

Reconstructing the Flintknapper: Exploring Drop Zones as an Indicator of Body Positions

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Questions Addressed

There are very few archaeological sites in the world that are formed from a single event. Evidence from Benedict's Rock (5BL232) suggests that the site was one of these rare preservations. However, it is still difficult to confirm and isolate these individuals. Ethnographic research and experimentation is just one approach to replicating these scenarios in the hopes of developing a clear picture of these individuals' use of space. This project attempts to uncover specifics about the flintknapper of Benedict's Rock by answering these questions:

- Do changing body positions of a flintknapper create lithic distributional patterns that can be observed?
- Can these patterns determine hand dominance?
- Can these patterns be applied to the 5BL232 site?

Methods of Approach

Four experimental flintknapping trials were conducted, keeping the following constant for each experiment:

- Flintknapper (author) of consistent skill level
- Obsidian material
- Time of 15 minutes for each experiment
- Chair: 82.5 cm tall to seat, 46 cm wide at base
- 6x3.5 meter grid broken into seventy 50cmx50cm square cells

Site Comparison

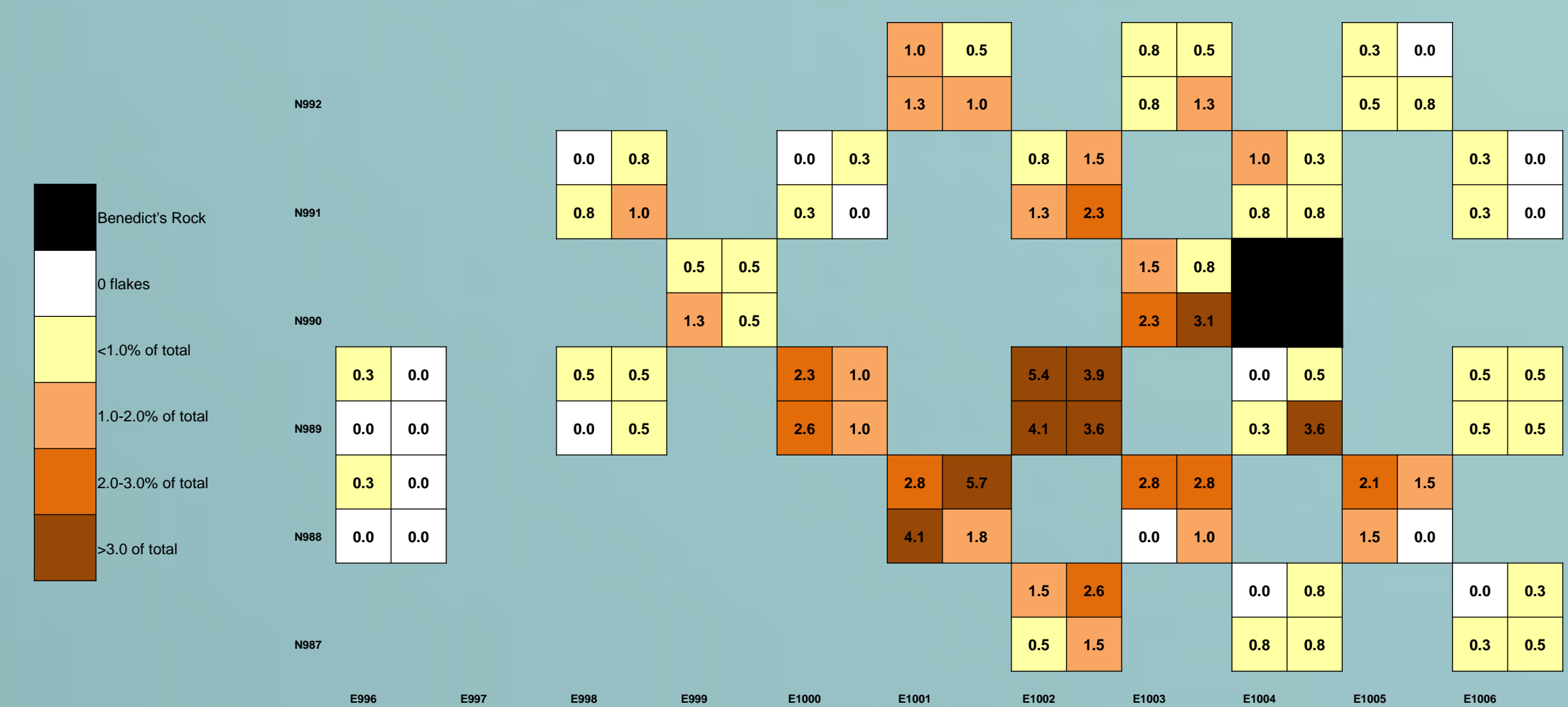


Above: Scott Yost sitting at base of Benedict's Rock. Below: Scott Yost sitting on Benedict's Rock, 2011.



East Highest Point: 81.5 cm
West Lowest Point: 36 cm
Widest Base Length: 80 cm

Benedict's Rock (5BL232) is a Late Paleoindian Scottsbluff site, located southwest of Lyons, CO. The site is a single component site with one or only a few flintknapping episodes. The site is centered around site furniture of a large boulder that is similar to a chair. The flake debitage was found in a semi-circular pattern around the base of the rock, with a concentration closer to the base.

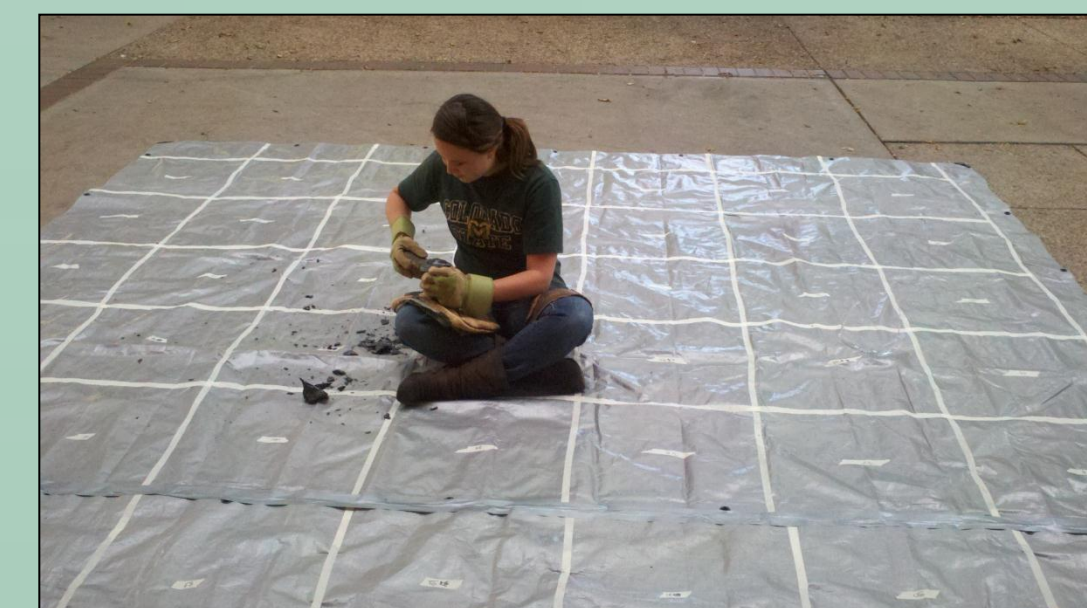


Flake distribution at Benedict's rock, shown by each quad's flake percentage of the total flake assemblage.

Trial 1: Sitting Cross-legged

Original Core Mass: 1162.33g
Number of Strokes Taken: 617
Core Mass After Trial: 46.8g
Debitage Outliers: 0g, 0%

<1g, <.01%					
		<1g, <.01%			<1g, <.01%
<1g, <.01%	<1g, <.01%	<1g, <.01%	<1g, <.01%	<1g, <.01%	<1g, <.01%
<1g, <.01%	<1g, <.01%	<1g, <.01%	2g, .01%	<1g, <.01%	<1g, <.01%
<1g, <.01%	<1g, <.01%	<1g, <.01%	1g, .09%	157.4g, 13.54%	1.8g, .15%
			94.5g, 8.1%	778.9g, 67.01%	3.5g, .3%
	<1g, <.01%		51.5g, 4.4%		2.8g, .24%
		1g, .08%			2g, .01%
1.6g, .14%		<1g, <.01%	5g, .04%	1g, <.01%	



Author flintknapping sitting on the ground during Trial 1.

The results of the trial that was conducted while sitting cross-legged shows a clear concentration of flakes to the right of the flintknapper with more than 80% of total flake mass within a meter of the center of production. The cells containing the smallest percentage of total mass usually contained only one or two flakes.

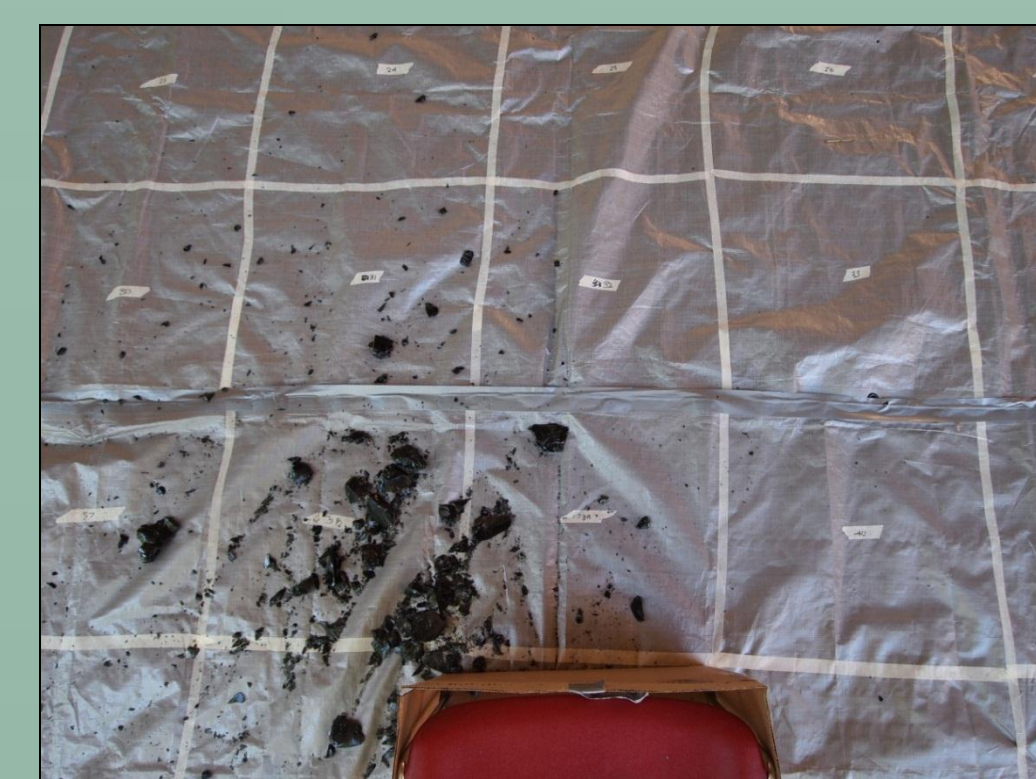
Flake distribution after Trial 1. Mass of flakes per square was recorded, then the percentage of the total weight was calculated. Colored by density.

Trial 3: Sitting in a Chair (Left Handed)*

*Note: Flintknapper is naturally right-hand dominate.

Original Core Mass: 1474.175g
Number of Strokes Taken: 437
Core Mass After Trial: 295.7g
Debitage Outliers: 6.3g, .43%

	<1g, <.01%		<1g, <.01%		
.4g, .02%	<1g, <.01%	2g, .01%			<1g, <.01%
<1g, <.01%	<1g, <.01%	1g, <.01%	1g, <.01%	1g, <.01%	<1g, <.01%
1.3g, .08%	.8g, .05%	4.1g, .28%		<1g, <.01%	<1g, <.01%
1.3g, .08%	13.7g, .93%	54.8g, 3.72%	3.1g, .21%	.2g, .01%	
8.3g, .56%	91.9g, 6.23%	670.1g, 45.45%	125.3g, 8.49%	<1g, <.01%	.6g, .04%
8.0g, .54%	139.2g, 9.44%	29g, 1.97%	.4g, .02%	<1g, <.01%	<1g, <.01%
.6g, .04%	.8g, .05%	1.0g, .06%		<1g, <.01%	
.4g, .02%	<1g, <.01%	<1g, <.01%	<1g, <.01%		
			<1g, <.01%		<1g, <.01%



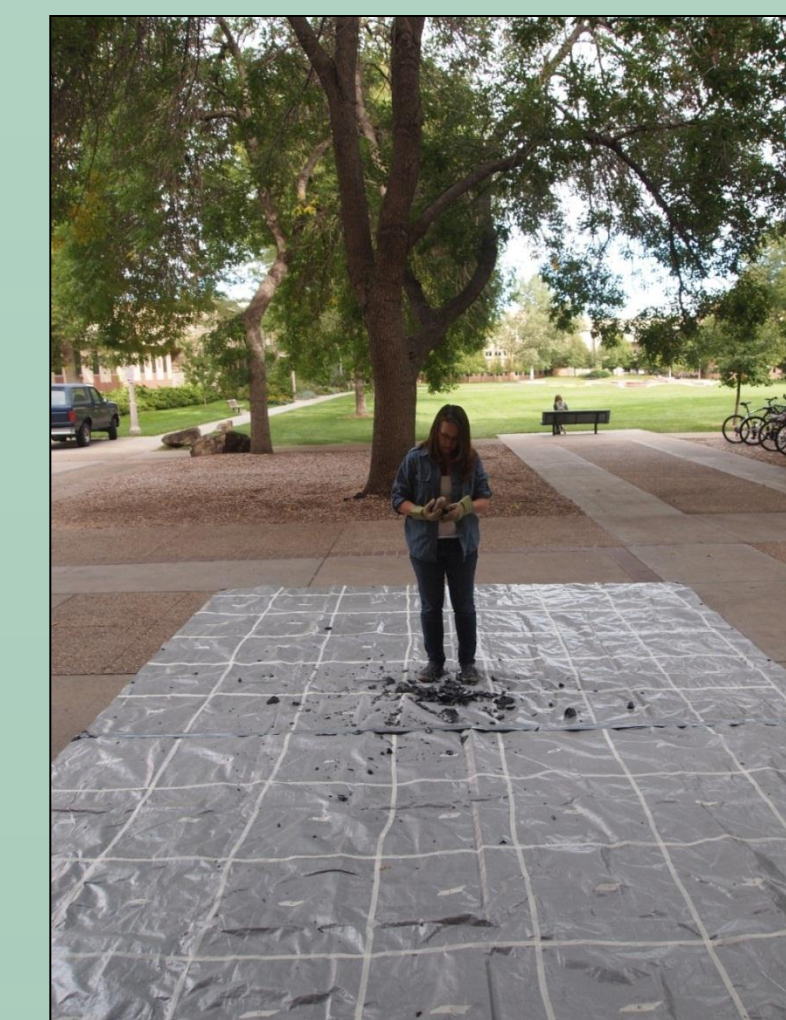
Flake distribution as seen from above after Trial 3.

Flake distribution after Trial 3.

Trial 2: Standing

Original Core Mass: 2834.952g
Number of Strokes Taken: 539
Core Mass After Trial: 69.8g
Debitage Outliers: 3.0g, .11%

<1g, <.01%		<1g, <.01%	<1g, <.01%	<1g, <.01%	<1g, <.01%
<1g, <.01%	<1g, <.01%	<1g, <.01%	.5g, .01%	.2g, <.01%	1.2g, .04%
<1g, <.01%		<1g, <.01%	3.6g, .13%	1g, .03%	.5g, .01%
<1g, <.01%	<1g, <.01%	1.9g, .06%	47.9g, 1.69%	25.1g, .88%	1.1g, .04%
4g, .01%	1g, <.01%	2.3g, .08%	985.5g, 34.76%	46.2g, 1.62%	3g, .11%
<1g, <.01%	29.5g, 1%	270.2g, 9.53%	761g, 26.8%	77.9g, 2.75%	79.4g, 2.8%
<1g, <.01%	2.5g, .09%	39.6g, 1.4%	5.2g, .18%	247g, 8.71%	21.5g, .76%
	<1g, <.01%	2.5g, .09%	<1g, <.01%	8.3g, .29%	7.2g, .25%
	1g, <.01%	.2g, <.01%	<1g, <.01%	.2g, <.01%	31.4g, 1.11%
				<1g, <.01%	<1g, <.01%



During Trial 2, author flintknapping while standing.

The standing trial results demonstrate a more uniform arc at the base of production area. Concentrations of flakes are seen within a meter and a half of the knapper in all directions except behind in the toss zone.

Flake distribution after Trial 2.

Trial 4: Sitting in a Chair (Right Handed)

Original Core Mass: 708.737g
Number of Strokes Taken: 402
Core Mass After Trial: 226.79g
Debitage Outliers: 1.6g, .22%

Trial 4: sitting in a chair (right handed) had very similar results to Trial 1. The flake concentrations were within a meter of the place of production and to the right of this area, with more than 80% of mass recorded in the cells directly in front of and diagonally from center of production

			<1g, <.01%		
<1g, <.01%			<1g, <.01%	0.1g, .01%	<1g, <.01%
		<1g, <.01%		1.1g, .15%	1.1g, .15%
	<1g, <.01%	<1g, <.01%	<1g, <.01%	1.1g, .15%	3.8g, .93%
<1g, <.01%	<1g, <.01%	<1g, <.01%	2.4g, .34%	39.2g, 5.53%	1.4g, .34%
<1g, <.01%	<1g, <.01%	1g, .01%	197.2g, 48.25%	134.4g, 32.8%	18.8g, 4.6%
<1g, <.01%	<1g, <.01%	1g, .01%	1.3g, .18%	75.3g, 10.62%	3.0g, 4.2%
<1g, <.01%	<1g, <.01%	<1g, <.01%	<1g, <.01%	.6g, .08%	.4g, .03%
<1g, <.01%	<1g, <.01%			1g, .01%	.3g, .04%
<1g, <.01%				<1g, <.01%	<1g, <.01%



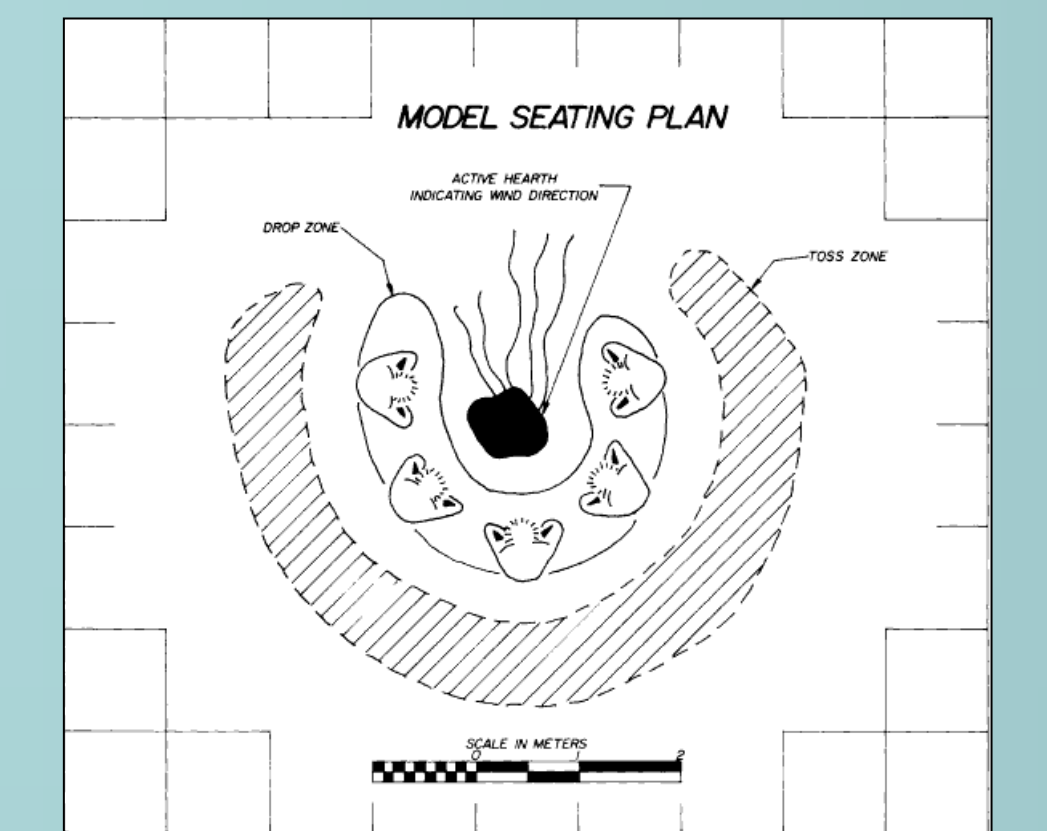
Author flintknapping during Trial 4.

Flake distribution after Trial 4.

Discussion and Conclusions

Body positions do create different distribution patterns which are mostly determined by hand dominance. Visual comparisons between the trials and the Benedict's Rock site suggest the flintknapper was sitting on the ground in front of the rock rather than using it as a chair.

The trials of these experiments expand on Binford's drop-and-toss zone model, focusing on the frontal "drop zone" or the natural distribution as flakes fall (Binford 1978). For each body position a distinct pattern can be seen mostly determined by the dominant hand. The lithic distribution at 5BL232 after being compared to the



Binford's Drop and Toss Zone Model (Binford 1978)

experimental trials suggest that the flintknapper of Benedict's Rock may have been sitting on the ground in front of the rock. The highest density of flakes are between a meter and two meters out from the base, too far away for someone sitting on the rock. Also there is a concentration towards the left (if the knapper was facing west) possibly indicating left handedness. Although, because only parts of the site are excavated, we cannot come to a resolute conclusion without further study.

These trials can't be the only consideration to figuring out the body position of the knapper either. Various parts of the experiment do not replicate the conditions of Benedict's Rock. For example, the experiment was conducted on concrete instead of grass and the author is a beginning knapper while the producer at 5BL232 was very skilled; the experiment was conducted by reducing a large core while the events at Benedict's rock were done on a smaller reduction scale; the comparisons were made based on the density of the number of flakes at Benedict's Rock while this experiment determined density by the weight of flakes, without considering the number of flakes produced; the density at Benedict's Rock was taken as a total number of flakes, without consideration to the raw material type (indicating possibly different episodes of flintknapping) or the levels at which each flake was found.



An Aborigine, flintknapping in Binford's 1986 study.

Also additional factors for consideration that affect flake and lithic distribution include natural geologic processes. Other factors that contribute to manufacture and possible distribution patterns need attention as well, such as shifting sun angles that could have caused the knapper to rotate positions throughout a day, creating a different distribution pattern. Ethnographic research suggests that there are even more body positions to be studied than just sitting and standing. Binford describes Australian knappers as placing the core on the ground then crouching behind it to strike flakes off (Binford 1986). There is plenty more to be explored in this topic, however this experiment can be a model for future experimentation. Future research is important because of the nature of the Benedict's Rock site as being a single component site; this can allow for specific individualization in the archaeological record, which is virtually impossible on other sites.

References available upon request.

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