

The Archeology of Alaska and the Peopling of America

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Although the conception that the ancestors of American Indians were Asians who journeyed to this hemisphere by way of Alaska is now scarcely disputed, the timing and circumstances of their original coming are not agreed on. In this article I discuss the present knowledge of the early archeology of Alaska and its implications for this question.

Since the presence in the United States of artifacts in stratigraphic association with the bones of extinct mammals was first definitely established in the late

Scattered finds of fluted points in Alaska, if not in Siberia, have been taken by these scholars as support for their position. In some of its more recent versions the theory has also included the proposal that these migrants played a decisive role in the extinction of late Pleistocene American megafauna (5, 6).

However, other evidence suggests strongly—albeit with some ambiguity—that humans were in America well before 12,000 years ago (7, 8). Some or all of such evidence has been convincing to

Summary. The proposed existence of a biotically productive tundra-steppe on the exposed Bering Land Bridge of the late Pleistocene aids conceptualization of the migrations of early Asian hunters. But clear knowledge of the human occupants of northwesternmost America before 11,000 years ago is elusive. Evidence indicates that at that time the Alaskan peoples had a culture generally based on microliths that, while obviously derived from Asia, were not sufficiently similar to the tools of the earliest widely distributed hunters of more southerly North America to support any direct and close relation between the two cultures.

1920's, prehistorians have come to disagree on the interpretation of the earliest widespread North American horizon of unambiguous date—the period of the Clovis complex of the Great Plains and contiguous regions, characterized by lanceolate projectile heads of chipped stone in which relatively long flake scars emanate from the base to form a shallow groove or flute on one or both faces, and which often occur with the bones of Pleistocene elephants, in particular the mammoth (1). Counterparts of the Clovis people were in South America at about the same time or only slightly later (2), and this substantially Pan-American fluted point period, accepted without much argument as dating from around 11,000 radiocarbon years ago, is interpreted by some scholars as evidence of the first human inhabitants of the New World, who arrived from Asia only at the end of the Pleistocene Epoch (1, 3, 4).

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many, despite the fact that putatively very early evidence of humans consists of finds of artifacts that have little in common and that range in assigned age from 13,000 to nearly 250,000 years. Those who are convinced are usually inclined to conceive of the Clovis hunters as having descended within America from local, although still ultimately Asian, ancestors, who arrived in America from 14,000 to 50,000 years ago or more (9, 10).

The Land and Ice Masses

If archeological evidence from Alaska is too scant to bear significantly on arguments concerning the presence of humans in America before 12,000 years ago, information provided by certain natural features is not. These include the presence at various times of a broad land mass that united Asia and America. A drop in sea level of nearly 100 meters accompanied major glacial advances, ex-

posing the floor of the Bering and Chukchi seas as a plain extending 1500 kilometers from north to south. This land mass, together with adjacent unglaciated parts of northwestern America and northeastern Asia, is called Beringia (Fig. 1). Hopkins (11) suggested that all or part of the Bering Land Bridge was exposed for a period before about 35,000 years ago and again between 25,000 and 14,000 years ago, with alternating periods of minor inundations and at least some exposure between about 14,000 and 10,000 years ago.

Another natural feature of interest is the continental ice that was present in northern North America during the late Pleistocene: the Laurentide ice mass was centered around the Hudson Bay region, while Cordilleran ice radiated from the Rockies and the Coast Mountains to join ice from the Alaska and Aleutian ranges in south-central and southwestern Alaska (Fig. 1). According to one hypothesis, these major ice sheets coalesced into a monolithic, mountainous block, preventing the passage of man or beast between unglaciated Alaska and North America; according to an extreme view this barrier lasted from 25,000 to 8,500 years ago (9). The other and more current conception is that through most of glacial time there remained a corridor between the major ice masses, with the only coalescence occurring at the very heights of Pleistocene glaciation—around 20,000 to 18,000 years ago during the Wisconsin maximum, or perhaps only during earlier glacial events (11, 12).

Clearly these views have important and divergent implications for the spread of early human populations, and prehistorians have made use of them accordingly.

The Central Beringian Landscape

Within the past 15 years, scholars have focused their interest on the possibility of the existence of grassland-steppe of high biotic productivity in Beringia during cold, dry glacial periods of the Pleistocene. Although the possibility of steppe-like plants such as grasses and xerophytes living in an otherwise tundra environment was discussed for some time in regard to portions of northern Eurasia, during the 1960's Soviet researchers began to discuss the possibility with reference to areas as far east as western (now Soviet) Beringia, where it could be related to the dominant presence of grazers such as the mammoth (*Mammuthus primogenius*), horse, and Siberian steppe antelope (*Saiga*) (13). In

1964, Colinvaux (14) suggested on palynological grounds that there had been grasslands in central Beringia during the Pleistocene. In 1968 Guthrie (15), in quantifying large mammals from the late Pleistocene "mucks," or frozen loess and silt deposits of central Alaska, made special note of the predominance of bison (*Bison priscus* or *B. crassicornis*), horse (*Equus ?caballus*), and mammoth (*M. primogenius*) in the assemblages and suggested that the late Pleistocene environment of that portion of eastern Beringia was one in which grasslands were much more prominent and productive and the accompanying mammalian biomass significantly greater than during the Holocene (15, 16). Since then, the idea of a tundra steppe, or arctic steppe (17), rich in grasses and sage or wormwood (*Artemisia*) but poor in tussock-forming sedges and mosses, has been taken up with enthusiasm. Despite words of caution—to the effect that relevant palynological evidence may be based primarily on mosaics of communities rather than on a single dominant community (18)—the grassy floral regime in much of Beringia during the Pleistocene has been compared to that of the recent plains of Africa in terms of productivity (17) and climate [drier and more continental than at present, with long, cold winters and short, warm summers (10)]. Established before the peak of the late Wisconsin glaciations, this arctic steppe regime is conceived to have prevailed throughout Beringia until the rapid increase in average temperature 14,000 to 12,000 years ago, when rising sea level, increasing humidity, and floral succession made drastic inroads, with tundra steppe first dwindling to a few active glacial outwash plains and other relict locations, then eradicated 9,000 or even 10,000 years ago, by which time the steppe fauna had been replaced by the much more impoverished assemblage of the modern tundra and taiga (10, 17, 19).

The concept of a rich plain, teeming with herds of large grazers and stretching from what is now central Alaska westward to north-central Asia and beyond, is particularly attractive to those interested in the background of the Clovis hunters of North America. Given the existence of such a plain, it is easy to imagine a migration of humans from Asia to the Great Plains by way of Alaska. Little drastic change in subsistence practice would have been required by this transition from a northern ecosystem featuring woolly mammoths and large-horned bison to a southern ecosystem featuring somewhat less hairy mammoths (*M. columbi*) and an only slightly different form

of large-horned bison (*B. antiquus*). The suggestion has even been made that it was the disruption of the arctic steppe that impelled the hunters to move on to the more southerly portions of the New World (20).

The Archeology of Earlier Beringia

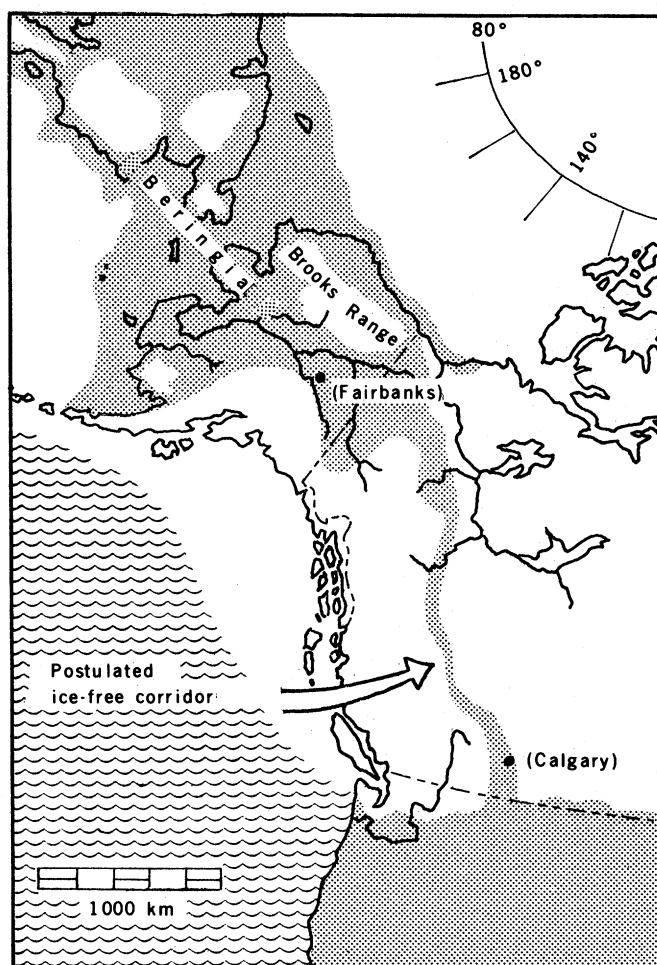
In 1966 the discovery of an undoubted artifact of caribou bone among a redeposited Pleistocene faunal assemblage on the Old Crow River of northwestern Yukon Territory—an area unglaciated during the late Wisconsin—gave promise of a dramatic, even revolutionary, development in the archeological understanding of America (Fig. 2). Radiocarbon determinations on the remnant apatite fraction of this and other more dubious bone artifacts from the reworked deposits produced ages in the probable range of 25,000 to 32,000 years (21). Since that time, parties sponsored by the University of Toronto, the National Museum of Man (National Museums of Canada), and the Geological Survey of Canada have recovered numerous additional artifacts, the remains of caribou, mam-

moth, bison, horse (*Equus* sp.), camelid (*Camelops*), mastodon, and moose, and at least one human bone. The most common putative artifacts are fragmentary bones of various animals that by the characteristics of their fractures were identified as having been broken by humans (22).

Mammoth, bison, horse, camelid, and some smaller forms suggest the presence of grassland, even though the date of their existence clearly precedes the late Wisconsin emergence of the Bering Land Bridge and the establishment of unbroken arctic steppe habitat across central Beringia. Other dating evidence is inconsistent: radiocarbon determinations on the collagen fraction of the bones do not fall precisely into the range of the apatite dates, but rather are predominantly either younger than 13,000 years or older than 30,000 years. From these determinations, and in view of geologic considerations and of problems often involved with the dating of bone, some investigators concluded that the original artifact dates were, if anything, erroneously late (23).

The discovery of putative bone artifacts in an unredeposited state is limited

Fig. 1. Approximate extent of Beringia and the postulated corridor to the south, shown in relation to modern land configurations. The shaded area represents exposed land at the height of the Wisconsin glaciation; white areas represent glaciers, marine pack ice (in the Bering Sea), and coastal drift ice (along the coast of Canada) (51).



to a few pieces found along two unconformities that may represent Pleistocene ground surfaces within the deep alluvium of the Old Crow River basin. The younger unconformity was dated at about 40,000 radiocarbon years (23). Despite the fact that stone artifacts are thought to have been used in the modification of some of the redeposited bones, no deposits containing stone artifacts of comparable age have been located. Excavations at one cave along the nearby Bluefish River produced what appears to be stone chipping detritus from levels radiocarbon-dated as no younger than about 13,000 years; the same levels also yielded remains of caribou, horse, and bison. Explorations by the University of Alaska

since 1978 in limestone caves along the lower course of the Porcupine River—of which the Old Crow is a tributary—seem to be achieving similar results (24, 25).

Thus after more than 10 years of exploring the Old Crow River locality, some scholars continue to be tantalized by the evidence and find it convincing, whereas others find it disappointingly short of definitive.

No evidence has been found for human occupation of eastern Beringia between about 25,000 and 13,000 years ago. In view of this, it has been suggested that the entire area was uninhabited by humans during this interval, whatever the situation may have been 30,000 years ago (26). Other scholars, perhaps

more susceptible to the intellectual attraction of the concept of a rich arctic steppe during the late Pleistocene, feel it is particularly unlikely that, once occupied by people, the region would have become depopulated as long as it maintained any productivity.

The Archeology of Terminal Beringia

There is clear evidence that by 11,000 to 10,000 years ago a major cultural horizon spanned adjacent parts of America and Asia, despite the fact that this time coincides with or postdates the final flooding of central Beringia. Although the available data did not permit even a

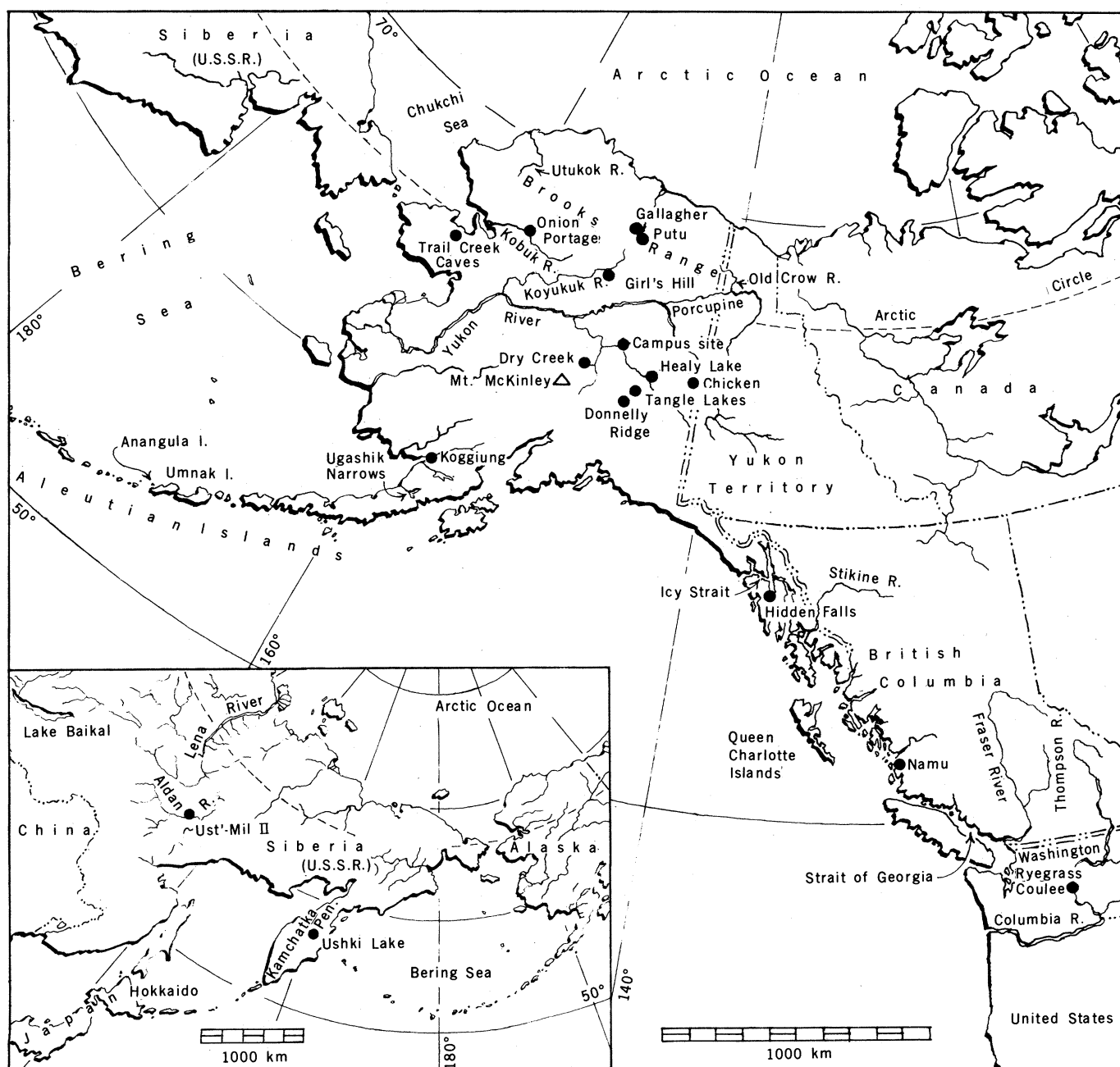


Fig. 2. Map guide to locations referred to in text.

rudimentary organization of sites and assemblages representative of this time until the past 15 years, the first site known to be representative of the period was excavated more than 40 years ago, and its Old World affinities were pointed out immediately.

The Campus site, within the grounds of the University of Alaska at Fairbanks, was discovered in 1933 and excavated in subsequent years (27, 28). The materials were examined and commented on by Nelson (27), who compared the artifacts—in particular the small, wedge-shaped blade cores and the blades derived from them—to artifacts he had excavated in Mongolia. The cores are characterized by a narrow platform from which bladelets were pressed usually from only a single edge, and most distinctively by a keel carefully chipped along the edge of the implement opposite both the striking platform and the face from which blades were pressed, presumably to serve in wedging the core into a split-stick vise while blades were removed (Fig. 3). With the overall wedge-like shape formed first, the platform would be prepared, blades pressed off, the platform prepared again by trimming and flattening, then more blades pressed off, and so on while the core shrank, sometimes to minute size. Undated radiometrically, temporal placement of the materials depends on typological comparisons that have become especially meaningful in recent years.

In 1949 and 1950, Larsen (29) excavated two caves at Trail Creek. One yielded (primarily from its lower levels) some bone projectile heads—perhaps arrowheads—slotted with narrow grooves as though to receive microblades (30–32) longitudinally, and four microblades presumed to be from small wedge-shaped cores. A radiocarbon determination on cracked caribou bone was thought to date the points at about 9000 years. Deposits outside the other cave produced a bison calcaneus, presumed to have been broken by man, that was radiocarbon-dated at about 13,000 years; and part of the scapula of a horse, dated at about 15,700 years. Caribou were everywhere the most numerous large mammal represented.

The Anangula Blade site was discovered before World War II on the islet of Anangula off the coast of Umnak Island in the Aleutians, and in 1962 extensive excavations were begun (33, 34). A battery of radiocarbon determinations suggested an age somewhere around 8000 years for the artifacts found there. Blade and flake cores of cherty material are present in some variety; the majority are

not formally wedge-shaped, although a relatively large variant of such a form is present [figure 28 in (33); see also Fig. 4]. Modal length of blades (the length distribution is unimodal) is about 50 millimeters, with extremes less than 30 and more than 100 millimeters, so that the blades can be termed middle-sized. Anangula artifacts also include transversely burinized blades and numerous scrapers; there are no bifacially chipped implements or recognizable projectile points. Location of the site may once have been on a peninsular extension of the Bering Land Bridge, but by the time of known occupation it was insular, suggesting the necessity of watercraft. A littoral or even maritime economy was inferred (33, 35).

In 1967, after comparing material he excavated at the Donnelly Ridge site in 1964 with material excavated in Mount McKinley National Park and with the early Campus site collection held by the University of Alaska Museum, West (36) defined a Denali complex consisting of distinctive wedge-shaped microblade cores, the microblades and core-preparation tablets derived from them, large

blades and bladelike flakes presumably derived from roughly prepared pebble cores, scrapers, and some relatively randomly flaked bifacial knives of variable form and size. Typological comparisons indicated that this complex is between 10,000 and 15,000 years old, but the radiocarbon determinations on charcoal (possibly from a tundra fire) from the vicinity of Donnelly Ridge artifacts gave dates within the second century A.D. Materials similar to the Donnelly Ridge collection recovered later from the Tangle Lakes area have recently been dated by radiocarbon at about 10,000 years ago (36).

In 1964 Giddings (37) began excavations at Onion Portage on the Kobuk River. After his untimely death in the same year, these were continued by his student, Anderson (38), leading in 1965 to the discovery of the Akmak complex. This tool assemblage is now thought to have been deposited no later than about 9600 years ago, the radiocarbon date of a piece of caribou scapula found near anciently redeposited portions of the assemblage (39). The Akmak complex con-

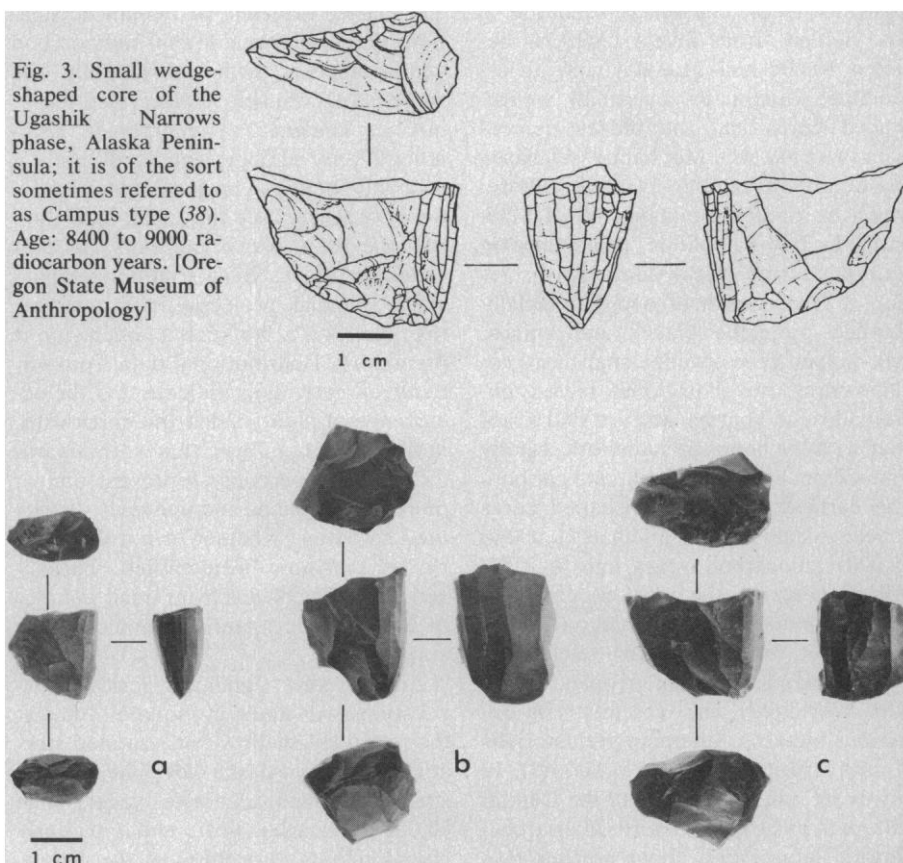


Fig. 4. Four views each of cores characteristic of three separate assemblages in southwestern Alaska. (a) Small wedge-shaped core of the Ugashik Narrows phase; age, 8400 to 9000 radiocarbon years. Basal view (bottom) shows the carefully chipped keel. (b) Larger, roughly wedge-shaped core of the Koggiung phase; age, 7750 to 7900 radiocarbon years. Basal view (bottom) shows a purposefully shaped but less formally positioned keel analogous to that of the core shown in (a). (c) Core of the Anangula Blade complex, roughly the same age as that shown in (b). No chipped keel completes the definitional wedge shape, although a suggestion of that form is maintained overall. [Oregon State Museum of Anthropology]

sists of small wedge-shaped microcores and the blades taken from them, certain classes of burins, larger blades, blade cores, and relatively large bifaces of a variety of forms—some apparently functioning as more or less discoidal flake cores, others as chopping implements or knives. No projectile points were found. The distinction between blade and microblade seems sustained at the Akmak complex on the basis of several criteria, among them a distinct tendency toward bimodality in the blade size distribution, with a major length mode at 25 millimeters and a lesser one between 80 and 100 millimeters. This particular assemblage was central to Anderson's definition of an American Paleo-Arctic tradition of blade-dominated assemblages in the region of the Brooks Range, a tradition lasting to the very end of the existence of Beringia (38).

This research crystallized the notion of a widespread and distinctive archaeological horizon of the terminal Pleistocene. Since then, information from Soviet research in Beringia and westward has become increasingly available. The important site No. 1 at Ushki Lake on the Kamchatka Peninsula (inset in Fig. 2) has yielded, from levels dated at between 10,000 and 11,000 years, an assemblage dominated by small wedge-shaped cores and the blades derived from them (40, 41). Mochanov (42) based his definition of the Diuktai culture, which he thinks dominated all of Siberia in the late Paleolithic, principally on materials from the Aldan River region. These consist of ovoid, bifacially chipped projectile blades and knives, disk-shaped cores, wedge-shaped microblade cores, Levallois cores, blades, microblades, and burins, and are said to appear with the bones of mammoth, woolly rhinoceros, bison, musk ox, and caribou. The earliest small wedge-shaped cores appear to date from as much as 30,000 to 35,000 radiocarbon years ago at Ust'-Mil' II (Fig. 2); the most recent were dated at about 10,000 years ago (41, 42). Mochanov attempted to relate the Diuktai people to early peoples of the New World (43), and was met with objections by some American prehistorians (4) and with tolerance by others (8). In any event, information about the Diuktai culture is in agreement with other archaeological information about northeastern Asia—in particular, with that from Hokkaido, which was occupied by microblade-producing peoples by about 15,000 years ago (44)—to support the concept of a widespread occurrence, at the end of the Pleistocene, of cultures emphasizing the production of microlithic blades from

carefully prepared wedge-shaped cores in what seems to be the latest manifestation of a Paleolithic tradition in that region.

The increase in arctic fieldwork by Americans during the late 1960's and the 1970's led to similar contributions; but at the same time that the credibility of a network of early microblade-using cultures in Beringia has been strengthened, dimensions of variation among these cultures have also become more noticeable.

Some Variations and Their Resolution

The important site recently excavated at Dry Creek in central Alaska is one of the very few of the period to yield faunal remains (45). Bones of large mammals originally thought to include horses and possibly mammoths, but now said to be limited to bison (*B. priscus*), elk, and sheep, were recovered from a zone also containing artifacts of an Akmak- and Denali-like complex clearly assignable to the Paleo-Arctic tradition. Radiocarbon determinations suggest an age of about 10,000 years. A component containing still earlier evidence of human occupation (dated at about 11,000 radiocarbon years) appears with substantially the same faunal remains as described above but no evidence of microblade technology, only scrapers and small bifaces, probably including projectile points (45). Some observers see this as an indication that the Paleo-Arctic tradition was preceded in Alaska by a tradition emphasizing bifacial projectile points rather than blades (1), but such a conclusion is premature. Distributional data from virtually all early sites indicate that the occurrence of microblades and cores within them is not uniform; that is, these artifacts almost certainly represent one or more fairly specific and unevenly distributed activities, whether or not those activities can now be identified. The absence of microblades from small samples of Paleo-Arctic materials should not be surprising.

Another very significant series of excavations was made in the late 1960's at the relatively shallow but stratified sites at Healy Lake, Alaska (46). One of these sites contained deposits older than 10,000 radiocarbon years and apparently having affinity with those of the American Paleo-Arctic tradition, except for the presence of Chindadn points—thin and relatively specialized projectile points of chipped stone, triangular or teardrop-shaped.

In the early 1970's the Gallagher Flint station was discovered in formerly gla-

ciated terrain on the north slope of the Brooks Range (in the right-of-way of the Trans-Alaska Pipeline). Locality I yielded a single radiocarbon determination of about 10,500 years ago, and a collection of more or less formalized cores, flakes, and blades. The material of which they were made was called calcareous mudstone, and was described as comparable to the material known from the Anangula Blade site far to the south (47). The absence of bifacial implements of any description, just as at Anangula, led excavator Dixon and some others to link the 10,500-year-old Gallagher site and the 8,000-year-old Anangula Blade site as a cultural unit set apart from the Paleo-Arctic tradition despite their distance from one another both in space and time (39, 47). Still others have pointed out that the Gallagher locality has the aspect of a quarry site or manufactory, and may yield artifacts different from those of other Akmak-like sites for that reason alone.

In the mid-1970's, the University of Oregon conducted excavations on the upper Ugashik River and at the mouth of the Kvichak River (both located on the Alaska Peninsula) and found tool complexes of obvious similarity to both the Akmak and Denali complexes. Indeed, the site at Ugashik Narrows produced an assemblage that duplicated the Akmak complex of Onion Portage as nearly as could be expected, given the distance between the two sites. From within a firm stratigraphic context, deposits of what is termed the Ugashik Narrows phase of local culture were dated at 9200 to 8300 radiocarbon years (31, 48). A slight departure from the Akmak complex is a series of burinized flakes markedly similar to the burinized blades of Anangula. Like the Akmak complex, however, the Ugashik Narrows collection differs from the Anangula complex in the plentiful inclusion of relatively large bifacial artifacts interpreted as cores, chopping implements, and knives; also, it appears to have predated the Anangula Blade site.

At another location, Koggiung, a pair of temporary campsites yielded a small series of implements assigned to the Koggiung phase of local culture. These were dated by radiocarbon determinations on charcoal from two separate campfires at 7400 to 8000 years—substantially contemporary with the Anangula Blade site. The material from which the recovered blades and blade cores are made is virtually identical to that most commonly found at the Anangula Blade site, and very similar to that used at the Gallagher Flint station. The few whole blades provide an estimated range in

length of 20 to 80 millimeters, and measurements of width (a function, although not a precisely linear one, of length) imply that the distribution is unimodal. Cores—blocky, but with a purposefully formed keel making them definitionally wedge-shaped—indicate that blades removed were predominantly 40 to 50 millimeters long even when the cores were nearly exhausted. In sum, the evidence suggests a size distribution of blades approaching that of the statistically much more adequate sample from the Anangula site. The Koggiung assemblage differs from that of Anangula in the presence of at least some bifacial knives and in the absence (within the small sample) of burinized blades. Virtually identical cores were recovered elsewhere in southwestern Alaska—by Ackerman (49) in a survey of the Kagati Lake region on the upper Kanektok River drainage, and by Dixon and Johnson (50) in site salvage at Igiugig on the upper Kvichak River.

With the Koggiung assemblage and the related collections appearing as a kind of typological intermediate between the Anangula Blade assemblage and the Akmak complex and its obvious affiliates (Fig. 4), and with the presence of one of the latter (Ugashik Narrows) on the Alaska Peninsula some 1000 rugged overland kilometers from Onion Portage but within 800 coastwise kilometers of Anangula, the Anangula Blade assemblage no longer appears necessarily indicative of a separate culture or ethnic group. Rather, it may represent a localized development from a base similar to that of the Akmak complex and the Ugashik Narrows phase. Put another way, the spatial and formal variation between the Anangula and Akmak complexes now appears more continuous than discontinuous (48).

With this in mind, and given the obvious similarity of Siberian materials of about 10,000 years ago—including the presence at that time of some early post-Paleolithic assemblages said to be without bifaces (41, 42)—I recently extended Anderson's (38) definition to postulate a Siberian-American Paleo-Arctic tradition in which both Anangula and Gallagher are variants reflecting the operation of unknown factors (51). Thus the blade-using cultures mentioned above are lumped together to provide a conception of a basic Beringian cultural tradition that persisted for several millennia after the final flooding of the Bering Sea (that is, from a time before 11,000 years ago to perhaps 7,500 years ago). This concept makes allowances for considerable diversity. Table 1 gives relevant radiocarbon dates (52).

Fluted Points in Alaska

The first find of an Alaskan projectile point unequivocally falling within the formal range of fluted implements of the Paleo-Indian horizon of more southerly North America was made in 1947 on the surface near the Utukok River in northwestern Alaska (Fig. 5) (53). Since that time more than ten additional areas have been identified as sources of similar implements, all of them located in the northern half of the main body of the state, both north and south of the Brooks Range and in both previously glaciated and unglaciated terrain. Most of these artifacts were found on the surface in ambiguous contexts or even completely isolated; still others are difficult to identify as purposely fluted points. Even when obviously fluted points were found near other implements and excavations were possible, the dating has often been unclear (54).

Two sites that, like the Gallagher Flint station, were discovered during the 1970–1975 Trans-Alaska Pipeline survey have held particular promise since both were at least partially buried, were excavated professionally, and provided an apparent artifactual context and datable samples.

The site known as Girls' Hill is located along the Jim River on the southern slope of the Brooks Range. One locality

was described by Gal (55) as producing a single fluted point, a rather flat microblade core of obsidian, a scraper, and microblades. At a second locality three fluted points were recovered together with four similar but unfluted specimens, conical polyhedral blade cores, wedge-shaped microblade cores, thousands of microblades, numerous burins (including some transversely burinized flakes) and burin spalls, many scrapers, and large symmetrical and asymmetrical bifaces of various forms. It seems clear that the total assemblage from the center of the main locality should, with the possible exception of the projectile points, be assigned to the Paleo-Arctic tradition. From one extreme edge of the site, however, there were recovered side-notched projectile points well known in the Alaskan interior as marking a horizon of some 5000 years ago, and the earliest radiocarbon age on charcoal from the center of the main locality—a spot said to be no more than 50 centimeters away from one of the fluted points and in the same soil horizon, as well as in the midst of a major concentration of microblades—was about 4400 years. The excavator interpreted the date as probably valid for the entire assemblage, and very possibly for most Alaskan fluted points (55).

The site designated Putu by its excavator, Alexander (56, 57), lies along the Sagavanirktok River on the north

Table 1. Radiocarbon dates for artifacts of the Paleo-Arctic tradition. The dates are based on the half-life of 5568 years and are not adjusted for fluctuations in atmospheric carbon-14.

Assemblage	Material dated	Age (years ago, reference date A.D. 1950)	Laboratory identification number	Reference
Koggiung complex	Charcoal	7,765 ± 95	SI-1955	(48)
Anangula Blade complex	Charcoal	7,895 ± 90	SI-1956	(33)
	Charcoal	7,287 ± 86	P-1108	
	Charcoal	7,657 ± 95	Pn1107	
	Charcoal	7,660 ± 300	W-1180	
	Charcoal	7,701 ± 93	P-1102	
	Charcoal	7,796 ± 230	I-1046	
	Charcoal	7,932 ± 497	P-1106	
	Charcoal	8,129 ± 96	P-1104	
	Charcoal	8,173 ± 87	P-1103	
	Charcoal	8,425 ± 275	I-715	
Ugashik Narrows phase	Charcoal	8,425 ± 115	SI-2641	(31, 48)
	Charcoal	8,995 ± 295	SI-2492	
Akmak complex	Caribou bone	9,570 ± 150	K-1583	(39)
Denali complex (Tangle Lakes)	Charcoal	10,150 ± 280	UGa-572	(36)
Gallagher Flint complex	Charcoal	10,540 ± 150	SI-974	(47)
Dry Creek Component 2	Charcoal	9,340 ± 195	SI-2329	(45)
	Charcoal	10,690 ± 250	SI-1561	
Component 1 Chindadn complex	Charcoal	11,120 ± 85*	SI-2880	(46)
	Bone fragments	11,090 ± 170	GX-1341	
Putu complex	Charcoal	11,470 ± 500	SI-2382	(1, 20, 57)
Trail Creek caves (early levels)	Caribou bone	9,070 ± 150	K-980	
	Bison bone	13,070 ± 280†	K-1327	
	Horse bone	15,750 ± 350†	K-1210	

*Presence of microblades is uncertain.

†Association with human occupation is uncertain.

slope of the Brooks Range, not far downstream from the Gallagher Flint station. Excavated in 1970 and 1973, the main area of the site yielded the bases of two unequivocal fluted points of obsidian and chert, and more highly fragmented pieces of others; lanceolate points; at least one triangular chert specimen reminiscent of the Chindadn points from Healy Lake; numerous burins or flakes reminiscent of the Denali complex or Paleo-Arctic tradition, and relatively large discoidal and ellipsoidal bifaces reminiscent of the same; scrapers; and numerous cores and blades. Most of the material represented is a calcareous silt or mudstone like that of the Gallagher Flint station (my impression is that the same source was involved), and the blade technology appears similar in the two sites, possibly reflecting the nature of the somewhat blocky raw material with cleavage planes that influence the forms of many blades. Many Putu cores, like those of the Gallagher Flint station, are relatively haphazard in form, and the size of the blades is in the range that might well be called middle-sized, although including a number of small examples that if found alone would be termed microblades. Formally wedge-shaped cores are not common, but are present, in particular in material other than the predominant mudstone. Fluted points aside, this assemblage can be recognized on formal grounds as another manifestation of the Paleo-Arctic tradition, one indeed not as variant as the Gallagher Flint collection.

The first date to be reported in connection with the Putu excavations was a radiocarbon determination on soil carbonates in the surrounding matrix of about 8500 years, which the excavator was inclined to reject (56). A later determination on charcoal, said to be from



Fig. 5. Fluted projectile point (length, ~5.5 centimeters) found on the surface near the Utukok River in northwestern Alaska in 1947 (53). Scale bar, 1 centimeter. [U.S. National Museum of Natural History]

remnants of a campfire in the buried occupation level itself, was reported at $11,470 \pm 500$ years, and is thought to date the associated artifacts more accurately (57). It is not surprising that this date is used to support the contention that fluted projectile points were borrowed from the north by Clovis hunters, or were carried by them from the north to the Great Plains as they entered the New World heartland at the close of the Pleistocene (1, 20, 57).

Any such conclusion seems premature at this point, however, given the overall ambiguity of the dating evidence for Alaskan fluted points. Holding the determinations aside for the moment, it does appear that if we have any understanding at all of the context of early fluted points in Alaska, it is that they occur in assemblages assignable to the Siberian-American Paleo-Arctic tradition, although they are certainly represented in only a minority of all such assemblages known (58).

Paleo-Arctic Invasion of North America

In order to assess the possibility that people present in Alaska at the end of the Pleistocene—at the time of the final dissolution of the hypothesized arctic steppe regime—were instrumental in the earliest peopling of America to the south, the approach taken here relies not on the distribution and spread of the fluted points, which are in fact rare in Alaska, but rather on the distribution and spread of the more ubiquitous microblades and microcores (59).

By 8,000 and possibly 10,000 years ago, people making microblades from cores (many of which were within the formal range of the Alaskan wedge-shaped cores) were present in the Icy Strait region near what is now Juneau in southeastern Alaska; by about the same time they may have established themselves 240 kilometers eastward in the upper drainage of the Stikine River in northern British Columbia, although the sites there are undated (60, 61). The same characteristic artifactual traces, perhaps as old as 9900 radiocarbon years, appear on Baranof Island at the recently discovered Hidden Falls site (62). By 9700 years ago, makers of microblades and bifacial implements were present at the site of Namu on the central coast of British Columbia (63). By 7000 years ago, microblade makers—still using some cores that were within the range of formal variation of those of the Paleo-Arctic tradition—had occupied the Queen Charlotte Islands (64) and had joined other peoples around the confluence of the Thompson and Fraser rivers in the southern interior of British Columbia (65), perhaps having reached that area by passage through the interior of British Columbia (59). After 5000 years ago, microblades appeared in a number of assemblages in the Strait of Georgia region, and possibly as early as 6500 years ago they appeared as part of a Columbia Plateau assemblage at the Ryegrass Coulee site near Vantage in south-central Washington (66). At about that place the southerly distribution terminates (Table 2).

It must be emphasized that somewhere in the latitude of central British Columbia the microblade technology ceases to appear in what otherwise can be easily related to the Paleo-Arctic tradition, and begins forming a part of assemblages that partake of other elements already present in the Columbia Plateau and adjacent regions by as early as 10,000 years ago. The makers of microblades clearly were not the earliest inhabitants of these southern areas. If the microblade technology is a reasonable

Table 2. Radiocarbon dates for the appearance of microblades in the Pacific Northwest. The dates are based on the half-life of 5568 years and are not adjusted for fluctuations in atmospheric carbon-14. Locations are on Fig. 2.

Location	Age (years ago, reference date A.D. 1950)	Laboratory identification number	Reference
Southeastern Alaska			
Icy Strait	10,180 $\pm$ 800*	WSU-412	(60)
	9,130 $\pm$ 130*	I-6304	
	8,230 $\pm$ 130	I-6395	
Hidden Falls	9,860 $\pm$ 75†	SI-3776	(62)
	9,410 $\pm$ 70†	SI-3778	
British Columbia			
Namu	9,140 $\pm$ 200	GaK-3244	(63)
	9,720 $\pm$ 140	WAT-452	
Queen Charlotte Islands	7,400 $\pm$ 140	S-679	(64)
Lower Thompson River	7,530 $\pm$ 270	GSC-580	(65)
Washington			
Ryegrass Coulee	6,480 $\pm$ 80	UW-113	(66)

*Presence of microblades in this earliest occupation stratum of the site is uncertain. †The actual date is from peat stratigraphically similar to the microblade-containing deposits.

indicator of the terminal Pleistocene material culture of Beringia—and the evidence would make it so—vestiges of that culture appeared in the continental United States only well after the end of the Pleistocene, and clearly not as early as the appearance there of the makers of the first fluted points of the Clovis horizon.

Conclusions

It seems obvious that the makers of the fluted projectile points of the Great Plains did not come from Alaska in the terminal Pleistocene. Any prehistorian intent on arguing otherwise must perforce explain why fluted points were transmitted southward with lightning rapidity, as if by people entering a completely uninhabited area, whereas numerically dominant elements of the same successful tool complex were transmitted in the same direction only over the course of several millennia, as if by migrants infiltrating an area already fully occupied.

If the Clovis people of North America, although substantially contemporaneous with the earliest Paleo-Arctic people of Alaska, were not derived from them, the implication is that Clovis culture developed in America south of the ice sheets from some ancestor already present. The first American immigrants, whoever they were, were then clearly pre-Clovis, and must have preceded people of the Paleo-Arctic tradition in Alaska by many centuries or even millennia—assuming, of course, that they entered America by that gateway.

All of this may strengthen the claim that the Old Crow River region provides evidence of humans in America 30,000 years ago. Or it may suggest simply that the original American ancestor had passed Beringia well before 11,000 years ago, leaving traces not yet recognized in the arctic. For although the inhabitants of Beringia in the terminal Pleistocene are known, the nature of their culture does not permit an easy and conclusive articulation with that of their contemporaries in America to the south, whose earlier history remains in question.

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