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Lessons from Ginsberg: An analysis of elephant butchery tools

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ABSTRACT

Actualistic studies have contributed greatly to our understanding of the past. In this paper, we analyze six stone bifaces used to butcher a 23 year-old African Elephant. Detailed records from this study allow us to illustrate how stone tool reduction is not necessarily a linear process, especially when attempting to use metrics to quantify the amount of reduction over time. Through long-term use of stone tools in butchery, we show that overall reduction was minimal even with successive resharpening events. The utility of these tools raise questions about the role of large bifaces in both Paleoindian and other hunter-gatherer contexts where bifaces may have been used as butchery or long-life tools. Our results suggest that bifaces are superior tools for maintaining an effective cutting edge during prolonged use. These findings may further explain the use of large bifaces among Paleoindian and other foraging populations.

1. Introduction

When I was asked to write a paper for Gary Haynes, I tried to think of a project that connected to his work. I then remembered the picture that overlooks my desk at the Smithsonian. On a large wall mount, Gary is pictured watching my co-author butcher the famous Ginsberg Elephant (Fig. 1). In life, Ginsberg was once a star in the John Wayne film, Hatari; later she was a favorite at Boston's Franklin Park Zoo; and finally, after being euthanized because of an injury, her remains would end up at the Smithsonian Zoological Research Center to make a significant contribution to North American Paleoindian studies. When the Ginsberg remains arrived in the winter of 1977–78, Gary Haynes was a fellow at the Smithsonian. Gary assisted and watched as Rob Bonnichsen, Errett Callahan, Dick Morlan, and Dennis Stanford performed various experiments to learn how early people in North America may have butchered and utilized their prey. Today, to honor Gary's career and its long connection with taphonomic and actualistic studies, my co-author and I present a preliminary analysis of select stone tools used to butcher Ginsberg, a 23 year-old African elephant.

Experimental studies have contributed greatly to our understanding of past lifeways. In North American Paleoindian research, these studies have ranged from the manufacture of stone tools for understanding technology and reduction techniques (e.g., Callahan, 1979; Bradley, 1982); actualistic studies which help establish the association and accumulation of artifacts and Pleistocene fauna (e.g., Frison and Todd, 1986; Haynes and Krasinski, 2010); and the experimental butchery and manipulation of skeletal elements to provide insights into both lifeways and the plausibility of different activities that may have been undertaken by Paleoindians (Huckell, 1979; Stanford et al., 1981; Frison and Todd, 1986; Frison, 1989; Callahan, 1994). Throughout his career, Gary Haynes has demonstrated how experimental, taphonomic, and ethnographic studies can provide many insights into New World origins and dispersals (e.g., Haynes and Stanford, 1984; Haynes, 1991, 1995, 1999, 2002, 2007; Haynes and Krasinski, 2010; Haynes and Klimowicz, 2015). He has also expressed, how many excellent experimental studies (e.g., Stanford et al., 1981; Stanford, 1987; Callahan, 1994) either failed to elevate others to a higher scientific level or never saw final publication to provide access to all of the valuable insights from these experiments (Haynes, 2007:3).

By presenting information on six stone bifaces from the Ginsberg experiment, we move towards sharing some of these insights. Through timed records of tool use, measures of tool reduction, and proxies of force and distance traveled of individual tools, we provide information about the utility of stone tools to process large game. The patterns of stone tool reduction and use documented during this experiment may also be applicable to the past.

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2. Background – The Ginsberg experiment

In December of 1977, Stanford received a call that Ginsberg, a 23 year-old African elephant, had died at Boston's Franklin Park Zoo (Stanford et al., 1981; Stanford, 1987). This death provided an opportunity to evaluate the presence of numerous, possibly modified, bone fragments that had been found at sites throughout North America. These possible artifacts were thought to pre-date Clovis, then considered the oldest widespread culture in North America. Proboscidean bone that exhibited possible cultural modification had been found at Old Crow Flats in the Yukon Territory, Canada and were thought to represent the earliest people in the New World (Irving and Harington, 1973; Irving and Cinq-Mars, 1974; Bonnichsen, 1978). At the same time, the Dutton and Selby sites in the western United States provided evidence of green bone breakage that, if verified, would also suggest a human presence in North America much earlier than Clovis (Stanford, 1979). Through the Ginsberg experiment, Stanford et al. (1981) were able to flake elephant bone and replicate the flaked bone patterns observed at Old Crow, Dutton, and Selby (Stanford et al., 1981). They also demonstrated that bone flakes could be used in slicing both warm and frozen flesh (Stanford et al., 1981; Stanford, 1987). These findings were the main outcome of this extensive experiment. Later, Gary Haynes and his students would re-examine the elephant bones from the Ginsberg experiment and make additional observations on bone flaking patterns (Krasinski, 2010) and other bone modification that was the result of the butchering process and cleaning bone for flaking (G. Haynes, Personal communication, 2015).

Fig. 1. Gary Haynes (top background, left) watching Dennis Stanford and Dick Morlan butcher Ginsberg.

2.1. Butchery and recording methods

The Ginsberg elephant was butchered using only stone tools. At least 65 stone tools are cataloged at the Smithsonian as being part of the butchery experiment. Fifty-three of these tools are unmodified flakes, retouched flakes, scrapers, or hand-held bifaces. This tool count does not include the bone and shell flakes that were also used for different cutting activities during the experiment. As there were copious notes taken on most activities, these tools may provide valuable information about the experiment. Most of these 53 tools, however, were only used for short periods of time.

The main tools used for butchering Ginsberg were 12 hafted bifaces. Six of these bifaces will be the later focus of this paper. Many of these hafted bifaces were made to resemble Clovis artifacts from the Anzick and Simon caches (Fig. 2). The bifaces and other stone tools were primarily made from Brandon Flint, Edwards chert, obsidian, and Munsungun chert. For the bifaces, several different haft types were used, most of which were modeled from haft designs observed in the Arctic and Eskimo ethnographic collections held by the Smithsonian Institution. While it is unknown if all large bifaces would have been hafted in the past, the ethnographic record suggests that knives were frequently hafted (e.g., Binford, 2009: 174–178; Murdoch, 1892:151–164; Smith, 1974).

Rob Bonnichsen and Errett Callahan, expert flintknappers, made the stone tools for the project. Bonnichsen and Callahan also resharpened the tools during the butchering process. Bonnichsen resharpened the majority of tools. Resharpening flakes from select resharpening episodes were saved.

Biface use was measured in several ways[1]. First, the time in use was measured for each stone tool. Second, dental acrylic casts were made of each tool edge throughout the use and resharpening cycles (Fig. 3). For example, most tools entered use after having the starting edge cast. After tool use, the used edge was cast to preserve use-wear. It was then resharpened and cast again before subsequent use. This cycle was repeated throughout the multiple uses of each tool. This research design sought to preserve evidence of not only reduction, but use-wear on the edges of the tool throughout its use-life. Third, a complex system of measuring distance, angle, and force was devised by Dr. Woody Seamone of John Hopkins, Department of Applied Physics and NASA to record cutting activities with the stone tools (Fig. 4). These were plotted on a six-channel strip-chart recorder and x–y–z plotter (Stanford et al., 1981). These recordings resemble a seismograph with time and distance plotted along an x-axis with variation in cutting strokes (e.g., short vs. long, and rapid short fluctuations [often hard/bone contact]) recorded along the y-axis. It should be noted that casting and time was a standard practice with most tools. The approach to creating an early 3-D record of tool use was only applied to four tools. The entire experiment and tool use was also documented by hours of 16 mm film footage.

2.2. Participant experience

When discussing experimental research, the experience of the researcher/participant should always be considered. While few, if any researchers, approach the expertise of hunter-gatherers that spend a lifetime conducting many of the activities that

[1] Here we specifically refer to the data recorded on hafted bifaces. Many flake tools and other unhafted bifaces have cast edges and notes relating to time of use. Given the size of the collection, which includes hours of transcribed or partially transcribed notes from film and audio recording we did not examine all the records for the other 53 tools noted. The quality of note taking/data recording was not equal for all 53 of the remaining stone tools.

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