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Reviewed Article:

Anglo-Saxon Beads: Redefining The “Traffic Lights”

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Many thousands of glass beads have been excavated from Early British cemeteries of the fifth and sixth centuries AD. Amongst these beads is a type that was particularly common: decorated polychrome beads in red, yellow, and green glass in a variety of styles and combinations. Birte Brugmann, in her 2004 analysis of Saxon-period glass beads (Brugmann, 2004), named these beads “Traffic Light” (TL) beads because of the colours and drew attention to the fact that they were probably made in England as they do not appear on the continent.

> This shows that a reasonable knowledge of how beads are made is important when creating a typology of beads in a particular culture and mistakes have been made in the past because of the lack of this knowledge.

Introduction

These beads have been the subject of an intense study by the author, using hot glass beadmaking to identify how they were made. The tools used were those which were available to ancient beadmakers of the time. The heat source was a basic Hothead blowtorch, fuelled by gas, that reaches similar temperatures to heat sources available at the time. This type of torch has no sophisticated controls and temperature cannot be adjusted. It was considered that it simulated the conditions of a small volcano furnace as closely as possible without building a replica furnace. Building a mud and clay wood furnace such as those replicated in various studies (Heaser, 2022) would have taken the research, which was focussed on the beads, into a different direction.

Many more beads of these types have been discovered in the past 20 years and this new corpus, combined with these experiments, has shown that a more detailed typology can be created when considering the techniques used to make them. “Traffic Light” is a useful term to describe a colour scheme, but many beads made in these colours use different techniques and require different skills. Beads with different making techniques should be given distinct categories as they may represent the work of different makers and may not be contemporary.

The different types are described below, and Table 1 is a proposed recommendation of how the original categories may be clarified and enhanced.

All the beads described in this paper were excavated from Saxon-period sites in England. Many of these beads have not been published or only recently excavated. References therefore are for the museums and archaeological units where the author studied the beads. Where the beads have been published, the publications are given in the References section.

TRAFFIC LIGHT (TL) TWISTED TRAIL BEADS AND ASSOCIATED TYPES		
Brugmann Typology	**More Precise Name**	**Notes**
TL Twisted Trail; Dark Twisted Trail	Twisted cable – round/cylinder/cube etc	These beads are mostly red, yellow and green but may be in different colours. The technique is the same whatever the colour scheme.
	“Dark” is a colour variation	Beads should be described e.g: Twisted cable bead with red body; yellow and green twisted cable.
	Twisted cable paired chevron – round/cylinder	These beads have paired cables with opposing twists (S-twist and Z-twist). They appear in

		several colours but red, yellow and green is the most common combination.
	Twisted cable combed chevron	These beads are usually round and have a single twisted cable applied to the equator. The centre is then drawn with a needle to drag the stripes into a chevron.
TL Imitation (Streaked dot)	TL Streaked dot	These beads are in a variety of forms but all use twisted cables for decoration in a different way - applied so that they look streaky and chaotic. They are therefore related to the twisted cables and would have been made by the same beadmaker/s.
TL Streaked (Streaked trail)	TL Streaked cable - round/cylinder etc.	
TL BEADS WITH NO TWISTED CABLE		
Brugmann Typology	**More Precise Name**	**Notes**
TL Imitation	Combed chevron beads - round, cylinder and cube	"Imitation" is better avoided as these beads are not imitating, they are different designs in their own right. They use single colour (usually green stringers) on yellow to make the lines, then the lines are combed.
TL Crossing Trail	Crossing trail and dot	These beads are made in a range of colours and the red, yellow and green variety is only one. They are not related to twisted cable beads.
	(single colour trail with no twist)	
TL Other	Cube Frame and dot	These are made in a range of colours. No direct relationship to twisted trail beads.
	(single colour frame and no twist)	

TABLE 1. TRAFFIC LIGHT (TL) TWISTED TRAIL BEADS AND ASSOCIATED TYPES AND TL BEADS WITH NO TWISTED CABLE.

Twisted Cable Beads

The most common types of Traffic Light beads are opaque red beads decorated with opaque yellow and translucent green twisted cables. These are found as cylinders with round or square sections (See Figures 1, 2a, 2c) as well as globular beads (See Figure 2b). The extra thinner lines in the twisted cables of the bead in Figure 2a are a common occurrence caused by re-using the same pontils repeatedly to make the cables. If traces of the previous twist are not always cut off, they will cause the appearance of extra lines of colour in the next twisted stringer. See also the left-hand replica bead in Figure 7 and the right-hand replica bead in Figure 9.

Black or red cube beads with yellow/green cables also occur occasionally with cables framing the bead (See Figures 2d and 2e). Other colour schemes are rarer: Red with blue and white

cables; green with red and yellow cables (See Figure 2c).

All these types have a twisted cable simply spiralled round the bead or applied round the edges of the cube. The beads are normally dated to the fifth and early sixth centuries AD (Brugmann Phase A). The cables used in these beads are remarkably similar suggesting they were made by the same beadmaker, or a group of makers who shared the technique. This is because there are so many variables when making delicate designs in hot glass that it is difficult to recreate the same effect precisely unless the same tools and heat source are used. It is noticeable that modern beadmakers can rarely copy each other's work exactly and a trained eye can spot different makers.

Technique

The following steps show tesserae (approximately 10mm x 10mm) being used to make the twisted stringer, but rods of yellow and green glass can also be used.

Step 1: The twisted stringer is made for the cables. Two colours of glass are melted together on a pontil. Another pontil is attached to the free end of the glass. The glass must be at the correct temperature and viscosity, or the twist will not form properly. The working temperature of soda lime glass of this type is usually between 800°C to 900°C (See Figure 3).

Step 2: The glass is removed from the heat and the hands are rapidly rotated in opposite directions while they are pulled apart to make the twisted stringer for the cables. The glass stiffens as it cools and the stringer is twisted and pulled into a rigid rod, approximately 3mm thick and up to 20cms long. The twisted stringer is set aside to cool for the next step (See Figure 4).

Step 3: A red cylinder bead is wound on the mandrel. This is done by touching the heated end of the glass rod to the mandrel and rotating the mandrel so that the melted hot glass from the rod is wound round it along the mandrel to create a cylinder bead about 25mm long. The bead is heated in the flame further so that the glass smooths out into a cylinder while the mandrel is continually turned (Heaser, 2018, p.10). The end of the twisted stringer is then softened in the flame. It is laid against the surface of the bead and the mandrel and bead are rotated so that the stringer is wound around the bead. It is important that the stringer is not dragged over the surface of the bead or a streaked trail will result (see Streaked beads below.) The bead is then heated until the cable design is flush with the surface and can be marvered to sharpen the ends or tonged to make a square cross-section (See Figure 5).

Different colour schemes can be used. Cube beads are tonged to shape and then the twisted cables applied to the cube edges to frame each side (See Figure 2d and 2e). Round beads have the cables applied as a simple equator; as a continuous spiral (See Figure 2b); or, more rarely, as a waving trail.

It is difficult to make the twisted stringers uniform and matching (See Figure 6). The softness of the glass, the heat of the flame and the speed that the maker can spin the opposing hands all affect the spacing of the twist elements and the thickness of the stringer. There is often considerable variety in the thickness of each colour and the slope of the twist (See Figure 1). Applying the twisted stringers is the simplest part of the process. When sufficient twisted cable has been wound onto the bead, the stringer is “flame cut” by holding it closer to the flame and pulling it away from the bead. The remains of stringers that are too short to use further would be saved for recycling or used for Streaked beads (see below).

(See Figures 7, 8 and 9)

Twisted Cable Paired Chevron Beads

The variation shown in Figures 10 and 11 uses twisted cables with opposite twists arranged in pairs on the bead. This type is rarer than the simple twist described above and mainly occurs in red globular beads with yellow-green twisted cables. Cylinder beads with the chevron around their centres seem to be a later development and appear in graves dated to the late sixth century at Cammeringham, Lincolnshire and Sewerby, East Yorkshire (see below).

The term “chevron” describes this pattern more accurately than the term “herringbone” which is occasionally used to describe this pattern. A herringbone pattern has a stepped edge and these are smooth.

Technique

The technique involves making two different twisted cables, one an S-twist and the other a Z-twist. This is achieved by twisting the hands in opposite directions when making the two types of twisted stringers. Figure 12 shows making an S-twist with hot glass (right hand turned away, left hand towards.) To make a Z-twist, the hand movements are reversed (Figure 4 above).

The beads are made by applying the opposing twisted cables side-by-side (See Figure 13). The Z-twist is on the left, the S-twist on the right. The illusion is best achieved if the two cables just touch (see Figures 10 and 11).

(See Figure 14)

Paired Cable Chevron Variations

Beads made using this technique have been found in Lincolnshire: at Ruskington (The Collection Museum, Lincoln), and Cammeringham, (Lincolnshire County Council Archaeology. Excavated 2020 - report forthcoming). Others were found at Sewerby, East Yorkshire (bead C7b, Hirst, 1985, p. 68). Excavations at Cammeringham produced a fine collection of these

beads in several colour combinations, all from one grave (See Figures 15 a-d). Fourteen beads are cylinder beads (See Figure 15 a-c), and one is a barrel bead (See Figure 15d). Only six of the cylinder beads are in Traffic Light colours (See Figure 15a), five are light green with dark green and yellow cables (See Figure 15b), and three are white with blue and white cables (See Figure 15c). The brooches found in the grave suggests these beads are late sixth century which is later than the TL Twisted cable beads and places them in the period of Annular Twist beads. The style is also slightly different with finer lines in the twisted cables. These beads could have been made by a later generation of beadmakers continuing a successful technique.

The single large barrel bead using paired cables in white and blue was part of the group and is unique, see Figure 15d. There appears to be no exact parallel although the occasional annular bead covered in twisted cables has been found in several Irish crannogs of this time (for example, a translucent dark blue and white annular bead from Lough Ravel, Co. Antrim, Hunterian Museum, Glasgow. Museum number: GLAHM: B.1951.2618/6).

(See Figure 16)

Combed Cable Chevron

This is a rare type that requires two steps (See Figure 17).

Technique

The twisted cable is wound once around the equator of the bead. Then a needle is used to drag the hot glass in the centre of the cable to make a chevron (See Figure 18). It produces a similar effect to the paired cables above. The techniques are difficult to differentiate, but paired chevrons may have a slight gap with the base bead colour showing between the cables and the paired stripes do not match exactly (See Figure 10). Paired chevrons will also show the ends of two cables where they join, while combed cable chevrons tend to have the stripes pulled finer than paired cable chevrons.

(See Figure 19)

Twisted Cable Streaked Beads

These beads use pre-made twisted cables in a different way. Instead of laying them onto the bead surface and melting them in so there is minimum distortion, the end of the twisted stringer is used like the tip of a pencil to swirl the hot glass onto the bead surface.

Streaked Dot Beads

(See Figure 20)

Technique

A red globular bead is first made and cooled slightly to firm the glass. The end of the twisted stringer is melted and used to draw with a circular motion to make three large dots around the circumference of the bead. The applied glass is melted into the surface until it is flush (See Figures 21 and 22).

Other Streaked Bead designs

There are many variations using this technique, but they can all be considered as part of the same type of streaked beads using twisted cables. The beadmakers became quite imaginative in the different types of beads they produced. Making different shaped beads and applying the techniques in diverse ways is a common artistic device that beadmakers have used for centuries. The technique produces short waste ends of twisted stringers that would have been useful for decorating beads such as these. Modern beadmakers use up every scrap of waste they produce so it is likely that ancient beadmakers, with less resources, would have done the same.

Round streaked beads

This type has streaked yellow-green bands alternating with red (See Figure 23).

Technique

Step 1: A red globular bead is first made, then the tip of the twisted stringer is dragged in loops up and down, all around the bead (See Figure 24).

Step 2: A red trail is applied around the equator to separate the streaked band in the middle into two lines. Occasionally red trails are also added at the top and bottom of the bead to neaten the ends (See Figure 25).

Cylinder beads: The streaked trails are applied all over the body of the bead and trails of opaque red are then applied over the streaks. These can occasionally be in the centre or at the ends of the bead (See Figure 26).

Cube beads: These show the same technique with the twisted cables applied loosely and jumbled together over a red base visible near the bead hole. Red glass has then been used to frame the bead sides (See Figures 27 and 28).

Beads Unrelated To Twisted Cable Beads

In the past, the following types of beads have been categorised as Traffic Light beads because of their colours, but they do not use the same techniques as the twisted cable beads above.

They, therefore, should be given categories of their own and are not necessarily made by the same beadmakers or workshop.

Combed Chevron Beads

These distinctive beads are found with only slight variations mainly in East Anglia. A yellow base bead has fine lines of plain green stringer spiralled around it. It is shaped into a cube with tongs, and then a knife or needle is used to drag the lines into alternating points. Finally, the cube is framed in red glass (See Figure 29).

Combed chevron round beads

This type is uncommon but is decorated in the same way as the cube beads above with fine trails of green dragged into chevrons and lines of red glass applied over the top (See Figure 30).

Cube bead with frame and dot

This type is found in various colour combinations. It is relatively simple to make with applied dots, cube shape and a single colour trail marking the edges (See Figure 31).

Conclusions

Experiments with replicating the beads of Early Medieval Britain have thrown light onto the existing typological framework and enabled the fine-tuning and subdivision of some categories while illustrating that others should be rejected because of differing techniques. This shows that a reasonable knowledge of how beads are made is important when creating a typology of beads in a particular culture and mistakes have been made in the past because of the lack of this knowledge.

The study of thousands of Saxon-period beads in British archives and the practice of their making techniques have also shown that it is sometimes possible to identify the work of a single beadmaker, much in the same way that art historians can identify the brushstrokes of an artist. This is an exciting subject that needs further investigation. X-ray analysis of glass such as XRF or SEM-EDS is widely used to identify the elements present, and this can work with enhanced understanding of beadmaking to help identify individuals plying their craft in the distant past. Practical investigation combined with advanced scientific techniques is an inspiring path for the future.

Acknowledgments

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IP6 8NZ, U.K.: Eriswell
Norwich Castle Museum, Castle St, Norwich NR1 3JU, U.K.: Morningthorpe, Spong Hill
West Stow Museum, Icklingham Road, West Stow, Suffolk IP28 6HG, U.K.: Westgarth Gardens, Icklingham
Lincolnshire County Council Archaeology, Newland, Lincoln LN1 1YL, U.K. : Cammeringham

Keywords bead
jewellery
glass

Country United Kingdom

Glossary

Twisted cable: "Twisted trail" has sometimes been used in the past to describe the design on these beads, but "twisted cable" which is also widely used, would be more precise and is the term used by modern glassworkers. It is also the term used for Iron Age beads made using the same technique (Foulds, 2017). Standardising the terminology would be beneficial and it would be best if glass beadmaking terms, used in Italy since Byzantine times, were applied.

Reticella: This term is used to describe TL twisted cable beads in some publications although it is the wrong technical term for simple twist decoration in glass working. "Reticello" means a design made of crossing lines or a "network" and is a glass blowing term (see the Corning Museum of Glass Dictionary: https://www.cmog.org/glass-dictionary/vetro-reticello). It is also used in archaeology to describe larger, more regular "Reticella beads" that are a later Continental type with twisted cables made from several colours. It is avoided in this study because the beads under discussion here are very different types, even though they share a twisting technique..

Stringer: A thin rod of glass used for adding decoration to beads. This may be plain or two or more twisted colours; approximately 2-3mm thick.

Mandrel: Pointed iron rod used by hot glass beadmakers for making wound beads. The molten glass is wound around the mandrel to make the bead and after cooling, the bead is removed. The hole results from the negative shape formed by the mandrel. All beads described in this paper are wound beads.

Pontil: A short, pointed iron rod used to manipulate the glass when bead-making. A second mandrel can be used for this.

Marvered: This term describes smoothing or shaping the hot bead surface with a flat metal tool such as a knife or shaping it with tongs.

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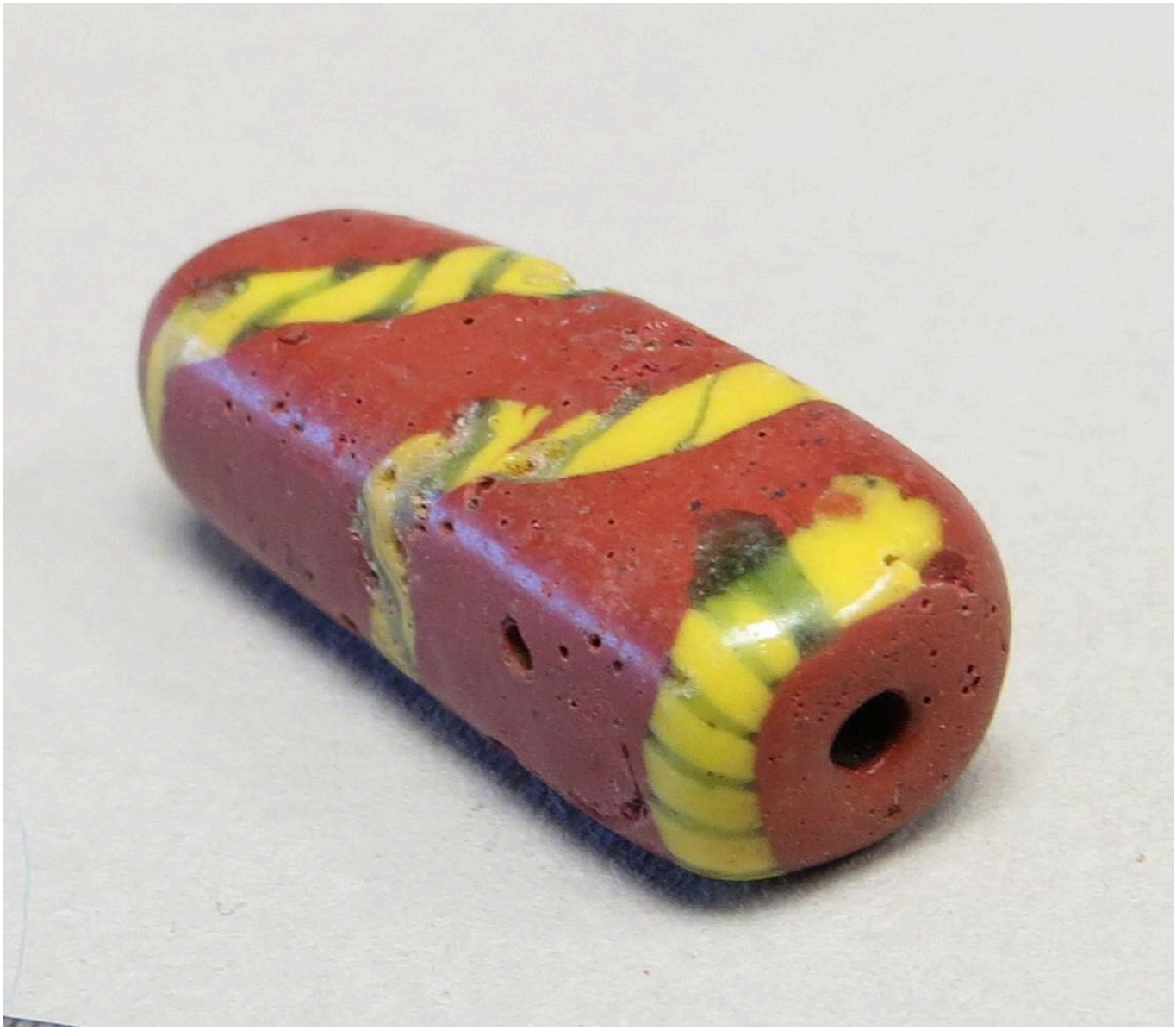

FIG 1. TYPICAL TL TWISTED CABLE BEAD FROM ERISWELL, SUFFOLK (COTSWOLD ARCHAEOLOGY). LENGTH 30MM. PHOTO BY SUE HEASER

FIG 2A. TWISTED CABLE BEADS FROM ERISWELL, SUFFOLK (COTSWOLD ARCHAEOLOGY). PHOTO BY SUE HEASER

FIG 2B. TWISTED CABLE BEADS FROM MORNINGTHORPE, NORFOLK (NORWICH CASTLE MUSEUM). PHOTO BY SUE HEASER

FIG 2C. TWISTED CABLE BEADS FROM ERISWELL, SUFFOLK (COTSWOLD ARCHAEOLOGY). PHOTO BY SUE HEASER

FIG 2D. TWISTED CABLE BEADS FROM WESTGARTH GARDENS, BURY ST EDMUNDS, SUFFOLK (WEST STOW MUSEUM). PHOTO BY SUE HEASER

FIG 2E. TWISTED CABLE BEADS FROM ERISWELL, SUFFOLK (COTSWOLD ARCHAEOLOGY). PHOTO BY SUE HEASER

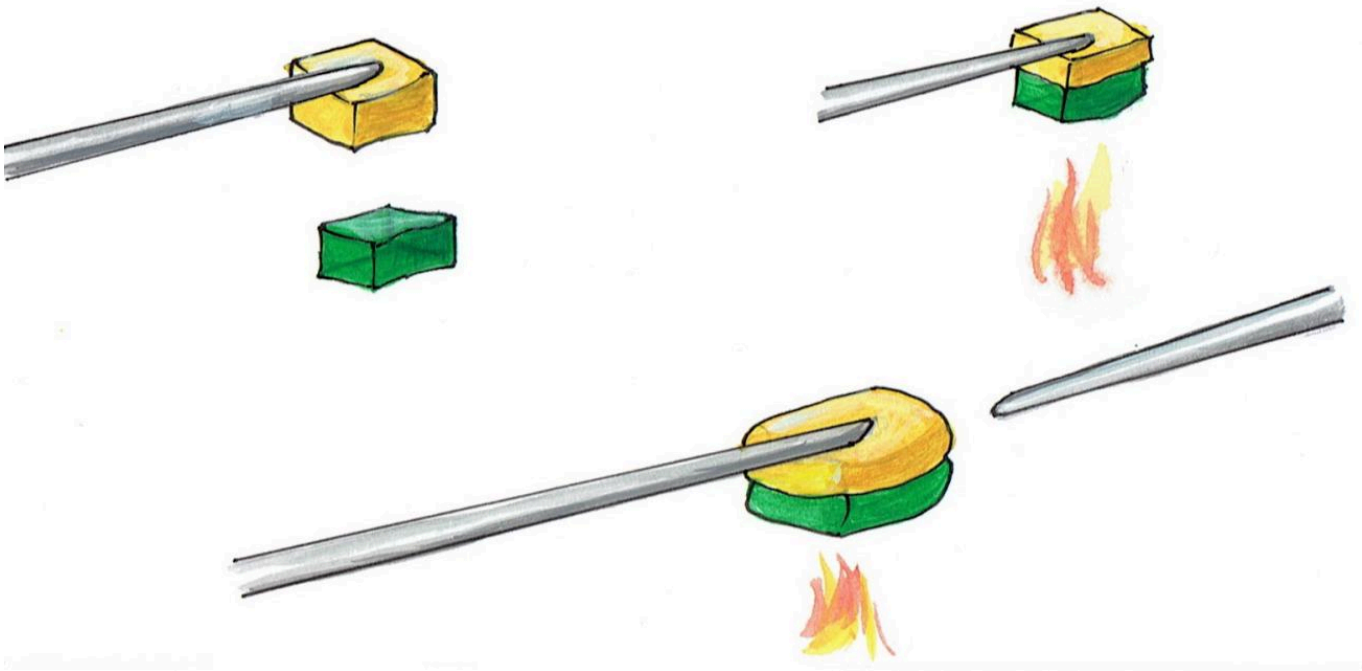

FIG 3. TWISTED CABLE BEADS, TECHNIQUE - STEP 1. DRAWING BY SUE HEASER

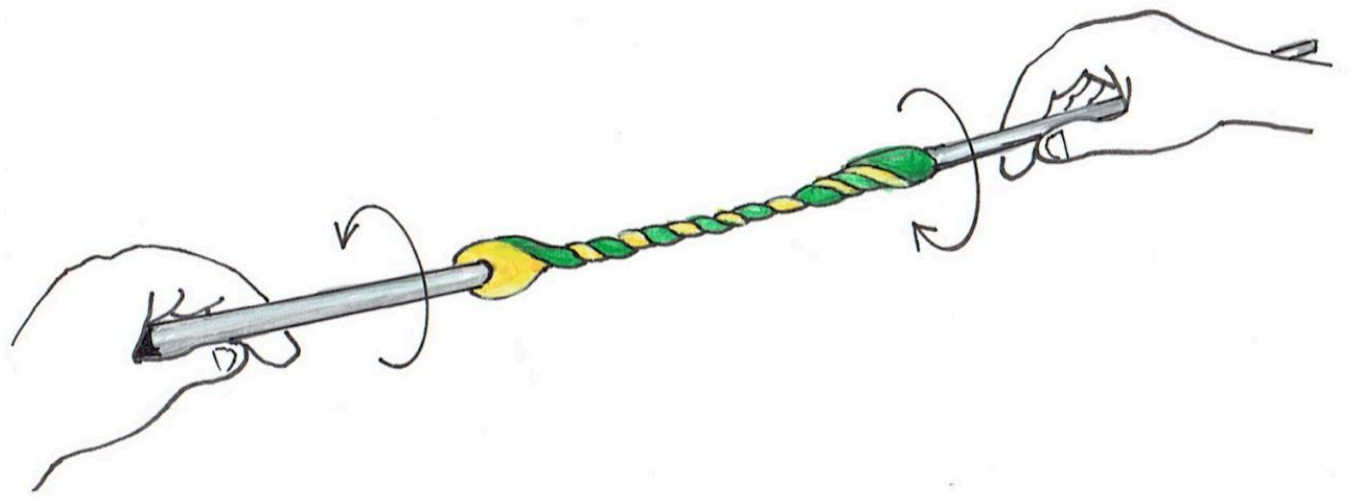

FIG 4. TWISTED CABLE BEADS, TECHNIQUE - STEP 2. DRAWING BY SUE HEASER

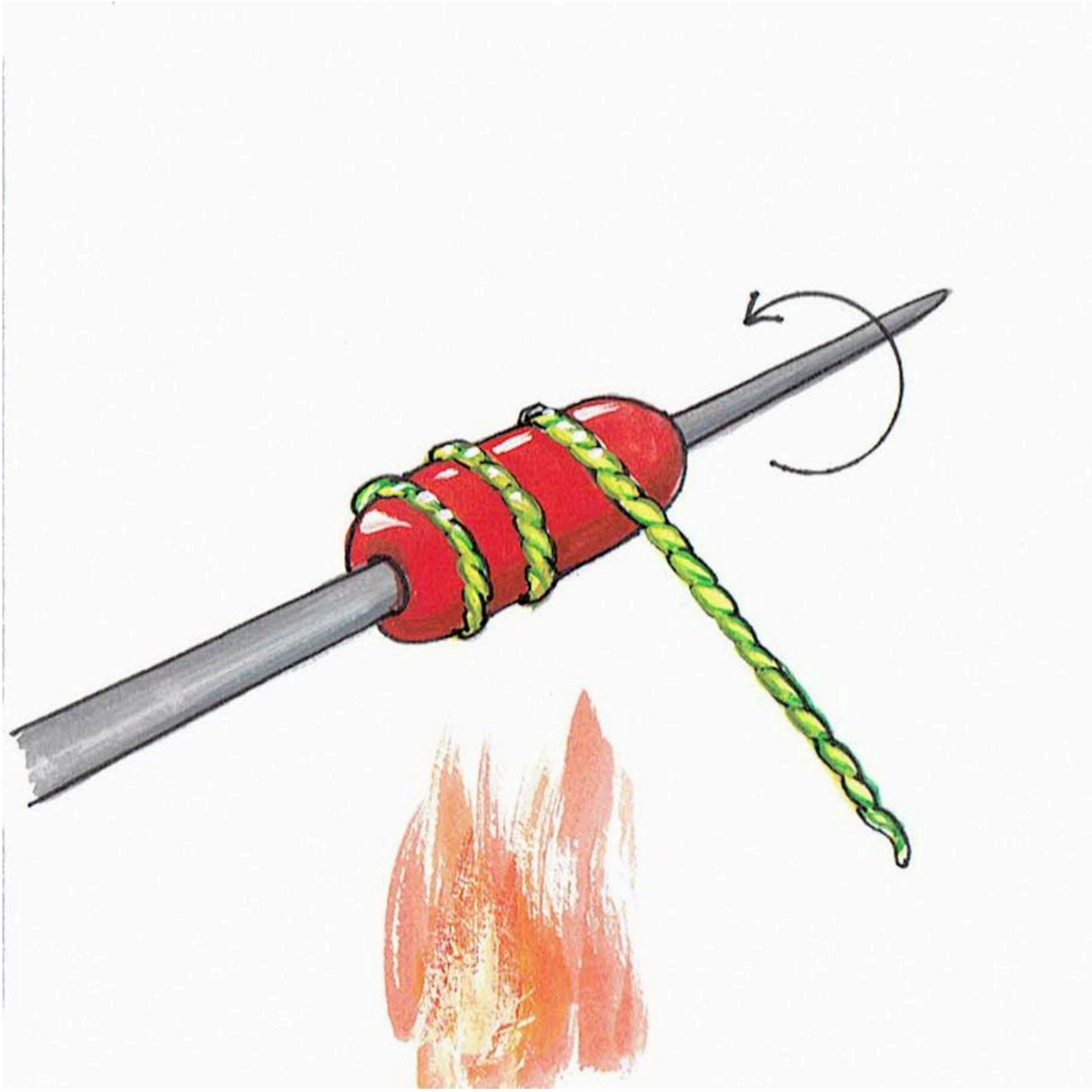

FIG 5. TWISTED CABLE BEADS, TECHNIQUE - STEP 3. DRAWING BY SUE HEASER

FIG 6. TWISTED STRINGERS AND REPLICA TWISTED CABLE BEADS MADE BY THE AUTHOR. PHOTO BY SUE HEASER

FIG 7. REPLICA ROUND TWISTED CABLE BEADS. PHOTO BY SUE HEASER

FIG 8. REPLICA CYLINDER TWISTED CABLE BEADS. PHOTO BY SUE HEASER

FIG 9. REPLICA CUBE TWISTED CABLE BEADS. PHOTO BY SUE HEASER

FIG 10. TWISTED CABLE PAIRED CHEVRON BEAD FROM ICKLINGHAM, SUFFOLK (WEST STOW MUSEUM). PHOTO BY SUE HEASER

FIG 11. TWISTED CABLE CHEVRON PAIRED BEAD FROM WESTGARTH GARDENS, BURY ST EDMUNDS, SUFFOLK (WEST STOW MUSEUM). PHOTO BY SUE HEASER

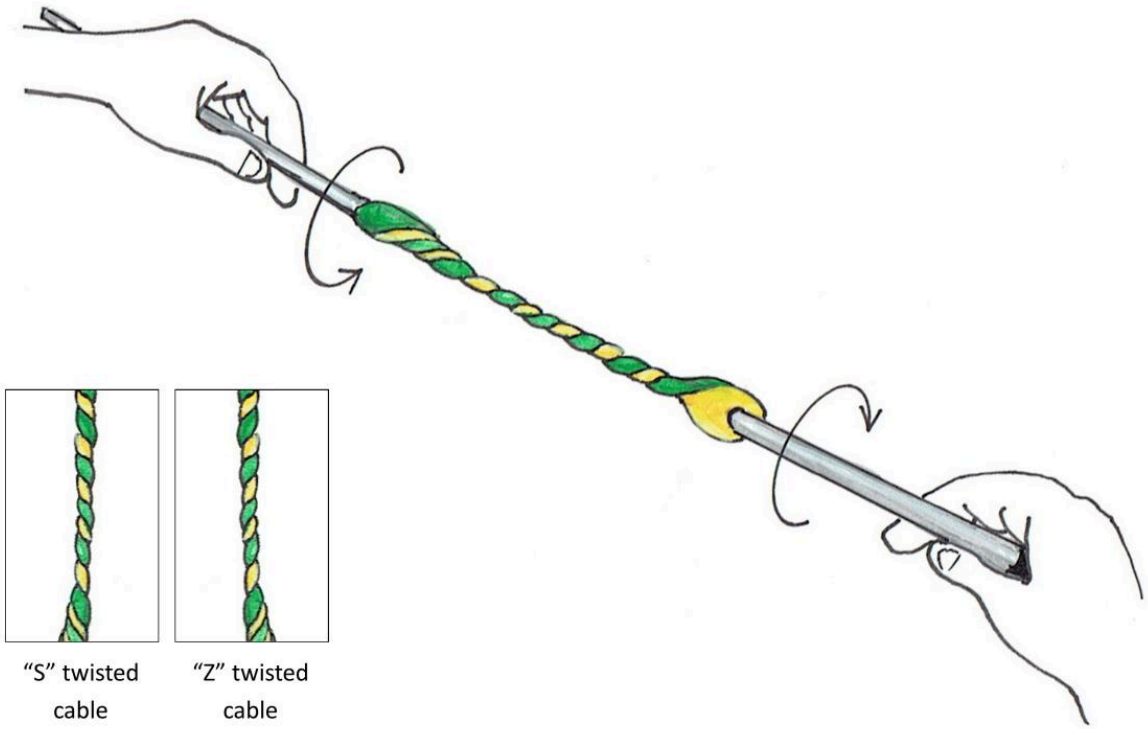

FIG 12. MAKING AN S-TWIST STRINGER. DRAWING BY SUE HEASER

FIG 13. APPLYING THE TWO DIFFERENT STRINGERS TO THE BEAD TO MAKE THE CHEVRON. DRAWING BY SUE HEASER

FIG 14. REPLICA TWISTED CABLE PAIRED CHEVRON BEADS. PHOTO BY SUE HEASER

FIG 15A. TWISTED CABLE PAIRED CHEVRON CYLINDER BEADS FROM CAMMERINGHAM, LINCOLNSHIRE LENGTH 13MM. (LINCOLNSHIRE COUNTY COUNCIL ARCHAEOLOGY). PHOTO BY SUE HEASER

FIG 15B. TWISTED CABLE PAIRED CHEVRON CYLINDER BEADS FROM CAMMERINGHAM, LINCOLNSHIRE LENGTH 13MM. (LINCOLNSHIRE COUNTY COUNCIL ARCHAEOLOGY). PHOTO BY SUE HEASER

FIG 15C. TWISTED CABLE PAIRED CHEVRON CYLINDER BEADS FROM CAMMERINGHAM, LINCOLNSHIRE LENGTH 13MM. (LINCOLNSHIRE COUNTY COUNCIL ARCHAEOLOGY). PHOTO BY SUE HEASER

FIG 15D. LARGE BARREL BEAD FROM CAMMERINGHAM, LINCOLNSHIRE. DIAMETER 22MM. (LINCOLNSHIRE COUNTY COUNCIL ARCHAEOLOGY). PHOTO BY SUE HEASER

FIG 16. REPLICAS OF THE BEADS FROM CAMMERINGHAM. THE BARREL BEAD HAS FIVE ROWS OF TWISTED CABLE THAT ALTERNATE. THE LIGHT GREEN BEAD SHOWS A SIMILAR WAVING IN THE CABLE TO THE ORIGINAL. THIS IS CAUSED BY PUSHING AGAINST THE ENDS OF THE BEAD TO STRAIGHTEN IT WHICH DISTORTS THE CABLE. PHOTO BY SUE HEASER

FIG 17. COMBED CABLE CHEVRON BEAD FROM ERISWELL, SUFFOLK (COTSWOLD ARCHAEOLOGY). PHOTO BY SUE HEASER

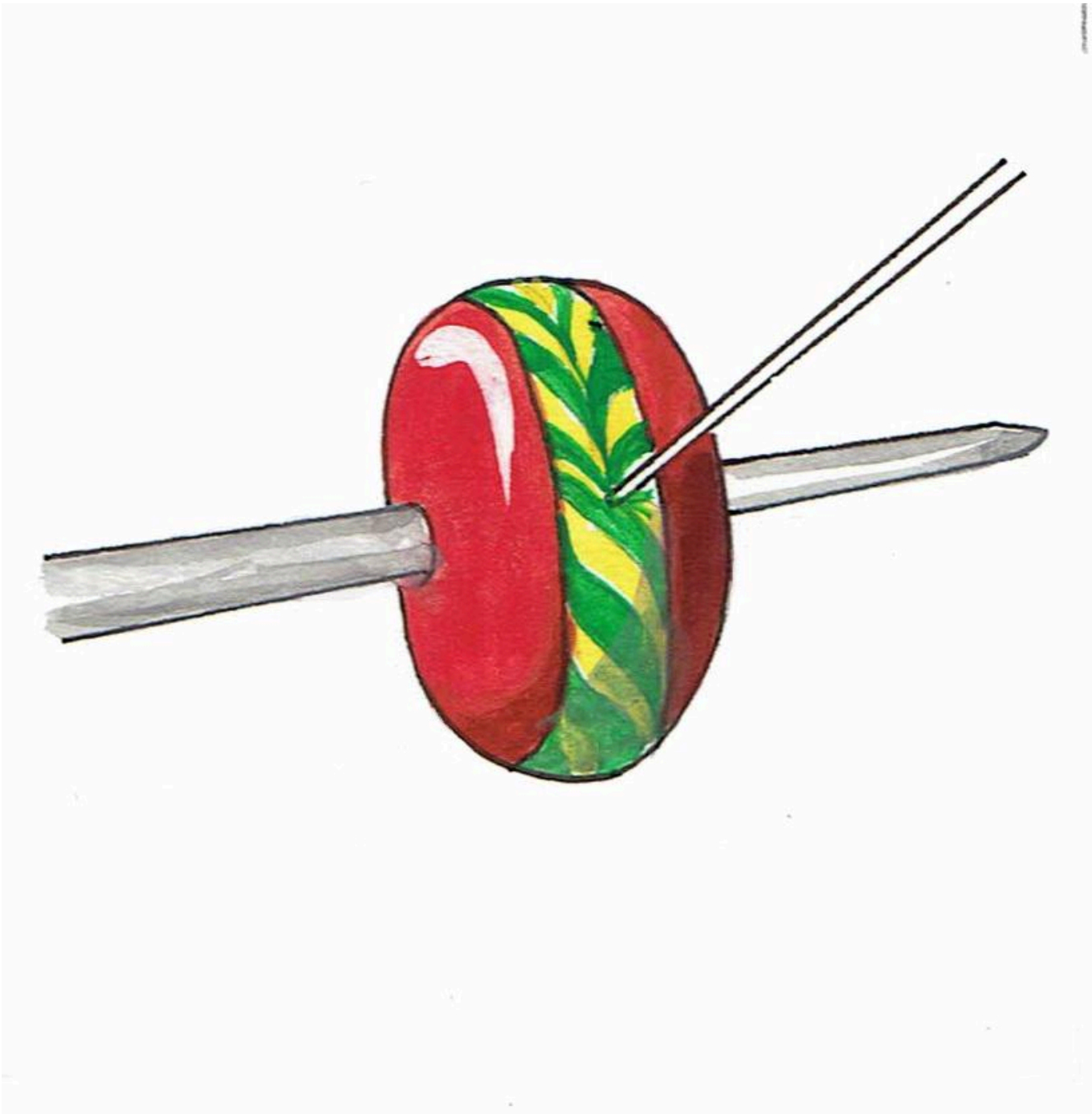

FIG 18. COMBED CABLE CHEVRON BEAD TECHNIQUE. DRAWING BY SUE HEASER

FIG 19. REPLICA COMBED CABLE CHEVRON BEADS. PHOTO BY SUE HEASER

FIG 20. STREAKED DOT BEADS FROM MORNINGTHORPE, NORFOLK (NORWICH CASTLE MUSEUM). PHOTO BY SUE HEASER

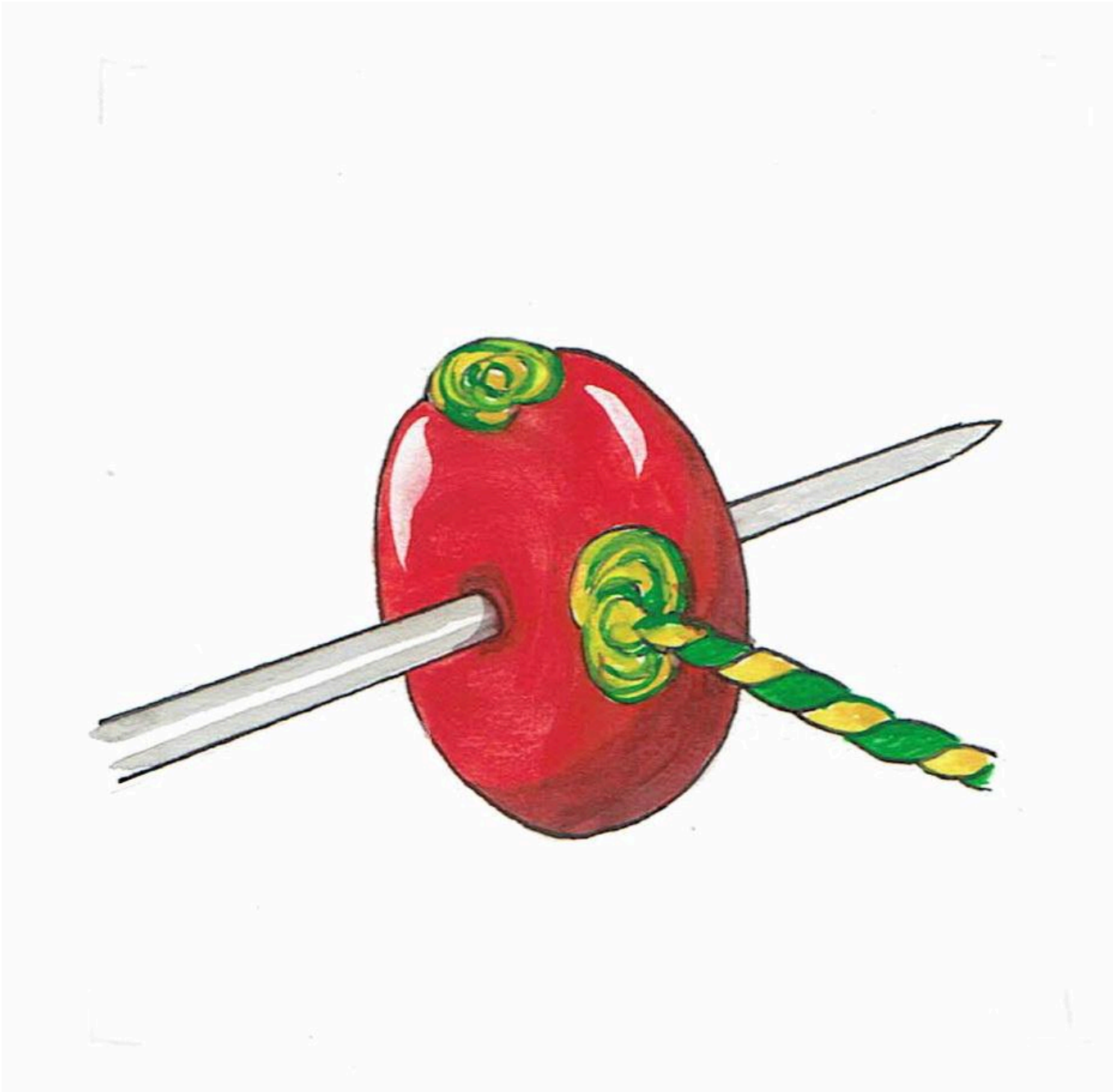

FIG 21. STREAKED DOT BEAD TECHNIQUE. DRAWING BY SUE HEASER

FIG 22. REPLICA STREAKED DOT BEADS. PHOTO BY SUE HEASER

FIG 23. ROUND STREAKED BEADS FROM MORNINGTHORPE, NORFOLK (NORWICH CASTLE MUSEUM). PHOTO BY SUE HEASER

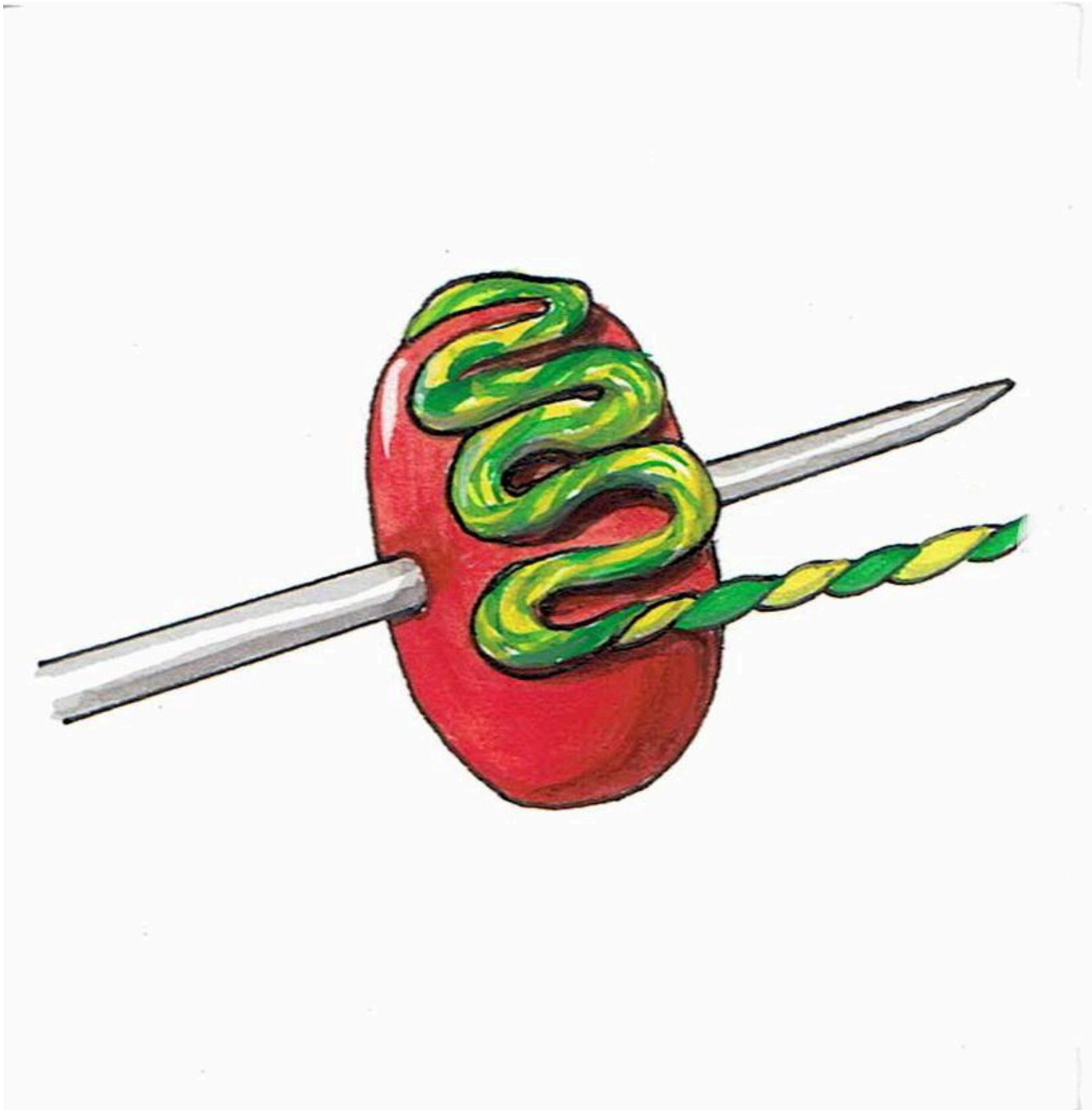

FIG 24. ROUND STREAKED BEADS, TECHNIQUE - STEP 1. DRAWING BY SUE HEASER

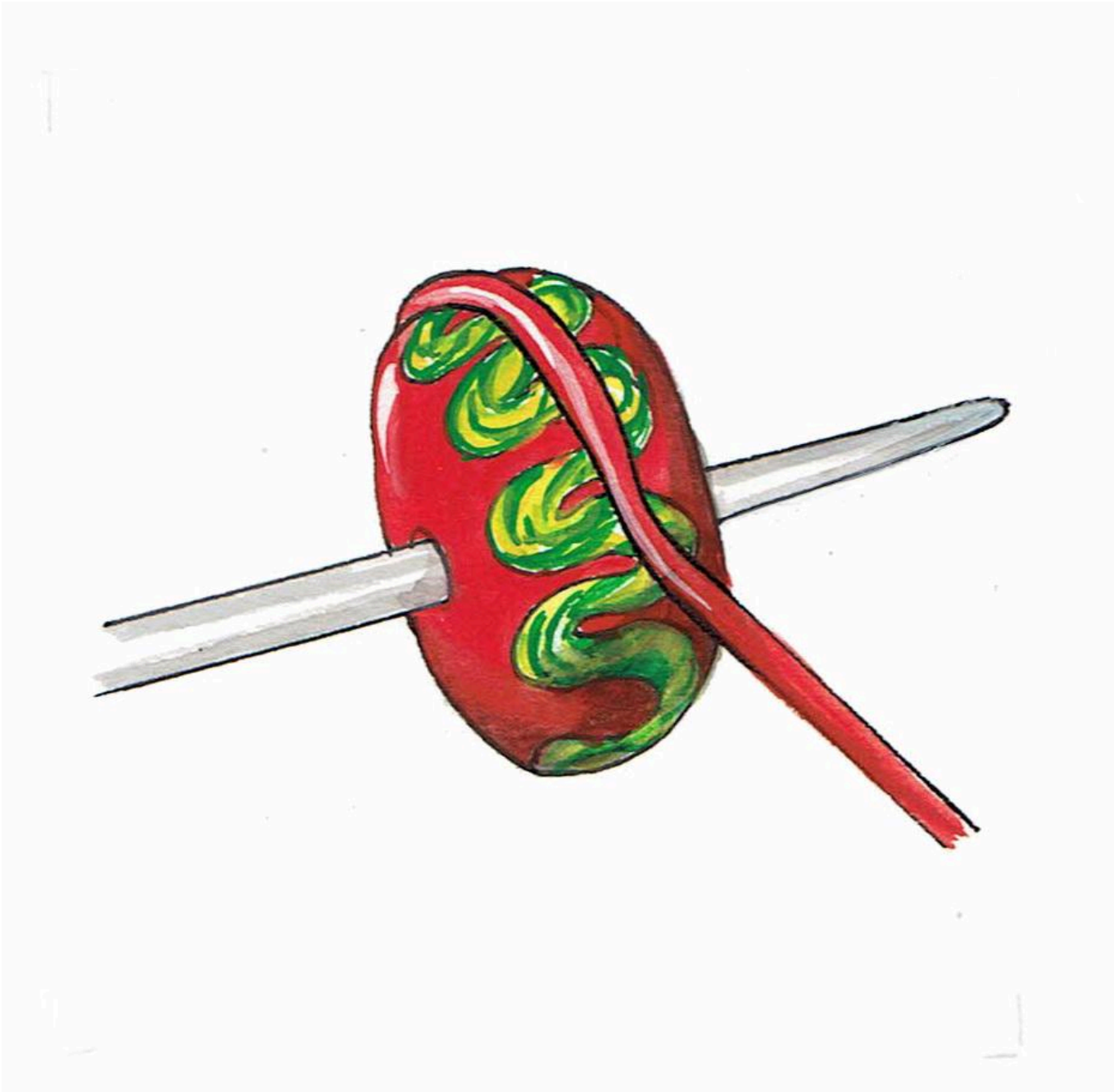

FIG 25. ROUND STREAKED BEADS, TECHNIQUE - STEP 2. DRAWING BY SUE HEASER

FIG 26. REPLICA ROUND STREAKED BEADS. PHOTO BY SUE HEASER

FIG 27. CYLINDER STREAKED BEAD FROM SPONG HILL, NORFOLK (NORWICH CASTLE MUSEUM). PHOTO BY SUE HEASER

FIG 28. CUBE STREAKED BEAD FROM SPONG HILL (IBID.). PHOTO BY SUE HEASER

FIG 29. COMBED CHEVRON CUBE BEAD FROM MORNINGTHORPE, NORFOLK (NORWICH CASTLE MUSEUM). PHOTO BY SUE HEASER

FIG 30. COMBED CHEVRON ROUND BEAD FROM SPONG HILL, NORFOLK (NORWICH CASTLE MUSEUM). PHOTO BY SUE HEASER

FIG 31. CUBE FRAME AND DOT BEAD FROM ERISWELL, SUFFOLK (COTSWOLD ARCHAEOLOGY). PHOTO BY SUE HEASER