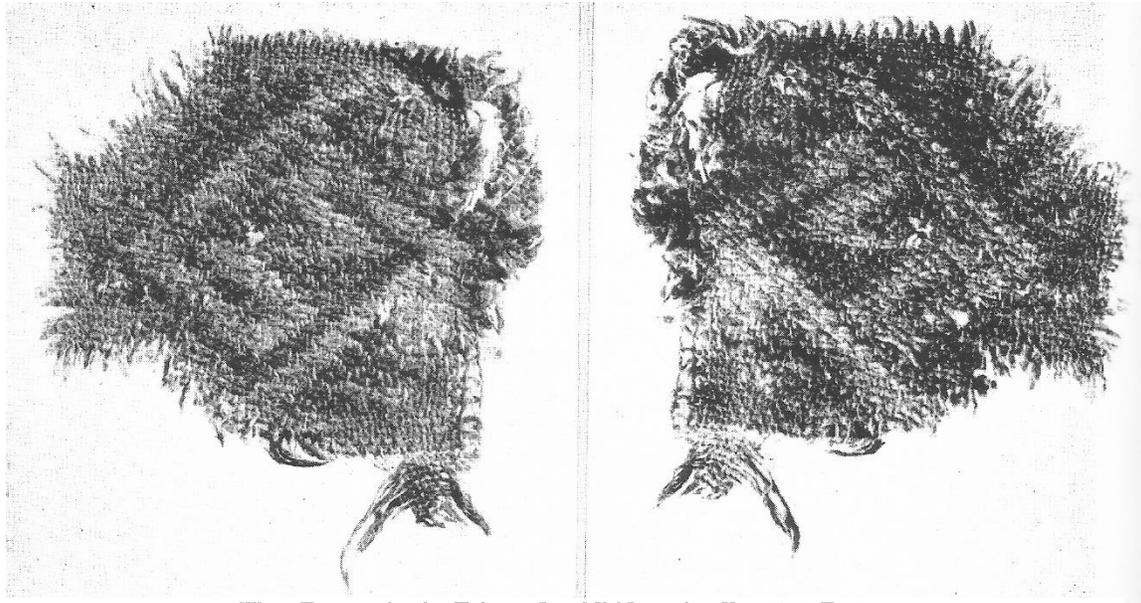


# Structural Analysis of Tularosa Cave Diamond Twill Fragment

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Contribution to Complex Weavers Archaeological Textiles Study Group



*Woven Fragment found in Tularosa Cave, NM Image from Kent 1957: Fig 63*

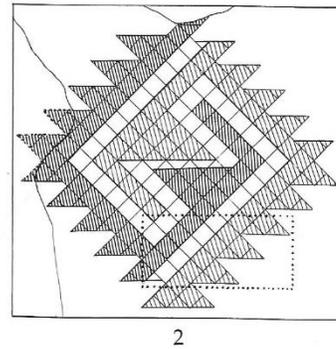
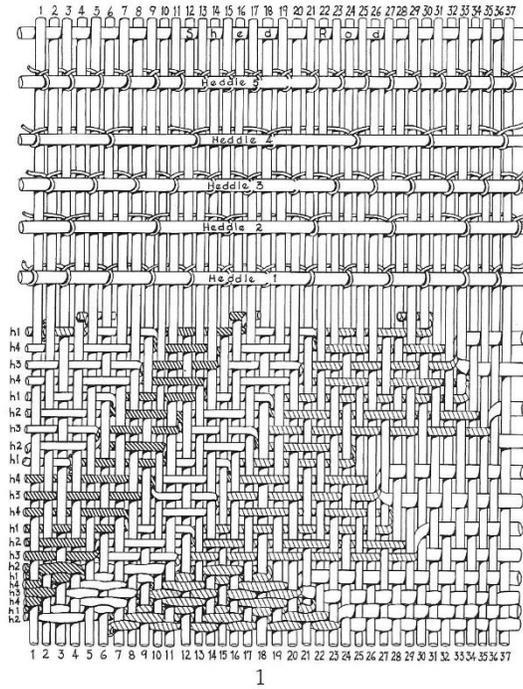
I continue to be fascinated by and focus on the small textile fragment found in Tularosa Cave, New Mexico in the early 1950s (Martin et al, 1952). It is a white plain weave cloth with a tapestry motif in blue and brown woven in diamond twill patterning, placed during the Mogollon 5 period, 1000-1450 CE by Kate Peck Kent (1982, 1957).

In my previous report for this group (Keeling 2019), I analyzed and critiqued the heddle rig Kent proposed for the creation of this cloth. I found that the description and rigging would not produce the patterning found in the fragment.

For this report, I have studied the illustration of the textile in Kent (1982: 166, Figure 98A 1) to develop a proper heddle rig, or pick-up strategy for weaving the motif in this cloth. I also began looking for examples of this diamond twill weave structure in pre- and post-Contact basketry and textiles from the Greater Southwest.

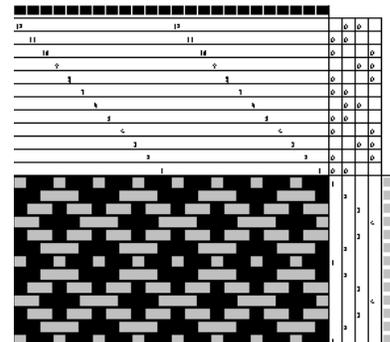
## Heddle rig proposed by Kent

As can be seen in the diagram below, the diamonds of this weave structure are close together and all of the same size and shape. The diamonds nest together, as seen in the illustration at the right and each diamond is created with 5 picks of weft across 5 warps with one warp between to the side as well as above and below each diamond creating a 6-thread interlocking pattern.



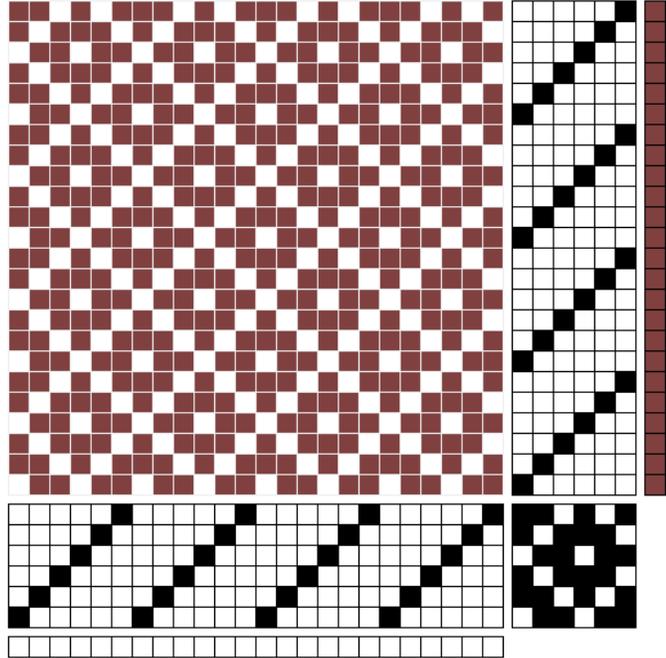
The lower portion of the diagram shows this single warp between the diamond points and edges. The upper portion spreads the wefts out and the spacing between the diamonds seems to increase to two warps. For the purposes of this analysis, I am using the lower portion of the diagram which seems to correspond to what I can discern from the image of the weaving itself.

For my previous report, I created the draft below with iWeaveIt using Kent's heddle rig. I have not been able to find any means of weaving the diamond twill as illustrated in the diagram above by means of the heddle rig Kent has proposed.

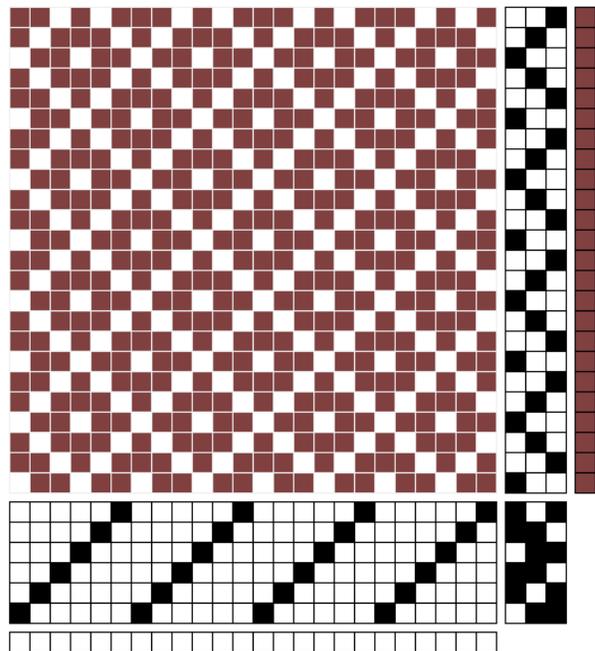


## Analysis of Cloth Structure Using Drawdown in Kent Diagram

To analyze the twill used in the fragment, I used WeaveDesign\* and first plotted the shape of the diamond in the tie-up box. I began with a 6-thread, 6-shaft draft to create a single diamond, filled the rest of the tie-up box leaving one square blank around the center diamond and repeating the pattern of the diamond in the lower left corner. Using a straight threading and treadling, I was able to recreate the diamond pattern in the draft.



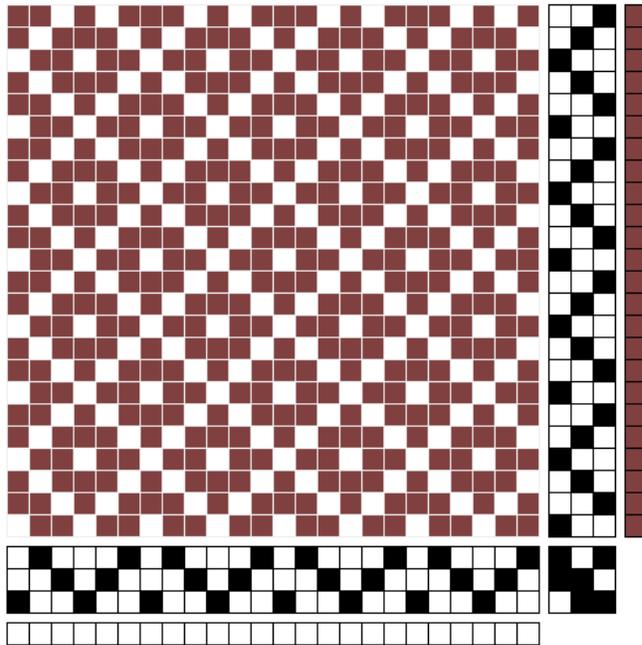
There are duplicate tie-ups in this draft, as shafts 1 and 4; 2 and 6; 3 and 5 are identical, so I reduced the draft to 3 shafts.



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\* I tried doing this in iWeaveIt but was unsuccessful so used WeaveDesign.

It seemed the draft could be further reduced by adding a point twill threading and treadling similar to rosepath.



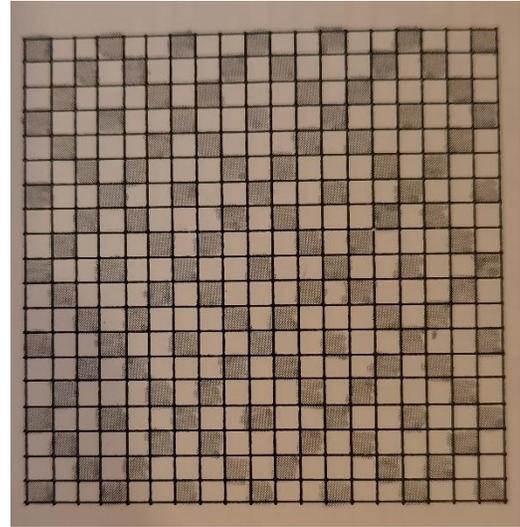
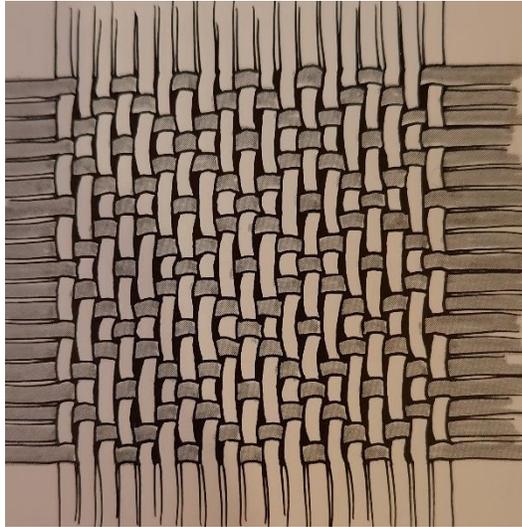
This last reduction would be used by a weaver using a shaft loom but a backstrap weaver would tie up the heddle rods after the loom was prepared so the first reduction seems more likely. I will weave a sample of this fragment using a frame loom with a separate set of heddle rods for the pattern along with the shed and heddle rods for plain weave.

As a weaver, I am quite taken by the ingenious use of the interlocking diamonds to create the motif in this fragment. I was a basketmaker long before I was a weaver and feel that it is quite possible for someone skilled in twill basketry to apply some of those skills when weaving this piece of cloth. As an anthropologist, I am interested in finding connections between the weaver of this cloth and others who lived in and near this region of the Greater Southwest as well as to those who came before and after.

This year I began exploring some of those connections looking at texts I had readily available in my own library and through interlibrary loan.

## Preliminary Survey of Basketry and Textile Examples of Diamond Twill

I found a basketry pattern like the diamond in the Tularosa fragment in Shereen LaPlantz's book, *Twill Basketry*, which LaPlantz describes it as a dovetailing diamond twill (1993: 86, 88; Figs 20, 21).



Baskets are generally woven from the center outward rather than from one end as this helps with tensioning when none of the elements are anchored as they are when weaving cloth. However, the patterning is the same as the Tularosa fragment. LaPlantz included several examples of Guatemalan twill basketry with patterning, but none had the dovetailing diamonds, nor did they have the type of patterning created by the diamonds found the Tularosa fragment. Guatemala is within the region of the Greater Southwest where cotton cultivation and weaving arose. This region, through trade and possibly migration, shared this technology with other cultural groups in the region. (Kent 1957). Other examples of dovetailing diamonds in LaPlantz's book were from regions too far away from the Tularosa area to have likely connections with the people living there at the time.

Examples of basketry sandals woven by the Anasazi found in the Utah Museum of Natural History (Kankainen, ed 1995) were woven with twill patterning but none I found in this text appeared to have diamond patterning. Puebloan and Navajo weavers used diamond twill when weaving their blankets (Wheat 2003, Amsden 1975) but as an overall weave structure not as a means of weaving discrete motifs. The diamond twills in these examples were sometimes dovetailing diamonds but more often a goose-eye diamond twill. These three cultural groups are also part of the cultural fabric of the Greater Southwest

Further study remains to understand what this small fragment can tell us about the weaver and her life, about how this particular woven fragment fits in with weaving in the Greater Southwest during this period, and how weaving evolved and was transmitted between cultural groups and across time in this region. For me, this fragment remains a tantalizing window into the past.

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