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RESIDUE OR RESIDON'T?

The Value of Archaeological Micro-debris in Unraveling Dhiban's Imperial Past

By Nicholas P. Ames

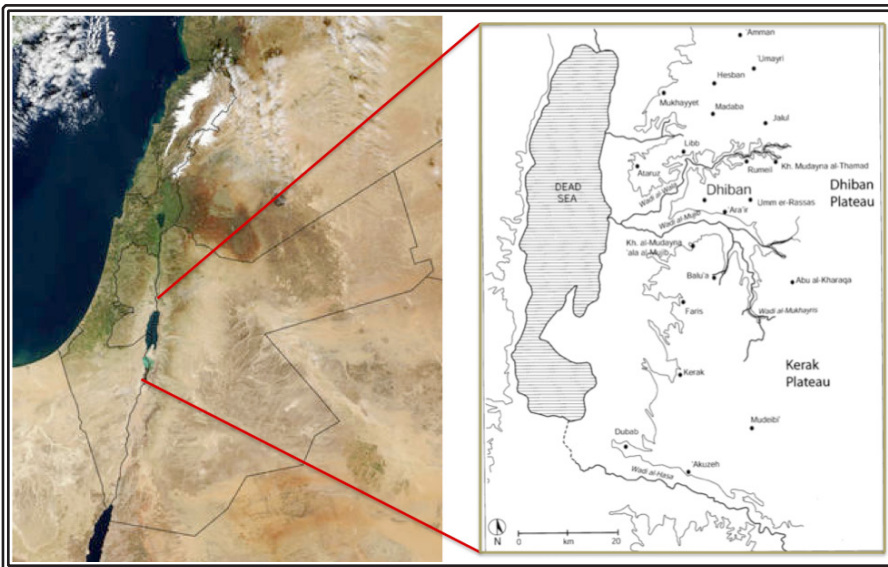
Waking up at 4:00 a.m. is difficult no matter where you are in the world. But somehow, waking up in Jordan for the first time made it just a little bit easier. Breakfast at 4:30 a.m. and troweling by 6:00 a.m.; it is a schedule regimented by the environmental and social concerns of laboring outdoors in a culturally foreign country—which is exactly what field archaeology is. This disciplined work is a small (though admittedly probably the most enjoyable) part of a larger research project in which I will be reassessing the value of current methodological practices within the archaeological interpretive process.

This reassessment will be grounded in data I collected this summer while excavating with the Dhiban Excavation and Development Project in Dhiban, Jordan to compare the use of two collected artifact types: standard heavy fraction and micro-debris, the details of which I will be addressing later in this paper. The scope of the questions that I seek to address includes: what possible interpretations are lost without the use of micro-debris analysis? How biased are interpretations derived from data sets consisting of larger sieve fraction sizes? Does the knowledge gained from the use of these specialized techniques offset the cost of micro-analytical practices? My work will compare the two types of data sets and the possible disparity between interpretive techniques.

For the purpose of this paper I will be focusing on the first of my proposed questions: What possible interpretations are lost without the use of micro-debris analysis? To explore this question, I will be a) analyzing the stratigraphic complexity of Dhiban's archaeological record, b) appraising the value of microdebris in response to secondary depositional processes, and c) looking at the common household as a sensitive indicator to political, cultural, and economic change within society.

To start, one might ask: what was I doing in Jordan? And what in the world is microdebris? The archaeological site of Dhiban is located in the central part of western Jordan. The site is perhaps best known for being the capital city of the Iron Age polity known as Moab headed by a “king” Mesha. It is also known for its brief mention in the Hebrew Bible where, in 2nd Kings, Mesha’s revolt against the Israelites is narrated.¹ Archaeologically, the site is known for bearing the Mesha Stele, which is a long inscription carved in polished Basalt that was rediscovered at Dhiban in 1868 CE, declaring victory in the battle against the Israelites and proves to be one of the few non-biblical referents to a biblical event.²

MAP I
THE SITE OF DHIBAN IN THE
HASHEMITE KINGDOM OF JORDAN³



1 2nd Kings 3:3-26, New International Version.

2 Gary Rendsburg, “A Reconstruction of Moabite-Israelite History,” *Journal of the Ancient Near Eastern Society* 13 (1981): 67-73.

3 Benjamin Porter, et. al. “Tall Dhiban 2004 Pilot Season: Prospection, Preservation, and Planning,” *Annual of the Department of Antiquities of Jordan* 49 (2005): 201-216.

The site, as with most of the Levantine region, encompasses an extremely long period of repeated habitation, occupied intermittently for almost 5,000 years by both local and foreign political entities beginning during the Bronze Age (around 3,000 BCE) and continuing into the present.⁴ The Roman and Byzantine eras of the second through seventh centuries (which are the periods on which my project will focus) contribute an especially complex representation of social impact on local communities – a conclusion that is based on the apparent lack of domestic surfaces attributed to this period.⁵

In the historical Middle East region, much of the archaeological research has focused, up to this point, on displays of monumental architecture, such as palaces and temples, and the glamorous lives of the powerful elite.⁶ It is only in recent years that we have begun to systematically explore what are often considered the mundane practices of everyday life, as they have been recorded in the archaeological record. The resurgence of humanist appeal in the 1970s prompted the development of specialized research such as household archaeology,⁷ which recognizes the valuable patterning housed in domestic spaces of the everyday and, subsequently, its reflection on people's daily lives. The significance of these studies influenced my project's goal of taking this "people's" approach one-step further. By providing an even higher resolution insight into daily life and site activity use within these spaces, my hope is to provide an even "closer" emic view into the lives of the people who made, and continue to make, Jordan what it is today.

Returning to the second question, one might ask: what is microdebris? Microdebris is a component of the "heavy fraction" of materials collected from an archaeological locus, which is itself sampled and processed through flotation.

Flotation is a useful technique that uses water to collect organic and inorganic remains, with organic remains generally floating to the top of the water and material with a specific density greater than water sinking to the bottom. The sunken items are therefore considered the

4 Benjamin Porter, Bruce Routledge, Danielle Steen, and Firas al-Kawamlha. "The power of place: The Dhiban community through the ages." in *Crossing Jordan: North American Contributions to the Archaeology of Jordan*, eds. T. Levy, P. M. Daviau, R. Younker and M. Shaer, 215-322. London: Equinox, 2007.

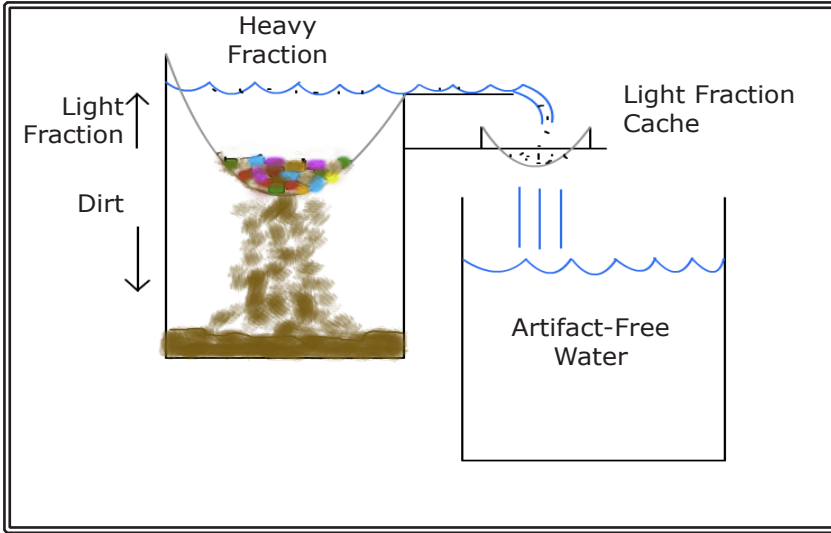
5 Ibid.

6 Sharon Steadman, "Recent Research in the Archaeology of Architecture: Beyond the Foundations," *Journal of Archaeological Research* 4(1) (1996): 51-93.

7 Bender, 1967; Bourdieu, 1970; Hammel and Laslett, 1974; Schiffer, 1975; etc.

FIGURE I

SKETCH OF THE TYPE FLOTATION
MACHINE USED AT DHIBAN



“heavy” fraction and include many different items such as ceramics, glass, and metal artifacts. Standard process for analyzing heavy fraction puts the material through a series of standard US geologic sieves and then identifies debris down to approximately 4 mm in size, keeping (but not analyzing) any smaller residue.⁸ The microdebris, then, is the material less than 4 mm in size that is not included in the standard practice of heavy fraction analysis.

Post-flotation, the debris follows the same analytical path as the rest of the heavy fraction items, except the process occurs at a much smaller scale and much slower pace. First the raw data is sorted, which involves using a microscope to separate out the artifacts (ceramic, glass, metal, bone, clay, etc.) from non-artifacts (rocks and other clay). The items are then catalogued and placed into a spreadsheet. After enough samples have been sorted, the collection of data is inputted into a statistical program.

8 Steven R. James “Methodological Issues Concerning Screen Size Recovery Rates and Their Effects on Archaeofaunal Interpretations,” *Journal of Archaeological Science* 24 (1997): 385–397. Commented on by Brian S. Shaffer and Barry W. Baker, “Comments on James’ Methodological Issues Concerning Analysis of Archaeofaunal Recovery and Screen Size Correction Factors,” *Journal of Archaeological Science* 26 (1999): 1181–1182.

Here we compare different samples and make inferences about greater social and economic patterning, as well as the use of space in Dhiban across time. The point of using microdebris in conjunction with heavy fraction as an analytical tool is that “microartifacts are not simply smaller versions of the larger artifact,” but “contain different information about the archaeological record than do macroartifacts.”⁹

MAP II
 SITE GIS MAP SHOWING
 BP48 (DOMESTIC CONTEXT) AND
 BS44 (“STORAGE ROOM”) AT DHIBAN¹⁰



Then why don't people always include microdebris in their analysis? There is a popular misconception by many archaeologists that the cost and time required for this research exceeds the worth of the information gained.¹¹ My greater thesis will work to dispel these notions and gauge the real cost-benefit of this analytical technique.

9 Robert Dunnell and Julie Stein, “Theoretical Issues in the Interpretation of Microartifacts,” *Geoarchaeology: An International Journal* 4(1) (1989): 31-42.

10 Image courtesy of Andrew Wilson and Alan Farahani, 2012.

11 Isaac Ullah, “The State of Microarchaeology Today: With Special Implications for Household Archaeology and Intra-Site Spatial Analysis,” University of Toronto, Public Access (2005).

During this past spring I conducted a pilot study for my project using the methods outlined and materials collected from past excavations of the site. In this study, I found that there were discrepancies between the types and amounts of artifacts present in a sample viewed between the two sizes of artifact classification. Breaking down the count of materials found in the samples (divided by size), the pilot study explored samples from two different site squares – BP48, a domestic context, and BS44, possibly a storage room.

In the domestic space, we found very few larger artifacts, with most of the items from the standard heavy fraction occurring between 4 mm and 8 mm in size. In the storage room, we found no items greater than 4 mm in size.

Turning to the microdebris from those two same squares, a different story emerges. In the domestic space, the presence of 1 marine shell fragment greater than 4 mm in size is met with an abundance of shells that appear in every subsample from the square's microdebris. Similarly, the absence of marine shells and other items from the storeroom's heavy fraction sample is called into question when a close examination of the micro-spread reveals the overwhelming presence of both marine shells and other important items.

This demonstration underscores the benefit of using this minute material. If one relied solely on the macro-material from these two spaces to determine spatial activities within the site, it would lead to a much different interpretation of area use. The entirety of the data—especially the presence on microdebris—drastically changes the interpretation. This change in interpretation becomes especially evident in the materials that are less than 1 mm in size, as an assessment of the debris reveals an abundance of marine shell and other similar aquatic resources such as fish and crab remains. Including these items into one's analysis of site area use not only changes the interpretation, but also provides a much higher resolution investigation of the types of activities occurring at the site.¹² This discrepancy, however, goes both ways. The near absence of other eco- and artifact types, such as ceramics, in the minute portions of the samples reminds us that the use of microdebris as an analytical tool must be done in conjunction with the standard practice of heavy fraction analysis, not as a substitution.

Aside from revealing what material items are present at the site, how else is this newfound data useful? For the purpose of this paper, I am

12 Dunnell and Stein, "Theoretical Issues in the Interpretation of Microartifacts," 1989.

going to be using Michael Schiffer's concept of Behavioral Chain Analysis to situate my research question and materials in the broader context of activities that may or must have occurred at the site.

Schiffer defines a behavioral chain as "the sequence of all activities in which an element participates during its 'life' within a cultural system," beginning with the smallest identified segment, or single activity.¹³ The point of using this progressive analysis is that one can begin to paint a "human" face onto raw datasets, formulating ideas as to what is required of the immediate and greater social systems for these smaller personalized social segments to even begin to exist. Schiffer writes, "an important property of behavioral chains lies in their ability to facilitate the prediction of activities that, although not directly indicated, must have occurred at the site."¹⁴ His rationalization lies in the principle that "when two non-sequential activities in the behavioral chain of an element occur at a site, then the activities that took place between them on the chain also occurred at the site."¹⁵

An example of this principle is found in square BS44, again the barrel-vaulted room commonly used for storage in classical Jordanian and Near Eastern societies, where we found the traces of shell, crab, and fish. Let us say that, hypothetically, elsewhere on the site we find coprolites of the same time period as the storage room, with isotopic traces that reveal the consumption of resources such as shellfish, crab, and fish. Through Schiffer's behavioral chain, the activities required to get you from A (the storeroom) to B (defecation of the resources) must also have taken place at the site (activities such as processing and cooking these stored resources).

Applying this chain to my pilot study, the power behind the presence of undervalued artifacts becomes apparent.

Returning to the context of the storeroom, long-term storage of these marine resources (namely crabs and shellfish) would not have required much more than their natural state of being, although keeping either species submerged in water would have been essential if any long-term storage were to take place. For short-term storage the presence of these materials would have necessitated the occurrence of certain activities,

13 Michael Schiffer, "Behavioral Chain Analysis: Activities, Organization, and the Use of Space" *Fieldiana. Anthropology* 65, Chapters in the Prehistory of Eastern Arizona, IV (1975): 103-119.

14 Schiffer, "Behavioral Chain Analysis: Activities, Organization, and the Use of Space," 112.

15 *Ibid.*, 113.

beginning with acts of simple processing. Perishable crab and shellfish would have required heat to be cooked, which in turn would have required a fuel source and safe location for cooking. Different tools, likely sharp as well as blunt instruments, would have been necessary for the opening and extraction of the flesh of each marine resource.

FIGURE II

BS44 COMPRISES THE NORTH-EAST PORTION THIS
“BARREL VAULTED” ROOM (PHOTO FACING EAST)



Moving outward, we can begin to use these activities to infer a larger social composition of the site. The choice of processing one’s foodstuffs at the location of storage, rather than being removed and processed elsewhere, labels it as an act of intimate familiarity, with the storage facility likely being used by a wider family unit or a segment of the local population. The types of items being stored provide a solid social narrative regarding those individuals who had access to this storeroom. Crabs and fish are readily

available in the local landscapes, with modern freshwater crab populations existing less than 10 km from the site. The ancient environment, which may have been more “wet” than today’s,¹⁶ likely had ancient crabs living directly adjacent to Dhiban’s own Wadi, or canyon. The marine shellfish, although imported, are easily transportable and plentiful due to their size. Thus, although a luxury item, marine shellfish were probably not a prestige good that would have marked consumers as members of an elite class. This type of area specific data allows us to situate the analysis of the space itself within the broader community. By expanding the sample to include many similar types of lived spaces and by looking at the similarities of activities that are occurring within the rooms we can identify trends of spatial use by common activities and create a “typology of rooms” based on where we expect what types of activities to take place.¹⁷ Using room typology along with the types of materials present within the space, we can trace the socio-political distribution of Dhiban’s past and begin to speculate about power relations and dynamics of social access in the Classical world. However, considering I have yet to analyze the rest of the data, I will leave those speculations for another time.

Retreating even further back into our behavioral chain, we can place the presence of these minute fragments in the geographic and political-economic context of the ancient Near East. For instance, one question that comes to mind is how is it possible to find marine shells in a desert?

Dhiban is located directly on top of the King’s Highway, one of the main North-South trade routes that ran from Aqaba to Damascus, present as early as the Middle to Late Bronze Age (around 1700 BCE).¹⁸ Because of this routine accessibility and the persistent Transjordanian structural fluidity, at least a portion of the trade that was occurring at Dhiban would have been with caravanning groups traveling along this

16 Yizhar Hirschfeld, “A Climatic Change in the Early Byzantine Period? Some Archaeological Evidence,” *Palestine Exploration Quarterly* 136(2) (2004): 133–149.

17 Schiffer, “Behavioral Chain Analysis: Activities, Organization, and the Use of Space,” 1975.

18 Crystal M. Bennett, “Excavations at Buseirah, Southern Jordan, 1971: A Preliminary Report,” *Levant* 5 (1973): 1–11. And Stefan J. Wimmer, “A New Stela of Rammesses II in Jordan in the Context of Egyptian Royal Stelae in the Levant,” *Third International Congress on the Archaeology of the Ancient Near East* (3ICAANE), Paris, 18 April 2002.

major route.¹⁹ Thus, following this singular behavioral chain, the simplest answer is that finding marine shell in the storeroom is likely a reflection of this commerce, as the shells themselves are a product of the distant Red Sea. Other factors, such as the general arid environment and social and political turmoil resulting from political centralization and economic and social differentiation (of which trade would be an important component) occurring throughout the Iron Age Southern Levant would again point to movement away from purely local economic dependence, and toward the creation of new resource economies during this time (of which the Red Sea would be part).²⁰ Though small trade did occur around the Dead Sea in the form of bitumen, salt, dry desert fruits such as *apharsimon* and dates, as well as freshwater resources collected from tributaries feeding into the sea,²¹ harvesting from its waters would have proved to be more of a hindrance than benefit in the case of economics.²² This is due to the size of the sea (in terms of the landscape's impact on social and economic development) and deadly content of the water (with an average salinity of 31.50%). There is also solid evidence of other trade items coming from the Red Sea during this time. In the heavy fraction materials from elsewhere on the site we recently discovered several pharyngeal grinding mills of the parrotfish family Scaridae, found most common at that time in the Indo-Pacific (which includes the Red Sea), but not the nearby Mediterranean.²³ Thus, using one type of artifact found in context at Dhiban, we are able to trace the local actions, social makeup, and regional economy of Jordan's past. We must keep in mind, though, that this is a singular interpretation based on the pilot materials present. Following a behavioral chain does not provide the one-and-only interpretation of site area use, but rather

19 Piotr Bienkowski and Eveline van der Steen, "Tribes, Trade, and Towns: a New Framework for the Late Iron Age in Southern Jordan and the Negev," *Bulletin of the American Schools of Oriental Research* 323 (2001): 21-47.

20 Alexander H. Joffe, "The Rise of Secondary States in the Iron Age Levant," *Journal of the Economic and Social History of the Orient* 45(4) Excavating the Relations between Archaeology and History in the Study of Pre-Modern Asia [Part 1] (2002): 425-467.

21 Ishaq Beit-Arieh, "The Dead Sea region: An archaeological perspective," in *The Dead Sea: The Lake and Its Setting*, ed. Tina M. Niemi, Zvi Ben-Avraham, Joel R. Gat, 249-251, New York: Oxford University Press, 1997.

22 Yaacov K. Bendor, "Some geochemical aspects of the Dead Sea and the question of its age," *Geochimica et Cosmochimica Acta* 25 (1961): 239-260.

23 Andrew Carr, et. al. "Inferring Parrotfish (Teleostei: Scaridae) Pharyngeal Function From Dental Morphology, Wear, and Microstructure," *Journal of Morphology* 267 (2006): 1147-1156.

demonstrates the link between action and object and the implications regarding greater social structure.

All this from items smaller than peas. Though I may be condemning myself to a year, and perhaps a lifetime, hunched over a microscope counting rocks, the power of the presence of these neglected fragments in the archaeological record provide a much clearer key into the lives of the everyday. Without this micro-material, and the time taken to unravel its clues, a huge piece of the puzzle of domesticity will continue to be lost. Through my research I hope to convince the archaeological world of the value of this analytical method and what it has to offer. To the rest of the world I float the idea that, if this is what we can accomplish, waking up at 4:00 a.m. may not be so bad after all.

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