by the British anthropologist Edward Evans-Pritchard in 1930-1931 from the pastoral Nuer people in the eastern part of South Sudan, is a dance rattle. It is kept in the Pitt Rivers Museum at the University of Oxford (See Photograph 1).

The dance rattle consists of a series of capsules plaited from strips of yellow palm leaf, “folded into a lozenge shape with several flattened faces, enclosing a moderately sized cavity that has been filled with small pellet-like seeds, measuring 4 mm in diameter, that produce a dry rattling noise when the capsules are moved. These capsules are fastened to one another using 2 lengths of twisted 3-ply brown plant fibre cord, that passes through their top part, where one strip has been bent into a loop for this purpose then its ends tucked back into the body to secure it” (Sparks, 2005). The dance rattle was probably worn around either the arm or leg.

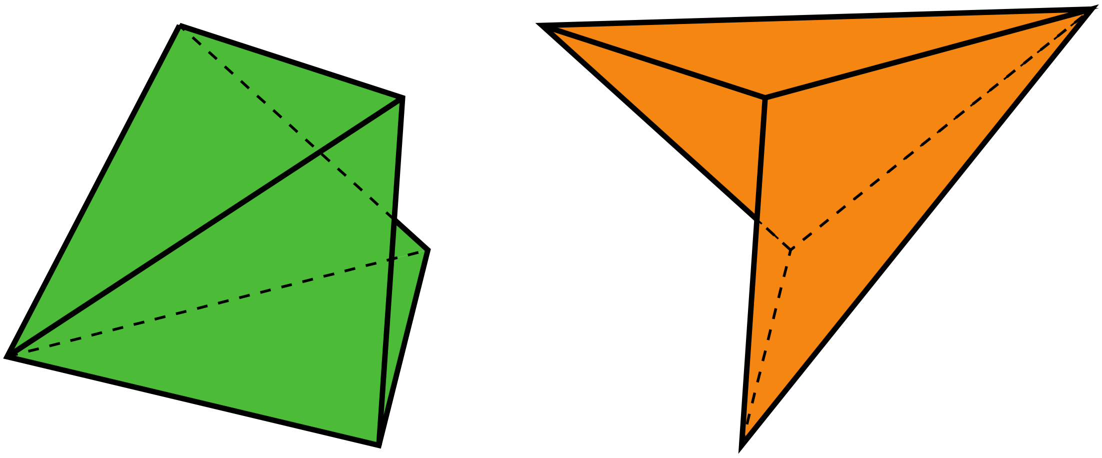
Octahedral shape

When all faces of a plaited capsule are flattened, its edges and vertices become clearly visible. Figure 1 displays the octahedral shape of a Nuer capsule.



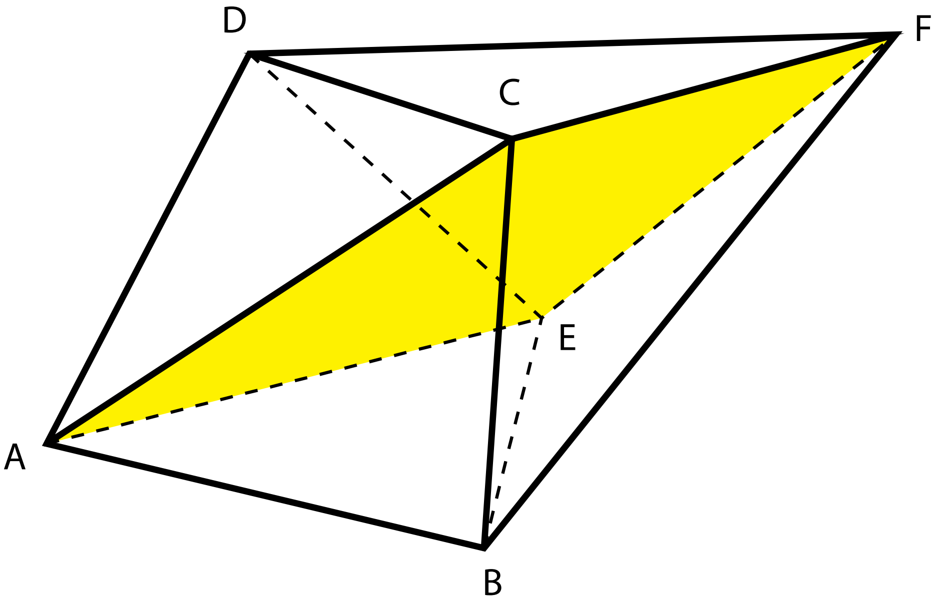
Octahedral shape
Figure 1

All eight faces are congruent isosceles, right-angled triangles. The surface of the octahedron is composed of two congruent halves. The position of the second one is reflected and twisted in relation to the position of the first one (see Figure 2).



Two congruent halves
Figure 2

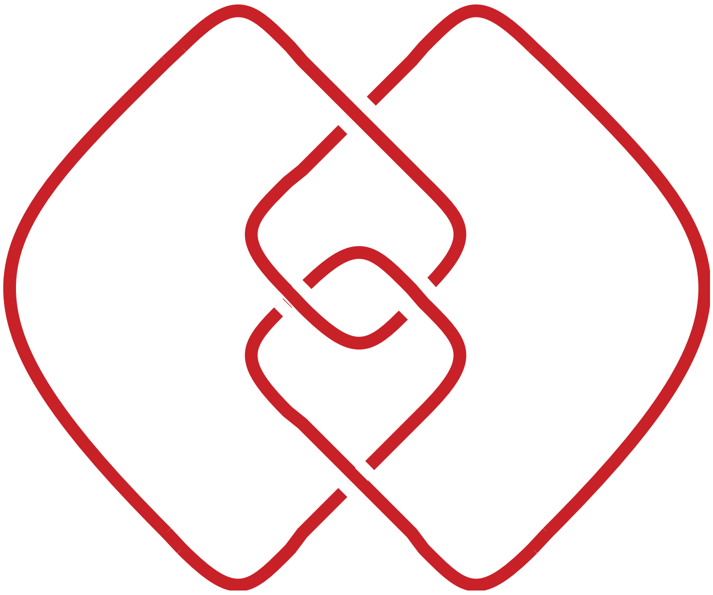
The quadrilaterals ABFD and FCAE are congruent kites and each divides the octahedron in two symmetrical halves (see Figure 3). FCAE is a kite, as FC ≅ FE (hypotenuse) and AC ≅ AE (legs of congruent right-angled triangles).



Two symmetrical halves
Figure 3

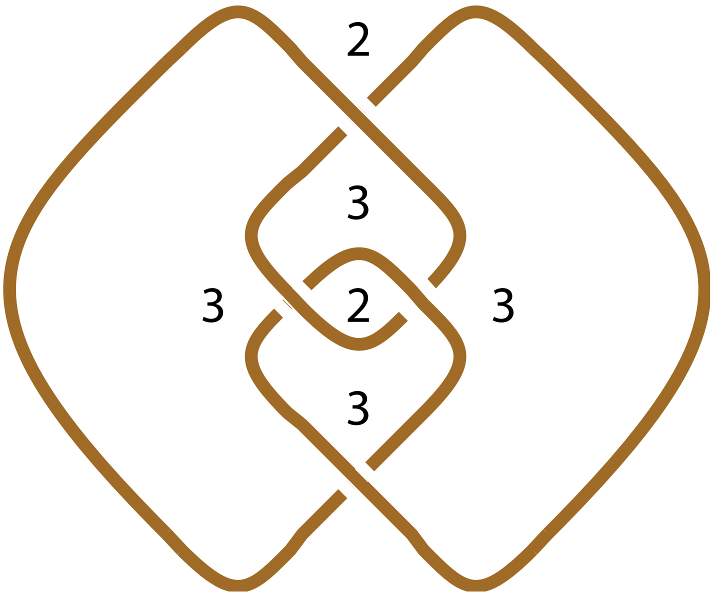
Alternating knot representation

The plaited structure of the Nuer capsule can be understood as a knot. Figure 4 shows a capsule can be represented as the **alternating knot 4_1 (figure-eight knot)**.



Alternating knot representation
Figure 4

In the centre of the knot representation we have vertex F: at it, two folded squares meet. In other words, F is bordered by two crossings of the plaited strip. Hence, we may write 2 in the centre (see Figure 5). From F we descend to C and E, and then to B and D. At each of these four vertices, three folded squares are coming together, that is, each vertex is bordered by three crossings of the plaited strip. We may write each time a 3 in the open areas in the alternating knot representation. And finally, like vertex F, vertex A is once again bordered by two crossings of the plaited strip and so we may write a 2 at the top.



Alternating knot representation
Figure 5

Plaiting the octahedral capsule

To be able to weave a Nuer octahedral capsule with a strip of cardboard paper, one has to prepare the strip by introducing a series of fold lines in the way Figure 6 presents. There are eight squares visible, each divided by diagonal fold lines into two isosceles right-angled triangles. To start the weaving, join the segments AB and BC so that they touch each other. Then one continues by plaiting, that is, by weaving over-one-under-one until the strip ends return to each other.

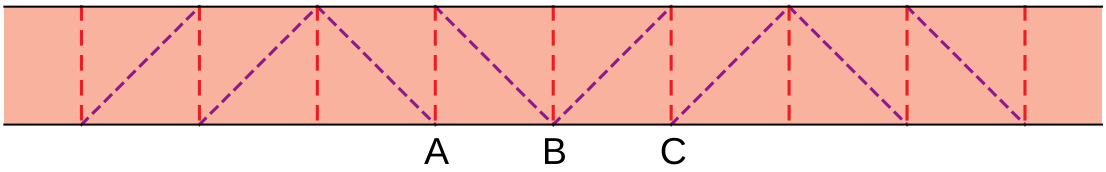
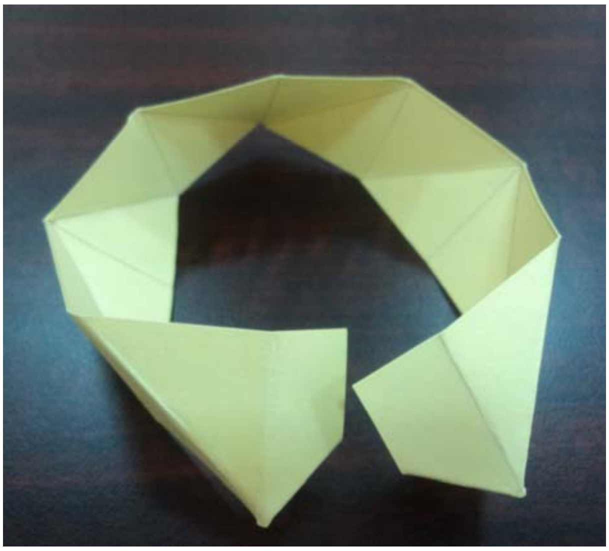
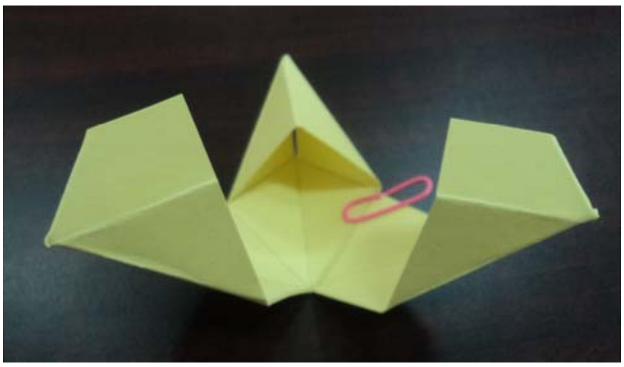


Figure 6

Photograph 2 presents a strip prepared with fold lines and Photograph 3 shows the result of joining the segments AB and BC.



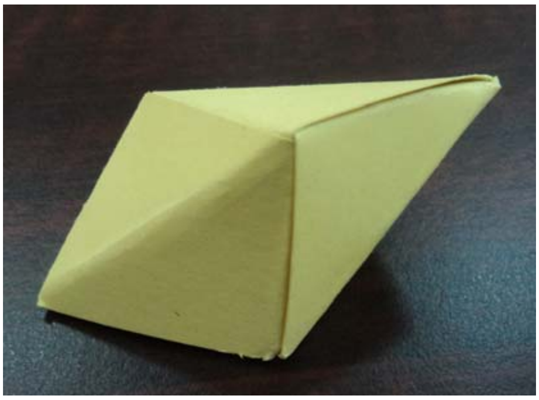
Prepared strip of cardboard paper
Photograph 2



Starting to plait
Photograph 3

Photographs 4 and 5 present two views of a completed, plaited octahedron.

Photograph 4



Photograph 5

Like the Bassari (Senegal / Guinea) and the Makhuwa (Mozambique) capsules, the Nuer capsule is made out of only one single strip. The polyhedral shapes of the capsules, however, are different: Decahedral, nonahedral, and octahedral, respectively.

References

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