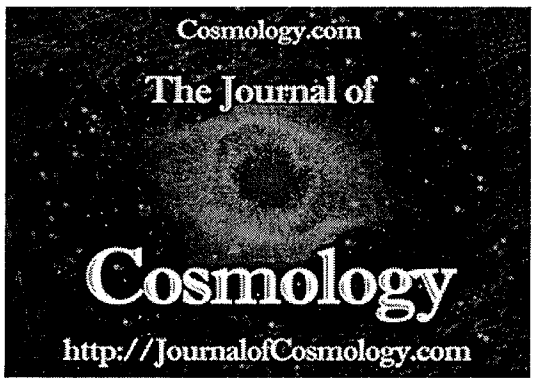

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Archaeological Perspectives on the ExtraTerrestrial Impact Hypothesis, 12,900 B.P.: A View from Western North America

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Abstract

The 12,900 B.P. extraterrestrial impact hypothesis has been introduced into American archaeology at a time when longstanding explanations for the Paleoindian archaeological record encompassed by the Clovis-first and Pleistocene Overkill theories have been conclusively rejected. The impact hypothesis provides one of the first reasonable alternative explanations. The YDB impact event is supported by an impressive body of empirical evidence including substantial paleoenvironmental findings, and it seems to provide an exceptionally parsimonious explanation for previously unexplained and unacknowledged patterns in the western North American archaeological record, including the strong disconnect between the late Pleistocene and the Holocene. In contrast with the predictions of gradualist/adaptationist models the western archaeological record suggests punctuated change consistent with a catastrophic event although the poor chronological resolution of the pre-10,000 cal BP archaeological record leaves plenty of room for debate and further research. The likelihood that the hypothesis will be supported and eventually accepted as fact, however, seems considerably greater than with overkill.

From the moment it was first presented to researchers at the 2007 meeting of the American Geophysical Union and in the initial paper by Firestone et al. (2007) the extra-terrestrial impact hypothesis has received a mixed reaction from archaeologists and paleoenvironmental scientists. Certainly, the most vociferous responses have been negative, including a wide array of challenges to the empirical evidence for the impact event itself. In this most recent paper

Firestone (2009) has done an admirable job of summarizing and responding to the many issues that have been raised by paleoclimate and other scientists. Importantly, he includes in this latest response, significant findings made since the original papers, including the work by Kennett et al. (2009a, 2009b) which seems to bolster the case for an impact event considerably. The contemporaneity of the black mat in Arizona with evidence for massive fires on Santa Rosa Island at 12,900 BP on its own seems compelling enough for this hypothesis to be taken seriously, yet alone the widespread evidence for other mat-like deposits throughout North America (Kennett et al. 2008).

Comments from the archaeological community have been much less profuse, but still have been more negative than positive (e.g., Buchanan et al. 2008; Fiedel 2009; Gillespie 2009; Hamilton and Buchanan 2009; Haynes 2008). This negative reception, however, may not reflect the majority of American archaeologists (Hagstrum 2009) many of whom work in narrowly defined geographic subregions.

In most parts of North America, the record of Paleoindian occupation is relatively weak in terms of reliable radiocarbon dates and clearly associated artifact and faunal assemblages. Only by combining all of the evidence on continent-wide level can any compelling case be made. However, funding is lacking and an undertaking such as this is generally outside and beyond the range of what most American archaeologists focus upoon.

As a consequence, the Paleoindian Period (often defined as anything pre-dating 10, 000 cal BP) is basically the domain of a small number of specialists who interpret it for everyone else. For the last 40 years these researchers have focused their interpretations on two closely related and intricately inter-connected theories: Clovis First and Pleistocene Overkill. During this time, Paleoindian research has also deteriorated into an intense if not hostile (see Grayson and Melzer 2003, 2004; Fiedel and Haynes 2004) debate over these two competing but not mutually exclusive ideas. Much of the energy in this protracted dialog has been devoted to debunking or nullifying alternative hypotheses associated with these two theories. While this is standard practice in science, the degree to which the Paleoindian debate has been focused on deconstruction of opposing ideas rather than development of empirically solid, new ones has been extreme. In the face of this situation, it is noteworthy that Clovis First may have been mortally wounded by the Paisley Caves (Gilbert et al. 2008), and Monte Verde findings (Dillehay 1997; Meltzer et al. 1997). However, characterization of pre-Clovis cultures remains murky.

With respect to Firestone's (2009) argument for an impact event, more important is the status after 40 years of debate of Paul Martin's (1967) overkill hypothesis. When it was first proposed, overkill seemed to provide a compelling explanation for the rapid peopling of the Americas by Clovis peoples, and the disappearance of megafauna at the end of the Pleistocene. While many practicing American archaeologists grew up believing in overkill, time has not been kind to the theory. As Grayson and Meltzer (2003) and Melzer (2009) have recently pointed out, research over the last 40 years has simply failed to produce additional compelling evidence to allow us to confidently attribute late Pleistocene extinctions to human overhunting. Precious few of the 35 genera of animals that went extinct at the end of the Pleistocene have been recovered from archaeological sites. While some ecologists still feel that the North American extinction pattern is consistent with a human cause (Barnosky et al. 2004), the archaeological record has not yielded additional meaningful support for this idea.

The extraterrestrial impact hypothesis has been introduced into North American archaeology at time when the failings of the overkill model have been acknowledged by the majority of researchers, protestations by the theory's advocates notwithstanding (Fiedel 2009; Fiedel and Haynes 2004). Alternatives to overkill have long been focused on climate change associated with the Pleistocene-Holocene transition, but this idea has always been problematic because large animal populations had lived through previous interglacials without massive die offs. Something different seems to have happened in North America at the end of the Pleistocene, and that something was not a blitzkrieg by human hunters.

An extraterrestrial impact event seems to provide an exceptionally parsimonious explanation for a variety of patterns in the archaeological and paleontological records that are not accommodated by overkill. In western North America a vexing problems with Paleoindian research is the near absence of Clovis sites with diagnostic fluted projectile points, associated megafauna remains, and trustworthy radiocarbon dates. Indeed, only a single Clovis site, the Wenatchee cache, has produced fluted points and associated dates (Waters and Stafford 2007), but even this site has no faunal record. However, fluted projectile points are found as isolates throughout western North America from the southern NW Coast to Baja California (e.g., Hyland and Gutiérrez 1995; Rondeau et al. 2007). These points are generally accepted to date to the Clovis window of 13,300 -12,900 cal BP since there is no reason

to question the overall Clovis chronology based on the continent-wide study by Waters and Stafford (2007).

Furthermore, while the western North American record is weak, the overall association of Clovis with the remains of megafauna (primarily mammoths) is also well-established based on finds made elsewhere. Western archaeologists, to my knowledge, do not question the dating of Clovis nor its association with big game hunting, but they have not been able to confirm these patterns for the region itself because it has been so difficult to locate full-blown Clovis sites.

Some argue (e.g., Rosenthal and Meyer 2004) that the absence of substantial late Pleistocene components is simply a problem of visibility-- that Clovis sites have not been found because they are deeply buried. Certainly this is a legitimate problem. However, fluted isolates are also commonly found on the surface, and it has proven very easy to find slightly younger sites in places like central and southern California where over 30 sites dating from 10,000 to 9,000 cal BP have been identified in the last two decades (Porcasi 2008). By contrast, it is extremely difficult to find sites that date older than 10,000 cal BP.

In other parts of the world, it is possible to connect Holocene occupations with earlier ones simply by digging deeper beneath 10,000-year old materials. In western North America, such excavations prove fruitless because the Pleistocene and Holocene archaeological records do not seem to connect. In my view this seems consistent with small but widely dispersed populations of Clovis hunters and coastal colonists who were present in western North America only for a very brief time prior to the impact event. These populations would have been severely reduced if not completely wiped out by the extra terrestrial impact as Firestone (2009), Firestone et al. (2007), and Kennett et al. (2008) have suggested. The dramatic increase in archaeological sites after 10,0000 cal BP probably reflects growth in human populations after the climatic perturbations caused by the impact event, including the Younger-Dryas. Human populations must have started to recover sometime following the end of the Younger-Dryas but did not become archaeologically visible until ca. 10,000 cal BP.

The archaeological record contrasts with the clearly delineated expectations of adaptationist models that were proposed for places like California in the 1970s and 80s (e.g., Chartkoff and Chartkoff 1984). These models suggest that western North America was initially settled by highly mobile, specialized big game hunters who, after wiping out the megafauna, gradually shifted to more generalized economies as climate warmed and their populations increased. The archaeological predictions from these models include evidence for gradual *"in situ"* adaptive shifts and incrementally growing populations. Archaeological visibility should slowly increase as well, but the record, as it has been revealed so far, simply does not suggest such gradual adjustment; rather it seems more consistent with punctuated change resulting from a catastrophic event.

Of course, an extraterrestrial impact also provides an excellent explanation for the extinction of 35 genera of animals. While the dating for most of these extinctions remains poor or equivocal (see Grayson 2007; Meltzer 2009), most of the animals that went extinct were large ones (the Aztec rabbit and some birds were exceptions). Larger animals would have been most stressed by the catastrophic environmental events that followed the impact, while the more diminutive animals would have survived differentially relative to large ones. As others have noted, this is similar to the extinctions that resulted from the K-T impact event (Ruban 2009).

After decades of debate focused on aggressive attempts to reject alternative hypotheses, the extra-terrestrial impact hypothesis provides one of the first reasonable alternative explanations for the Paleoindian archaeological record in North America. The impact event itself seems to be supported by an impressive body of empirical evidence (Firestone 2009; Kennett et al. 2008; Napier 2009) including substantial paleoenvironmental findings. It also provides an exceptionally parsimonious explanation for previously unexplained and unacknowledged patterns in the archaeological record, and it also has clear testable implications for future research. The poor chronological resolution of the pre-10,000 cal BP archaeological record in western North America (and indeed most of the rest of the continent) leaves plenty of room for debate and additional research focused specifically on the implications of this hypothesis. In my view, the likelihood that the hypothesis will be vindicated and eventually accepted as fact seems considerably greater than the belief in overkill.

References

Barnosky A.D., Koch P.L., Feranec R.S., et al (2004) Assessing the causes of late Pleistocene extinctions on the

continents. Science 306: 70-75.

Buchanan B., Collard M., and Edinborough K. (2008) Paleoindian Demography and the extraterrestrial impact hypothesis. Proc. Natl. Acad. Sci. 105: 11651–11654.

Chartkoff, J. L., & K. K. Chartkoff (1984) The Archaeology of California. Stanford University Press, Stanford.

Dillehay, T.D. (1997) Monte Verde: a late Pleistocene settlement in Chile, Vol. 2, The Archaeological Context and Interpretation. Smithsonian Institution Press, Washington, D.C.

Fiedel, S. (2009). What caused the megafaunal Extinctions? The case against bolide impact. Journal of Cosmology, 2009, 2, 286-288.

Fiedel S. & Haynes, G. (2004) A Premature Burial: Comments on Grayson and Meltzer's "Requiem for Overkill." J. Arch. Sci. 31: 121-131.

Firestone, R.B. (2009). The Case for the Younger Dryas Extraterrestrial Impact Event: Mammoth, Megafauna and Clovis Extinction J. Cosmology 2. 256-285.

Firestone R.B., West, A., Kennett J.P., et al (2007) Proc. Natl. Acad. Sci. 104: 16016-16021.

Gilbert M.T.P., Jenkins D.L., Götherstrom, A., et al (2008) Science 320: 786-789.

Gillespie, R. (2009). Desperately seeking a cosmic Catastrophe 12,900 B.P. Journal of Cosmology, 2009, 2, 293-295.

Grayson, D. (2007) Deciphering North American Pleistocene Extinctions. J. Anthropol. Res. 63:185-213.

Grayson D. & Meltzer D. (2003) Requiem for North American Overkill. J. Arch. Sci. 30: 585-593.

Grayson D. & Meltzer D. (2004) North American Overkill continued? J. Arch. Sci. 31: 133-136.

Hagstrum, J. T. (2009). Large-body impacts and global mass extinctions: How compelling is the causal relationship? Journal of Cosmology, 2009, 2, 296-299.

Hamilton, M. J., & Buchanan, B. (2009). Archaeological and paleobiological problems with the Case for the Extraterrestrial Younger Dryas Impact Event. Journal of Cosmology, 2009, Vol 2, pages 289-292.

Haynes, C.V. (2008) Younger Dryas Black Mats and the Rancholabrean termination in North America. Proc. Natl. Acad. Sci. 105: 6520-6525.

Hyland, JR & Gutiérrez M. L. (1995) An Obsidian Fluted Point from central Baja California. J. California and Great Basin Anthopol. 17: 126-128.

Kennett, D. J., Kennett, J. P., West, G. J., et al (2008). Wildfire and Abrupt Ecosystem Disruption on California 's Northern Channel Islands at the Ållerød-Younger Dryas Boundary (13.0-12.9 ka). Quaternary Science Review 27: 2528-2543.

Kennett D.J., Kennett J.P., West A., et al (2009a) Shock-synthesized hexagonal diamonds in Younger Dryas boundary sediments Proc. Natl. Acad. Sci. 106: 12623- 12628.

Kennett D.J., Kennett J.P., West A., et al (2009b) Nanodiamonds in the Younger Dryas Boundary Sediment Layer. Science 323: 94.

Martin P.S. (1967) Pleistocene Overkill. Natural History 76:32-38.

Meltzer, D. (2009) First Peoples in a New World, University of California Press, Berkeley.

Meltzer, D, Grayson, D.K., Ardila, G., et al (1997) On the Pleistocene Antiquity of Monte Verde, Southern Chile. Amer. Antiq 62: 659-663.

Napier, W. (2009). Comets, catastrophes, and Earth's history. Journal of Cosmology, 2009, 2, 344-355.

Porcasi, J. F. (2008) Subsistence Patterns of Prehistoric Coastal California: Investigating Variations of Early Maritime Adaptation. Ph.D. thesis, School of Archaeology and Ancient History, Leicester University.

Rondeau, M F. Cassidy J. and Jones T.L. (2007) Colonization Technologies: Fluted Projectile Points and the San Clemente Island Woodworking/Microblade Complex Jones, T. L., and K. A. Klar (eds.) California Prehistory: Colonization, Culture, and Complexity. Alta Mira Press, New York.

Rosenthal, J. S. & Meyer J. (2004) Landscape Evolution and the Archaeological Record: A Geoarchaeological Study of the Southern Santa Clara Valley and Surrounding Region. Center for Archaeological Research at Davis no.14. University of California, Davis.

Ruban, D.A. (2009) The Survival of Megafauna after the end-Pleistocene Impact: a lesson from the Cretaceous/Tertiary Boundary. Geologos 15: 129-132.

Waters M. E. & Stafford T.W., Jr. (2007) Redefining the age of Clovis: Implications for the peopling of the Americas. Science 315: 1122-1126.

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