

Lithic Technology, Cultural Transmission, and the Nature of the Far Western Paleoarchaic/Paleoindian Co-Tradition

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Over 20 years ago, Alan Bryan challenged the idea that Clovis should lie at the base of all far western culture histories. His main claim and associated hypothesis on this topic are as follows:

It has generally been assumed that fluted points should everywhere precede stemmed and notched points as they do on the High Plains. However, this assumption has never been properly demonstrated, either stratigraphically or by independent means of dating. An alternative hypothesis which should be tested is that the Stemmed Point Tradition developed in the Great Basin, perhaps even before the Fluted Point Tradition appeared in the area [1988:59].

Bryan's arguments against the uncritical acceptance of a Paleoindian–Archaic culture-history model in the far west accurately reflect a problem still unresolved. Progress toward the accumulation of hard facts that might allow us to assess Bryan's Stemmed Point Tradition hypothesis has been relatively slow; however, available information collected since 1988 can be used to discuss what seems to be an emerging pattern of far western, late Pleistocene prehistory. Most important, evidence indicating a co-occurrence of fluted and nonfluted point and lithic traditions in the far west continues to accumulate. Many terms have been advanced through the years to account for early but distinctly non-Clovis patterns in the far west region, including the Desert Culture (Jennings 1957, 1964), the Western Pluvial Lakes

Tradition (Bedwell 1973), the Old Cordilleran Complex (Butler 1961), the Western Lithic Co-Tradition (Davis et al. 1969), the Paleo-Coastal (Davis et al. 1969), the Western Stemmed Tradition (Bryan 1980, 1988), and most recently, the Paleoarchaic Tradition (cf. "paleo-Archaic" [Beck and Jones 1997; Jennings 1957, 1964; Willig 1988]). More recently, Beck and Jones (1997) revived the term *Paleoarchaic* in a more expansive manner to signify this early nonfluted point-bearing cultural pattern in order to highlight what they argue is a late Pleistocene–early Holocene cultural pattern with distinctly non-Clovis technological attributes. This has not been accepted by all and has recently been the topic of debate (e.g., Haynes 2007).

Gary Haynes argues that the etymology of the word *Paleoarchaic* is invalid and its use must be discontinued: "This coined word is made from two Greek roots that just cannot be assembled comfortably: paleo means ancient, and archaic means early or old. Thus, Paleoarchaic literally means 'ancient old'" (2007:258). If Haynes is right, then we should reconsider our modification of Early, Middle, and Late Archaic since they literally mean "early old," "middle old," and "late old." In this light, the need to discontinue the use of *Paleoarchaic* hardly seems relevant or important. The logic that the term *Paleoarchaic* should be abandoned because it implies "an old-fashioned or outmoded form of the Archaic" (Haynes 2007: 252) must also be applied to the term *Paleoindian*, which is unlikely to be accepted as it too implies

a period of old-fashioned or outmoded form of Indians. To quibble over these details gives the impression that the primary basis for highlighting a distinctly different perspective on far western Pleistocene prehistory rests primarily with its moniker. This misses the larger point, which is that the conceptual elements associated with the term *Paleoindian* fall short of explaining what we see in the early archaeological record of the far west. Use of the Paleoarchaic concept indicates a hypothetical perspective that questions the assumption that Clovis was an ancestor to all far western cultural groups.

In contrast, to use the term *Paleoindian* as a universal, one-size-fits-all label implies knowledge of a clear evolutionary relationship between fluted and nonfluted technologies in the far west, which has not been demonstrated to any degree. To simply subsume all Pleistocene-age cultural components into a Paleoindian category in the absence of proof of an evolutionary relationship with fluted traditions is incorrect because it inappropriately generalizes the archaeological record. Clearly, we must view the primacy of the Paleoindian evolutionary pattern as hypothetical in the far west, particularly since the regional archaeological record of Clovis and other nonfluted Paleoindian traditions exists almost entirely as surficial finds or otherwise undated, largely uninformative (at least to the thematic topics discussed here) surficial sites.

The inclusion of the “Archaic” concept in the term *Paleoarchaic* is meant to indicate continuity of an economic lifeway across the Pleistocene–Holocene boundary. We justify the modification of the *Archaic* term, despite apparent economic continuity that might otherwise simply warrant a simple modification of the word (e.g., “Pleistocene Archaic” [Haynes 2002]), because the Paleoarchaic period context includes evidence of people living in significantly different marine, alluvial, lacustrine, and terrestrial environments. Thus, while the economic pursuits show focus on “a wide range of locally available plants and animals [that] are exploited across regional micro-environments by populations familiar with their distribution and seasonality” (Willig and Aikens 1988:5), the environmental context in which these economic activities were performed is dramatically different than that associated with

the Archaic Holocene epoch. Although the timing of a Paleoarchaic–Archaic transition may vary from place to place in the far west depending on environmental histories, we generally consider this transition to have occurred during the early Holocene. As currently defined, there is no accommodation in the Paleoindian Tradition concept for the early nonfluted archaeological patterns seen in the far west. For this reason, we require other testable ideas to explain the distinct, highly visible, and arguably contemporaneous archaeological tradition that clearly stretches along the far western edge of North America.

In this chapter, we seek to answer the following questions: (1) Are the Paleoarchaic and Paleoindian archaeological patterns distinct enough to warrant the interpretation that they actually represent a cultural co-tradition in the far west? (2) What might have led to the existence of a cultural co-tradition in the late Pleistocene period? and (3) What kinds of intergroup interactions might have occurred within the context of this cultural co-tradition, and how can these be measured in the archaeological record?

Defining the Paleoarchaic and Paleoindian Patterns in the Far West

In order to address our first question regarding evidence of an early cultural co-tradition in the far west, we examine the available evidence as it relates to the temporal concept and timing of the Paleoarchaic and Paleoindian archaeological patterns and their related technological patterns (Figure 3.1).

Temporal Context

Late Pleistocene-aged (i.e., chronometrically dated in excess of 11,500 cal BP) archaeological components are known from a relatively small number of sites in the far west, including K1 Cave on Haida Gwaii (Fedje et al. 2004b), Indian Sands (Davis 2006, 2008; Davis et al. 2004; Willis 2005; Willis and Davis 2007), Newberry Crater (Connolly 1999), Lind Coulee (Daugherty 1956; Irwin and Moody 1978), Marmes Rockshelter (Hicks 2004), Hatwai (Ames et al. 1981; Sanders 1982), Wewukiyepuh (Schuknecht 2000), Connley Caves (Bedwell 1973), Paisley Five Mile Rockshelter (Jenkins 2006; Jenkins et al. 2010), Cooper’s Ferry (Butler 1969; Davis and Schweger

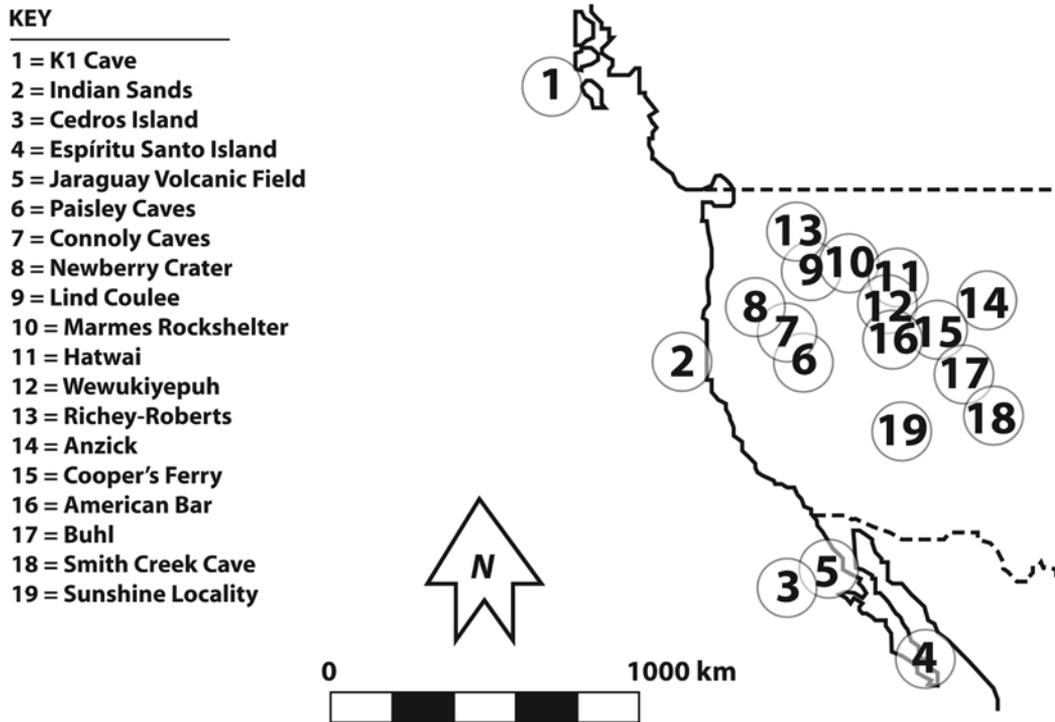


FIGURE 3.1. Map showing sites and localities mentioned in the text.

2004), Smith Creek Cave (Bryan 1979), the Sunshine Locality (Beck and Jones 1997), Bonneville Estates Rockshelter (Goebel 2007; Graf 2007), Cerro Pedregoso on Baja California's Cedros Island (Des Lauriers 2006), and Covacha Babisuri on Espiritu Santo Island in Baja California Sur (Fujita 2006). Of these sites, only Marmes Rockshelter, Connolly Caves, Cooper's Ferry, Paisley Five Mile Rockshelter, and Smith Creek Cave include cultural components with nonfluted lanceolate projectile points dated in excess of 12,900 cal BP.

Although Clovis points have been identified from all far western states and from the Baja California peninsula, Clovis artifacts have not yet been found in association with radiocarbon ages associated with the Clovis Tradition (13,350–12,870 cal BP [Haynes 1980, 1982, 1987; Haynes et al. 1984]; 13,125–12,925 cal BP [Waters and Stafford 2007]). The Richey-Roberts Clovis site of eastern Washington includes fluted points reportedly in contact with grains of Glacier Peak tephra (which initially erupted at 13,120 cal BP [Mehringer and Foit 1990]); however, this can

only be considered a relative, maximum age, not a chronometric age estimate. The absence of chronometric ages for Clovis archaeological components in the far west means that we also lack empirical proof that the age of the Plains Clovis cultural tradition will be the same in the far west. If we are to treat the Clovis model as a testable hypothesis, we are correct to require such proof. Our guess, however, is that the appearance of Clovis technologies in the far west probably dates within the range of Clovis sites in the Plains and Southwest. That said, the best, most current information indicates that Paleoarchaic components are earliest in the far west and thus leads us to reject the hypothesis that a Clovis Paleoindian cultural tradition gave rise to the Paleoarchaic tradition.

Evolutionary Links Through Technology?

Evolutionary relationships between Paleoindian and Paleoarchaic traditions are most commonly discussed in relation to supposed technological similarities or dissimilarities. In their review of the prehistory of the southern Columbia River

Plateau, Ames et al. succinctly summarize a commonly held view about the place Clovis holds in the cultural-historical sequence of the interior Pacific Northwest:

Rare surface finds of Clovis points occur throughout the region (Galm et al. 1981; Hollenbeck 1987). The similarity of these finds to dated sites in other regions implies an early link to areas south and possibly east of the Plateau. Less evident is the nature of relationships between Clovis and succeeding phases of prehistory. There is little evidence of a cultural continuum from Clovis to later-dating cultural manifestations in this area, though Aikens (1984) describes what may be transitional artifact forms in Oregon. Thus, while a Clovis presence is documented, it is unknown whether this culture had any bearing on subsequent cultural development in the Plateau region [1998:103].

Taking an alternative view, Willig and Aikens provide a summary of a long-standing argument for evolutionary continuity between fluted and nonfluted technologies in the far west based on the simple application of a Plains-style early Paleoindian-late Paleoindian culture-history model to all early far western sites:

The typology of early western assemblages could be interpreted as representing a complete temporal continuum of forms, with fluted Clovis grading into fluted and nonfluted basally thinned, concave based and stemmed and shouldered styles of later Archaic periods (Willig [1989]). As pointed out by Aikens (1978), this “continuum” of gradual blending from fluted into stemmed points and later forms is well documented from dated sequences in the Plains and Southwest (Frison 1978; Frison and Stanford 1982; Haynes 1964, 1980), where Clovis gives rise to Folsom and Plano forms [1988:20].

Embedded in this statement are unspecified concepts of “grading” and “gradual blending” wherein earlier fluted Paleoindian point styles undergo a kind of metamorphosis into later nonfluted Western Stemmed and foliate lanceo-

late forms. This conceptualization of early technological evolution is an oversimplification and seems to consider only the most basic morphological features of artifacts as meaningful indicators of ancestor-descendant continuity. We question the value of evolutionary interpretations made only on typological grounds. Instead, we seek to understand the technological basis of a Paleoindian-Paleoarchaic evolutionary relationship (cf. Beck and Jones 1997; Bryan 1988, 1991; Fagan 1988; Warren and Phagan 1988), if it indeed exists. We do this next by considering the technological continuum as a whole.

Early Paleoarchaic lithic assemblages are known from excavated contexts in the 15 sites listed earlier and include the hallmark stemmed and/or foliate (i.e., willow leaf-shaped) finished biface forms. The presence of Paleoindian cultural traditions in the far west is inferred almost entirely from isolated surficial finds of fluted and unfluted bifaces. Exceptions to this are seen in the discovery of the Simon, Fenn, and Richey-Roberts “Clovis caches” in the far west (Frison 1991; Gramly 1993; Mehringer 1988; Mehringer and Foit 1990; Woods and Titmus 1985). Of these, only the Richey-Roberts site was systematically excavated by archaeologists. Because bifacial tools dominate these “caches,” and lithic debitage either is absent or was not recovered, they do not provide a detailed view of an entire Paleoindian lithic assemblage. In the absence of direct knowledge about Paleoindian lithic technology from far western sites, we must rely on studies made on Plains Paleoindian assemblages in order to make a comparison with Paleoarchaic lithic technology. Far western Paleoarchaic and Plains Paleoindian lithic technologies differ in two fundamental ways. First, fluted bifaces and stemmed and foliate bifaces consistently use separate hafting elements. Second, the lithic reduction sequence models (*sensu* Bleed 2001) for Paleoindian and Paleoarchaic technological assemblages are, we argue, completely different and readily distinguishable (cf. Fagan 1988; Figure 3.2).

Paleoarchaic Lithic Technology

Paleoarchaic lithic reduction strategies consistently include the following elements: raw material use is diverse and often focused on local sources of varying quality (Figure 3.2a); reduc-

PALEOARCHAIC REDUCTION SEQUENCE

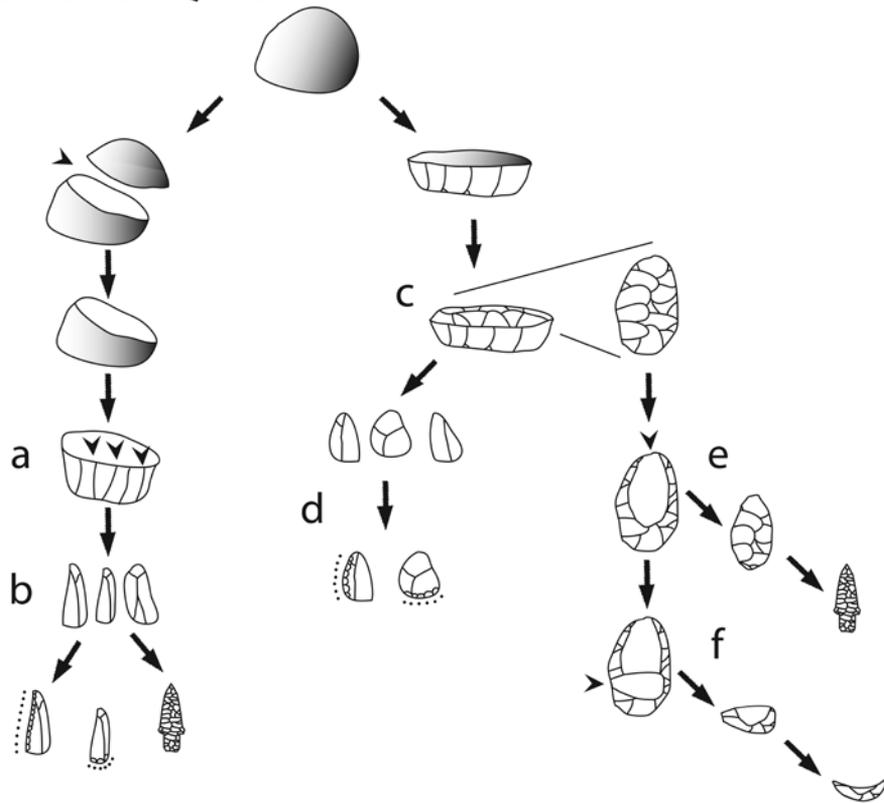


FIGURE 3.2. Paleoarchaic lithic reduction sequence, including unidirectional core production (a), followed by the creation of flake tools and simple modified flakes, projectile points, and crescents from blades and macroflakes (b); centripetal core production (c), resulting in macroflakes that are crafted into flake tools or simple modified flakes (d); centripetal core production (c) that leads to discoidal macroflakes and subsequent projectile point and crescent production (e–f).

tion of macroflakes struck from cores provides the primary means for all tool production (Figure 3.2b); core forms are diverse (centripetal, unidirectional, multidirectional) and appear to be a key characteristic of the Paleoarchaic technological sequence model (Figure 3.2a, c–2f); some stemmed and foliate finished bifaces are made on macroblades (Figure 3.2b); most stemmed and foliate finished bifaces are made on macroflakes (Figure 3.2d); direct, multistage reduction of large bifacial preforms to smaller finished biface forms is relatively uncommon but present in some instances. The diversity of raw material use patterns and core forms and the presence of biface production directly from macroblades and macroflakes may offer the best evidence for conceptualizing Paleoarchaic lithic technology as distinctly

separate from Paleoindian lithic technology. Paleoarchaic core diversity promotes use of the widest variety of raw material types and forms. The ability to create a tool kit from igneous, metamorphic, and sedimentary rocks in both nodule and rounded cobble form—the latter being ubiquitous in the far western landscape—undoubtedly enhanced knappers’ ability to use the broadest range of regional environments and reduced the need for exotic, distant lithic sources. This approach directly contrasts with fluted biface site assemblages based on far-ranging, high-quality toolstone sources: namely, fine-grain cherts, quartz, and obsidians.

Core forms include formal centripetal and unidirectional designs as well as nonformal amorphous or multidirectional forms. The presence of

a centripetal core reduction strategy is notable and likely a distinct behavioral adaptation for producing macroflakes and blade-like flakes of predetermined sizes from rounded cobbles of varying quality. In the far west, the early use of centripetal cores includes similar reductive elements to Old World Levallois technology. A distinct Levallois-like lithic technology has been documented for early Holocene lithic assemblages in the Pacific Northwest by Muto (1976) and can be applied to other far western sites where centripetal core forms are present.

Recent excavations at the American Bar site in the Lower Salmon River canyon of western Idaho produced a crescent associated with early Holocene radiocarbon ages (E. L. Davis, unpublished data). Crescents are rare in the Columbia River Plateau, seen elsewhere at the Lind Coulee site (Daugherty 1956), but are commonly associated with Great Basin Paleoarchaic lithic assemblages (e.g., Beck and Jones 1997, 2010). Most important to this discussion is the observation that the American Bar crescent appears to have been made on a transverse flake struck from a centripetal core, exhibited by its retention of the distal portion of a large flake scar on its dorsal face. In this way, the American Bar crescent appears to show a direct link with Levallois-like, centripetal core reduction (Figure 3.2f).

Formal unidirectional core forms are an additional design found in Paleoarchaic assemblages throughout the far western region. Many of these cores have been ascribed to categories such as “scraper planes,” “domed scrapers,” or “discoidal scrapers,” suggesting use as steep-edged tools (Fedje et al. 2004b; Rogers 1966; Warren 1967). While we agree that these artifacts were used in many cases as scraping implements, it is very apparent that these artifacts served as highly formalized cores. These unidirectional *core tools* include a single prepared platform with faceted blade-like flake removals. Flake removals from the single core edge were serially driven off downward along the entire circumference of the core edge. Amorphous or multidirectional core forms were also used to produce blanks for direct modification into tools or for direct use as unmodified flake tools. While the indistinct morphology of these cores is synchronically and diachronically ubiquitous in the far west, they represent yet an-

other way in which the more generalized Paleoarchaic core and flake reduction pattern is applied to virtually any kind of toolstone.

Early Paleoindian Lithic Technology

Wilke et al. (1991), Collins (1999), and Morrow (1995) provide examples of early Paleoindian lithic reduction sequences from beyond the far west. In general, fluted biface site assemblages include evidence for bifacial reduction and formal conical and wedge-shaped core and blade reduction (Figure 3.3). The production of finished bifaces is nearly always seen to be a result of extended bifacial reduction from larger bifacial preforms (Figure 3.3c–f). While Collins (1999) notes that fluted biface technology largely included tools made from bifacial reduction and conical and wedge-shaped cores, tools made on core-struck macroflakes are also present, albeit rarely. Moreover, macroflakes used for tool manufacture are typically attributed to debitage produced during extensive bifacial reduction, rather than through a formal core and flake reduction process (Collins 1999). A further distinction of the Paleoindian technological sequence model is the presence of the blade industry as a reduction “subsystem” (Figure 3.3a–b). Formal unidirectional conical and wedge-shaped cores were used to make true blades. These blades were not used for bifaces but instead served as special-purpose tools apart from the biface. The existence of this highly formalized core and blade industry also serves to further distinguish Paleoindian technology from Paleoarchaic technology. That is, fluted biface manufacture is extremely limited to direct biface reduction, which is not a diverse use of core technology or tool production. Instead, early Paleoindian lithic assemblages are quite standardized and restrictive.

As is commonly known, the defining characteristic of early Paleoindian technology is the removal of fluting flakes, which were typically driven off the biface before completion of the point, suggesting an implicit and integrated reduction and design strategy (Callahan 1979; Collins 1999). However, unlike in regions farther east, the far west manifestation of fluted Clovis technology does not share a diversity of fluted forms (e.g., Suwanee, Cumberland, Redstone) and is commonly considered to be “different”

PALEOINDIAN REDUCTION SEQUENCE

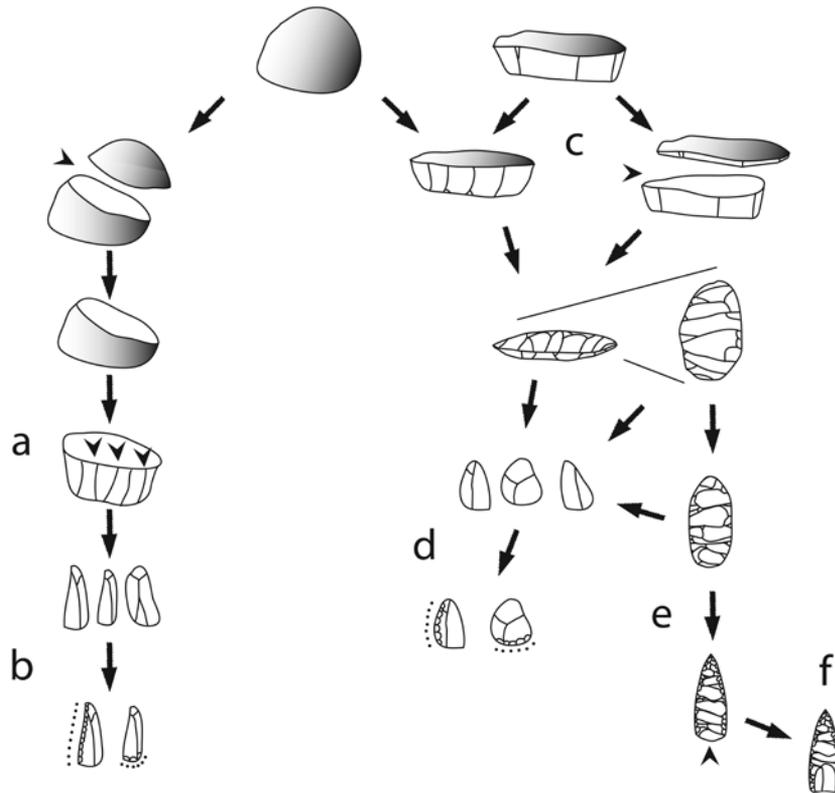


FIGURE 3.3. Paleoindian lithic reduction sequence, including unidirectional core production (a), followed by the creation of blades, flake tools, and simple modified flakes (b); a large bifacial preform created from extensive reduction of a large nodule or macroflake/spall (c); and repetitive stages of bifacial reduction producing usable flakes (d) and refining the bifacial preform (e); ultimately leading to a fluted Clovis point (f) or a non-fluted Paleoindian point type.

from Clovis elsewhere (Beck and Jones 2007, 2009; Beck et al. 2004), based on its shape form, degree of basal indentation, and variation in fluting (i.e., absent to “basally thinned”). Moreover, the nature of technological variability inherent in the Western Fluted tradition is mainly understood from basic morphometric comparisons (e.g., Beck and Jones 2010: Table 4).

While diagnostic biface characteristics are commonly used to separate early site types in the far west (i.e., fluted = Paleoindian, and stemmed/ foliate = Paleoarchaic), we feel that the morphological end product of the bifaces was probably less important than the reduction sequence behind their production. We believe that close examination of fluted and nonfluted stemmed/ foliate site assemblages reveals vastly different

reduction methods, core strategies, tool forms, and raw material preferences. Until better chronometric dating control on early sites is available, this technological evidence of distinctly separate lithic reduction sequences is perhaps the strongest indication for the presence of two contemporaneous cultures or co-traditions during the late Pleistocene–early Holocene period in the far west.

Divergent Technologies

Significant differences exist between Paleoarchaic and Paleoindian lithic technological organization that cannot be explained as having resulted from an evolutionary process wherein one is derived from the other. Whereas the argument of early lithic co-traditions has been in play for decades,

it has not been adequately tested. We believe that the hypothesis that Paleoarchaic and Paleoindian lithic traditions are derived from separate evolutionary lines can be evaluated from the different ways in which their technological systems are organized. We explore the hypothesis of early far western lithic co-traditions by comparing aspects of Paleoarchaic and Paleoindian lithic reduction sequences as related to core technologies and their products.

Variation in core design and their reduction strategies represents a major difference between Paleoarchaic and Paleoindian lithic technological organization. Paleoarchaic core strategy is highly variable, with a reliance on multidirectional and amorphous core designs. There also exists a patterned use of formal centripetal and unidirectional core forms in multiple Paleoarchaic assemblages, yet these strategies are not as prevalent as the multidirectional forms. While prepared unidirectional core and flake strategies are common in the Paleoarchaic lithic reduction trajectory, so are core and blade approaches. Paleoarchaic core and blade technology is in no manner morphologically or technologically cognate to the hallmark large, cylindrical wedge-shaped unidirectional blade cores recovered at numerous Paleoindian sites (Collins 1999). In contrast, Paleoarchaic unidirectional cores are typically smaller, due to both exhaustion and original nodule size, and are typically used for macroflake production. In many cases, Paleoarchaic core forms serve additional functions as scraping implements and are commonly referred to as scraper planes, domed scrapers, steep-edged unifacially retouched tools, or core scrapers (e.g., Des Lauriers 2006). The patterned use of this unidirectional core tool type is associated with early sites from the northern Northwest Coast of British Columbia (Fedje et al. 2004b), the Great Basin (Warren 1967), and the Baja California peninsula (Des Lauriers 2006).

We may further distinguish the use of the unidirectional core form by the different traditions and their respective by-products. Macroblade production is present within Paleoarchaic and Paleoindian site assemblages; however, where this specialized reductive technique is present at a few Paleoarchaic sites, including Cooper's Ferry (Davis 2001) and Connley Caves (Bedwell

1973) — and probably Marmes (Hicks 2004), Lind Coulee (Daugherty 1956), and Buhl (Green et al. 1998) — a formal core and macroblade strategy does not appear to be a consistent part of Paleoarchaic technological organization. Paleoarchaic macroblade production also includes centripetal core technology similar to the Old World Levallois technique (Muto 1976). Not only is there an apparent absence of the larger, formal cylindrical/wedge-shaped cores (*sensu* Collins 1999) at Paleoarchaic sites, but the dimensions of the macroblades are significantly smaller when compared with the Paleoindian forms. Comparatively, the use of the core and macroblade strategy, or blade-making strategy (*sensu* Boldurian and Cotter 1999), has been highlighted at Paleoindian sites in the far west and greater North American continent, exemplified at sites like Richey-Roberts (Mehring 1988), Blackwater Draw, and Kevin Davis (Collins 1999). Describing northern Plains Clovis technology, Bradley states, “Most Clovis tools are either bifaces or are made from flakes that resulted from the biface manufacturing process” (1991:370). Bifacial core use is present in both Paleoarchaic and Paleoindian core reductive strategies; however, while Paleoarchaic bifacial core use is inconsistent — likely reflecting an opportunistic core strategy — Paleoindian use of bifacial cores is a fundamental aspect of its technological organization.

Generally held notions of the Paleoarchaic tool kit as an evolutionary descendant of fluted point technology are untested assumptions based largely on adaptations of technological evolutionary models from neighboring regions. To understand the basis for this assumption we may look farther east to the Rocky Mountain region, where Frison (1991), Bradley (1991), and Boldurian and Cotter (1999) offer a more substantial example of the evolution from fluted point technology to unfluted stemmed and lanceolate forms. The Plains model of Paleoindian technological evolution differs from archaeological patterns seen in the far west in two significant ways. First, unlike the far west, the Rocky Mountain region possesses a substantial chronological record that clearly demonstrates fluted point assemblages occurring earlier than cultural components associated with what Bradley (1991) terms the *Collateral Point Complex*. Projectile points associated with the

Collateral Point Complex include well-known Goshen, Plainview, Eden, Scottsbluff, and Cody types. Because the reduction sequence of fluted and nonfluted Collateral Point Complex projectile point technologies is based on the same processes of raw material selection, core production, and bifacial reduction (Bradley 1991), a clear case is made for technological continuity between Paleoindian fluted and Collateral Point Complex traditions (i.e., the Llano–Plano continuum). Bifacial core reduction remains as the most prevalent core strategy associated with the Collateral Point Complex, further indicating a connection with earlier Clovis technology; however, the Collateral Point Complex also shows the discontinuation of fluting and the serial production of macroblades. Although it is reasonable to assume that the evolution of early far western lithic technologies followed the same unilinear trajectory embodied in the Llano–Plano continuum, this model has not been borne out by the facts of the archaeological record. It is possible to identify far western sites that bear artifacts that could be easily classified within the Collateral Point Complex; however, these are quite rare (e.g., Sentinel Gap [Galm and Gough 2008]). Instead, evidence suggests that nonfluted, non–Collateral Point Complex, stemmed projectile point traditions are widespread in the far west.

Whereas a technological continuum is plausible between fluted and nonfluted Collateral Point Complex point traditions based on their shared technological elements, the same cannot be said for Paleoarchaic and Paleoindian technologies. The majority of Paleoarchaic stemmed and foliate finished bifaces are manufactured from core-struck macroflakes. This reduction process is commonly indicated by the retention of original macroflake landmarks such as portions of the dorsal ridge, distal striking platform, and plano-convex cross section. This different approach to projectile point manufacture is, we believe, tremendously significant because of its place within the Paleoarchaic sequence model and given the fact that point manufacture from core-struck macroflakes is not a normal part of fluted biface assemblages. Juliet Morrow (1995) provides a rare exception to this last statement as she interprets the presence of a macroflake-to-finished fluted Clovis point trajectory in the Clovis technologi-

cal sequence model from the Ready/Lincoln Hills site in Illinois.

One hallmark of the Paleoindian fluted biface is the patterned use of overshot and collateral flaking applied in the final stages of biface manufacture. Like their fluted predecessor, stemmed and lanceolate bifaces of the Collateral Point Complex include a consistent collateral flaking pattern as well as many instances of overshot flaking. This is not the case for the majority of Paleoarchaic stemmed and foliate bifaces, which often exhibit relatively unpatterned flaking. Although rare examples of collateral and overshot flaking patterns can be found on some Paleoarchaic stemmed and foliate bifaces (e.g., Lind Coulee [Daugherty 1956], Hatwai I [Ames et al. 1981]), these techniques do not seem to be significant or consistent aspects of Paleoarchaic biface shaping strategy.

Potential Explanations for a Paleoarchaic/Paleoindian Co-Tradition

On the basis of our earlier reasoning, we consider the Paleoarchaic and Paleoindian archaeological traditions to represent separate, early, and at least partially contemporaneous New World technological systems. While we do not know for certain, we speculate that the appearance and persistence of these two different technological systems represent separate peoples, probably ethnic groups bearing their own languages, who spread into the New World from different areas (see also Goebel et al. 2008 for an additional perspective on this sort of two-pronged migration process). To begin to answer the question of how an early cultural co-tradition came to be in the first place, we consider the fact that very few sites bearing what might be interpreted as Paleoindian artifacts are found in the far west and very few Paleoarchaic sites are found east of the Rocky Mountains. We find this pattern to be highly significant, and it probably reflects the manner in which their related peoples came to be separated in mid-latitude North America. The Late Wisconsinan glacial history of North America provided critical opportunities at different stages during the late Pleistocene that may have allowed Paleoarchaic and Paleoindian peoples to migrate south of the ice sheets at different times, in different ways. Close examination of the Dyke

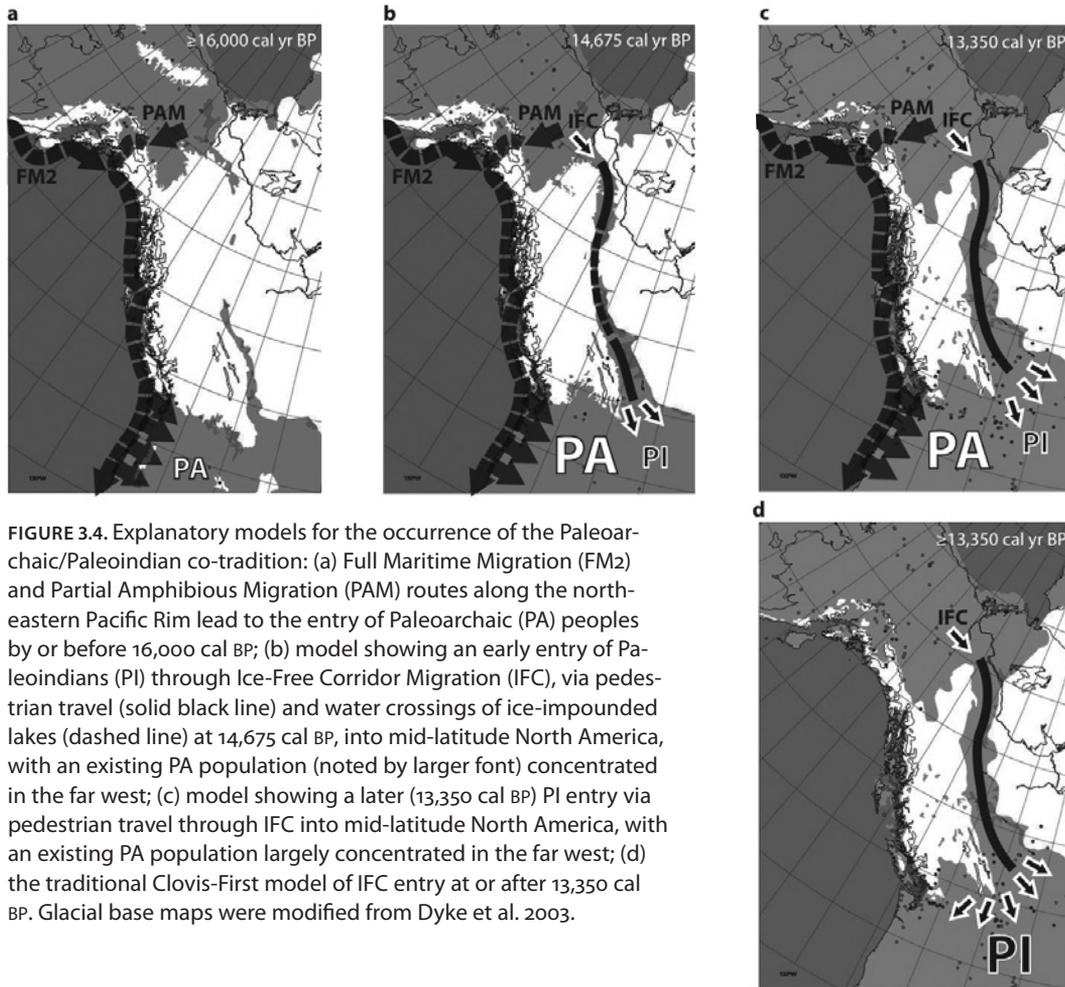


FIGURE 3.4. Explanatory models for the occurrence of the Paleoarchaic/Paleoindian co-tradition: (a) Full Maritime Migration (FM2) and Partial Amphibious Migration (PAM) routes along the north-eastern Pacific Rim lead to the entry of Paleoarchaic (PA) peoples by or before 16,000 cal BP; (b) model showing an early entry of Paleoindians (PI) through Ice-Free Corridor Migration (IFC), via pedestrian travel (solid black line) and water crossings of ice-impounded lakes (dashed line) at 14,675 cal BP, into mid-latitude North America, with an existing PA population (noted by larger font) concentrated in the far west; (c) model showing a later (13,350 cal BP) PI entry via pedestrian travel through IFC into mid-latitude North America, with an existing PA population largely concentrated in the far west; (d) the traditional Clovis-First model of IFC entry at or after 13,350 cal BP. Glacial base maps were modified from Dyke et al. 2003.

et al. (2003) reconstructions of Late Wisconsinan glacial ice sheets indicates the presence of a hypothetical coastal route by at least 16,000 cal BP and that a hypothetical ice-free corridor had opened by 14,675 cal BP or was perhaps delayed until 13,350 cal BP. Within the context of these late Pleistocene environmental conditions, we consider the process of early human migration along coastal and interior routes of entry and offer a possible explanation for the Paleoarchaic/Paleoindian co-tradition problem. These processes of early human migration into the Americas include *Full Maritime Migration*, *Partially Amphibious Migration*, and *Ice-Free Corridor Migration*. We briefly discuss these three migration scenarios, which are illustrated in Figure 3.4, and their implications for the Paleoarchaic/Paleoindian co-tradition problem.

Full Maritime Migration

Early peoples bearing a fully maritime adaptation that enabled long-distance oceangoing travel and broad use of coastal economic resources, including areas along extensive glacial ice margins, could easily negotiate movement across the Bering Strait and continue along the eastern Pacific coast at or before 16,000 cal BP (Figure 3.4a). Whether a full-fledged maritime orientation was an adaptive aspect of the first Americans is not clear; however, others have argued for its existence based on global patterns of human migration in coastal regions (e.g., Dixon 1999, 2001; Erlandson 2002). Under a Full Maritime Migration (FM2) strategy, migrants could be expected to create fewer sites with highly ephemeral traces and may not have colonized all or any of the available coastal areas. If FM2 migrants

traveled great distances along the eastern Pacific coast in short time intervals, perhaps in the process of following migratory waterfowl or some other marine animals, then their transit time from Beringia to the Olympic Peninsula could have been relatively brief. If the FM2 strategy was employed, we would expect the Alaskan and British Columbian coastlines to hold the earliest sites in the Americas; however, a highly mobile population that was focused on nearshore ecosystems would be expected to leave little to no archaeological evidence in most of today's modern coastal environment. Conversely, some early FM2 migrants could have stopped their voyage at different points along the unglaciated Alaskan and British Columbian coast, colonizing New World coastal regions, while others continued on to points south. If this occurred, then we should expect that the earliest New World sites should be found along the northeastern Pacific Rim.

Partially Amphibious Migration

Dyke et al. (2003) indicate that the Copper River Basin was deglaciated by 16,000 cal BP, opening a route for human migration from southeastern Beringia to the Pacific Ocean. South of the Copper River's mouth, large, scattered areas of coastal Alaska and British Columbia were never glaciated, or were deglaciated by 16,000 cal BP, providing a mosaic of terrestrial environments extending to Washington State's Olympic Peninsula (Dixon 1999, 2001; Fedje et al. 2004a; Mandryk et al. 2001), from which early human migrants could easily move into mid-latitude North America and beyond (Figure 3.4a). This particular scenario considers coastal migration as an "amphibious" process involving a mix of terrestrial and maritime movements and adaptations within coastal and pericoastal environments (see Dixon 1999, 2001; Fedje et al. 2004a), perhaps only requiring relatively limited seafaring efforts. If the initial peopling of the Americas occurred via a Partially Amphibious Migration (PAM) strategy, we should see the earliest New World sites occurring between the Copper River and Vancouver Island, dating as early as 16,000 cal BP. In contrast to the FM2 model, early human migrants who employed a PAM approach would undoubtedly produce a greater number of sites in more places along the coastal route. If PAM settlers left be-

hind colonizing populations as they moved south along the coast, early human occupation of the coastal landscape might limit the ability of later migrants to follow the PAM route south of the ice sheets. If this indeed occurred, and if the early coastal colonizers competed to deny outsiders access to their territorial resources, such a settlement process could close a PAM route to other, later migrants within a few generations after becoming settled. Such a process might cause pronounced cultural and genetic divergence between Pacific coastal and Beringian peoples. As well, the presence of FM2 settlers along the northeastern Pacific Rim prior to 16,000 cal BP could have limited or excluded others from later employing a PAM model.

Ice-Free Corridor Migration

According to Dyke et al. (2003), Late Wisconsinan deglaciation produced an ice-free corridor between the Cordilleran and Laurentide ice sheets as early as 14,675 cal BP; however, Duk-Rodkin and Hughes (1991, 1992) argue that the Mackenzie Mountains' glacial ice did not retreat until 13,350 cal BP, delaying the full opening of the corridor. Mandryk et al. (2001) argue that the initial opening of the ice-free corridor was accompanied by the simultaneous growth of an inland sea, which persisted until 13,350 cal BP and initially impeded human migration; however, Haynes (2005) has speculated that Clovis migrants could have solved this problem by building boats to cross the water obstacle. If boats were used to cross water bodies within the ice-free corridor, then the Ice-Free Corridor Migration (IFC) route could hypothetically have been traversed by 14,675 cal BP (Figure 3.4b). A fully terrestrial IFC route was apparently open by 13,350 cal BP (Figure 3.4c). The opening of the corridor by 14,675 cal BP or 13,350 cal BP could have offered an alternative interior route of southward migration at least a thousand years after a PAM strategy could have been pursued along the Pacific coast. Moreover, the IFC could have offered an alternative to an earlier but already occupied coastal route of entry for Beringian populations. Although it fails to account for evidence of pre-Clovis-aged human occupation at sites like Monte Verde (Dillehay 1989) and Paisley Five Mile Rockshelter (Jenkins 2007; Jenkins et al. 2010), the traditional Clovis-First

model of entry via an IFC route is also shown in Figure 3.4d simply for comparison.

Early Intergroup Interaction

If the Paleoarchaic peoples initially entered mid-latitude North America via a coastal route of entry before or soon after 16,000 cal BP and, by pursuing economic-settlement strategies focused on water-based environmental zones, mainly settled in the unglaciated coastal, pericoastal, riparian, and lacustrine ecosystemic niches of the far west, we would expect to see the greatest number of Paleoarchaic sites in areas west of the Rocky Mountains and their numbers declining in frequency toward the east (e.g., Figure 3.4a). Less populated regions east of the Rockies could be rapidly infilled by a later entry of Paleoindians via an IFC route after 14,675 cal BP or 13,350 cal BP. Interaction between the Paleoarchaic and Paleoindian populations undoubtedly occurred once both peoples were south of the ice sheets. Depending on the distribution of Paleoarchaic peoples in the far west, there may or may not have been unoccupied areas for Clovis Paleoindians to establish their own territories west of the Rockies. If a population of Clovis Paleoindians actually moved into the far west and established territorial ranges, we should expect to see sites clearly bearing Plains-style Clovis assemblages, complete with “Clovis-like” artifacts. Because the far western Clovis data set lacks Paleoindian assemblages from buried archaeological contexts (i.e., apart from the Richey-Roberts cache), we can only attempt to address the issue of population influx from the available “Western Clovis” projectile points. If Clovis Paleoindians were unable to settle throughout the far west due to the presence of a preexisting Paleoarchaic population, intergroup interaction at the margins of the far west could have introduced fluted points through trade, and/or the technological ideas behind fluted lanceolate points may have been spread throughout the population.

Testing this particular interpretation in the absence of undisturbed lithic assemblages bearing fluted points that might be studied to elucidate the nature of far western fluted point reduction sequences is difficult but not impossible. If Clovis projectiles were made by two distinct populations (one in the Great Basin, the other in the

Great Plains/U.S. Southwest) and each population used a different strategy for manufacture, then we should see the signature of these strategies in the covariation of design elements (i.e., length, width, thickness, and basal indentation) from projectiles recovered from these regions (see Bettinger and Eerkens 1999). Based on an analysis of 87 Clovis projectiles recovered from the Great Plains/Southwestern region (Table 3.1), we find that maximum width has a positive relationship with basal indentation, while total length and maximum thickness do not (Table 3.2).

On the other hand, when the same package of covariates is examined against basal indentation in the Great Basin Clovis sample just the opposite pattern is found; total length and maximum thickness predict basal indentation, while maximum width does not (Table 3.3). To account for the small sample represented in the Great Basin, standard error estimates were bootstrapped (Brownstone and Valetta 2001). In the Great Basin, as total length increases, basal indentation decreases; and as maximum thickness increases, basal indentation increases. If basal indentation is a significant indicator of a tradition’s lithic reduction sequence, then it appears that two separate lithic technological schemes are present: one whose cultural signature is indicated by a package of ideas for reducing lithics that causes maximum width and basal indentation to correlate, the other whose signature links maximum thickness and total length with basal indentation.

Indeed, Beck and Jones (2010:96) describe “Western Clovis” points as shorter and thinner, with deeper basal concavities (absolute and relative to basal width) than Plains Clovis points. Beck and Jones (2010:Figure 10) also show several examples of fluted point fragments from the Sunshine Locality of Nevada, which mostly appear to retain minor basal thinning or weakly expressed fluting and were only minimally modified from a macroflake preform. If Paleoarchaic knappers replicated Clovis-style lanceolate projectiles mostly by pressure flaking a macroflake preform, as is typical in the manner of their lithic reduction sequence model, they probably did not need to remove a fluting flake since the point’s base would be thin enough or would only require minimal preparation (e.g., “basal thinning”). Thus, the existence of archaeological phenomena

TABLE 3.1. Descriptive Statistics for the Clovis Projectile Sample by Region.

Variable	Total Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Basal Indentation (mm)
Mean (SD)				
Great Plains/Southwest (<i>n</i> = 86)	89.2 (36.5)	31.2 (6.8)	7.7 (1.3)	3.5 (1.9)
Great Basin (<i>n</i> = 47)	57.4 (20.5)	26.7 (5.7)	6.9 (1.6)	3.5 (1.5)
Median				
Great Plains/Southwest (<i>n</i> = 86)	83.0	30.7	7.8	3.1
Great Basin (<i>n</i> = 47)	50.5	26.1	6.7	3.4

such as the Sunshine Locality’s “non-Clovis-like fluted points” (Beck and Jones 2010:Figure 10) may signal the desire of Paleoarchaic knappers to produce a facsimile of the Clovis lanceolate point without having to give up the use of a distinctly non-Paleoindian lithic reduction sequence.

What could have led to the transmission of ideas about Clovis technology, but in such an indirect, experimental fashion? We interpret the observed variations in “Western Clovis” points to further suggest that Paleoarchaic and Paleoindian peoples were separate ethnolinguistic groups who probably maintained separate territories during the late Pleistocene (cf. Bettinger and Eerkens 1999). The higher frequency of fluted and unfluted Western Clovis points in the Great Basin (Anderson and Gillam 2000:Figure 9) and their relative scarcity in other outlying areas of the far west might reflect the way in which concepts of Paleoindian technology entered and later spread throughout the far west. If Paleoindians first encountered the far western Paleoarchaic population in the areas south of the rugged and glaciated Rocky Mountains, Paleoindian technological ideas would spread first into the Great Basin physiographic province and later into the rest of the far west. From the perspective of an age-area effect, this scenario of intergroup interaction and cultural transmission makes the best sense of the known distribution of fluted points in the far west (Anderson and Gillam 2000: Figure 9).

Conclusion

In this chapter, we take up the argument that the late Pleistocene prehistory of the far west includes an archaeological tradition, termed the Paleoarchaic, that is characteristically different and not

TABLE 3.2. Regression Model (Using Robust Standard Errors) Examining Great Plains and Southwestern Clovis Point Basal Indentation and Projectile Diagnostics.

Variable	β	<i>p</i>
Maximum width	.5	.003
Total length	-.1	.43
Maximum thickness	.01	.89

Note: Model $R^2 = .21$; *n* = 86; *p* < .001. The analysis is based on data provided by Charlotte Beck (personal communication 2010) and is a more detailed version of that presented in Beck and Jones 2009:Table 6.2.

TABLE 3.3. Multiple Regression Model (Using Bootstrapped Standard Errors [BSE], 50 Replications) Examining Great Basin Clovis Point Basal Indentation and Projectile Attributes.

Variable	<i>B</i> (BSE)	<i>p</i>
Total length	-.07 (.02)	.003
Maximum thickness	.63 (.3)	.05
Maximum width	.05 (.06)	.4
Constant	1.7 (1.2)	.2

Note: Model $R^2 = .21$; *n* = 48; *p* < .03. The analysis is based on data provided by Charlotte Beck (personal communication 2010) and is a more detailed version of that presented in Beck and Jones 2009:Table 6.2.

descendant from the Clovis Paleoindian Tradition. Our basis for arguing for the presence of a cultural co-tradition is drawn from the fact that the lithic reduction sequences of the two traditions are significantly different and also that the timing of the Paleoarchaic pattern appears to overlap and probably precede the appearance of Clovis Paleoindians in North America. We offer a hypothesis that the Paleoarchaic and Paleoindian cultural patterns represent separate

ethnolinguistic populations who arrived south of the ice sheets at different times and in different ways. The presence of fluted and unfluted “Western Clovis” points in the far west, then, is best explained as the result of intergroup exchange of technological knowledge, which was further spread throughout Paleoarchaic populations in the far west under a guided variation mode of cultural transmission and not as the actual spread of Paleoindian peoples. In contrast, our analysis reveals that greater correlation exists among the attributes of Plains and Southwestern Clovis fluted points, which is interpreted to indicate the operation of an indirect bias in the transmission of technological knowledge within Paleoindian populations. To us, the clear morphometric differences between these regions indicate separate modes of projectile point manufacture. That such diversity in fluted point design should be widespread between central and western North America is hard to reconcile under a Clovis-first model of rapid, widespread distribution of Paleoindians. If Clovis peoples spread quickly throughout North America, perhaps within a century or so, it seems reasonable to expect to see great regional homogeneity in fluted point design; however, our study shows this not to be the case. In accordance with the precepts of cultural transmission theory (Boyd and Richerson 1985), and in a similar manner as Bettinger and Eerkens (1999), we hypoth-

esize that the technological concepts of Clovis fluted point production were transmitted and applied within the far west in a way that emphasized individual learning and experimentation separate from the original knowledge base. In contrast, knowledge of Clovis fluted point production was transmitted in the Plains and Southwest through a process of social learning wherein technological production techniques were carefully learned and maintained. To us, the presence of two different modes of cultural transmission is highly significant and lends weight to our view that the Paleoarchaic and Paleoindian archaeological patterns probably represent separate ethnolinguistic populations who arrived in North America in different ways and maintained a general state of separation during the late Pleistocene. Although direct evidence that Western Clovis points were actually produced through a Paleoarchaic lithic reduction sequence is not yet available due to a lack of extensive, intact lithic assemblages containing fluted points, we speculate that the lack of uniformity among point attributes and the presence of particular design elements (e.g., greater basal indentation commonly coupled with weak to absent fluting) among Western Clovis projectile points might ultimately reflect attempts to produce fluted points within a Paleoarchaic-style lithic reduction sequence.

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