

## **Analysis of Residue from a Qumran-Type Jar Lid**

*Dennis Mizzi, Joan E. Taylor, Marcello Fidanzio, and Kamal Badreshany*

*Paper delivered at the American Schools of Oriental Research Annual Meeting, San Diego, 21 November 2019*

*and at the Society of Biblical Literature Annual Meeting, San Diego, 24 November 2019.*

*The authors make this paper available due to public interest ahead of scientific publication of the detailed research article.*

When the Dead Sea Scrolls were first discovered by the Bedouin who occupied the north-western Dead Sea region, early reports testified to these being found in clay cylindrical jars, some of which were broken open to reveal their precious contents. Further cylindrical jars with distinctive bowl-shaped lids were found by both Bedouin and archaeologists in many other caves around the site of Qumran as well as in the ruins of the built settlement itself. One such jar and its accompanying lid, now in the private collection of Mrs Judith Brown, the daughter of Dead Sea Scrolls scholar John Allegro, have provided a unique opportunity for study. Most importantly, the lid is partly filled with a solidified substance. This substance has now been analysed as an initiative of the Leverhulme-funded Network for the Study of Dispersed Qumran Caves Artefacts and Archival Sources (DQCAAS), a collaboration between Joan Taylor, Marcello Fidanzio, and I. In this paper, we present the findings, with the scientific contribution of Kamal Badreshany.

First, I must address the critical question of provenance, a matter which has not received due attention in the field of Qumran until very recently. Provenance relates to two different but equally important facets of any archaeological artefact. On the one hand, provenance refers to the find spot of the object; on the other, it relates to its history of acquisition and ownership. Without the former, significant information about the artefact and its historical significance is irretrievably lost. Without the latter, one runs the risk of working with illicit materials. Both

are also necessary to ensure the authenticity of the object in question. In the interest of best practice, we have made sure to treat the matter seriously, and we therefore hope that this study also serves as a model of how to properly deal with *and* publish artefacts found in private collections.

In line with the recommendations that Jodi Magness and I set forth in a recent paper in *DSD*, our team has sought to find all records testifying to the purchase, export, and ownership of the jar and lid, whether documentary or illustrative. We have thus endeavoured to crosscheck and analyse all information in detail and to support our conclusions with extensive documentation, avoiding reliance on hearsay or unsubstantiated statements.

An important standard is the so-called “1970 rule,” a policy which has been widely adopted by international institutions and which requires that archaeological objects be shown to have been removed from their country of origin prior to 1970 or else legally exported after 1970. The principle originates from the UNESCO’s “Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property,” held in 1970 but which came into effect on 24 April 1972. While some institutions, such as ASOR, take 1972 as their benchmark, for the purpose of our study, we have been concerned to find out whether the objects under study were acquired and exported prior to 1970, following the wider international standard.

The key evidence exists in the personal archives of Judith Brown, which were made freely available to DQCAAS. These archives include personal letters from John Allegro to his wife, correspondence with Sotheby’s when he later tried to sell the jar and lid, newspaper articles, and numerous photographic resources. We were also given a copy of a letter from John Allegro to David Diringer in 1963 reporting on his shipping of a jar to the UK (courtesy of David Jacobson) and we have found evidence in the archives of the École biblique et archéologique française in Jerusalem. We are grateful to all individuals and institutions for

their help. All these documents will be published together with the results of our analysis of the jar and lid so that the scientific community would be able to scrutinize the data and the conclusions we draw from them. Time does not permit me to discuss the paper trail in detail, but we have enough documentary and photographic evidence to confirm beyond any reasonable doubt that Allegro's jar and lid were exported before 1970. The artefacts appear to have been acquired in 1963, and by 1964 they had made their way to the UK. Subsequently, Allegro made several attempts to sell them, all of which proved futile. Both objects remained in Allegro's possession until his death in 1988, after which they were passed on to his daughter, Judith Brown.

Unfortunately, we are on less sure ground with regard to the other aspect of provenance—the archaeological context. Any information on the exact find spot is lost for good, but the jar and lid have a condition that would match what we would expect in a cave environment. The vessels are coated with a white wash which is susceptible to deterioration in damp conditions. Moreover, the wash comes off as a fine powder if touched. Both the jar and lid have damp-stained surfaces where the white wash has been completely rubbed off. This indicates that both objects originally lay in a damp environment *but also* that parts of their surface area came in direct contact with another surface, causing the wash to come off. The stains are seen more deeply on the upper side of the jar, but there are stains also on the lower side and at the base. This suggests that the jar stood upright on (or embedded in) a damp surface for some time, until eventually it fell over to lie on its shoulder with its base protruding into the air. The lid has damp stains across its outer surface, which would correlate with a scenario in which it lay top down, at an angle. Both jar and lid were clearly preserved in a clean environment since their exterior and interior are almost without any damage or staining, and encrustations appear only slightly. Their condition would be consistent with them existing in a cave environment as one would not expect the particular staining to result from a buried context

(e.g., in a shaft grave or under fill). Importantly, we have observed similar stains on other such jars and lids from the Qumran caves.

The morphology of the two vessels is paralleled by other Qumran cylindrical jars and bowl-shaped lids, and they share with them several physical characteristics. This, together with the fact that this class of jars and lids have only been found in caves around Qumran may provide a strong indication as to the general provenance of the vessels under study. (Here, I emphasize that while similar jars and lids are attested at some sites around the Dead Sea, no exemplars have ever been found in any of the caves of the Judaeian Desert, except those of Qumran.) Nonetheless, we underscore the fact that it is impossible to determine the cave from which the vessels could have come. In the end, despite the fact that a general Qumran provenance is highly likely, we insist on qualifying Allegro's jar and lid as "Qumran-type" artefacts so as to highlight in no uncertain terms that the objects were not unearthed in the course of a scientific excavation. This is an integral element of their artefactual identity, and it must always be underlined in any discussion of the vessels.

Our focus, today, is the bowl-shaped lid that came with the jar. The lid is ca. 9 cm high and 17–18 cm in diameter. The key interest comes from the fact that the lid is partially filled with a hardened material, and this has not been cleaned off. Allegro mentions this residue in one of his letters to Sotheby's, thinking it to be bat dung. However, we wanted to test this claim, and so a sample was collected and submitted for analysis to the Quest laboratories at the University of Reading.

During Phase 1 of the project, the sample was initially analysed non-destructively using SEM and FTIR (Scanning Electron Microscope and Fourier-Transform Infrared Spectroscopy), which confirmed the presence of some amount of non-soil organic residue. These results prompted further analyses using py-GC-MS (pyrolysis Gas Chromatography-Mass Spectrometry), the primary aim being to identify the nature of these organic compounds

in order to assess whether the sample could possibly include within its matrix remnants of the original materials contained in the jar. The initial results were very promising, showing many interesting compounds which may indeed be linked directly to the original contents of the jar or material used to seal the vessel. However, as is often the case with organic residue analyses, a focused program of standard-based analyses or an exhaustive database of standards had to be employed to positively and specifically identify the contents. Accordingly, the sample was subjected to a third stage of analysis, which entailed running by the py-GC-MS a number of standards based on the list of potential materials which could have been inside the jar as well as some of the compounds identified in the first and second phases of analysis. These include standards of cow, sheep, and goat dung, skins (parchment), linen, papyrus, and beeswax.

This third stage of analysis sought to test eight possible hypotheses, namely: 1) the sample is from a linen sheet used to wrap scrolls which has decomposed in situ; 2) the sample is from a scroll made from parchment or vellum (animal skin) or papyrus which has decomposed in situ; 3) the sample is a combination of the aforementioned two possibilities; 4) the sample is waste from the production of papyri recycled as a sealant; 5) the sample is a sealant consisting mostly of animal dung; 6) the sample is a sealant consisting mostly of animal dung containing other matter; 7) the sample is a sealant consisting mostly of beeswax; and 8) the sample reflects little more than post-excavation contaminants.

The results indicated a heterogeneous organic component, showing derivation in part from soil material and in part from non-soil organic compounds. Several compounds were identified that are generic to modern plant or animal biomass. The chromatogram was then searched for the mass spectra of known idiosyncratic compounds taken from a library of identified samples from archaeological contexts, as well as modern reference standards. This makes it possible to identify any stable, distinctive, and characteristic compounds (termed

“biomarkers”) which may be present and give greater specificity as to the identity of the material being analysed.

The absence of characteristic compounds led us to exclude the presence of the following types of material: dung, jute, sisal, abaca fibres, vellum, parchment, and beeswax. However, a combination of components associated with plant epicuticular was detected. The presence of very long chain alkanes and fatty acids as well as degraded plant sterols was helpful for identifying the residues. The presence of such idiosyncratic compounds in the sample indicates that the unknown material from the jar lid is derived from a member of the sedge (Cyperaceae) family, such as the papyrus sedge (*Cyperus papyrus*), nutsedge / nutgrass sedge (*Cyperus rotundus*) or chufa sedge (*Cyperus esculentus*). Non-significant quantities of modern phthalate plasticizers were also detected, demonstrating recent contamination of the sample.

Therefore, of the eight hypotheses we tested, the sample seems most likely to be the remains of degraded papyrus. This would correlate with what we know to have been deposited in some Qumran caves, in which were found remains of papyrus scrolls (e.g., Caves 6Q, 7Q, and 9Q), or else it may correspond to recycled papyrus scroll material used as a sealant. The latter practice has been documented in Egypt, where a small papyrus roll was placed in a cooking pot, which was then covered over by a sheet of papyrus, sealed with plaster, and buried in a tomb. It is also assumed, that papyrus, together with other materials, such as vine leaves, twigs, or wattle, was used as a protective cover for wine jars, its purpose being to avoid contamination by the sealing compound. This does not seem to have been the common method of sealing Qumran-type cylindrical jars, however, for which earthen stoppers and possibly linen were used as sealants. Critically, plants of the sedge family are not indigenous to the area of the Dead Sea. *Cyperus papyrus*, in particular, was grown widely in the Nile Valley and other proximate areas where there were freshwater swamp lands, and exported as papyrus paper. This means that the availability of waste papyrus material around the Dead Sea would have

been extremely limited. Accordingly, this gives us reason to conclude that the residue in the sample most probably comes from one or more degraded papyrus scrolls.

What is the significance of these findings? On the one hand, the results continue to consolidate the assumed link between scrolls and cylindrical jars—when these are found in caves. On the other hand, our conclusions serve as a pointed reminder to exercise caution in formulating certain historical reconstructions based on the extant Dead Sea Scrolls. Let me unpack these statements in turn.

It is often taken as a given that the Qumran scrolls were placed in cylindrical jars when they were deposited in the caves. Archaeologically, the strongest evidence comes from Cave 1Q, in which was found a scroll fragment wrapped in linen still adhering to the neck of a broken jar. This corroborates the Bedouin accounts, which place the discovery of at least some scrolls inside one of the many jars there. Most of the other caves with scrolls (i.e., Caves 2Q, 3Q, 4Qa, 4Qb, 6Q, 7Q, 8Q, and 11Q) likewise yielded cylindrical jars and their accompanying bowl-lids, but their contextual relationship to the scrolls is unproven. In some cases (e.g., Cave 3Q), the number of excavated jars is too large relative to the number of scrolls, although various post-depositional factors could account for the discrepancy. In others (e.g., Cave 4Q), there were many scrolls but only a few jars. Some artificial caves (e.g., Caves 5Q and 9Q) did not yield any jars whatsoever. Then there are numerous caves, all of them natural, which contained cylindrical jars but no scrolls. To what extent can the association between scrolls and jars established for Cave 1Q be extended to these other caves? Were all the scrolls originally placed in cylindrical jars? Did all cylindrical jars in the caves contain scrolls, including those found in caves which yielded no scroll fragments? Or did some of the jars contain food and liquids? Therefore, did people bring jars full of scrolls to the caves, did they reuse jars already there to hide scrolls, or did they just leave the scrolls on the ground? Though the answers to these questions may seem obvious to many, we would do well to remember that the premise of the

so-called “scroll jar” relies, in large part, on an argument, however reasonable or educated it may be. It is therefore always welcome to have further evidence with which to buttress this argument. We think that the results we present today make a contribution in this regard. Here, we have a jar, from an unknown cave, but likely from the general area of Qumran, which appears to have contained one or more papyrus scrolls. The results of the analysis, therefore, continue to underline the connection between cylindrical jars and scrolls.

This, in turn, raises another critical, but related, point. Some scholars have long suspected that many other Qumran caves contained scrolls—that the caves with empty cylindrical jars were once scroll caves too. In addition to various written testimonies attesting to the discovery of scrolls within jars in caves near Jericho—probably a veiled allusion to Qumran—it makes little sense that the Qumranites would have stored their foods and liquids in cylindrical jars placed in relatively distant and inaccessible caves, when they could have stored the jars either within their built settlement or in the surrounding artificial caves. Here, it bears emphasizing that, as many scholars (myself included) have argued, none of the natural caves could have been used for long-term habitation. This makes it highly probable that the jars stored something other than food and liquids, and scrolls are the only objects for which we have evidence, however limited, of their storage inside the jars. Our results provide further support to this hypothesis.

If we accept the premise that most, if not all, cylindrical jars in the Qumran caves once held scrolls, we would have to address the implications. Among other things, this would mean that our knowledge of the Qumran collection is far more limited than we previously thought, and what we have is a highly incomplete and haphazard dataset. This urges extreme caution in regard to formulating hypotheses which seek to elucidate cave profiles or underline the significance or purpose of a particular cave deposit, to mention two common lines of inquiry. Of course, these precautions have been voiced before and they do not stem directly from our



results, but this study offers evidence which continues to affirm the validity of these concerns. For this same reason, we should not try and attribute Allegro's jar and lid to a Qumran cave known already to have contained papyrus scrolls (e.g., Caves 6Q, 7Q, or 9Q), for this assumes (wrongly) that we can define precisely the nature of the Qumran collection.

We have now submitted the sample to a final stage of analysis, which aims to use additional and more specific standards. The main conclusion will not change, but we may be able to detect something more specific and clear up outstanding questions. In the meantime, we hope to have underscored the significance of these types of analyses and the importance of careful excavation, documentation, and well-thought-out sampling strategies. This is all the more pertinent in view of the renewed investigations in some Judaeen Desert caves.