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The Scene of Disciplined Seeing

Shanti Morell-Hart from McMaster University writes the third entry in the series dedicated to The Senses and Aesthetics of Archaeological Science. Responses follow from co-editors of the issue, Andrew Roddick and Colleen Morgan.

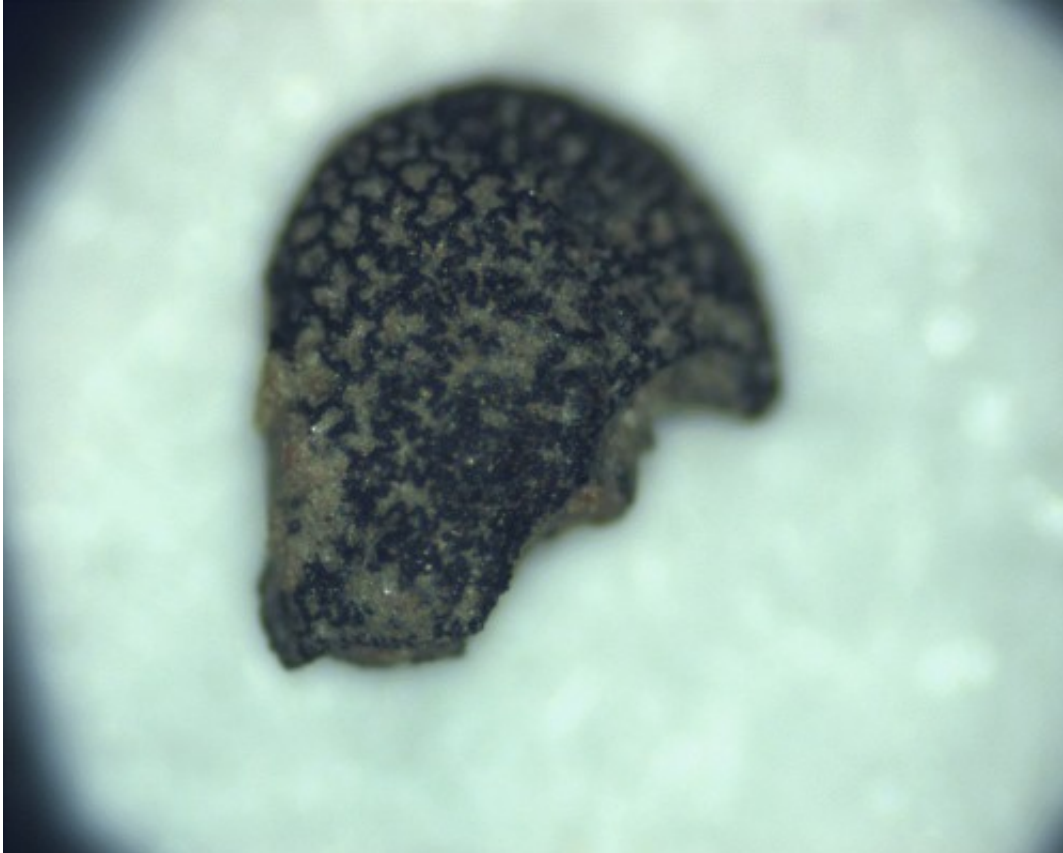
The Scene of Disciplined Seeing

Shanti Morell-Hart

“What is the most AMAZING thing you’ve ever found?” This is the question dogging archaeologists, right now, this very second, while we sit on planes, wait in doctors’ offices, and visit school classrooms. There are two common types of answers: the sensational kind, and the kind with intellectual merit. If you’re lucky, these overlap in a perfect Venn region, maybe something like an ancient golden statue depicting rare sexual acts in Pharaonic Egypt (that also happens to transform the way we understand ancient Egyptian sexuality and expands the known range of gender performatives).

I used to go for intellectual merit right off the bat. I’d start: “One time, I found this **really old *Nicotiana seed***—that’s tobacco, maybe *tabacum* or *rustica*—it was a lot stronger back then, not like the stuff now that people smoke for fun. Anyway, it was in this flotation sample I was sorting through—really beautiful reticulated surface, there’s no mistaking it...” I’d trail off, lamely. I would see vague disappointment shifting into obvious disappointment. The Latin binomials were alienating; also, smoking kills. I’d clear my throat and give it another try: “Uh, so there was also this time where I was excavating a tomb with a team in Peru and we found a sacrificed baby llama that still had a leash around its neck...”

Somehow it's easier to explain life-sized things than microscopic things, to talk from a shared mind's eye. It's easier to evoke a scalar perspective-in-common, where you're staring at something the listener can (virtually) point at and poke at along with you. It's also easier to generate interest in the kind of findings that would hit tabloids if they took place in the contemporary world.

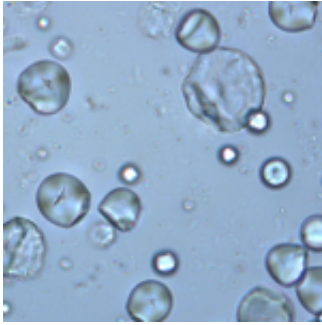


The intrinsically exciting *Nicotiana* (tobacco): an archaeological seed. (Photo by the author.)

For paleoethnobotanists, it can be hard to express the excitement of the find. What gets us into it? In my case, I was interested in food, I wanted to be able to analyze food residues myself, and I didn't want to deal with roadkill for my reference collections (so sorry, zooarchaeologists). This meant learning the trade of paleoethnobotany, with long hours at the microscope and a rich payoff in plants.

Plant payoffs, moving from the microbotanical to the practical:

The work of paleoethnobotany takes place at many scales: the monumental (wooden Viking longboats), the macro (woven yucca sandals), the micro (grass starches on Neanderthal teeth), and the chemical (theobromine signatures of chocolate). For those of us lodged at the microscopic level— a realm of seeds, phytoliths, pollen, and starch grains— the practice of



Modern manioc (*Manihot esculenta*) starch grains
(Photo by author)



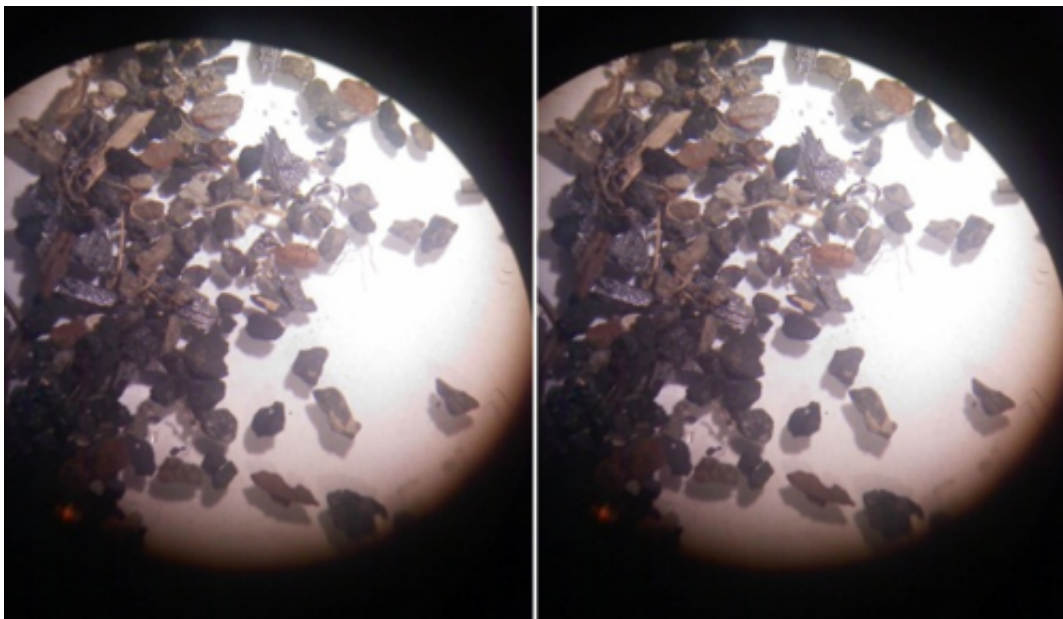
Posited use of an obsidian prismatic blade to trim away epidermis from the tuberous root of manioc. (illustration by Sarah Davidson)



Cutaway view of manioc collection from a cultivated field. (Illustration by Sarah Davidson)

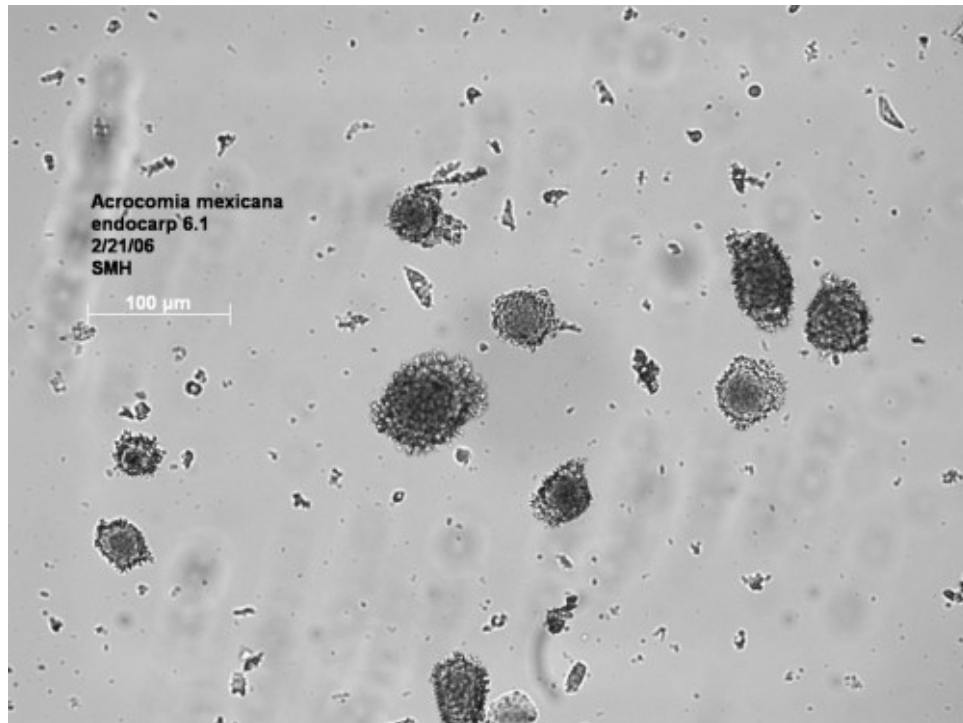
archaeology holds a special set of practices and problems. We experience back pain, eye strain, headaches, tendonitis, and even ganglion cysts. Health issues related to the ergonomics of microscope use can be found in a variety of places) but the neurological effects are less well documented. I suspect a wide range from mild discomfort to madness.

But the visceral experience of microscopic practice is not all discomfort and tedium. We are also drawn into exotic and mysterious worlds. The first time I peeked into a microscope while sorting flotation residue, I felt like Jacques Cousteau. My god, the things in dirt. We take germs on faith and most of us have seen earthworms up close. We know—or are pretty sure we know—those things are in there. But there is so much more to see. Never mind the chemistry of it all, which is way outside my pay range.

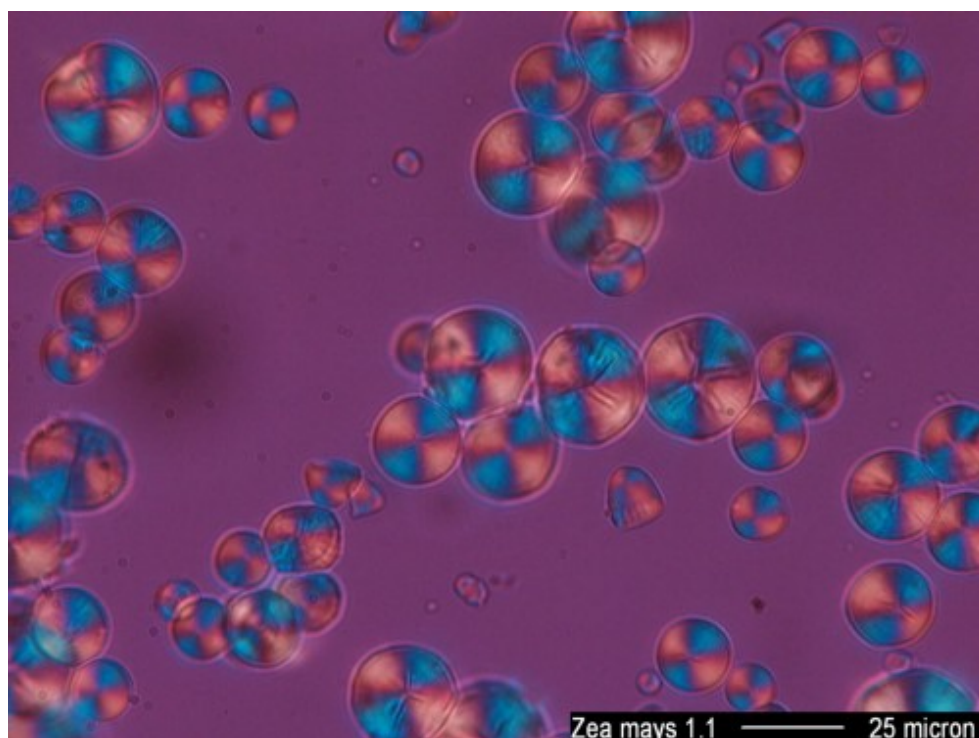


Charred wood, seeds, insect legs, modern rootlets, egg casings, and god knows what else, in a macrobotanical flotation sample.

If looking at flotation samples is like scuba diving, studying microbotanical remains is like flying through another galaxy. Extracted sediment and artifact residues, suspended in liquid and mounted on slides, present strange psychedelia. *Acrocomia mexicana* endocarp phytoliths appear as planets; *Zea mays* starch grains as 1960s beanbag chairs.



Rorschach test #1: Coyol palm (*Acrocomia mexicana*) phytoliths, viewed at 100x. (Photo by the author)



Rorschach test #2: maize (*Zea mays*) starch grains viewed at 400x with polarized light. (Photo by the author.)

Visually, you feel suspended alongside the residues. Your eyesight becomes disarticulated from the regular workings of your body. An awkward shift in physicality takes place. Your normal manual dexterity is fitted with giant clown hands to manipulate objects smaller than you can see with the naked eye. Trying to get silicified plant cells to roll over, to view their 3-D morphology, involves some measure of agility and some measure of luck. Gently depressing the slide with a blunted probe will sometimes get phytoliths to rotate, but not always. Yelling at the slide is futile. The last thing you need is to turn the microremains against you.

While at the microscope, the miniscule becomes “life-sized,” and you experience a set of layered realnesses. You sense an envelope of lab smells (dust, mysterious liquids evaporating from jars, someone’s leftover pasta cooking in the microwave), gossip (who shortchanged who last beer night), podcasts and music (strains of Finntroll coming from the speakers), temperature (always overly warm). But your eyes are in another place here and not-here; or two half-real places. It’s almost like playing a videogame. Although the meatspace houses the bodily you, sitting at a microscope, your findings are actually taking place in an entirely different location: microscospace.

The “scene of disciplined seeing” (to borrow a phrase from Dennis (1989:342) is part embodied discipline, with all the necessities of proper posture and focus. It is also part disciplinary perspective, with all its rules, affordances, expectations, and perspectives. Early use of the microscope by the 17th century British Royal Society was a unifying endeavor. If we are to believe Robert Hooke, it was a way of “exceeding the Ancients” through scientific labor. At that time, according to Michael Dennis, “instruments imparted a distinct sense of the past and the future, uniting men holding otherwise diverse philosophical positions” (1989:310). Modern archaeologists, however, take to this same instrument intending to connect the past with the present, and our pursuits can divide people holding otherwise similar philosophical positions. (One example: the current philosophical centrifugation of STEM disciplines [including archaeological science] across political divides, yet persistent denial of evidence of anthropogenic climate disruption recovered by these same disciplines.)

What is the role of disciplined seeing outside of archaeological science? Early appetites for micrographic images—Hooke’s 1665 volume *Microphagia* was a certified bestseller—are not what they once were. The fruits of disciplined seeing are no longer exclusively harvested through the magnanimity of the Royal Society. Basic instrumentation has become affordable. Gentlemen scholars under moneyed noble patrons are no longer the sole gatekeepers of every microscopic finding. The ready availability of scientific instrumentation has helped to democratize scientific practice, and microscopic images can even be captured and posted using smartphones.

These are all welcome changes. But the “watering down” of academic imagery has made it harder to evoke the excitement of archaeological science through the simple presentation of pictures. *Representation*, through interpretation, helps to elicit such excitement. This is not a simple process. Representation is subject to other rules and expectations, including those of anthropology and the public. Ultimately, our seeing is disciplined by visual, experiential, academic, and political fields, and our findings are only as relevant as our audiences allow them to be.

So how can we recapture that magical Venn region where the sensational and the academic merge? Maybe the answer is “blog posts.”

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Disciplinary Vision, Disciplined Seeing, and New Technologies of Enchantment

Andrew Roddick

Shanti Morell-Hart's contribution to "Then Dig" highlights the sense of excitement that can come from our engagement with instruments, ways of seeing that can catch not only our colleagues' attention, but generated interest from students and the greater public. Morell-Hart shows that these technologies of enchantment (*sensu* Gell 1992) are modes of disciplinary and disciplined seeing, relying on particular mediated and trained ways to engage with our materials. She brings us into her piece through the familiar anecdote of the typical conversations we encounter as archaeologists on planes and other public places. I imagine, however, many archaeologists have discussed with their undergraduates how our disciplinary way of seeing can bring into focus a range of multi-scalar phenomena, perhaps the multi-temporality of agricultural landscapes, the systems of garbage disposal within large cities, or the re-daubing of buildings in religious centers. A few of those interested students will follow us to the laboratory, to develop their disciplinary seeing into a form of "disciplined seeing", whether within Morell-Hart's paleoethnobotany lab to identify phytoliths, or perhaps a lithics lab to record bulbs of percussion on pieces of obsidian.

As Morell-Hart demonstrates, technical ways of seeing always introduce issues of representations and translation. I remember several years ago at the Institute of Andean Studies Annual Meetings in Berkeley, the Andeanist Dr. Gary Urton was giving a public talk on the khipu, the knotted string technology used by the Inka. Despite detailed slides and well-explained graphs, a member of the public could not quite follow the way that Urton was seeing these knots. What followed was a difficult interchange between the two. The difficulty came down to the kinds of disciplined seeing that Dr. Urton has spent a career developing from a wide variety of disciplines. In other words, despite his careful lecture, there still remained some presupposition that the audience and the presenter shared a particular way of seeing.

I like Morell-Hart's use of the concept of "disciplined seeing", and appreciate her highlighting of Dennis' interesting article. Dennis clearly shows that for Hooke, the microscope could reveal the power of human art, but it also brought into harsh contrast the difference between products of culture and products of nature. Unlike an archaeologist, Hooke had little time for artifacts: "There are but few Artificial things that are worth

observing with a Microscope For the productions of art are such rude and mis-shapen things, that when view'd with a Microscope, there is little else observable, but their deformity And the most smooth and burnished surfaces appear most rough and unpolisht. (Hooke [1665] 1961: 8; quoted from Dennis 1989: 335). In stark contrast were the divine details seen in natural objects. The argument was that the scientist was a “transparent observer” – here there was no interpretation at the ocular lens. Rather nature revealed the purity of god (I suspect Hooke might spend some time with Morell-Hart’s statement “My god, the things in dirt!”). But it did require a sort of “disciplined seeing”, a standardization of perceptions gained through reason disciplining the experience won through the senses.

As Morell-Hart demonstrates, this notion of disciplined seeing might benefit from further reflection in archaeological science, a set of conversations around not just the microscope, but a range of instrumentations and their mediations within archaeological practice. In taking up Morell-Hart’s provocative riff on Hooke, I’m just as interested in where the scene of disciplined seeing are emerging in new forms of technical archaeological practice. She points to the relatively low tech of smart-phones, and how this democratization might also include the “watering down” of academic imagery (although if the petrography community on social media and Flickr is any indication, I think I’ve seen the opposite!). So let me briefly go to the other end of the spectrum to the high-tech, where the cost and learning curve results in some inevitable gatekeeping, but where we see the emergence of new kinds of “disciplined seeing”.



Working towards a disciplined form of seeing a CT-scan of a ceramic vessel at Sustainable Archaeology at the University of Western Ontario

For the past few months I have been visiting Sustainable Archaeology at the University of Western Ontario for a pilot study of CT-scanning ethnographic and archaeological pottery. There are, in some ways, rather crude objects, things that surely Hooke would disparage. But flying through artifacts at the tiniest of scales is an amazing thing, and this truly is an area where the sensational and the academic merge. For instance, I challenge you not to be amazed at the CT scan of this charred piece of a deciduous hardwood. Or better yet, of a 16th-century Northern European wooden prayer bead, with an interior showing the Last Judgment. Surely even Hooke, who suggested cultural materials had no mysteries within them, would be impressed! But while we can enjoy the voyage through other artifacts, my work requires more than passive enjoyment, and the difficulties of developing a disciplined form of seeing is quite clear with this technology.

I am interested in using micro-CT scanning as a way to probe the traces of skill involved in the production of archaeological ceramics, and we are struggling to figure out a way to compare large datasets. While my interests lie in the images and the interpretations, those working so hard to develop a systematic approach of this amazing technology to archaeological materials (Greene and Hartley 2007; Jansen et al. 2001; Kahl and Ramminger 2012; Sanger et al. 2013) impress me. What standardized protocols can be developed? How must we standardize the software but also our perceptions to create working typologies? What kinds of analytical filters and image analysis program are required to highlight not just Hooke's divine natural world, but also the complexities of the cultural? Like Morell-Hart, I still need my plane conversation for the greater public (I always go back to either the 2,500 year old red painted skull we found in 2001, or the perfectly preserved 1,500 year old potato), but this emergence of a new way of seeing is also part of the excitement of archaeological science. It is here that we can see the "rules, affordances, expectations, and perspectives" develop, and reflect on our connections and divergences in scientific practice since Robert Hooke's days. Like the camera or microscope, these are technologies of enchantment that can have powerful effects on our imaginations.

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Disciplined Visualization

Colleen Morgan

Last week during one of our Heritage & Play sessions—a series of workshops at the University of York loosely structured around a topic, theory, or making session using play as a productive means to engage with heritage—we tried out an Oculus Rift. After previously trying out Google Glass and Google Cardboard, most of us preferred mixed reality, not a fully (or at least visually) immersive experience. As Morell-Hart describes her immersion in the microscopic world, we were similarly between worlds— while surrounded by a virtual Tuscan villa, we would still be talking to other Heritage & Play participants, still partly present in the classroom.

I've found the concept of telepresence to be very useful in describing such situations, or, where you are when you are talking on the phone (Morgan 2009). Not really with the person you are talking to, but not entirely within the place where you happen to be while you are talking on the phone. While we were using the Oculus Rift, participants felt like they were farther away from other people in the room. I find this similar to archaeological investigation, wherein we are not entirely in the present, nor are we entirely in the past. The boundedness of social persons, our subjectivity, is thrown into question through the delegation of perception to technological mediation.

As a digital archaeologist, my primary mode of research is translating disciplined seeing into disciplined visualization. I am challenged by Roddick's example of the public unintelligibility of the khipu—what kind of intervention could have made Urton's interpretation obvious? Could we create a 3D reconstruction of the khipu that would be navigable at the microscale, showing the warp of the threads, highlighting the intervals of the knots, annotated by Urton? How can we create data-rich interpretive media that do not fetishize technology but productively use them to show how we see?

Finally, though I consider myself still very oriented toward excavation as my preferred way of archaeological performance, I have spent relatively little time in the field versus behind a computer screen. My "finds" these days are more related to interpretive projects and the links between genetics, bioarchaeology, virtual reconstructions, and avatars. These excite me, but make for hard plane conversations, so I usually revert to the heyday of my time behind a trowel and describe murals and various dead things. So in this I may be failing my own remit—can I create a remediation of my visualization process that will enchant an audience as much as scraping the dirt?

