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Potential Future Digital Archeology Techniques

We began this class by discussing what archeology is, and found that while there are several different branches, the overarching purpose is to analyze artifacts to glean a better understanding of human history and prehistory. There is no reason our understanding should be limited by what is "old" or not- archeology can even extend into the recent past. One example is digital archeology. Humans have been generating an inordinate amount of digital "material" since the turn of the century, and much of that can give us insight about how groups of people live and communicate.

In another class I completed this semester called Fundamentals of Digital Archeology, we formed groups and analyzed data on topics of our choosing, and then presented our findings to the class. The topics ranged from social media to sports to finance to gaming, and so on, and were an interesting anthropological study in and of themselves. These topics give us some insight on what college-age students are interested in enough to spend a semester studying and forming groups with others to discuss. In my group, we studied the shift in attitudes around 9/11 over the years by completing a sentiment analysis. We did this in Python using a library called the Natural Language Toolkit (NLTK) and a tool within it for categorizing the sentiment of English language words and phrases. Through this study, we found that the proportion of neutral language has increased in articles about 9/11 in the past twenty years. One way that this could be advanced to study other qualities of human behavior would be to study *all* English language news articles. From our cursory research, it seemed as if newer news articles used less vivid language. This may be because with the development of the 24/7 online news cycle, less graphic language is required to convey a point. If this is true, it tells us something interesting about the development of technology and how it shifts the way we trust journalists to communicate with us. In any case, VADER is a powerful tool for analyzing language, and will hopefully become helpful for archologists. There is no reason it couldn't be expanded for other languages or used to examine much older writing. While this tool isn't ideal for every purpose (it would probably struggle with text as recent as Shakespeare, for example), it is good for measuring large sets of textual data. I'm looking forward to its continued development, and hope that archeologists find some use from it.

To look even farther forward, I suspect that image recognition technology will be able to help us categorize and analyze aspects of our lives in the future. A few years ago, the New York Times released a "quiz" on Trump versus Biden fridges. The idea was that humans, in their innate, pattern-seeking mindsets, would be able to pick out certain items in a photo of a fridge and determine whether the owner of the fridge was a Trump or Biden supporter. Those two candidates, of course, already tell us a lot about groups of people and what they value. But the fridge photos also tell us a lot of other things- what people eat, what their socioeconomic status likely is, what their access to various foodstuffs is, how they prevent things from going bad, and so on. While humans can do an okay job at identifying a few items, algorithms can probably be trained in the future to derive information about large swaths of people. In fact, in the quiz linked above, the people are even prompted to click on what in the image made them select "Trump" or "Biden". In

a Trump fridge, for instance, I've noticed Kool-Aid and Zebra Cakes. People who consume a lot of sugar or processed foods, for instance, may be of a lower socioeconomic status. This tells us that they probably work a job (or a few) that don't pay very well, and therefore inform some of their political opinions. These methods aren't foolproof, of course. We know, as in the past as now, that people don't always act strictly in their self-interest- consider the Inca and several other ancient societies who sacrificed many people for issues outside of their control, for instance. But zooming in on these tiny pieces of digital, photographic material yields much of interest for anthropologists.

These are a few of the new frontiers I can predict growing in contemporary archeology in the coming years. While humans continue to generate lots of material and even more material waste, we have been generating even more digital waste. Companies clearly see the value in it, as they rush to offer us more and more storage space, track our data across platforms, and spend an increasing amount of money in data analytics, and I'm sure that anthropologists can find something of note to study in it too.

Ancient Mesoamerican and Chinese Constructions and Social Organization

Ancient constructions tell anthropologists much about a group's social organization. Most importantly, they tell us that groups have a structure, an interest in pursuing a common goal, and often, surplus, to fuel the people building the structure and to store. All of these qualities indicate a state-level society. Examples in Mesoamerica and China are especially helpful because they also indicate what the society finds valuable.

In Mesoamerica, we find a few examples of state-level projects. One type of project were ball game courts. These courts were used not only for playing an older version of the modern game "ulama", but also for political reasons. In this game, players would bounce a rubber ball against their hips, trying to knock them into a stone loop on the side of the court. This tells us a few things- first, that they had to ability to flatten and expose a section of land (this is not as surprising- we already knew that Mesoamericans had the ability to do this because they had to flatten large swaths of land in the mountains to build buildings), they had the ability to more delicately refine circles and the holes within them, they had the agricultural surplus required to fuel their players, and they had conflicts that they had to resolve through ballgames rather than bloodshed. These qualities suggest state-level society also because sport cannot really be played until after humans have fulfilled their need for shelter, food, and safety.

Another type of project in Mesoamerica were the Olmec basalt sculptures of heads. A few different aspects of their existence suggest that state-level society was required to construct them. First, that there was planning involved. Moving these rocks required the work of multiple people, as did carving them. Each head must have required someone to scope out a suitable boulder, people to move the rock and build the machinery to move it, people who could farm enough food to feed the laborers, and the artists themselves. Further, all of these laborers had to be able to agree on a person to carve- this means that the leaders, who were likely the ones depicted in the heads, were popular enough to garner many followers. Between these leaders, the labor required to pull off these projects, and the number of heads, we can assume that states were already established and maintained for several years.

One other type of project that suggests state level societies are the stepped pyramids in Mesoamerica. To pick out one particular example, the Templo Mayor is in modern day Mexico, and actually has two shrines at the top instead of the typical one. Building a pyramid is no small feat. It requires all the same things that carving a basalt head does (people to scout a location, to move materials, to plan the building, to complete the structure, and to feed to laborers) but it also requires organized religion, in order to entice people to help. Organized religion and state level society go hand-in-hand. Organized religion asks people to engage in faith in things that they cannot see, which is something that state level society also requires. When one is inculcated, the other is reinforced. While they don't always require each other, they do support each other, and are further proof that these material structures indicated state-level society.

We see many of the same structures and evidence in China. Walled cities suggest that groups were large enough and productive enough to require protection and be able to band together to build protection. If not state-level society, this at least suggests agreed upon leaders, councils, or democracy. However, we also know that the people living in these areas built palace complexes

for royal families that contained ritual areas, temples, royal cemeteries, jade vessels, craft workshops, and defensive enclosures. Each one of these things tells us a little about the society. The ritual areas and temples, of course, again tell us about the somewhat organized religion and the part it played in uplifting state government. Further, the jade vessels and craft workshops tell us about the amount of surplus that the people experienced. Artisanship in most society requires that some people no longer must engage with agriculture and can instead be paid and fed through patronage or by trade or commerce. This means that their skills were valued equal to that of subsistence, which takes quite a while for most societies to achieve.

Similar to what the jade pieces and workshops tell us, the terracotta tombs also inform our understanding of what was possible and what was valued in ancient China, but at a much larger scale. The terracotta tomb is huge, and filled with thousands of unique soldiers, chariots, weapons, and horses. The conclusions we can draw are like those of the Olmec heads- a lot of people were involved, and they had to be guided by influential leaders. Especially so, because the terracotta soldiers were buried- the artisans and everyone else involved completed all of that work only for it to be interred with their leader.

A few last state level projects in ancient China were roads, canals, and beacon towers. All of these require huge groups of people to complete and indicate that a government needed to control a large population. Roads are useful for a few reasons- most importantly, they allow leaders to mobilize troops to faraway regions, but they also enable commerce and communication. Canals are useful for ensuring that the population is healthy and supported, and beacon towers also protect and guide the populace. None of these projects would be possible or required without state level society, and the fact that they exist in ancient China indicates that complex societies with hierarchies of rulers, nobles, and commoners must have existed.

These ancient constructions in Mesoamerica and China tell anthropologists much about the people who lived there. They tell us about what they valued, what they were able to complete, and what they intended to do next. Many of these qualities and interests are tied to desires that can only exist in state-level societies, and therefore prove their existence.

We start to see social inequality in Eastern Asian between the Peiligang culture and the Yangshao culture. In Peiligang, there is evidence of farming, subterranean houses, and storage pits. All these things are also present in the Yangshao culture and onward, but so too are increased settlement sizes, ceremonial structures, and visible rankings of individuals. This tells us that two things often lead to social inequality- agricultural intensification and a rise in social complexity.

There are a few reasons these two variables are associated with material evidence of social inequality. The first is that they are both born of one main concept, which is surplus. Surplus seems to rapidly advance every society, and Eastern Asian cultures are no different. With a little consistent surplus, early humans were able to dedicate more time to developing agricultural strategies, which leads to agricultural intensification, which yields greater harvests. The promise of greater harvests encourages humans to set up permanent camp around their fields, both so that they can remain to tend to them and so they can store their produce. This leads to living in villages which contributes to greater numbers of children. Children inform social status, and in early cultures, they were built-in laborers and individuals who could vouch for a family's legitimacy. Unfortunately, this is the stage at which the Peiligang culture begins to decline, but if it had continued in its upward trajectory, we likely would have seen an increase in social complexity like we see in the Yangshao culture.

With surplus, we also begin to see some humans opting to work in trades like developing tools or art instead of farming. Some evidence in Yangshao tells us this must have been the case there. Not only do the ceremonial structures imply some kind of organized objective, rulers, or government, the pottery, burial chambers, fabric, and flowers do as well. While pottery is not impossible to do outside of a typical farmer's schedule, if there is enough surplus, someone may have to make pottery to contain produce full-time. Pottery also requires some kind of kiln, which is also a structure that requires labor from multiple people. Burial chambers also cannot be built by a single person, and require people to plan, build, and feed the builders. Fabric is a little less taxing to develop the infrastructure for, but still requires that the individuals involved in a society are comfortable burying resources. If circumstances were too dire, the people living in Yangshao would not have been able to maintain a social hierarchy, and certainly would not have been able to justify burying the resources used to protect them and keep them warm.

We also see social inequality widen in the rest of China because of agriculture. Rice, which has grown to become a superfood today because of its caloric value, was a dish reserved for the upper class, especially in the Damenko culture. This is because Damenko was farther north, and it was therefore more difficult to grow a crop that required humidity and warmth. As we know from basic economic principles, scarcity breeds competition, which when fed enough, leads to inequality. Furthermore, all crops require care, but rice is very particular in how it must be grown. It is not as simple as just planting rice in the ground. A rice paddy must be formed, which submerges the rice in water, tufts of rice have to be planted in equally spaced places in the mud, and harvesting it requires first threshing, which separates the rice from the stalk, and then winnowing, which separates the shell from the actual edible grains. Consuming rice is an intensive process, and almost certainly required dedicated farmers and the people who employed them.

In this way, we see surplus contributing to social inequality in China through the specific concepts of agricultural intensification and social complexity. Occasionally, a society will develop with one or the other of these two variables, and sometimes they will lead to inequality, though not always. It is rare, however, to see social inequality rise where these two variables are not present.