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Archaeometric overview of the Jehoash Inscription and James Ossuary.

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A - The Jehoash Inscription, a black tablet bearing an inscription in ancient Hebrew composed mainly of quartz and feldspar minerals is a fine-grained arkosic sandstone known from the Cambrian rocks found south of the Dead Sea, in the Timna area, and in southern Sinai (e.g., Serabit el-Khadem inscriptions). These rocks were readily available to stone engravers in Judea in ancient times.

The patina post-dates the incised inscription as well as a crack that runs across the stone, and cuts several of the engraved letters. The covering patina contains a rich assemblage of accreted particles that includes feldspars, clays, iron oxides, sub-angular quartz grains, carbon soot, microorganisms, and gold globules (1 to 4 μm in diameter). Radiocarbon dating analyses of the carbon particles incorporated into the patina yields an age of 2340 to 2150 BP.

Wind-blown dust derived from the weathering of Cretaceous marine carbonates exposed in the area as well as the limestone buildings of Jerusalem contribute large amounts of material to the local soil. Indeed, well-preserved marine carbonate microfossils (foraminifers and coccoliths) were found within the patina supporting its authenticity.

The presence of microcolonial long-living black yeast-like fungi (Rosenfeld et al., 2005) inside the letters of JI forming pitted embedded circular structures indicate slow growth over many years.

Depleted oxygen isotopic analyses indicate a thermal event in close proximity to the tablet. The occurrence of pure gold globules is evidence of melting, indicating a conflagration above 1000°C. All this support the antiquity of the patina, which in turn, strengthens the contention that the inscription is authentic (Ilani et al, 2002)

Additional points contradicting the oxygen analyses that provided the “smoking gun” for the forgery:

1 - Dr.A. Shimron (GSI) examined the oxygen isotopic composition of ancient plasters, a major component in a Tel environment. His results shows very depleted isotopic oxygen values for ancient plasters, twice as much depleted as the cave deposition, similar to the JI “fake” results. Moreover, a Second Temple limestone that experienced conflagration exhibits similar depleted oxygen isotopic values to the patina found within the JI letters.

2 - A recent oxygen isotopic study (Kolodny et al. 2005) deemphasizes the importance of oxygen isotopes as a palaeotemperature indicator both for lake and cave deposits. Their important conclusion is: *“The dominance of the source effect in determining the oxygen isotopic composition of both speleothems (stalagmite, stalactite) and lake sediments in the Levant reduces the power of $\delta^{18}\text{O}$ as an independent climate indicator...”* “The source (i.e. the rain) originates from different areas of the sea, and thus has a variable isotopic composition. This casts into doubt much of the paleoenvironmental work of Ayalon et al. over the

past three decades in the Beith-Shemesh cave. These cave isotopic values were erroneously compared by Ayalon and Goren as a datum for all the buried antiquities!

3 - A very important examination according to many archaeometric scientists is the UV illumination test. The UV test on the JI tablet detected no signs of fresh engravings.

B – The James Ossuary (JO) – additional observations.

1- The brown patina “varnish” (denoted the “real patina” by the “material committee”) can be found inside the letters – accreting gradationally into the inscription (see Figures: 1a,b). The patina can be observed on the surface of the ossuary continuing into the engraving. The engraving clearly does not cut the patina, a strong proof for authenticity. This phenomenon can be seen almost in every letter of the inscription.

2 - Notice the few scratches/fine lineaments (Figures: 1a,b and 2) on almost every letter probably caused by falling roof rock in the cave during the past 2000 years. These scratches occur both on the surface of the ossuary, moving into the letter and scratching it in the same direction. This is, in our opinion, another strong piece of evidence for authenticity.



Figure: 1-a

Figure: 1a.b -Note the brown patina “varnish” in the “beth” of Yakob (the size of the Beith from top to bottom is about 10 mm). The engraving does not crosscut it. The patina goes from the surface of the ossuary into the engraving. There are some scratches on the surface of the ossuary that are oriented in the same direction into the engraved letter. .



Figure: 1-b
Enlargement of 1-a



Figure: 2- Note the engraving of the letter “kof” filled with the white patina as well as a coating of the brown patina above.