

THE JEHOASH INSCRIPTION TABLET-AFTER THE VERDICT

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By Amnon Rosenfeld

Geological Survey of Israel
Jerusalem, Israel

Howard R. Feldman

Anna Ruth and Mark Hasteen School, a Division of Touro College
Division of Paleontology (Invertebrates), American Museum of Natural History
New York, NY

Yoel Kronfeld

Department of Geophysics and Planetary Sciences
Tel-Aviv University
Tel-Aviv, Israel

Wolfgang, E. Krumbein

Department of Geomicrobiology, ICBM
Carl von Ossietzky Universitaet, Oldenburg, Germany
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As a result of the forgery trial the following conclusions have been made by the Judge, the Honorable Aharon Farkash: it is impossible to determine, beyond any reasonable doubt, on the basis of the letters and the writings that the Jehoash Inscription tablet (JI) is fake and, the trial sparked a fruitful and important debate on the issue of unprovenanced artifacts. The judge concluded that it is impossible to determine, beyond any reasonable doubt, that the JI is fake. He also concluded that according to the language [philology] no determination can be made that the inscription is fake. He agreed with the defence experts that there is indeed a clear black-brown crust (film) coating the stone surface and it is very likely that this crust was formed after the engraving of the letters, since some of the bottom of the letters exhibit this crust. The Judge concluded that according to the language [philology] no determination can be made that the inscription is fake. The judge believed the defence witness Mr. Winkler, a stone art expert, who testified that it is impossible to engrave an inscription of 200 letters on this hard rock with a visible open crack, without breaking the tablet and without creating "Glaetzim" [flakes] on both sides of the crack. The judge agreed that the crack in the JI opened in ancient times and post-

dated the inscription. He accepted Professor Krumbein's testimony about the presence of micro-marine fossils that indicate that the patina is authentic. He accepted that the two oxygen composition values found in the patina of the JI fall within the natural values found by Professor Shemesh as discussed in detail in relation to ostraca 1 and 2.

According to the Judge, the oxygen isotope "expected range" cannot determine forgeries. The Judge determined that the oxygen isotopic examination of patinas on artifacts cannot be used to determine whether the artifact is authentic or forged. It is sufficient to establish reasonable doubt about the validity of the isotope examination as a method to check forgeries. According to the Judge, from the standpoints of epigraphy, language, and material, it was not proven beyond reasonable doubt that the JI tablet is a forgery. Therefore the judge ordered the acquittal of Oded Golan on this charge (number 2, forging the Jehoash Inscription).

INTRODUCTION

A rectangular dark stone tablet 31x25x9 cm in size was discovered in 2002 and tantalized the world of archaeology. The stone tablet is engraved with an inscription in ancient Hebrew known as the "Jehoash Inscription" (JI). The inscription commemorates the renovation of the First Temple carried out by King Jehoash, who reigned at the end of the 9th century BCE (ca. 2800 years BP). A similar account of the Temple repairs is found in the Bible (Kings II: 12). This tablet represents the only Judahite royal inscription found to date.

It is said that the JI tablet has been found near the southeastern corner of the wall of the Temple Mount complex, where it was used as a secondary building stone in a tomb. It was found in the Jerusalem antiquities market and it is now under the custody of the Israel Antiquity Authority (IAA). The unprovenanced JI tablet if found in an official archaeological excavation would have been an artifact with a direct link to King Solomon's temple.

The Translation of JI by Professor Chaim Cohen (2007) is as follows:

I. Prologue (lines 1-4)

[I am Yeho'ash, son of
A]hazyahu, k[ing over Ju]dah,
and I executed the re[pai]rs.

II. Body of the YI (lines 4-14)

When men's hearts became
replete with generosity in
the (densely populated) land and in the (sparsely
populated) steppe, and in all the cities of Judah, to
donate money for the sacred
contributions abundantly,
in order to purchase quarry
stone and juniper wood and
Edomite copper / copper from (the city of) 'Adam,
(and) in order to perform
the work faithfully (=without corruption),—

(Then) I renovated the
breach(es) of the Temple
and of the surrounding
walls, and the storied structure,
and the meshwork, and the winding stairs,
and the recesses, and the doors.

III. Epilogue (lines 14-16)

May (this inscribed stone) become this day
a witness that the work has succeeded,
(and) may God (thus) ordain His people with a blessing.

The JI swiftly sparked a scholarly debate that generated many studies, several documentary movies and even one book. The authenticity of the JI has been a fiercely debated topic over the past decade. Experts at the IAA declared it a modern-day forgery. Israeli police seized the tablet and arrested its owner, Tel Aviv collector Oded Golan. In December 2004 he was charged with faking the JI and dozens of other items.

This article is based on the expert witnesses who testified in the “Forgery Trial” and mainly on the 475 pages of the meticulous verdict of Judge Aharon Farkash, District (Criminal) Court in Jerusalem, Israel. The verdict was delivered on March 14th, 2012 (case number 482/04) the State of Israel (IAA) - against Oded Golan and 4 others that were accused of forging very important antiquities. We discuss herein mainly the scientific problems in lieu of the verdict according to the indictments concerning the JI tablet (count # 2). The verdict in case 482/04 by the Judge Aharon Farkash who **acquitted** Oded Golan from forging the inscription because the proofs were not presented in the court beyond any reasonable doubt. The prosecution experts could not agree among themselves about whether the artifact is a fake. We have investigated, published and testified about this artifact (Ganor et al., 2009; Ilani et al., 2008; Krumbein, 2005; Rosenfeld and Feldman, 2008 and Rosenfeld et al., 2009). Our main conclusions are therefore summarized herein.

The forgery trial was very thorough, lasted 7 years, and contains about 13,000 protocol pages with hundreds of exhibits, reports and books. It expanded to more than 120 sessions that lasted more than 8 hours per day, some lasted until the late evening hours. The 74 prosecution witnesses and the 54 for the defendant (total of 128 witnesses) originated from different fields and came from Israel, USA, Canada, France and Germany. The court had to decide about certain antiquities most of which came from the antiquity market (unprovenanced) and had to hear testimonies and lectures from various scientific fields in geology, chemistry, geochemistry, microbiology as well as experts from the humanities such as archaeology, philology, epigraphy, paleography, Biblical scholars and more. The scope of the questions dealt with during the trial revealed many scientific as well as judicial issues.

We must praise the work of the Honorable Judge Aharon Farkash and his assistant attorney Inbal Moshe. They have painstakingly worked faithfully and with great skills to produce such an important verdict. Judge Farkash praised all the experts who testified in the trial and said that his impression is that the experts were loyal to their fields and worked according to their skills, ability, experience and honesty in order to seek scientific truth. Judge Farkash believes that in the future some more conclusive new

scientific methods will be developed, enabling the identification of fake or genuine antiquities.

The Judge emphasized that he found no proof of forgery, either regarding the artifacts nor any clue of an act of forgery by the accuser or his collaborators. The judge expressed his own view on some key questions and stated that the JI was not proved to be a fake and could well be genuine. Some scientific issues from Judge Farkash's verdict and the testimony by the experts in this trial were translated. The brackets [...] are used by the authors for clarification. The numbers next to the subheadings are the paragraph numbers appearing in the Judge's verdict. The citation (p. 1234) relates to the Court protocol page/s of the testimony in this case.

Our conclusions

Our analyses strongly support the authenticity of the JI and its inscription (Ilani et al., 2002; Krumbein, 2005; Ilani et al., 2008; Rosenfeld and Feldman, 2007 and Rosenfeld et al., 2009). The tablet is composed of a gray, fine-grained arkosic sandstone tablet bearing 16 lines of inscription in ancient Hebrew from the First Temple period. It contains a rich assemblage of particles accumulated in the covering patina that includes calcite, dolomite, quartz and feldspar grains, iron oxides, carbon ash particles, microorganisms, and gold globules (1–4 microns in diameter). The iron oxide-rich patina, a product of micro-biogenetic activity, covers firmly the rock surfaces and the inscription grooves post-dating the incised inscription. The central fissure that runs across the stone and cuts across several lines and letters indicates another strong argument for the authenticity of the JI inscription.

The carbon particles in the patina yield a radiocarbon age of approximately 2250 years BP (third century BCE). The presence of micro-colonial fungi and associated pitting indicates slow growth over many years. No modern elements related to the use of modern tools were found. All evidence indicates that the production of the tablet and the carving of its inscription occurred at essentially the same time. The occurrence of minute, well-sorted globules of pure gold, a product of melting, as well as carbon ash particles found within the patina is indicative of a thermal event. This can be explained within an historical scenario and framework. Some of the gold artifacts could have melted in a conflagration, become airborne and resolidified there, to settle later as minute globules on the ground. These and the carbon particles were later incorporated, by a winnowing process, within the patina that developed on the buried tablet. We would like to emphasize that we found nothing suspicious to indicate that the JI is a forgery. We came to the conclusion that our analyses strongly support the antiquity of the patina, which, in turn, strengthens the contention that the inscription of the JI is authentic (Ilani et al., 2002; Ilani et al., 2008; Rosenfeld et al., 2009).

The conclusions of the IAA Material Committee

The day after our investigation of the JI was published in the Israeli newspaper Ha'aretz (January 13, 2003) Professor Y. Goren (Archaeology Department, Tel Aviv University) addressed a letter to the head of the Geological Survey of Israel and to the editor of the newspaper Ha'aretz. In his letter Goren, without even seeing the tablet, dismissed the authenticity of the JI comparing it to a series of fantasy artifacts like the

Arc of Noah. Goren urged us not to publish our “pseudo-research” because the JI is certainly a fake (Goren’s letter dated 14th January, 2003, is entered into evidence at the antiquities trial in Jerusalem and available upon request). Professor Goren accused us and the “sophisticated ambitious fakers” of trying to fool the public and the media. Three months later Professor Goren was nominated as a key figure in the IAA material committee to check out the authenticity of both the JI and the James Ossuary inscriptions. Professor Goren also published his views about JI and its connection to the Jerusalem syndrome (Goren, 2005).

The IAA established two committees of scholars to investigate the authenticity of the JI. Within 3 months (March to June, 2003) all the members of the committee concluded unanimously that the JI inscription is a fake (IAA report, 2003). The IAA (Report, 2003) and Goren et al., (2004) summarized their results by denoting that “The rock of the JI is graywacke, a metamorphic rock not found in Israel- an indication of forgery. “ Their conclusions were as follows:

1. The occurrence of foraminifera (microfossils) within the patina is an indication of forgery.
2. There is evidence of fresh engravings.
3. There is a soft, loosely attached patina. The fake patina was prepared with hot water used to harden and ensure adhesion. The real patina, attached strongly to the rock, is found on the back of the tablet and is a type of silica and not carbonate.

We would like to note that the oxygen isotopic composition of the patina covering the inscription was used for the first time as a “smoking gun” to uncover forgeries. Its use in archaeometry is a new technique. According to Goren et al., (2004) the values of the oxygen isotopes should agree well with the carbonate stalagmite cave deposition of oxygen isotope -4 ‰ to – 6 ‰ PDB. This range according to Ayalon et al., (2004) and Goren et al., (2004) did not change during the last 3,000 years and matches with the annual averages of 500 mm of rainfall and the annual average temperature of 18-19 degree Celsius in the Jerusalem Mountains (in a limestone terrain with an elevation of 700 m). However, they found that the only 4 measured samples were lower or higher than this range. Thus, the patina could not have been formed under natural climatic conditions that prevailed during the last 3000 years (Goren et al., 2004; their testimonies in the trial). This “anomaly” apparently caused the members of the scientific committee of the IAA to announce undoubtedly that the patina of the JI was artificially created in recent times and consequently is clearly a modern forgery (op. cit.). However, these assumed averages, neither of rainfall nor of temperatures in the Jerusalem mountains, are not hard scientific evidence and certainly does not relate to objects buried in soil.

The patina and the oxygen isotopic contradictions

The compositions of oxygen isotopes were measured in patinas on 56 artifacts from officially sanctioned excavations and exhibit a wide range of values (Shemesh, 2007; Weitzman Institute). The values of the oxygen isotopes not only vary

between different geographic locations but vary also in the same location as well as in the same artifact. About 30% of the oxygen isotope patina samples exhibiting more negative values compared to the Ayalon's and Goren's "expected" (-4 to -6 ‰ PDB) stalagmite values with discrepancies ranging up to -8 ‰ PDB. It is clear that the use of the oxygen isotope method for the authentication of archaeological artifacts is premature and unreliable (Shemesh, 2007). To our knowledge this method of authentication is not used in any lab in the world today.

The expected oxygen isotopes of an archaeological patina during the last 3000 years according to Ayalon et al., (2004) must be similar to the stalagmite from the Bet-Shemesh cave (near Jerusalem) and ranging between -4 ‰ to -6 ‰ delta O₁₈ PDB. Deviations from -4 to -6 ‰ are strictly considered by Ayalon et al., (2004) to be a faked patina.

Surprisingly, Ayalon and Bar-Mathews contradict this oxygen isotope range in Orland et al., (2009). There, they examined the same stalagmite from the Bet-Shemesh cave using a very new and exact isotopic method yielding different values for the composition of the oxygen isotope range between -6.5 ‰ to -8 ‰ PDB. This new oxygen isotope analysis averages matches the annual rainfall range between 800-1200 mm during the Roman and Byzantine periods (during about 600 years; Orland et al., 2009, Figure 6; Kalman, 2009). This is twice as much as their former annual estimation of 500 mm rain. These new data of oxygen isotopes averages -6.5 ‰ to -8 ‰ delta O₁₈ produced by Ayalon and Bar-Mathews severely contradict their former expected oxygen isotopic range of -4 ‰ to -6 ‰ PDB.

The Indictment (count #2; case, 482-04; translation/summary)

To carry out his plan Golan used an ancient stone tablet. Golan engraved the stone tablet, with an inscription, which is now called "the inscription of the breaches of the house" or "Jehoash Inscription" [JI]. The JI contains dozens of letters in ancient Hebrew script. It described the renovation of the first Temple during the king Jehoash, a well-known event described in the Old Testament in both Kings II and Chronicles books. After adding the inscription to the tablet, Golan, with the help of another man, masked the newly engraved inscription by applying various substances on the tablet so it will look like an ancient inscription that was supposedly written during the First Temple period, thanks to the covered patina purporting to be also from the first Temple period. Golan did all the above in order to create an inscription which is seemingly the last remnant of the first Temple, and that agrees well to the Bible description in lieu of the renovation of the Temple. Golan did so knowing that he could sell this antiquity for millions of dollars. Golan performed all this actions, knowing that, holding on to this tablet having a huge religious, scientific, economic and emotional meaning. All this was done by Golan in order to gain worldwide recognition with the potential of gaining much money which will be paid to the owner of the tablet.

The severe circumstances of Golan's forgery [set by the prosecution in order to extend the statute of limitations from 5 to 10 years as well as to increase the punishment] are expressed by a well-planned and systematic manner to create a fake antiquity. By this false creation Golan contributed to the implications between the religious controversies, which might mislead millions of Jewish believers in the world, as well as historians and archeologists throughout the world.

Two special committees were established by the Israel Antiquities Authority (IAA) to investigate the JI authenticity: the script and the material committees. Both committees reached the same conclusion that the inscription of the "Jehoash Inscription" tablet is a fake, and that the patina on top of the inscription is a counterfeit, significantly different from the original patina on the surface of the artifact.

Reasoning for the Acquittal of Golan of Forging the “Jehoash inscription” - Excerpts of judge Farkash’s Verdict

Note: some scientific issues of this trial, the summaries of the testimonies of the experts as well as the reasoning of the acquittal were translated from Judge Farkash’s verdict below. The numbers next to the subheadings are the paragraph numbers appear in the Judge’s verdict.

Aspect of the Writing - Epigraphy – Evidences and Testimonies [Summaries by the Judge]

Prosecution experts:

Professor Joseph Naveh.

The late Professor Joseph Naveh said that he had serious doubts about the authenticity of the inscription and reinforced his decision that the inscription is not genuine. According to Professor Naveh, the reasons he suspected that it is not a genuine inscription are that the letters are inappropriate for an ancient Hebrew inscription from the ninth century BCE. The letters are known from Aramaic and Phoenician inscriptions, but absolutely not from Hebrew inscriptions. The text is based on formulas found in the Biblical story of king Jehoash and his renovations of the Temple built by King Solomon. Especially the expression "I made the breaches of the house." It's a modern day combination, but according to Professor Naveh in ancient times "BEDEK" is actually a "crack" [SEDEK] and at ancient times according to the Bible you reinforce/strengthen [LECHAZEK] the breaches [cracks] of the house, but by no means the expression "to make the breaches of the house" which is a modern expression (p. 533 and later). Professor Naveh recommended that the Geological Survey of Israel investigate the stone tablet. A few months later the Geological Survey of Israel published the scientific research on JI [Ilani et al., 2002]. Professor Naveh still believed that the JI was not genuine. Professor Naveh, in his cross-examination by Golan's attorney, confirmed that he is known as a skeptic and a pessimistic man.

Professor Christopher Rollston

Professor Rollston testified about the Jehoash stone. According to him, without any doubt, the JI is a modern forgery. According to ancient Hebrew language finds from archaeological excavations the two letters Samech and Peh, when they are linked, the letter Samech is higher than the Peh. The letters Samech and Peh in fake artifacts are written in the same level. Another issue: "... What I say JI is a mixing of different national letter forms" (p. 1330.)

Dr. Hagai Misgav

Dr. Misgav (pp. 1675-1753) is an epigrapher dealing with inscriptions and ancient texts and western Semitic paleography. Dr. Misgav again emphasized that the problems with the JI is the writer. Royal inscriptions are written by professional scribes who planned it in advance, whereas, in the JI there is a considerably lack of planning. If the JI was found in a controlled excavation "I was not falling off the chair." but, when there are no inscriptions from the 9th century BCE to compare to the JI, and when there are a whole series of problematic paleographical issues "So the entire inscription shows that this thing stinks." (p. 1710.)

Dr Ada Yardeni.

Dr. Yardeni has made comparison between the letters of the JI with some common inscriptions from the tenth and ninth BCE. According to Dr. Yardeni the writing of the JI inscription is mainly similar to the inscription from Kiphros and the Aramaic inscription from Tel Dan. The JI inscription seems to match the developmental stage of the Phoenician script from approximately the ninth century BCE to the transition to the Hebrew script. The most significant similarity of the JI to the Tel Dan inscription is in the size of the letters, the spacing between them and the flat engraving method. The conclusions of the opinions of Dr. Yardeni is as follows: "... **in light of available material that can be used for comparison, it is impossible at this stage to confirm the authenticity of the JI by paleographical and linguistically examination. However, in my opinion until conclusive evidence is found here, the JI should be kept in accessible place for comparing the findings that will be discovered in the future.**" (Emphasis is original - A. F.)

Dr. Rachel Altman.

Dr. Altman holds a doctorate in medieval literature and was subpoenaed by the prosecution. The witness testified in English (pp. 2259-2452). According to Dr. Altman's report the JI has a mixture of letters; the letters were written in different forms: rounded, pointed and in square forms. At this stage I already have to say that I noted carefully the testimony of Dr. Altman and with all due respect I cannot adopt her approach. Therefore, it is not possible to say that the JI is a fake by the shape and design of the letters. It is not unusual or different enough to be diagnosed and determined on the basis of her findings that the inscription is false. It is noted that in the summaries, the prosecutor did not refer at all to the testimony of Dr. Altman. I deduce that he did not seek to rely on her opinion.

Defense experts:

Professor Andre Lemaire.

Professor Lemaire testified in French on behalf of Golan on the areas of his expertise and experience we've listed above in the charge of the ossuary (philology.) Professor Lemaire's testimony on the JI began with his stating that the "Jehoash inscription" is much more complicated to interpret than is the [James]ossuary." (p. 3908.) In his cross-examination by the attorney Bahat, Professor Lemaire testified that the problem with the JI is complicated because there are no monumental inscriptions from the ninth century BCE, and we must rely on what is known so far. In addition, in the inscription it seems that there are mixed forms of letters with Phoenician influence and

Paleo-Hebrew letters. He added that in general there is an impression that the "model is a little hesitant." (p. 3977.)

Judge Farkash's Discussion and decision

"After I heard and read all the experts testimonies, opinion reports and documents submitted to me, I concluded that it is impossible to determine, beyond any reasonable doubt required in criminal law, on the basis of the letters and the writing that the JI is a fake."

Aspect of the Language [Philology; Summaries by the Judge]

The testimonies and evidences from the accuser

Professor Nadav Na'aman.

Professor Nadav Na'aman, has been a full professor at Tel Aviv University for 15 years at the time of his testimony (6/April/2006). He teaches Israeli history in Biblical times and is the author of numerous papers. He raised the possibility that the JI was inspired by an article that he wrote that regarding one of the sources of the author of the II Kings (chapter 12) in which was a building inscription [similar to the inscription of the JI]- "It's too good to be true," and that there is a link that looks suspicious between what he suggested in his article and the JI (T / 53; p. 690).

In his cross-examination Professor Na'aman confirmed that what he wrote in his article is not a new thesis. He stated that there is no way for archaeologists and epigraphers to confirm or to rule out the JI. This is because until now there has not been found any monumental royal inscription not from Judea nor from Israel, so the obvious answer should be given by the geologists.

He said that he himself belongs to those who are very skeptical about the ability of epigraphy to determine authenticity. According to him, linguistically there are reasons to suspect the authenticity of the JI. For example, the expression "I did the breaches of the house" is an impossible phrase in ancient Hebrew since there is a contradiction between "do" and "tested" [BEDEK] which means a gap, crack.

Professor Shmuel Ahituv.

Professor Ahituv is one of the members of the writing committee of the IAA. He is dealing more with the linguistic aspect and less with paleography. The impression of Professor Ahituv is that the JI is not authentic. This conclusion is based on a number of phrases in the inscription. For example, the terms: "Bedek Habait" [the renovation of the house] and "copper of Edom" that many scholars already talked about. According to Professor Ahituv: "The impression is that this inscription is a combination of some biblical words, some new mistakes of modern Hebrew" (p. 1865). Another says Professor Ahituv, that he would expect that the word "Amo" [people] will be written at the end with the letter "He" [and not with "Vav"].

Professor Avigdor Horowitz.

Professor Horowitz, Department of Ancient Near East Archaeology and Biblical studies, Ben-Gurion University in Beersheba holds a doctorate from the Hebrew

University. According to Professor Horowitz the JI is not authentic. "JI is clearly seen as a mosaic of elements cut from different locations and pasted together."

Professor Israel Ephal.

Professor Israel Ephal is a full Professor at the Hebrew University in Jerusalem. He is historian and deals with the Biblical period and the history of Israel.

According to Professor Ephal, the JI is a fake inscription and in his article he believed that the expression "and I did the breaches of the house," did not exist in biblical Hebrew.

Dr. Esther Eshel.

Her report to the IAA committee dated 13/May/03 provided a very brief reference to the JI. Dr. Eshel says that "I have no doubt that the inscription is false. This emerges from the writing, spelling and language."

Philology- The Testimonies and Evidences from the Defendant [Summaries by the Judge]

Professor Ronny Reich.

Professor Reich, is an archaeologist who worked many years at the IAA. He was also one of the members of the IAA committee and wrote a report of opinions from 8/May/03. According to the opinion of Professor Reich, the JI tablet agrees well with the writing from the ninth century BCE, even if there were slight deviations from the typical form of this time period. Such minor deviations are reasonable, since the inscription was engraved on stone, which is difficult way for writing, compared to writing using pen and ink [ostraca]. These deviations do not suggest possible mistakes by a forger. At the end of his opinion, Professor Reich stated the following:

"Finally I would like to be a 'devil's advocate and argue that it seems to me that the inscription is indeed authentic because it is hard to believe that a forger (or group of forgers) will come out and succeed to get under their hand such a well versed object in all aspects of the paleographical linguistic and Biblical as well as of physical aspects. Moreover, the inscription is missing the title, which must specifically mention the Temple and the explicit name of King Jehoash. I think that if the inscription was a modern inscription for grabbing money or a desire for publicity or prestige, or it was made for political purposes related to the present status of the Temple Mount, I guess that the producer of the inscription [the forger] was actually would leave the upper part [the title] and break another part of the inscription."

It should be noted that Professor Reich was the only one of the members of the IAA committees who expressed an opinion that the JI is an authentic item.

Professor Chaim Cohen.

Professor Chaim Cohen: (testimony, pp. 5278-5335; 8222-8236; 9056-9064), is the head of the Hebrew Language Department at Ben Gurion University. His field of expertise is the ancient Hebrew language especially in light of the ancient biblical Semitic literature Akkadian and Phoenician.

Professor Cohen prepared a document which he made a comparison of the words

written in JI. At the top of this document he stated that he does not know whether JI is genuine or fake, but his determination is firm that no philological evidence is admissible to prove that the JI is a contemporary forgery. However, if at all, the JI would turn to be a fake then this "is a brilliant forgery."

At the beginning of his testimony in court Professor Cohen emphasized that the field of philology cannot declare something as genuine, but at most can say that there is no admissible evidence of forgery. Later in his testimony he referred to the text of the JI which in his opinion is divided into three parts: introduction, body and epilogue of the inscription.

At the end of the main investigation Professor Cohen stressed that he invested many hours on his philological study of JI from his own initiative and not at someone's invitation.

Professor Victor Sasson.

Professor Sasson is a faculty member at Columbia University in New York and gives a seminar on the Bible in Hebrew dealing with all aspects of ancient Near Eastern studies. Professor Sasson describes himself as an expert in languages but he is not an expert in paleography. He published about 25 articles on the main inscriptions that were discovered in Israel and in northern Iraq. He published a paper (Sasson, 2004) on JI tablet: "Philological and Textual Observations on the Controversial King Jehoash Inscription" (N / 66).

Professor Sasson in his article and in his testimony in English referred to the expression found in the JI: "and I did the breaches of the house" = "V'aas Et Bedek Habait" which is in Jehoash inscription. According to him, had they been written in modern Hebrew, it would be "Veasiti Et Bedek Habait" = "and I have checked/renovated the house" and not "V'aas." The expression in the Bible to strengthen the breaches of the house is a dialect ("Idiomatic Expression" p. 578, in his article on N / 66 and on p. 7720). According to professor Sasson the researchers who found problems [in the expressions] of the inscription are Biblical scholars and are not philologists (inscription researchers), who had never published anything on inscriptions. The expression "Vehaya Hyom Hazeh Le'edut" indicates the completion of the renovation and reconstruction of the Temple.

The use of the word 'Hayom' is very important; it is factual evidence of the Endeavour indicating the completion of the work or craft.

Professor Sasson suggested, in an article about the stone inscription that was discovered at Tel el - Fahariya, that it is a copy of the original inscription that was made a hundred or two hundred years after the reign of Jehoash. (Professor Sasson suggested that the JI is a copied inscription of the original. Since stone inscriptions like scrolls were copied from time to time after being weathered in order to keep the text alive.) In summary of Professor Sasson's main testimony, he stated that he did not think the JI is a fake inscription. If he had thought so he would not have invested three months of intensive research for which he has not received any remuneration (p. 7728).

He is inclined to believe that the inscription is authentic. He added in his testimony, that there is a reasonable possibility that the person who wrote the inscription was a young inexperienced writer and therefore there is a mixing in the forms of the letters. But from the language it is written "almost certainly that it is impossible that the

JI is a forgery" (p. 7754, line. 19-20).

Judge Farkash's Discussion and Decision on the Language and the Linguistics.

(450) I do not intend to return and discuss any expression, as interpreted by various experts, but I looked back and reviewed all what was written by the experts and deepened in their statements and their testimonies in the court, and **my conclusion is, that according to the language no determination can be made as was claimed by the prosecution, that the inscription is indeed a fake.**

(451) I would like to emphasize that the testimony of Professor Chaim Cohen, an expert in Biblical Hebrew who compared the language [of the JI] to the previous Semitic literature made a special impression on me and I embrace it. Recall that Professor Cohen made his philological research independently and without an invitation from someone, this has more weight to adopt his statements. Professor Cohen explained in great detail, with comparisons, the various manifestations listed and answered all the arguments of the other [negated] experts of the accuser. It seems also, that the approach of Professor Cohen is not alone but is supported by the testimony of Professor Victor Sasson. It should be noted also that in the first place Professor Reich, a member of the IAA material committee, believed that the JI is not a fake inscription, and only after hearing the opinion of the material committee members had changed his mind.

(453) "In summary, I cannot determine that the JI is a fake inscription according to the language and the linguistic aspects."

THE MATERIAL ASPECT [Summaries by the Judge]

Stone Type and Origin

Dr. Shimon Ilani, defense expert and Dr Aryeh Shimron [prosecution expert] believe that the JI rock tablet is composed primarily of quartz (p. 5546). After removing the black and brown patina that covers the tablet the inside of the rock is light gray (p. 5550). Dr. Ilani noted that he had drilled a fine hole in a hidden place on the tablet, and according to the components that were there he concluded that the rock is very dense arkosic sandstone (p. 5551). Such sandstone can be found south of the Dead Sea and south of the Timna area (p. 5552).

Dr. Shimron expressed the opinion that Dr. Ilani is a professional geologist and this is indeed an arkosic sandstone and not as claimed by Professor Goren [graywacke.] As this issue is of vital importance, **it should be established**, as concluded by the prosecution expert Dr. Shimron and Dr. Ilani for the defense that the rock of **the JI is made of arkosic sandstone.**

Professor Yuval Goren

According to Professor Goren, on the back of the slab appears a concentration of patina in shades of white to cream to light brown. The patina is hard and is connected firmly to the rock. Petrographic examination reveals [silica=quartz] and it is

completely different from the assemblage found on the front of the inscription. [On this issue see Watzman, 2005, explaining Professor Goren's **silicon** issue on the JI.] Microscopic examination shows an artificial mixture of clay, crumbled chalk dissolved with micro-fossils, carbonized material and the microscopic grains of heavy metals without corrosion and very thinly distributed. This mixture was dissolved in hot water before being smeared on the side where the inscription is engraved in the stone. It is possible that in order to harden the smearing of the artificial patina and to provide a form of patina on the stone, the "patina" was heated at a temperature not more than 400 degrees Celsius.

Because the composition of the coating of the inscription is different from the patina on the back of the tablet Professor Goren concluded that the inscription on the slab is a modern forgery. His main points are: the stone itself is authentic, as well as the patina on the back of the stone, while "in front of the stone is not a genuine patina." The weathering products within the letters are different from the weathering material on the stone which raises suspicious and doubts about the engravings that were created at a later stage.

Professor Goren testified about the JI tablet and concluded: "I would say that there is enough evidence to cast serious doubt on the authenticity of this item" (p. 1065). In his cross-examination by Mr. Lior Bringer, Professor Goren referred to the opinion of Drs. Ilani and Rosenfeld regarding the time the engraving on the stone took place. They testified that the engraving of the letters happened before the crack appeared in ancient times, and that the inscription predated the crack. But Professor Goren expressed his opinion that the stone was cracked before the engraving. And he does not agree with Drs. Ilani and Rosenfeld view that a modern engraving on the cracked tablet would have caused to its breakage.

Dr. Boaretto

Dr. Boaretto (Weitzman Institute) referred to the patina's radiocarbon result of Beta laboratory in Florida, USA and told the court that the level of certainty in each measurement is 95%.

Isotope tests [Summaries by the Judge]

Dr. Ayalon and Dr. Bar-Matthews

As we indicated in the first charge regarding the ossuary, Dr. Ayalon works in the Geological Survey of Israel in Jerusalem and has a Ph.D. from the Department of Geology of the Hebrew University in Jerusalem. His field of specialty is stable isotopes and geochemistry. According to his testimony he has no background, knowledge or interest in archeology. He has never been close to this subject. He said he first heard about all the discussed antiquities in the media, and in March 2003 the director of the Geological Survey, Dr. Amos Bein, appointed him to be the official representative of the Geological survey on the IAA material committee to examine the issue of the patina.

In his report Dr. Ayalon defined the term patina as an outdoor weathering layer. He said "patina is formed by coating the surface as a result of dissolving the surrounding rock components by rainwater seeping through the soil and rock and re-deposited. In

chalky areas (like the Judean Mountains) patina is composed mainly of calcite (calcium carbonate - CaCO₃).

In his report Dr. Ayalon reported that the JI is engraved in a rock containing silicate minerals and does not contain carbonate. He sampled three samples of patina from the back of the tablet and 3 samples from various parts of the letters of the inscription. The patina that was taken from the back of the tablet is composed of silica and contained no carbonate. The samples from the surface of the inscription can be divided into two groups: one, patina samples with very negative oxygen isotopic values (-7.3 and -8.4 per mill) and two, patina samples with relatively high isotopic values (-1.7 and -0.9 per mill), similar to values typical of a marine origin. This last group undoubtedly originated in the sea as indicated by the presence of microscopic marine fossils (foraminifers).

Dr. Ayalon concluded:

- 1-“The oxygen isotopic composition of the surface patina and the letters patina of the JI are clearly different from the typical oxygen isotopic composition of the natural expected carbonate range that is deposited today and was deposited in the Judean Mountains during the last 2000 years.”
- 2- "Assuming the usual burial conditions, the very negative values of the oxygen composition of the patina could not have formed naturally in conditions of temperature and water composition typical of the Judean Mountains during the last two thousand years. "

Therefore, the conclusion of Dr. Ayalon is that the measured composition of the patina can be achieved by artificial means by the **artificial creation of patina** by crushing and dissolving carbonate (even partially) in hot water and deposited it on the surface of the inscription. An oven was used to insure good adhesion of the patina. Another option is grinding carbonate, applying it in the appropriate surface areas and then using an oven.

In addition, Dr. Ayalon confirmed that no chemical analysis was done by him on the samples that were tested for oxygen isotopes and that he based and relied on the analyses made by Dr. Rosenfeld and Dr. Ilani (p. 4182).

Material Aspect, the Testimony and Evidence from Golan (experts) [Summaries by the Judge]

Professor Wolfgang Krumbein

Recall that Professor Krumbein is a geoscientist and microbiologist at the University of Oldenburg, Germany. He is the founder and the director of the Institute of Chemistry, Biology and Environment of the university. As specified at the beginning of the report, Professor Krumbein is considered to be an expert in the following fields: stone surface changes, patina and formation of biogenic membranes on rocks and stones, the development of organisms and microorganisms living on stones, the study of artifacts and ancient stone structures, protection and preservation of the stone structures, the effects of climatic, mineralogical and air pollution on the destruction and weathering of ancient rocks, mineralogical changes on artifacts, the development of micro-organism colonies, destruction of materials and neo-mineralization changes in stones as a result of processes produced by bacteria and microorganisms.

According to Prof. Krumbein microscopic photographs confirm that significant cleaning processes were done on the tablet including the attempts to enhance the appearance of the inscription at an unknown date in modern times. The stone was buried for a **very long period** in contact with soil or with alluvial material and probably was never exposed to atmospheric conditions similar to those of the cave (Emphasis is mine - AF).

Examination of the back of the stone indicates that it is probably in a completely natural state as it occurs before the stone tablet was quarried, so the patina on the [back] of the rock evolved over many years. And therefore, it is impossible to compare the patina of the back of the tablet to the patina on the engraved side of the inscription.

Microscopic examination carried out by Professor Krumbein revealed that the surface within a few letters is similar to the surface of the JI tablet. The base within the engraved letters of the JI has the same morphology as the surface on the tablet indicating a continuity of form. There is no modern engraving indicating the interrupting of the morphological continuity. The morphological continuity was also found in some letters after the softer filling material was removed. This may indicate that the letters were engraved in the distant past. Possibly, the “softer” material found in number of letters are the natural patina.

The new fracture crossing the JI tablet occurred along a narrow crack clearly visible in photographs taken before several years. The crack is very old. The natural patina in the fracture near the tablet surface is thicker having the signs of “whitening” of the early stages of patina development – these are not seen in the lower part of the fracture, where the two parts of the tablet were broken apart recently.

Examination of the letters in the crack (new fracture) strongly suggests that the letters were engraved before the formation of the crack, as it seems quite impossible to make a new engraving in this type of stone. All engraving operation immediately causes the stone to break into two parts, along the crack line. Examination of the (new) fracture and photos of the JI tablet that were taken before the breakage indicate that the crack was very subtle and thin, and that it was not possible to introduce an artificial patina through the crack into the inner parts of the stone. The patina inside the crack was uncovered only after the police broke the JI tablet into two halves.

The opinion of Professor Goren and Dr. Ayalon who mistakenly thought that occurrence of microfossils in the patina is an indication of forgery, is in contrast to the opinion of Professor Krumbein. According to Professor Krumbein the presence of microfossils in the patina of the inscription enhances the probability of authenticity of the inscription, because the accumulation of micro-dust-borne fossils requires a prolonged period of exposure of the stone surface to the wind and climatic conditions. According to previous examinations where spherical microscopic gold globules were found in the inscription’s patina together with remains of micron-sized particles of coal, Professor Krumbein does not know of any technology that enables the artificial embedding of such micro-sized gold particles in a new or antique patina. The presence of organic remains and microscopic sized gold in the patina may indicate that the JI tablet was at some point in its history near fire, sparks and near very high temperatures.

The conclusion of Professor Krumbein’s opinion is that **“the inscription and crack were formed at least before many decades, if not hundreds of years.”**

Professor Krumbein defines patina as: "The total of all changes and happenings that have taken place on the surface and near the surface of the materials" (p. 4878). He said that the development of patina is almost always a temporary process that occurs in stages during periods of inactivity, absence of action or weathering and disintegration. This development stops or ends when all the chemical dynamics, particularly the physical and biological processes are arrested because of lack of energy or lack of pressure from the environment.

The witness presented an archaeological flint artifact taken from the Negev in 1967 that has a very similar brown patina and bio-pitting as found in the tablet of Jehoash Inscription (p. 4911).

Later, Prof. Krumbein was asked and replied as follows: (p.4922):

Q: "... Can the oxygen isotope test can tell us about the authenticity and nature of the patina?

A: No.

Q: Can you please explain to court why?

A: Patina is a product that the artifact gets elements from the rock, from the atmosphere and from the organisms that grow on it. The isotopes within the patina can come from too many potential sources into the patina.

Q: Tell me more please if you can.

A: Calcium carbonate can be formed by algae, by fungi and bacteria. There may have been different temperatures during day, night and in the various seasons and each contains a patina of dust coming from everywhere. I never could and I am still trying, but I never managed to take a sample solely of patina ... Always I get some part of the rock underneath because the rock is not so strong. "

When Professor Krumbein was asked what could he say about the isotopic examinations [done by Ayalon and Bar-Matthews] and about their methodology he answered (p. 4925, line 1-19):

A: "Now I have to be precise, first, I tried in my comments and in my presentation to show convincingly that this [isotope examination] is not a technology that can be used to define and determine authenticity of the patina. Secondly, I think that the equipment and the time invested by Goren and Ayalon are good. The Geological Survey is well equipped and Tel Aviv University certainly has good equipment, and time and equipment were very good ... **but I think it is wrong to talk about the pollution of microfossils by mixing sea-sand, I think it is wrong to use the isotopes – O16 and O18 as a method to identify good or bad patina. I think the theory of constant temperature inside the cave is nonsense.**

Q: Why?

A: Because it refers to very specific cave.

Q: You yourself know the cave of Avshalom?

A: Yes, I know it. Even in Avshalom cave [=Beit Shemesh cave] the climate has changed over time; I know it, the climate has changed. And [I know] other caves in the Judean Mountains that have different climatic conditions with very high variability."

Dr. Amnon Rosenfeld, Dr. Shimon Ilani and Michael Dvorachek. (496)

In approximately 2000, Golan went to the Geological Survey and asked that the JI inscription be examined by them. In November 2001 an examination report was

prepared in the Geological Survey by Dr. Ilani, Dr. Rosenfeld and Dvorachek. Document dated 3/July/02 signed by the three researchers (Taf / 158) stated that extensive tests have been conducted to the inscription using scanning electron microscope [SEM-EDS], an X-ray, mass spectroscopy and other equipment. In addition, samples were taken from the patina of the letters in different areas from hidden places and from the patina of the crack; chemical and mineralogical analyses were performed. The conclusion of the researchers was that the patina on the rock tablet, in the letters and in the crack is authentic. All tests and chemical and mineralogical analyses indicate that the engraved inscription is ancient, and that the inscription was buried for the longest time in a chalky soil rich in iron, as is expected to be in destructive soil (Tel). Another report said that the tests did not show any signs that may indicate artificial patina was added to the JI tablet. In addition, there is no possibility that genuine patina was “glued” or added or artificially distributed on the stone tablet and on the letters. According to the authors of the report the formation of the patina started just after the processing and the engraving of the inscription and therefore the occurrence of the authentic patina in the letters unequivocally indicates that the inscription is ancient.

Dr. Amnon Rosenfeld (498).

Early in his testimony Dr. Rosenfeld asked the court to note that his scientific work in connection with the three examined artifacts states that no evidence of forgery was found. It is not a question of determining the authenticity of the exhibits but that no evidence of forgery was found, but only positive points were found supporting the possibility that the three artifacts [James Ossuary, Jehoash Inscription and the stone oil lamp] could indicate authentic antiquities. And in his words Dr. Rosenfeld says:

“We did not determine that it is one hundred percent genuine but that they’re probably genuine” (p. 5039, lines. 1-5). It is noted that Dr. Rosenfeld found it necessary to say the following on its own initiative early in his testimony (p. 5040, lines. 13-22): “I think the scientific part of this trial should have been conducted at the university as I have already said. And that international academic scientific scholars could openly research and review the antiquity and grant freedom of publication. It’s the right process to determine the authenticity of important antiquity by writing scientific articles for and against it and the scientific world will come in academic way to some consensus on whether the antiquity is genuine or fake according to the most compelling articles. Certainly not by determinations of government established committees of the IAA. This method is contrary to the academic scientific study. Archaeology belongs to all people and not just to the Israel Antiquities Authority officials.”

Dr. Rosenfeld (499) also said that you cannot determine authenticity with one tool even if it will be the most advanced tool, but with the knowledge and experience of archaeologists, epigraphists, [philologists] and more. All together must give the positive or negative answer. The isotopes alone cannot determine this but all the disciplines together (multi-disciplinary) should give the answer. To quote from Dr. Rosenfeld’s statement (p. 5042, line, 14-20):

“I’m sure that the JI and the ossuary of Jacob and other antiques that stand here in this court on trial, in more years to come their authenticity will may be recognized and they will be displayed at the museum. I’m sure they may be displayed at the Israel Museum with the ivory pomegranate made of hippopotamus tusk. These

artifacts will be studied and learned in various courses and they will bring them for an example as happened to the Mesha inscription [now in the Louvre museum in Paris] that took a hundred years to recognize it as genuine inscription, and it took 10 years to recognize that the Dead Sea Scrolls are authentic, and till today there are some scholars that think that Tel-Dan inscription is a forgery..."

Dr. Rosenfeld (500), in his main testimony noted that according to the patina covering the letters and that also covers the crack, we can assume that the letters were engraved before the formation of the crack. He said that the black patina on the surface of the tablet is the product of yeast and fungi, the patina would be produced during hundreds of years, it sits right next to the stone and is one of the points that support the antiquity of the JI stone along with gold globules, the radiocarbon age of the coal, the crack is now a fracture and suffers from biopitting. Dr. Rosenfeld concluded that the JI is ancient presumably because of the fault that was once a line of weakness in the ancient stone, and that the engraving of the letters was made before there was a crack. That the crack crosses the letters almost intact without flakes, the patina covering the letters and the crack which today is a fracture; that black - red thin patina produced by fungi colonies wraps the tablet and coating also the letters; that the light patina in the letters containing particles of sandstone from the rock and carbonate from the exposed surrounding, as well as fly ash and tiny molten gold spheres that indicated a subsequent fire, and microfossils blown in the wind from the exposed mountains of Jerusalem. The radiocarbon age of 2300 years BP and the significant morphological continuity between the tablet surface and the carved letters [all support the authenticity of the JI.] (p. 5075, S. 2 or later). Dr. Rosenfeld stressed that from his long experience that the presence of precious metal particles usually indicates authenticity since there is no possibility of planting such a high number of globules of such small size in a patina.

Dr. Shimon Ilani (502).

Since 1970 Dr. Ilani has worked as a researcher at the Geological Survey of Israel. His research interests are economic geology with an emphasis on raw materials for construction and industry. Dr. Ilani prepared some geological maps and geochemical surveys that cover most of the country. His main fields are: petrography, geochemistry and mineralogy of rocks. He has sampled thousands of rocks for physical and geochemical examinations. He said that the management of the Geological Survey asked him to examine the ossuary, the Jehoash tablet and then the stone oil lamp. His work was done in collaboration with Dr. Amnon Rosenfeld and Mr. Michael Dvoracheck, who is, he said, one of the best technicians qualified to operate the scanning electron microscope. Dr. Ilani, in his long and detailed presentation, explained the types of stones [of the antiquities] and about the patina (N / 200).

In his main testimony Dr. Ilani pointed out that as a geologist he encounters many rock exposures in Israel, and the first thing he sees is a patina, where the patina is considered to be the weathering crust [exposure to climate conditions]. Dr. Ilani measured it, understood what he saw in it, and removed the patina when examining the chemical and physical characteristics of the rock without the patina (p. 5541). Dr. Ilani wished to emphasize that, contrary to the opinion of the experts, Dr. Ayalon, Dr. Bar - Matthews and Professor Goren, who believe that patina is a product of deposition, in his opinion the patina is not deposited [like in stalagmite] but it is formed and built, and we

are not talking about merely a semantic issue (p. 5545). He added that in the past, stable isotope examinations were done only on marble but not on patinas, there is no work, at least he himself does not recognize a work on the isotopes of patina itself [natural or fake]. He says: "**by moving sharply from marble [isotopic] examination that is already done for the last 20 or 30 years to patina [isotopic] examinations [investigators] must bring the proof along with the data base so we will know the information about these things**"(p. 5545).

According to Dr. Ilani, the organisms involved in the formation of a patina are mostly important in the building of the patina. These organisms on an archaeological artifact gather around them material from the adjacent environment such as grains of plaster, lime and foraminifers, which are single-celled organisms [calcitic microfossils] that are building the Judean Mountains rocks, but they also could come from the dust of the Sahara and sink here on the ground during periods of hundreds of thousands of years and all these can affect the oxygen isotope composition (p. 5549).

During his testimony, Dr. Ilani wanted to deal with the findings of Dr. Ayalon, in connection to the four samples taken from the JI tablet. Two of them yielded light isotopic composition and two have rather heavy isotopic composition. Dr. Ayalon explained the finding of the lightest isotopic composition [as forgery] by grinding limestone and dissolved it in hot water and pouring the solution across the [engraved] tablet. According to Dr. Ilani, limestone (calcium-carbonate) does not dissolve in hot water of 50 degrees Celsius, and if you want to dissolve limestone it has to be done with cold water of one to 3 degrees Celsius. About the heavy isotope compositions, according to Dr. Ayalon it is due probably to the occurrence of foraminifers [calcitic marine microfossils] found in the patina. According to Dr. Ilani this indicates one component of a real patina that contains many elements. The patina is multi-variegated when the JI tablet was buried in a Tel environment. He added that while he checked the Jehoash tablet [in 2002] the tablet has a closed crack with a patina in it, the letters that had passed through it were homogeneous, and in his opinion, if a forger would have carved a letter across the crack, the stone would have been broken (p. 5552).In his prepared presentation Dr. Ilani showed a micron size of gold globule as well as carbon particles that were caught within the patina (p. 5557). At the end of Dr. Ilani's presentation (N / 200), he writes:

"In patina of antiquities one should not consider [using] averages [of temperature and water compositions]. On certain days and certain soils we can find in nature similar to isotopic values that were measured on the Jehoash inscription, and at the ossuary."

The brief explanation is, that:

"Patina in antiquities is created in short episodes. So there is no great meaning to annual average temperature and to average annual composition of the water (as opposed to climatic reconstruction studies during periods of tens and hundreds of thousands of years). In the case of a carbonate patina that was deposited on an artifact, we must know the exact temperature during the day/days of the formation of the patina and the exact water composition during the days of the deposition of the carbonate, [not averages] as well as the components of the environment (the type of the burial soil, etc.)" (Emphasis is in the original).

At the end of the main investigation in relation to his research and findings of

Dr. Ayalon and his opposition to these findings, Dr. Ilani explained his position in these words (p. 5564):

"I say that the conditions examined in the Beit-Shemesh-Soreq cave, and not only of this cave, are not the same conditions of the formation of patina developing on a stone tablet within a Tel-soil environment. That's what I want to say: The cave [is a close environment] has a constant annual average and even perennial average [of temperature]. If it rains, even if we will forget for a moment that patina is formed by organisms, we will assume for a moment that patina is only formed by evaporating of rainwater, and rain falling on a warm black tablet, in an open environment, a drop evaporates [deposited carbonate], what will be the composition of the patina there? Will it have a different isotopic composition than that of the cave? [of course] That's what I can say here ..."

"...In case of deposition of patina, let's say that I accept it here for the sake of argument that patina is carbonate deposit, from what was it deposited? It deposited by evaporation of rainwater falling on an artifact. Water is evaporating, and patina is deposited there. It's hard for me to understand why the isotopes that deposited will be the same as in the cave. We are dealing with patina that is formed in an open area with different CO₂ [pressure] and different temperatures from that of the cave. We saw the damage caused by people entering the Beit-Shemesh cave, with their heat [and breath], changing the temperature. [Causing stalagmite disintegration]. The temperature of the surface is different of that of the cave. You will get another isotope composition, so I cannot understand ..."

Answering the questions of the defense attorney Mr. Sitton, Dr. Ilani sharpened the positions between the two sides. According to Dr. Ayalon and his co-authors in the articles they have concluded that the [oxygen] isotopic composition of the stalagmite of the cave (the Beit-Shemesh-Soreq cave they have been monitoring for many years) is a function of the composition of the rainfall over the Judean Mountains. And they assume that during the last 3000 years the isotopic composition of the rainwater remained the same. Thus, they expect that the oxygen isotopic composition of a patina found on archaeological artifacts buried in the soil of a Tel will exhibit the same [oxygen isotopic] values as in the stalagmite of their cave. But, the position of the Dr. Ilani is different, because he believes that the formation of a patina on Tel-soil archaeological objects has the involvement of organisms which collect and are covered with not only evaporated drops of rain but also particles of the existing old plaster found in most of Tel-soil sites. A Tel-soil [mound] is always lighter in color because of the huge amount of plaster, which is basically lime with very light [oxygen] isotopic composition. (p. 5568).

In his testimony, Dr. Ilani also refers to the finding of the U.S. Beta laboratory that examined the radiocarbon 14 age determination of the JI patina which yielded about 2,300 years BP. But, the inscription on the stone tablet is attributed to King Jehoash and was probably set in the gate of the First Temple and should be approximately 2,800 years old. Dr. Ilani's opinion in principle is that patina began to be formed on the tablet that was set at the gate of the Temple. However, the estimated gap was created because the tablet was displayed on the wall of the Temple, and the [guards] probably used to clean the tablet all the time with a brush and by that prevented the formation of the patina; the patina began to be formed only after the tablet was buried in a Tel soil (p. 5675).

However, Dr. Ilani, stressed because "I want that it will be clear that my bottom line is not that I say that these artifacts are genuine, maybe I don't even need to say it, I

never said that. I'm just talking here about the use of this discipline (of isotope examinations – AF) regarding the patina "(p. 5565).

Judge Farkash's Remarks.

The prosecution also emphasizes that there is no "black film" on the stone, contrary to the experts for the defense. Another argument is that the crust observed by the defense's experts is just an optical illusion, and in any case even if the court reach the conclusion that such a film exists, then it is broken or cut in some of the letters, and the conclusion should be that the engraving of the letters was done after the formation of this black film.

The defense attorney for Golan directs that, after the tablet broke one can see clearly the existence of a thin dark crust, which coats the surface of the tablet, as one may see in the photographs submitted by witnesses for the prosecution and the defense witnesses. The argument is that by examining these photographs, you can clearly see how the film of the dark layer in question, penetrating into the grooves of the letters of the inscription, so it is clear that this patina layer was formed after the inscribing of the JI tablet. According to the defense attorney Mr. Bringer, even if this dark layer is sliding into the grooves of the letters but does not coat the bottoms of all the letters, but covers only [in one letter] the entire engraved letter [including its bottom], it is enough to explain that the engraving was made before the formation of that layer.

About the isotope test, I see no point in going back and list the various aspects and issues which emerged on the isotopic examination. These things were already discussed decided concluded and has been reasoned at length in the ossuary charge [charge number 1; Rosenfeld et. al., 2012] and in charge [number 3] in relation to the ostraca 1 and 2. **As explained in the ossuary, the "expected range" obtained for the oxygen isotope results do not indicate necessarily of an authentic patina. However, since the results may indicate a reasonable possibility that the patina is authentic, a reasonable doubt arouses also for this examination about the JI rock tablet.**

Material aspect – isotopic tests – Professor Aldo Shemesh (637-702) **[Summaries by the Judge]**

(Count # 3 – Ostraca 1, 2 and 3)

The defense filed a counter report of opinion (Shemesh, 2007) on the isotopic subject by Professor Shemesh, Department of Environmental Sciences at the Weitzman Institute of Science. Professor Shemesh's research deals with natural isotopes in geological systems, geochemistry and more. Needless to say, that I [Judge Farkash] was impressed by his expertise and his extensive knowledge. My impression is, as noted, that Professor Shemesh is loyal to his scientific duty and his objectivity is impartial as he declared at the beginning of his testimony [for further explanation refer to Rosenfeld et. al., 2012.]

In the chapter "scientific argument" Professor Shemesh elaborated an introduction of scientific infrastructure about which we are dealing – the oxygen isotopes and their relationship to temperature and water composition. A total of 56 well documented archaeological items [from official excavations] were sampled, with a wide distribution from the north to south of the country [Israel]. The "patina" was weighed and examined

in the Weitzman Institute.

The results of the samples analyzed by Professor Shemesh are presented in a table appended to his report. The conclusions from the data of the analysis were as follows:

Most of the oxygen isotopic values of the patinas from the country are in the range of -2 to -6.2 per mill. Two of the three measured sites with a large number of samples (Tel Hazor, Tel Dan and Tel Gat) **yielded in their patinas measured values of oxygen isotopes that have a very wide distribution, completely contradicting with the basic work assumption of Drs. Ayalon and Bar-Matthews. The measured variability range in Tel Hazor was of 8 per mill [-4 to -12 per mill] and in Tel Gat the measured variability range was of about 9 per mill [-3 to -12.5 per mill]**. In Tel-Dan the distribution results [of the oxygen isotopes] are smaller, about 1.5 per mill although this distributed result analytically is very significant. The oxygen isotopic values of the patinas do not indicate a clear trend by regarding geographical distribution in the country. Various sites in north and south, a topographic high or low, sites more or less close to the shoreline, do not show any relationship to the oxygen isotopic values.

Another problem according to Professor Shemesh is the lack of calibration of the patina. In the professional scientific literature there is no accepted worldwide calibration between the isotopic compositions of a patina to the temperature of patina formation. The prosecution's experts measured a total of 10 samples. Professor Shemesh in his report has introduced the largest number of measurements of patinas from Israel [56], and it seems that even those are not enough.

The conclusions of Professor Shemesh, as presented at the end of his report of opinion, are as follows:

The use of oxygen isotopic composition of a patina cannot determine authenticity and cannot yet be used as geochemical tool. So, it cannot be used in court or in forensics without raising reasonable scientific doubt. To the best of Professor Shemesh's judgment and based on his scientific experience and publications, the level of our understanding of the mechanism creating the patina and the processes that determine the isotopic composition is not yet developed enough to maintain that a new scientific tool allows identification of a fake patina. The data presented in this report [of Professor Shemesh] as well as the data presented in the report of Dr. Ayalon, are still insufficient to create a new tool in geochemistry.

However, Professor Shemesh argued that although he sampled a larger number of samples than the prosecution experts, yet in his opinion it is not enough.

"In my opinion, the amount of measurements in the report submitted by Dr. Ayalon was not enough to clarify the facts. And therefore the first pillar in a geochemical research is first of all to collect the information, without any prejudice, without any intentional bias." ... "I do not see a wide data base, wide enough to determine such truths certainly I did not see a data base wide enough to come before the court." ... "I emphasize that what I did, is very far from being complete, far from being absolute, and far for me, from running and waving conclusions "... (p. 8574).

Disequilibrium

Another argument that has been presented by Professor Shemesh as criticism of the isotopic test refers to the impossibility of proving, by an external criterion (not isotopic), that patina is deposited in isotopic equilibrium without the influence of kinetic

processes affecting the system. Can a patina as well as calcite deposited under ideal conditions without “disturbances” of variable factors? Professor Shemesh’s opinion, in the absence of proof of equilibrium, that it is impossible to use the isotopic composition equation as did the prosecution experts, since the equation assumes a deposition under equilibrium conditions (page 8550 and later). Professor Shemesh’s claim about disequilibrium relied among others, on the article written by the prosecution experts (Dr. Bar – Matthews, Dr. Ayalon and Professsor Matthews); (p. 8694 and later).

Professor Shemesh also stressed that he told the defense that he insisted of one condition before sampling the patinas, that he will be able to come to an objective true conclusion –”They taught me and educated me that in science you have to present everything ... THE GOOD, THE BAD AND THE UGLY.”

However, you cannot remove a sample from the database only because the result is not “appropriate” or was not expected or it is apparently “abnormal” isotopic composition result and if they do so [Dr. Ayalon and Bar-Matthews with the Het sample of the James Ossuary] then it will be scientific bias and a circular argument (pp p 8594; 8627-8268).

Judge Farkash’s remarks:

We have to accept the detailed examinations and results of Professor Shemesh, as well as his conclusion that it is impossible at this point to base any findings on the basis (that was not yet properly proven) of the [oxygen isotopes] “expected range” of patina on pottery. The patina results for the authentic pottery items found in the official excavations (from – Tel-Gat and Tel-Hazor) gave much more negative results than the “expected range” determined by the prosecution experts. **This conclusion is supported by the statements made by the prosecution witness Professor Kolodny as follows: “... these two distinguished researchers (Dr. Ayalon and Professor Shemesh – A.F.) if they checked the same things [achieving different results] then there is a doubt in the validity of the method” (p. 4090).**

I think, therefore, that it is sufficient to establish reasonable doubt about the validity of the isotope examination as a method to check forgeries.

The Material Aspect

Discussion and conclusion [Summaries by the Judge]

The stone was delivered intact from the accuser to the police investigators and was broken on top. Experts from both parties raised various theories why the tablet was broken. Some argued that there was a crack in the first place and after that the stone had been transported the crack became a fracture. A question was raised whether it is reasonable that those who chiseled the inscription either during old days or in modern days will use a cracked stone tablet risking its breakage while processing the stone.

On this issue I believe to the testimony of Mr. Chen Winkler, who testified for the defense, and presented a legal opinion (N / 213). Mr. Winkler is the third generation of the founders of a marble and stone factory in Israel, and deals for over 30 years with stone work, stone engravings and works of art in stone, both handmade and by using advanced equipment. The witness deals with the establishment of monuments and sculptures in stone. The witness visited the Rockefeller Museum, home of the Israel Antiquities Authority, and examined the JI stone. According to him, he examined the

stone before the breakage and even then it was possible to distinguish the thin crack passing through the letters. He said that the option to engrave an inscription on this hard rock, like the tablet of Jehoash, with a visible crack, without breaking the tablet and without causing to cut and to affect the continuity of the engravings on both sides of the crack – is very slim, especially, when it comes to engraving of an inscription with some 200 letters and symbols as in this case. It can be firmly determined that such an option is unacceptable.

Mr. Winkler added that before the rock tablet was processed, maybe there was a hidden deep crack from view, and perhaps even a number of cracks, and if the stone had not experienced an extreme event after the engravings of the letters, the crack would never be seen or be opened. Mr. Winkler, said that every experienced man even with a little bit of experience with stone engravings, if he sees a crack across the board, the chances that this tablet would break during the work is very high. He would probably avoid carrying out actions such as cutting and chiseling the stone, making the frame, particularly engraving more than 200 symbols and letters on this stone—operations that require long and difficult effort and he would choose another stone.

Mr. Winkler asked himself, as he wrote in his opinion's report, assuming the crack was already hidden in the stone, how could the crack be opened? He answered that it might be that they pounded the tablet for posting it in a wall as secondary building stone, or maybe they pounded the frame of the tablet after the engravings of the letters in order to install the tablet in a wall, or exposure to an event of a fire in the history of the rock, or during its fall.

Mr. Winkler noted that on the surface of the stone tablet a covering layer can be observed, with brown – reddish, crust covering the surface to a depth of several millimeters deep in the stone. Such weathering crusts are recognized across various rocks, and they are formed during a long time and are extremely hard. This membrane layer is in different color from the stone itself and is clearly visible. Mr. Winkler's opinion is that this crust is the patina and you can see it on the surface and in the section where the stone was broken. Mr. Winkler said in his opinion that based on his experience, if the crack was visible or open then the stone engraving of more than 200 letters with primitive tools and even with modern tools was probably cause to the breakage of the stone before ending to chisel the inscription. He added that in any case the engraver could not perform a straight line of the letter passing through the crack because the chisel was escaping from the straight line and would create "Glaetzim" (broken side flakes, the origin is probably from the German language; the plural is in Hebrew) at the connection of the engraving points with the crack. The inscription photographs before the fracturing of the tablet and then a view after the breakage of the stone shows the existence a complete sequence of the letters on both sides of the crack without the "Glaetzim" in these letters. The conclusion of his opinion is, that "**the engraving of the letters was done before the crack was discovered, or at least when the crack was completely closed (hidden)**" (see photos 8 and 9 in report N / 213). It should be noted that in his report, Mr. Winkler attached several photographs under which he performed several experiments to engrave letters on various types of cracked stones and in all the rocks the "Glaetzim" are clearly visible. In his summary Mr. Winkler wrote this:

"According to my experience, it was impossible to engrave on the hard board an inscription of 200 letters and symbols, which was on top of an open crack without

breaking the board and without creating a” Glaetzim. “In my opinion, the crack in the JI that existed from ancient time opened only after the inscription on the stone was existed, probably due to an extreme event – a blow, a fire, etc.. Thus, the inscription pre-dated the opening and fracturing of the hidden crack. In the cross section of the letters an ancient natural patina, can be observed which can only be formed after the writings of the letters, hence the inscription was created before the opening of the crack “ (Emphasis is in the original – AF).

Judge Farkash's Remarks:

As stated above, I adopt the opinion of Mr. Winkler that he is an expert on rock and stone art works. Also, as suggested by the prosecution attorney “I will pick up the glove” [and say:]

“As for the letters adjacent to the fracture of the stone, my opinion is, similar to what came out from the testimony of Mr. Winkler, it is possible that the fault which we now see was earlier a thin crack, and perhaps an invisible crack to the naked eye, and due to the shaking of the rock, the tablet broke and the fracture caused also to the breakage of some of the inscribed letters that were engraved on the invisible crack. Since it does not seem that the engraver carved the letters so close to the crack and it does not look to have “Glaetzim”. Thus, indeed it seems that the letters were broken because of the fracture that happened in the stone after the engraving of the letters.”

“About the thin crust, that was claimed by the defense that due to the fracture it can be observed. After I gave my opinion to the request of prosecution attorney, and I watched at the pictures and I read thoroughly the testimony of all the experts on this point, **my conclusion is that indeed there is a black –brown crust coating the stone surface and which is clearly visible on the fracture line. And it appears very likely that this crust was formed after the engraving of the letters, since the presented pictures clearly show that in number of letters the [black-brown] crust can be seen not only in the margins of the letters but also at the bottom of the letter** (N / 186 – N / 187 B). Dr. Shimron and other witnesses testified about the crust in the letters.”

I am aware of that the dark film contention of the defense was not raised in the first report by Dr. Rosenfeld and Dr. Ilani, and it was raised only during their testimonies. Both experts explained that their opinions were made before the tablet was broken and they did not notice the dark crust. After the tablet was broken and after Professor Krumbein turned their attention to it and they examined the rock tablet and then they observed the dark patina. This revision of the dark patina seems not to be made on behalf of the accuser’s experts.

“It should be emphasized that I don’t accept the prosecution argument that the camera or lighting angels during the photographing caused the crust to look in favor to the defense. **At least in some of the letters that were cut by the fracture, the mentioned dark crust can be seen clearly.** It is not superfluous to note that even during the hearing of the testimonies and viewing the enlarged photos presented to the witnesses, **I expressed my opinion prima facie, that the dark crust is clearly visible in the section of the fracture of the JI board, as well as the its gliding into a few letters and it can be seen even at the bottom of number of letters** (p. 4785 that 28; and p 11370 (in the summary of the prosecutor)). **Further examination of this issue during the writing**

of the verdict did not lead me to change my mind.”

“I will add that even if there are letters in which the dark membrane is not observed at the bottom of the letter, as argued by the accuser...there are new signs of scratches, which seems like the removal of the material in those letters. Where the crust is not present at the bottom it is not inconceivable that those who carried out the markings and scratches, perhaps as an attempt to reveal the letters, [cleaning the inscription] had removed the crust from the bottom of the letters. The problem and more important in my opinion is the fact that there is a crust in the bottom in some letters, and the accuser could not explain it satisfactory... The prosecution claimed that their experts had not observed such a crust, or that such a crust does not exist, or that the patina is uneven in its thickness and Golan carved the letters and where the crust is thick the engravings did not go through the entire thickness of the crust. But this [explanation] is not logical or reasonable and cannot be accepted. Professor Krumbein testified that this last scenario cannot happen, and he cannot even imagine of such a scenario (p. 5013, lines. 8-13). In this situation, it is sufficient to raise a reasonable doubt and it is sufficient that the defendant will point out and refute the claim of the prosecution that the stone has been recently engraved on the crust and that this is really a forgery.”

As for the isotopic examination, I see no point in going back and listing all the various aspects and issues which emerged from it. The matter has been discussed in detail and reasoned at length and was decided for both in the ossuary charge and in relation to the ostraca 1 and 2 charges. As explained in the ossuary, the results obtained for the expected range do not indicate necessarily the authenticity of the patina. However, since the results [in the ossuary] may indicate a reasonable possibility of an authentic patina, a reasonable doubt can also exist for the JI tablet. Dr. Ayalon claimed in his testimony, that the results of the expected range can be explained by the presence of heavy oxygen isotopes composition of the micro – marine fossils in the patina affecting the results for the better [an authentic patina], but this does not changes my conclusion. **Remember that Prof. Krumbein testified about the presence of micro – marine fossils in the patina that indicates precisely about the authentic patina and his testimony about it is accepted by me.** It must be added that the negative results obtained in the JI tablet were outside the expected range (-7.3 per mill and -8.4 per mill).

According to the claim of the prosecution experts there is no way to explain it by natural explanations, but these two oxygen composition values are falling within the larger [natural] values that the defense expert Professor Shemesh found , as discussed in detail in relation to ostraca 1 and 2.

Judge Farkash:Remarks: (531)

The conclusion raised in the material aspect is that the prosecution failed to prove beyond a reasonable doubt also in this aspect that the tablet of JI was forged.

The Result (579) [by the Judge]

As stated above, from the standpoints of the writing, and from the standpoint of the language, and from the standpoint of the material aspect, all these were not proven beyond reasonable doubt that the JI tablet is a fake inscription. In my opinion, even the prosecution attorney’s argument that a combination of doubts in various aspects should lead to the determination of a fake inscription, is unacceptable to me.

(580) The result is, therefore, that I ordered the acquittal of the Golan by reasonable doubt in this charge (Indictment # 2-JI tablet).

EPILOGUE

The authors of this article presented the two opposing scientific views regarding the JI tablet, as well as the verdict of the Honorable Judge Aharon Farkash. We should bear in mind the unfortunate reality according to the IAA (anti-theft department) that 90% of the artifacts in Israel including the West Bank were and are being looted. Should all of these unprovenanced archaeological artifacts be neglected? We believe that unprovenanced archaeological artifacts should not be ignored because of their unknown origins. They must be investigated and debated by the scholarly community. An automatic rejection of unprovenanced artifacts is not a mature, responsible attitude. The “Forgery Trial” clearly demonstrates the problems with unprovenanced artifacts and the need for careful investigation of all archaeological material.

We [the authors] think that the integrity of the archaeology and the history of the Middle East is truly very important and that the scientific and general community should strive for a fruitful and positive discussion in a free academic atmosphere precluding the politics of authorities. We should strive for a true scientific debate so the most convincing scientific research will prevail (Barkay, 2008). We join Judge Farkash’s encouragement for further debate about these artifacts, they are not at all fakes: “they can well be genuine.”

CONCLUSIONS

The “Forgery Trial” sparked a fruitful and important debate on the issue of unprovenanced artifacts by top scientists from all over the world. **The conclusions of the Judge regarding the inscription of the Jehoash tablet contributed much to this debate. By casting doubts on the accusations and by endorsing the defense expert opinions the Judge accepted some crucial facts:**

- 1- Judge Farkash concluded that it is impossible to determine, beyond any reasonable doubt required in a criminal law, on the basis of the letters and the writings that the JI is fake.
- 2- The Judge concluded, that according to the language [philology] no determination can be made as was claimed by the prosecution, that the inscription is fake. The judge emphasize that the testimony of Professor Chaim Cohen, an expert in Biblical Hebrew made a special impression on him. He answered all the arguments of the prosecution experts. Also Professor Reich and Professor Sasson supported the linguistic aspect that the JI could well be authentic.
- 3- Judge Farkash adopted the opinions of the defense experts that there is indeed a clearly black –brown crust (film) coating the stone surface. And it is very likely that this crust was formed after the engraving of the letters, since some of the bottom of the letters exhibit this crust.
- 4-The judge believed the defense witness Mr. Winkler, a stone art expert who experimented and testified that it is impossible to engrave an inscription of 200

letters on this hard rock of Jehoash, with a visible open crack, without breaking the tablet and without creating a “Glaetzim” [flakes] on both sides of the crack.

5. The judge agreed that the crack in the JI opened in ancient times and post-dated the inscription, probably happened due to an extreme event – a blow, a fire, etc.

6-The Judge accepted Professor Krumbein’s testimony about the presence of micro – marine fossils that indicate precisely that the patina is authentic.

7-the Judge accepted that the two oxygen composition values found in the patina of the JI fall within the natural values found by the expert Professor Shemesh, as discussed in detail in relation to ostraca 1 and 2.

8-According to the Judge, from the standpoints of the epigraphy, and from the standpoint of the language, (philology) and from the standpoint of the material, all these aspects were not proven beyond reasonable doubt that the JI tablet is a fake inscriptions. Therefore the judge ordered the acquittal of Golan in this charge (number 2, forging the JI).

9- According to the Judge, the oxygen isotope “expected range” cannot determine forgeries.

10- The Judge determined that the oxygen isotopic examination of patinas on artifacts cannot be used to determine whether the artifact is authentic or forged. It is sufficient to establish reasonable doubt about the validity of the isotope examination as a method to check forgeries.

The Judge Aharon Farkash’s reasoning that led to the verdict in the alleged forgery of the JI tablet clearly contributes more than ever to the strengthening of the contention that the inscription is genuine.

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