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The james ossuary- a forensic inquiry

Abstract

Examining the antiquity of artifacts to determine their authenticity requires multidisciplinary expertise. The final verdict can influence an object's value and can impact our historical knowledge of the period in question and of the historical figures of that time. There are many methods of testing authenticity and they build upon modern scientific know-how and instruments. This paper presents some of the scientific tests that are routinely applied in forensic labs that can be used to confirm or challenge findings obtained through the accepted methods of examining archeological artifacts. Specifically, this paper discusses authenticity testing in the context of a disputed inscription found on a Second-Temple ossuary (Jewish burial bone box). The inscription on the ossuary possibly alludes to the brother of Jesus and is therefore highly significant to Christian believers.

Keywords: forensic science, james ossuary, toolsmarks, patina

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Introduction

In the Second Temple Period (first century B.C-first century A.C), there was an ancient practice of secondary burial. Once the flesh had decayed during primary interment, dry remains were transferred to a receptacle which then served as the final resting place for the deceased. Family members would return to the primary burial site on the first anniversary of the death to collect the dried bones and place them in an ossuary purchased for this purpose. The deceased's name was sometimes inscribed on the ossuary.[1,2]

The bible refers to this burial method when it is written 'was gathered to his people'.(Genesis 25:8). Saducee custom was to gather the deceased's bones into a room known as a Repository. Pharisee practice was to gather the bones into ossuaries and place these in a family burial ground, usually a burial cave. Over 3000 Second-Temple ossuaries have been discovered in and around Jerusalem.[3–5] Although most are unembellished, about 30% of them carry inscriptions; some are inscribed with a name and place of residence and in rare instances the head of the family is also noted. In 2002, the Christian world was thrilled by the discovery of the Second-Temple ossuary shown in Figure 1, inscribed with the words 'Jacob son of Josef brother of Jesus'.

Figure 1 Ossuary with the Aramaic legend 'Jacob son of Josef brother of Jesus'.

This ossuary was introduced to the public in Israel in 2002 and has come to be known as the James Ossuary. It bears the inscription in Aramic letters 'Yakov bar Yosef akhui d'Yeshua' (Jacob son of Josef brother of Jesus) shown in Figure 2. According to the Gospel (Matthew 13:55 and Mark 6:3), James, known as James of Jerusalem and James Adelphotheos (James brother of God), is the brother of Jesus and son of Josef husband of Mary. This inscription might therefore imply a fraternal relationship between the person whose remains were interred in the box (who died in 62 BC) and Jesus Christ.

Authenticity of this ossuary was under debate. Some claimed that it is a modern forgery, as the name in the Aramaic phrase 'brother of Jesus' could only have been meaningful starting in the fourth century AD after Christianity had already been accepted by the Romans in the days of Roman emperor Constantine the Great at the beginning of the fourth century. Before that time, members of the new religion were still persecuted by the Romans, who had also crucified Jesus.

Further support of the forgery claim derived from the fact that Jews began using such ossuaries to store human bones in 20 BC and the practice disappeared with the destruction of Jerusalem in 70 AD. This period was in the lifetime of Jesus and of his brother and, as noted above; during this period the name Jesus had not yet gained special meaning. Archeological forgeries of inscriptions and illustrations are very common; they are generally motivated by avarice or a desire for professional or political prestige. A perpetrator might also be attempting to use the forgery as scientific proof of some historical turn of events. There are many methods of establishing the antiquity of artifacts, calling on expertise in a great variety of disciplines. When investigating inscriptions, archeologists may turn to some or all of the following areas of expertise:

i. Petrology is a geological method of studying rocks by structure, composition, texture, distribution, taxonomy and the chemical and geological processes that shaped those.[6]

ii. Epigraphy is the study of inscriptions, the characters and symbols carved in stone.[6]

iii. Paleography is the study of characters written in ink on paper, parchment, clay and other materials, as well as of the texts themselves.[7]

Figure 2 The inscription found on the ossuary attributed to the brother of Jesus; it reads 'James son of Josef brother of Jesus' in Aramic letters (Yakov bar Yosef akui d'Yeshua).

When this investigation began, several Israeli experts, members of the Geological Survey of Israel, as well as several international experts concluded that the ossuary and its inscription can be dated to the Second Temple period. Their opinion relied on analyses of the deposited patina (a thin film of chemicals) and its morphology.[8] Patina is formed on stone when oxides from bacteria, fungi, algae and yeasts build up over time creating a homogenous layer that is smooth and glossy. Those who believed both the ossuary and inscription are authentic, relied on the structure of patina samples which they examined and found to be homogenous, smooth, glossy and free of granules.

Those who did not believe its authenticity were doubtful as to the ossuary's origin because it was not discovered at an official dig, or under supervision of an authorized party. Its provenance is unknown and the owner has not provided information on when or from whom it was purchased. Following contradictory publications regarding the inscription's authenticity, the Israel Antiquities Authority (IAA) decided to settle the matter by appointing a multi-disciplinary committee of experts to examine the ossuary. The IAA agreed to have the ossuary examined by The Forensic Lab. The Forensic Laboratory examinations focused on the authenticity of the inscription on the James ossuary.

Materials and methods

The James ossuary examination included three types of expertise, the Petrology the Epigraphy and the Paleography. The examination also included a comparison to an ossuary undisputedly dated to the Second-Temple period from the Rockefeller Museum collection - "Salome daughter of Judah of Hadid" ossuary, an authentic ossuary dated to 20BC-70AD.

Petrology examination

The Forensic Laboratory composed morphological and chemical examination of the patina to compare the patina on the engraving markings in order to see if there were any differences. A silicon rubber[1] mold made of the inscription (Figure 3). Once the material had hardened (polymerized) it was removed from the inscription (Figure 4). A second mold was made from an uninscribed area of the James ossuary. A third silicon rubber[1] mold was made on the "Salome daughter of Judah of Hadid" ossuary (Shalom bat Yehuda meHadid) (Figure 5), in order to compare the composition of the patina that had adhered to the James ossuaries with patina that has been undisputedly dated to the Second-Temple period. Patina samples were collected from various locations on the James and Salome ossuaries. Element composition of the samples were analyzed using an EDAX XRF Eagle μ-probe

Figure 3 Silicone rubber mold of the 'James brother of Jesus' inscription.

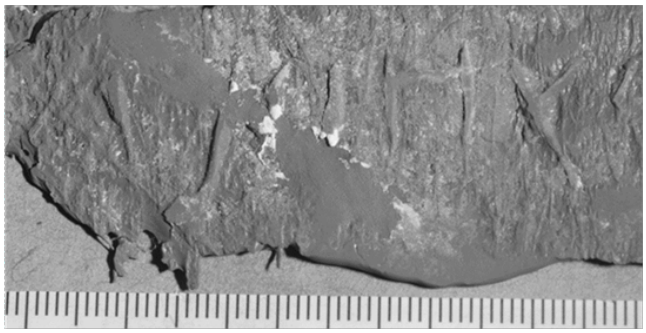

Figure 4 'Brother of Jesus' portion of the inscription. The white flecks are the patina that came off the inscription when the silicone mold was lifted off.

Figure 5 Partial reproduction of the Salome daughter of Judah of Hadid inscription produced using a silicone mold made of the inscription on a Second-Temple ossuary currently on display at the Rockefeller Museum.

[1]Silicone rubber mold - Kit duo-pak -P 116 RTV silicone rubber. Weight ratio 4:1, hardness after final polymerization Shore A 50-60, curing time 4-5 minutes, a high-viscosity substance which adheres to and reproduces the surface topography

Paleography and epigraphy examination

The paleographic style of the letters inscribed on the ossuary was examined. The engraving markings were compared in order to determine whether there were any differences between the two sections of the sentence. Assuming that all the letters were inscribed by one person there should not be differences in letter form or style. The letters were also compared to the letters on Salome daughter of Judah of Hadid ossuary.

Results and discussion

Petrology examination

No patina was found on the silicone mold in the portion that had covered the first section of the inscription. Samples 2 and 3 in Table 1 were taken by scratching the ossuary. The patina on the silicone mold that had come off the 'brother of Jesus' inscription was grainy and brittle and crumbled at a touch (looks as white flecks- Figure 4). It was unlike natural patina, which is uniform, smooth and glossy. Element composition of the samples from the James and Salome ossuaries were analyzed. Selected results are shown in Table 1.

The composition of patina had adhered to the James silicone mold compared to the patina that has been undisputedly dated to the Second-Temple period. No patina residue was found on either of these two additional molds. Samples 1 & 2 from the Salome and James ossuaries, respectively, exhibited similar values of the elementary components of patina: silicone, calcium and iron, at locations that are distant from the inscription.

Table 1 Element composition of patina samples from the James and Salome ossuaries

Sample no.	Sample location	Si % wt	Ca % wt	Fe % wt
1	Sample from Salome ossuary	3.32	89.33	7.35
2	Sample collected from a spot located far from the inscription*	2.53	88.87	8.6
3	Sample from the Aramic letter "Kuf" in Yakov* - upper point on the vertical line	2.79	91.33	5.88
4	Sample from the Aramic letter "Kuf" in Yakov* - bottom point on the vertical line	4.17	82.98	12.85
5	Sample from the Aramic letter "Bet" in bar*	7.52	75.07	17.41
6	Sample from the Aramic letter "Yud" in akhui* - upper point	5.95	80.87	13.19
7	Sample from the Aramic letter" Yud" in akhui*- middle point	9.35	76.29	14.36
8	Sample from the Aramic letter "Yud" in akhui* - bottom point	9.51	69.97	20.51
9	Sample from the Aramic letter "Alef" in akhui*	5.01	81.62	13.37
10	Sample from the Aramic letter "Shin" in Yeshuah*	9.22	76.77	14.01

*On the ossuary inscribed James son of Josef brother of Jesus

Samples 3 & 4 shows lack of homogeneity in patina composition along with the letter "Kuf", this letter has both a naturally occurring patina (early) (Sample 3) and an added patina (Sample 4). A morphological examination has shown a shallow-depth modification of the letter, extending the vertical line of the Kuf. As seen in Figure 6 and 6a, on the vertical line in the Kuf of Yakov. The bottom edge of the line is engraved at a shallower depth than the top portion of the line.

Figure 6 The word Yakov (James) in the inscription. The end of the vertical line in the Kuf (third letter from right) is engraved at a shallower depth than the upper portion of the line.

In Samples 5-10, a difference in element composition is visible between the James son of Josef section and the undisputed Salome ossuary and the 'brother of Jesus' part of the inscription. These results indicate that a newer patina has been applied over the 'brother of Jesus' section. Its composition suggests that several substances were mixed to obtain a patina composition that would be similar to the authentic one. The synthetic patina has a larger concentration of silicon and iron compared to patinas that are a result of natural erosion and sedimentation on stone. Apparently, iron-oxide rich clay and granules of ancient charcoal were added to the mixture to impart a darker red tint that would match the natural color of the stone.

Paleography and epigraphy examination

Comparing the engraved markings

There are five words in the inscription 'Yakov bar Yosef akhui d'Yeshua' (James son of Josef brother of Jesus). Comparing the engraved markings, a visual examination of the inscribed words (Figures 4)(Figure 6) shows that the text 'brother of Jesus' is visibly shallower than 'James son of Josef' (Figure 7). The difference in depth is almost double.

Character depth in the first part of the inscription is uniform, but in the second half the engraving depth varies. An extreme example of this is the Aramic letter "Khet" in akhui (brother) (Figure 8) in which the upper portion is deeply engraved and the lower portion is shallow.

Figure 6(A) The letter "kuf" in the word Yakov.

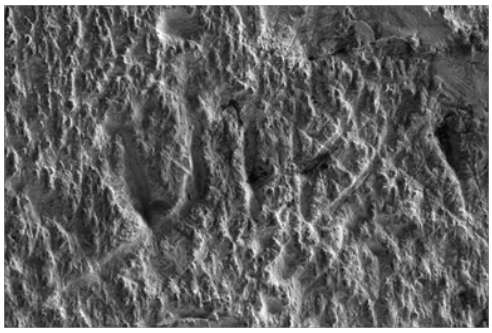

Figure 7 The word Yeshua (Jesus) as it appears in the inscription.

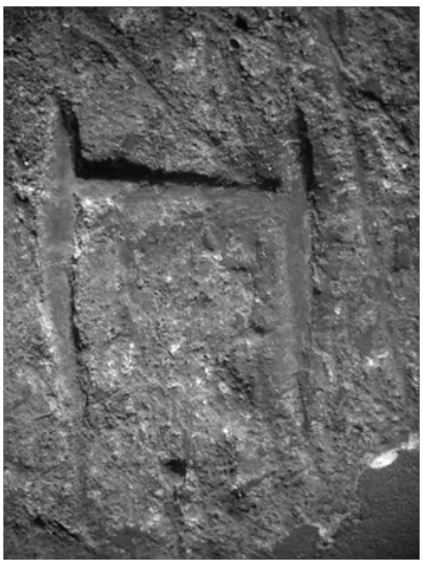

Figure 8 Letter Khet in akhui (brother), difference in engraving depth is clearly visible.

When examining the letter forms in each portion of the inscription, two script systems were identified (Figure 9)(Figure 10). The letters forming 'James son of Josef' are more stylized, uniform depth of stamping and ornate than those in the second portion. For example, the Aramic letter "Ayin" in Yeshua (Jesus) (Figure 9) and in Yakov (James) (Figure 10) are superficially similar; however, a microscopic examination of the letter "Ayin" in James revealed a circular embellishment engraved at the top edge of the letter and a lower line that is finer and shallower than the upper lines forming the letter. The letter "Ayin" in Yeshua lacks all these elements, which were common during the Second Temple period.

Figure 9 The Ayin in Yeshua (Jesus).

Figure 10(A) The Ayin in Yakov (James).

An examination of the Salome ossuary, also dated to 20BC-70AD, revealed similar embellishments on the upper portion of the Aramic letter "Shin" (Figure 11). The letter "Shin" in Yeshua, however, does not bear this decoration (Figure 12).

Further examination by microscope showed other significant differences in the way the letters were engraved. In the first half of the

'James son of Josef' inscription, the craftsman used circular motions in carving the stone and created letters with circular edge-points, but the engraving strokes in the 'brother of Jesus' portion are visibly linear and lack the circular edge-points. This significant difference in engraving method between the two parts of the inscription seems to indicate the existence of two artisans, i.e. the text 'brother of Jesus' was inscribed by a different person.

Figure 10(B) Ayin in Yakov (James mold).

Figure 11 The Shin in Salome ossuary (mold).

Figure 12 The Shin in Yeshua (Jesus).

Conclusion

Petrology examination

The composition of the material that was collected from the letters carved ossuary led to the conclusion that the patina of the inscription is not a naturally formed one. It was probably created by grinding and dissolving a group of substances similar to those found in natural patina. Apparently, iron-oxide rich clay and granules of ancient charcoal were added to the mixture to impart a darker red tint that would match the natural color of the stone.

Paleography and epigraphy examination

Significant differences have been identified in the character fonts and inscribing styles between the first section 'James son of Josef' and the second section 'brother of Jesus'. Specifically, the earlier font is embellished in the customary way for Second-Temple inscriptions, while the later one is not. The earlier font is deeply and uniformly inscribed in the stone and the later font is shallower and irregular. These differences could indicate that the two parts of the inscription were produced by two different people; the later inscriber of the second part was less particular about stylizing the characters as the earlier inscriber had done. The differences in the patina composition on the two sections of the inscription and the differences in the paleography and epigraphy results, led to the conclusion that the two sections are not the same age.

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None.

Conflict of interest

Authors declare that there is no conflict of interest.

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