The Connection of the James Ossuary to the Talpiot (Jesus Family Tomb) Ossuaries

Each of the examined caves and each cave's associated ossuaries in the Jerusalem area, exhibit in their patinas a unique elemental fingerprint. The patina of the unprovenanced James Ossuary exhibits geochemical fingerprints consistent with the patinas of the Talpiot ossuaries. This strengthens the contention that James Ossuary belong to the assemblage of the Talpiot ossuaries.

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The most important indication that the inscription "Ya'akov Son of Josef Brother of Jesus" is authentic is the beige patina that can be found inside the letters, accreting gradationally into the inscription (Rosenfeld and Feldman, 2008; Rosenfeld et al., in press). The patina can be observed on the surface of the ossuary continuing into the engraving. The patina on the ossuary is also composed of the following minerals apatite (calcium phosphate), whewellite (hydrated calcium oxalate), weddelite (calcium oxalate)

and quartz (silicon dioxide) (Krumbein, 2005; *cf.* Ilani et al., 2008). These minerals and the circular pitting within the thin layers of the beige to gray patina were found on the surface of the ossuary and, more importantly, within the letters of the inscription. They indicate biological activity and are the product of airborne and/or subaerial geo-bio activity that covers all surfaces of the ossuary (Krumbein, 2005; Ganor, 2009; Rosenfeld *et. al*., in press). The presence of microcolonial long-living black yeast-like fungi causes the alteration and biological weathering of rocks and minerals surfaces (patination) and is indicative of slow growth over many years. Additional archaeometric criteria indicating the authenticity of the James ossuary inscription are discussed in Rosenfeld et al., (*op. cit.*).

In 1980, a burial tomb was unearthed in Talpiot, east Jerusalem, containing 10 ossuaries, 6 of which bear inscriptions such as Yeshua bar (son of) Yehosef, Mariya, Mariamne (also known as) Mara, Yose, Yehuda bar (son of) Yeshua and Mattya (Matthews)-names that are consistent with those of the New Testament, but were commonly used during the first century CE (Kloner, 1996; Tabor 2006). The Talpiot Tomb cave (=Jesus Family Tomb; JFT) has 6 niches (Kloner, 1996). The *Golal* (Rolling stone) that was used to seal the tomb was not found. The niches (2 eastern, 2 western and one northeastern; *"kochim"*) contained the 10 ossuaries. The 2 meter long northwestern niche was empty of ossuaries when discovered in 1980. One meter of soil from the floor of the cave covered the ossuaries when it was first explored and was removed in a salvage excavation.

Pellegrino (in press) examined samples from 14 caves in the Jerusalem area (including the Talpiot cave) and discovered that each of the patinas develops its own

chemical signature. He based his analysis on 14 separate elements "patina fingerprints." No two patina's caves exhibit the same elemental distribution. These quantitative elemental "fingerprints" are consistent with the patina on the ossuaries found in each cave. In other words, each ossuary can be matched to the cave in which it was buried. Even caves in close proximity to one another, within the same rock formation, exhibit in their patinas different elemental fingerprints. This makes it easier to match the ossuaries to the host cave and is a powerful tool for linking unprovenanced artifacts to their cave of origin. This promised preliminary observation should be researched further in order to have a clearer probability geochemical signature on patina layers of caves and ossuaries.

Among the examined 14 burial caves was also Talpiot cave. Six Talpiot tomb wall and ceiling patinas were sampled December 14th, 2006 (*op. cit*.). The elemental spectra of the samples were examined by SEM-EDS in the Suffolk Crime Lab (NY). Each sample was analyzed (SEM-EDS) in at least 3 different locations. The differences between tombs were easily discerned by the elemental fingerprints. The quantitative variability of the elements (patina fingerprint) within an individual tomb (wall patina, ceiling patina, ossuary patina) were small, 5% or less.

Pellegrino (*op. cit*.) also examined the elemental distributions of the patinas of the 3 ossuaries found in the Talpiot cave: "Jesus son of Josef" (5 samples), "Mariamne" (4 samples) and "Matthew" (3 samples) (stored in the Israel Antiquity Authority warehouse since 1980). By comparing these 3 ossuaries and the chemical fingerprints of their patinas to the walls and ceiling patinas of the Talpiot tomb the same distinctive elemental "peaks" were consistently identified (silicon, phosphorous, titanium, iron, aluminum, and potassium). The patinas of the ossuaries are unique, reflecting, the same elemental

development of the Talpiot cave (*op. cit.* figs. 1-3), including a final phase of patina formation based on agricultural 'red soil" that entered the tomb during at least 200 years. The variation between all Talpiot tomb walls ceiling and ossuaries patina samples was less than 5%.

The patina of the unprovenanced James Ossuary was analyzed by three different laboratories: by the SEM-EDS method (Rosenfeld and Ilani (2002) in the Geological Survey of Israel; Pellegrino (*op. cit*.). examined in Suffolk crime Lab. NY; and by. Prof. Vertolli, of the Royal Ontario Museum. The results were consistent in all labs. The characteristic elements of the James Ossuary patina are silicon, phosphorous, titanium, iron, aluminum, and potassium. The only tomb including the ossuaries' patinas with which the "James" ossuary patina fingerprints appeared to be consistent is the Talpiot Tomb.

The phosphorous peak originates from the dissolution of the bones whereas the titanium and aluminum peaks can be linked to clay particles and the silicon peak originates from quartz grains that come from atmospheric exposure to dust and soil.

The James Ossuary is very similar in size to the missing 10th ossuary (Kloner 1996). The measurements of the width and the height are identical, but the length falls short by 3-4 cm. Dimensions of carved stone ossuaries are not typically identical on parallel sides; moreover, the length of JO has changed between measurements as a result of having been broken and repaired along its length. Based on similar size and the elemental fingerprints it is possible to conclude that the James Ossuary is the missing 10th ossuary from the Talpiot cave (Pellegrino, *op. cit*.). However, we also suggest that the

James Ossuary could in fact be the missing 11th ossuary. The fact that the James Ossuary was weathered intensively, and cracked suggests that this cave was breached a long time ago and another adjacent niche of the JFT (possibly the empty northwestern niche) with the same chemical history held the 11th ossuary. The Talpiot cave could have very well been looted before it was discovered in 1980 because it was exposed to atmospheric conditions by a partial collapse and the penetration of soil and water for at least 200 years (Krumbein, 2005). The massive pitting and striations as well as the intense weathering of the James Ossuary are not found in the other 9 ossuaries. Only the Mattya Ossuary exhibits sporadic pitting; the diameter of the pits is between 1-3 mm but they are very shallow. No ossuary of the Talpiot tomb was affected as much from climatic conditions as the James Ossuary and it could possibly be considered the 11th ossuary.

The fact that the patina of the James Ossuary exhibits the same geochemical fingerprints as the Talpiot cave and the patinas of its ossuaries is a very important observation in regard to the Jesus family tomb. According to statistical calculations (Feuerverger ,2008; Kilty and Elliott, 2010), the probability that Talpiot tomb is the Jesus family tomb is rather high [3% to 47% according to Kilty and Elliott]. Adding the James Ossuary with the inscription “Ya’akob Bar Yoseph Akhui d’Yeshua” to the cluster of the names found in this tomb has a great statistical weight. It raises the calculated odds to a compelling level of certainty that it is really the historic holy family tomb.

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