

Introduction

Stone artifacts are the earliest form of technology used by humans that can be studied by archaeologists today. These stone tools, or lithic technology, is created through the process of flintknapping, where a groundstone tool (a hammerstone) is used to chip away flakes of stone from stone cores. Lithic analysis includes an understanding of the cryptocrystalline structure of stone that allows flintknapping, the types of rock used to make the tools, and the flintknapping techniques that create the tools. From there, types are constructed to organize what we find. For the purposes of this lab we will be using functional types, which reflects how the objects were used.

We have been given the assemblages for G-IIa, G-IIb, G-IIIa, G-IVa, and G-IVb from the Gault site in Texas to learn of both the function of each site, and whether or not the groups were mobile or not. There are four stratigraphic layers that have been examined. The first has no sign of human activity, while the second has two assemblages, G-IIa and G-IIb, the third has one, G-IIIa, and the fourth has two sites, G-IVa and G-IVb. What purpose did each assemblage serve? Do these assemblages relate at all? If they do, what would the reconstruction of the groups' activities look like? How many occupations are represented? Did the inhabitants of the Gault site travel far to collect their stone, or did they stay close to home? We can answer all these questions through the use of lithic analysis.

First we must understand the types of sites that could be present. A campsite is the home base of hunter-gatherer bands where most activities of day-to-day life are done. Most types of lithic artifacts could be found here and thus a wide diversity of tools would be the indication of a

campsite. A hunting locale is much more specialized and it would be likely that a majority of projectile points be found at this type of site. This is where hunters would sharpen weapons and launch hunts for prey. A cache is a storage space hunter-gatherers' tools. Functionally, caches can be used as a backup in case they need to resupply on tools. Ritually, a cache will contain artifacts of larger sizes and are generally less practically useful. With these types of sites in mind, we can infer much of a group off of the types are artifacts present in an assemblage.

We must understand the artifact classes involved in the creation of the tools. Groundstone tools are lithics that were created through abrasion or grinding of stone, and are generally used for either processing food or creating chipped stone tools. Chipped stone tools are created through flintknapping techniques such as percussion with a hammerstone or pressure flaking with a bone tool. What allows chipped stone tools to be broken as they are is their cryptocrystalline structure which has a rippling effect when broken that produces sharp edges, much like that of glass. How we can tell the function of a site has much to do with the artifact types. While groundstones mainly consist of hammerstones, chipped stones consist of a multitude of types.

There are two ways we can find out how mobile people were in collecting rock for lithic production. The presence of obsidian and the presence of cortex both tell us of the distance traveled by inhabitants. Obsidian is a highly glass like, sharp when broken, volcanic rock that can only be found at distinct locations fairly far from the Gault site. If these artifacts are found, then these people must have been relatively mobile as they traveled or traded to receive the obsidian. Cortex is merely chalky buildup on the outside of a cobble of chert or obsidian that was formed from weathering. It is generally understood that the more cortex present, the closer the site is to the primary quarry area.

We hypothesize that if a site has a high diversity of lithic functional types, then the lithics will primarily be of chert as it would be a campsite that locally retrieved its resources. Chert and obsidian are the two most likely types of rock to be found. As we move up in the stratigraphic layers, more obsidian will be observed as the connection between other groups, trade, and resource gathering should increase over time. The nearest obsidian deposit to the Gault site is 700 miles northwest in the Jemez Mountains of New Mexico making it a journey to retrieve it, even in terms of trade between bands or tribes. The use of chert however should stay the same over time. Indications of a hunting locale are slightly different than a campsite as they are slightly more specialized than campsites. We hypothesize that lithics found at a site with a slightly more specialized inventory will mainly consist of projectile points, bifaces, or blades. Lastly caches will contain tools of the same kind only or at least have a certain type in the vast majority.

Methods

Our group choose assemblage G-IIb to observe and analyze. Our assemblage is in the second stratigraphic layer which is the oldest one containing evidence of human activity. There are three primary variables in our data table that will provide all the information we need to make inferences. The raw material variable could be labeled as either chert, obsidian, quartzite, sandstone, or other. This variable will tell us where they got their rock from the nearby Edwards chert quarry or the Jemez Mountains of New Mexico. The next variable, cortex, will be answered in a yes or no fashion (Y/N) and will tell us how far away the raw material is from its original deposit. The more cortex present, the closer it is to its original deposit. Artifact class will tell us about the base functionality of the site. If we find ground stone, more general uses could be applied as well as the production of lithics. If we find chipped stone, the site could have been

used for more specific tasks depending on frequency of type. The artifact type variable includes core, flake, blade, scraper, biface, projectile point, pressure flaker, abrader, and hammerstone. The functional type of each individual artifact will be the primary teller of the function of the sites at each different occupation.

Every type of artifact can be distinguished morphologically as well. Cores are the centerpiece of a rock from which flakes are chipped off. Flakes usually have cracking ripples springing from the point of impact. Blades are flakes that are twice as long as they are wide. Also, they must have relatively parallel sides. Scrapers are unifacial flakes that are chipped on one side to create a sharp edge while the other side is kept dull so it could be grasped. Bifaces are merely tools flaked on both sides that fulfill multiple purposes. Projectile points are bifaces that are made to be attached or hafted to a shaft and used for propulsion or thrusting.

The last variable on the table, comments, was a joint effort of our group to help distinguish between artifacts and artifact numbers if need be. Lastly in our process of data collection, we created two more tables to hold the frequencies of both artifact type and class. With this, we can compare our summarized results with the summarized results of the other groups. Sydney recorded the data while I held the artifacts and analyzed them. We both put each artifact into all the variables. Paige came in and helped us finish the designation process and then took the data and wrote it on the board. We did not run into any issues during this lab but we did often have to refer to Gwen's assistance to decipher between certain characteristics of types.

Results

Out of our 12 artifacts in assemblage G-IIb, we found a variety of types of artifacts, but the class and raw material used both stay fairly similar throughout. The majority of the artifacts

did not have cortex present, but artifact number 1 being the only artifact varying in raw material with the use of quartz, seemed to have the presence of cortex.

Figure 1: Photo of Assemblage G-IIb (Artifacts 1-12, left to right)



Table 1: Data for Assemblage G-IIb

artifact #	raw material (obsidian, chert, antler, other)	cortex present (y/n)	artifact class (chipped stone, ground stone, other)	artifact type (core, flake, blade, scraper, biface, projectile point, pressure flaker, abrader, hammerstone)	comments
1	Quartz	y	Ground stone	Hammerstone	Rounded, convex
2	Chert	y	Chipped stone	Flake	Uniface
3	Chert	n	Chipped stone	Projectile Point (broken)	Biface
4	Chert	n	Chipped stone	Biface	Clear
5	Chert	n	Chipped stone	Projectile Point (broken)	Deadly
6	Chert	n	Chipped stone	Biface	Ugly
7	Chert	n	Chipped stone	Flake	Sharp
8	Chert	y	Chipped stone	Flake	Red
9	Chert	n	Chipped stone	Projectile Point	In perfect condition
10	Chert	y	Chipped stone	Biface	Inclusion present
11	Chert	y	Chipped stone	Scraper	Smooth one side, and rough on other
12	Chert	n	Chipped stone	Scraper	Very smooth, dangerous

As seen in Table 1, 11 out of the 12 artifacts in the assemblage are of chert, with only 4 of those having a presence of cortex. The amount of chert present at the site suggests that the occupants of the site in the second stratigraphic layer retrieved their materials from the nearby Edwards quarry. The artifacts that did not contain cortex however could have just been in use longer and thus the weathering eroded away. Another factor that could contribute to the lack of presence of cortex is just the distance itself from the Gault site to Edwards quarry. Below are the data for the recorded frequencies of both artifact types and classes.

Table 2: Frequency of Artifact Types

Type	Number of Artifacts of this Type	% of Assemblage

Cores	0	0
Flakes	3	25%
Blades	0	0
Scrapers	2	17%
Points	3	25%
Groundstone	1	8%
Tools		
Other	0	0
Bifaces	3	25%

Table 3: Frequency of Artifact Class

Artifact Class	Raw Material	Number of Artifacts of This Material	% of Assemblage
Chipped Stone	Chert	11	92%
	Obsidian	0	0
	Quartzite	0	0
Groundstone	Quartzite	1	8%
	Sandstone	0	0
Other	Antler	0	0

The ratio between chipped stone and groundstone 11 out of 12 artifacts being of chipped stone. With 92% of the artifacts being of chipped stone, it may be possible that this site served a more specific purpose than production. The frequencies of the artifact types should clear up the interpretation. As seen in Table 2, 25% of the artifacts observed are flakes, 17% are scrapers, 25% are projectile points, 8% are hammerstones, and 25% are bifaces with the rest of the types have 0 artifacts observed. This gives a more informed view of the site. Although the site is primarily made up of chipped stone with only one hammerstone most likely used for lithic production and other smaller tasks, the diversity of the artifact types is vast.

Table 4: Frequencies for Artifact Type and Class for Assemblage G-IIa

Type	Number	% of Total Assemblage	
Cores	4	29%	
Flakes	4	29%	
Blades	0	0	
Scrapers	0	0	
Bifaces	1	7%	
Points	2	14%	
Groundstone Tools	2	14%	
Other	1	7%	

Artifact Class	Raw Material	Number	% of Total Assemblage
Chipped Stone	Chert	11	79%
	Obsidian	0	0
	Quartzite	0	0
Groundstone	Other	2	14%
	Sandstone	0	0
Other	Antler	1	7%

Above is the combined frequency tables for assemblage G-IIa, the other site in our assemblage's stratigraphic layer. Their results resembled the same pattern as our own, a wide diversity of artifacts. Their assemblage may even be more diverse than our with the presence of

an antler bone tool, presumably used for pressure flaking lithics, and a high number of cores, making up 29% of the assemblage. Both of these assemblages suggest that a wide range of activities were performed at these sites.

In Table 5, a far different story is told. With 84% of the artifacts being blades in the assemblage, the site's functionality would have to be extremely narrow. Another interesting factor of this site is that the raw material used is obsidian which would have had to have traveled from The Jemez Mountains in New Mexico, a distance of 700 miles. One antler was observed from the assemblage so there could have been some presence of pressure flaking or sharpening of weapons.

Table 5: Frequencies for Artifact Type and Class for Assemblage G-IIIa

Type	Number	% of Total Assemblage	
Cores	1	8%	
Flakes	0	0	
Blades	11	84%	
Scrapers	0	0	
Bifaces	0	0	
Points	0	0	
Groundstone Tools	0	0	
Other	1	8%	

Artifact Class	Raw Material	Number	% of Total Assemblage
Chipped Stone	Chert	0	0
	Obsidian	12	92%
	Quartzite	0	0
Groundstone	Quartzite	0	0
	Sandstone	0	0
Other	Antler	1	8%

Tables 6 and 7 show the results for G-IVa and G-IVb, the two highest assemblages in stratigraphic layer IV. G-IVa is very similar to G-IIa and G-IIb in its diversity of artifacts. It contains at least one artifact of flakes, blades, scrapers, bifaces, and points. It also has 2 antlers. This high diversity is accompanied by a presence of obsidian which combines the traits for the earlier assemblages and assemblage G-IIIa.

Table 6: Frequencies for Artifact Type and Class for Assemblage G-IVa

Type	Number	% of Total Assemblage
Cores	0	0
Flakes	1	9%
Blades	1	9%
Scrapers	2	18%
Bifaces	1	9%
Points	4	36%
Groundstone Tools	0	0
Other	2	18%

Artifact Class	Raw Material	Number	% of Total Assemblage
Chipped Stone	Chert	1	9%
	Obsidian	8	73%
	Quartzite	0	0
Groundstone	Quartzite	0	0
	Sandstone	0	0
Other	Antler	2	18%

Table 7 is more specialized but not completely polarized to one type of artifact like G-IIIa. 40% of the assemblage is groundstone tools probably used for production of lithics. The majority type is flake lithics accompanied with 2 cores. This suggests that much production happen at this site at this time.

Table 7: Frequencies for Artifact Type and Class for Assemblage G-IVb

Type	Number	% of Total Assemblage
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Cores	2	13%
Flakes	7	47%
Blades	0	0
Scrapers	0	0
Bifaces	0	0
Points	0	0
Groundstone Tools	6	40%
Other	0	0

Artifact Class	Raw Material	Number	% of Total Assemblage
Chipped Stone	Chert	9	60%
	Obsidian	0	0
	Quartzite	0	0
Groundstone	Other	6	40%
	Sandstone	0	0
Other	Antler	0	0

Discussion and Conclusion

With these data, we were able to classify each site into the functional types of a campsite, a hunting locale, or a cache. G-IIa and G-IIb were both campsites. The reason we came to this conclusion was the diversity of the artifact types. Although the sites slightly varied in some types, such as scrapers being present in G-IIb but not G-IIa and having cores and an antler present in G-IIa but not G-IIb, they both shared a great variation in functional capabilities. Because the sites were in the same stratigraphic layer, the sites were around in the same time period due to the law of association. So, we have two campsites that were only 500 meters away from each other in distance and around at a similar time. Perhaps the two sites merely coexisted or they traded with each other. There is a possibility that one of them could have been a hunting locale, but G-IIa did not have enough artifact types meant for hunting for butchery and G-IIb had

plenty of points, bifaces, and flakes to be one, but it still contained two non-hunting type scrapers.

G-IIIa was certainly a cache. It contained only blades and one core, and an antler for sharpening. All of the tools were also made with obsidian as well, so this shows by stratigraphic layer III, obsidian was being brought to this area and used as a resource for their technology. This occupation of the site was probably less active as a cache is basically a storage room where hunter-gathers could store any unused tools for future use.

G-IVa and G-IVb were in stratigraphic layer IV and had a definite working association with each other. G-IVa was a campsite due to its high diversity of artifacts while G-IVb was a hunting locale due to its more specialize affinity for flakes. In G-IVb, the combination of cores and groundstone tools that produce more lithics from percussion strengthen the notion that this assemblage area was used for production of lithics. And the 7 flakes found shows a high use of percussion flaking. G-IVa on the other hand has flakes, bifaces, scrapers, points, blades, and antlers. Far too diverse in functional types to be a hunting locale that would primarily have points, bifaces and possibly flakes. Again the law of association comes into play and these two sites must have been around at similar if not the same time intervals. With G-IVa being positioned up on the hill, it makes it a well-protected spot for a campsite while also giving the groups a vigilance of their surrounding area.

There are three occupations of the site, one for G-IIa and G-IIb, one for G-IIIa, and one for G-IVa and G-IVb. Our hypothesis concerning the amount of chert seen at sites with a diversity of types was supported. Both of the lower campsites were primarily of chert, while the older campsite had obsidian as our hypothesis given in the introduction explains. Our next expectation of chert staying the same over time did not hold. Although chert persisted in the II

and IV stratigraphic layers, it did not persist in the III, therefore it did not remain consistent over time. Lastly, our expectation that sites with highly specialized inventories will primarily be projectile points, blades, or bifaces was supported as G-IIIa which was highly specialized only consisted of blades, with one core and one antler present.