

# ANCIENT ALASKA AND PALEOLITHIC EUROPE<sup>1</sup>

by

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Previous proposals for early American derivations from Eurasia have treated various culture-time horizons in widely scattered regions of the Old World and have suggested a variety of ways in which traditions, cultures, or traits may have reached these shores (see, for instance, Bushnell and McBurney, 1959; Chard, 1959; Collins, 1951, 1962; Gjessing, 1944; Griffin, 1960; Irving, 1962; MacNeish, 1959b; and Wormington, 1957). The literature gives me the impression that a majority of recent writers interpret the Paleolithic record to mean that (1) one cannot yet speak with much certainty of the direct Old World derivation of any sizable, coherent constellation of early American traits, (2) on the other hand, certain specific, discrete, early American traits were directly derived from the Old World, and (3) while, in certain instances, early American traits (specific core and blade techniques, for example) probably reached the Americas from remote sources, on the present evidence there is no reason to look beyond Asia for origins. Despite its title, this paper is not intended as a minority report, but rather, using the Brooks Range as a point of departure, as a review of recent archaeological and ecological evidence bearing on the possibility of Paleolithic connections between Europe and America.

Elsewhere (Campbell, 1961a, 1962b) I have described in part the Kogruk complex, discovered in 1959 on a kame terrace at the summit of Anaktuvuk Pass in the central Brooks Range. In 1961 my associates and I further excavated the Kogruk site and, in addition, found another early lithic assemblage in Anaktuvuk Pass, which I call the Naiyuk complex. Descriptive and comparative summaries of those complexes are pertinent to the present discussion.<sup>2</sup>

The original Kogruk series of rude flake and blade artifacts recovered from just below the present ground surface in an area of 125 square feet, was supplemented in 1961 by additional specimens, found concentrated beneath the sod in an area of less than 50 square feet, about 75 yards from the first finds (Plate I illustrates selected Kogruk artifacts from both the 1959 and 1961 collections). The second collection contains a much larger proportionate number of unused, unretouched flakes than the first; but, in addition to further examples of several of

<sup>1</sup> I am grateful to my colleague, Professor Patrick Gallagher, for critically reading the first drafts of this paper.

<sup>2</sup> The Kogruk and Naiyuk sites were discovered during explorations supported by the Arctic Institute of North America; the Office of Naval Research, United States Navy; and the National Science Foundation.

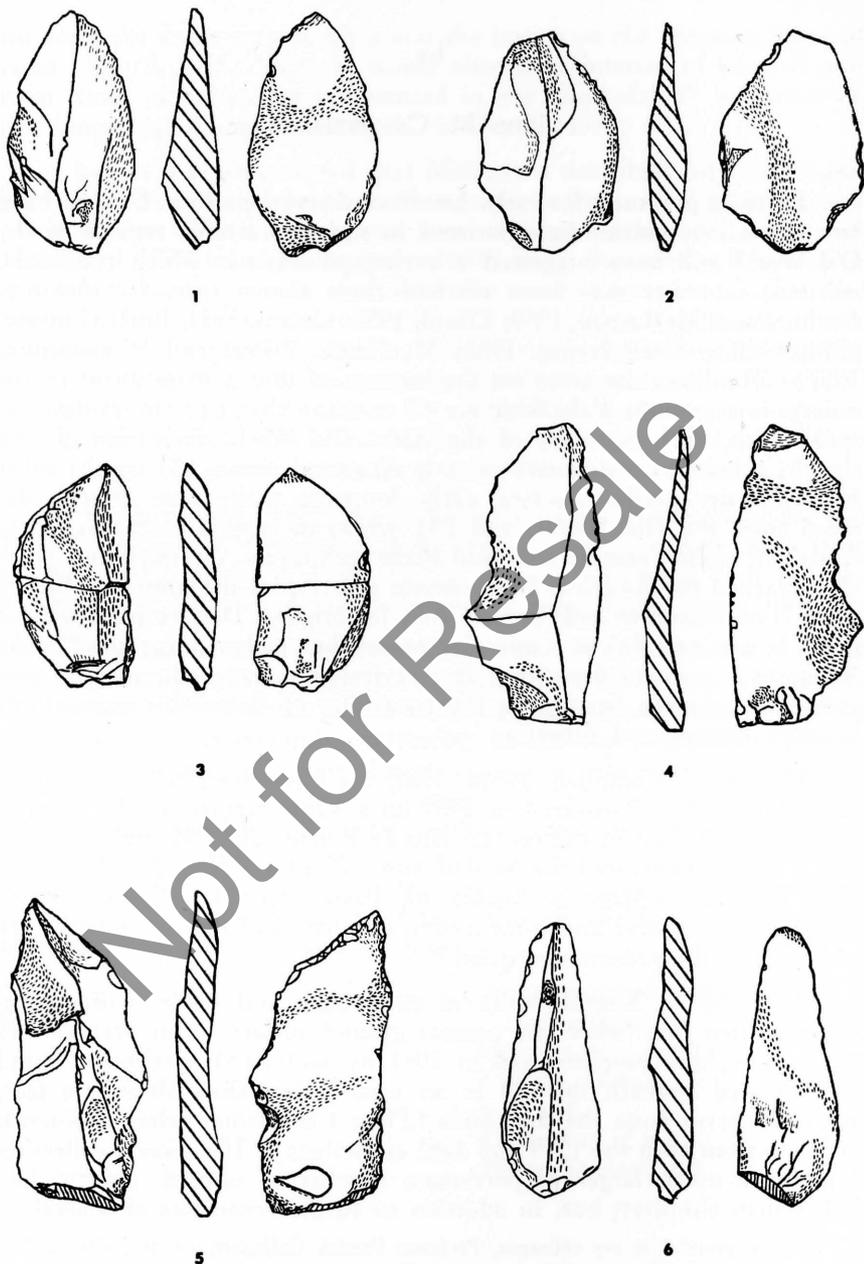


Plate I. Kogrük flake and blade artifacts. 1, flake, slightly retouched on bulbar surface; 2, flake, slightly retouched on both surfaces; 3, blade, retouched on non-bulbar surface; 4, 5, flakes or blades, slightly retouched on bulbar surfaces; 6, flake, retouched on non-bulbar surface. To scale, length of 1, 2½ inches.

the implement types recovered in 1959, it also contains types absent from the 1959 assemblage (most notably, perhaps, a single-edged flake scraper).

Implement types of the total series include "points" or "end blades" (both flake and blade examples); various, slightly retouched flake and blade knife-like tools; large, thick flake bifaces (perhaps knives), at least two types of flake scrapers; flake graters; a single example of a flake "saw"; and choppers fashioned from massive flakes ("flake-core" implements).

A single, unworked obsidian spall in the 1959 collection is probably intrusive. A few unworked spalls and two well retouched flake implements of chalcedony in the 1961 collection perhaps also do not properly belong to Kogruk. With those exceptions all of the specimens are of dull gray chert, probably quarried from a single deposit, of a sort which I suspect occurs in the immediate area of the Pass. A further, perhaps more telling, homogeneity is reflected in the Kogruk implement categories. All of the tool types share several major characteristics. Only a few manufacturing techniques were used in fashioning Kogruk tools, and those techniques bind the several typological elements in a distinctive, cohesive assemblage. Whatever the history of Kogruk "culture" may have been, the homogeneous Kogruk complex suggests a technological tradition of considerable antiquity and relative isolation. There is nothing in Kogruk that reflects development beyond relatively very simple flake, blade, and biface techniques, and nothing that speaks of a blending of diverse culture ways.

In previous discussions of the series collected in 1959 (Campbell, 1961a: 14-17; 1962b: 41-2) I noted resemblances between some Kogruk artifacts and European Paleolithic implements, as well as similarities between Kogruk specimens and some of those from the Levalloiso-Mousterian levels at Et Tabun Cave, Mount Carmel, Palestine (Garrod and Bate, 1937), certain artifacts from the Mal'ta site, northeast of Lake Baikal (Bonch-Osmolovsky, 1953), and from the early British Mountain phase at Engistciak, on the Firth River, northernmost Yukon Territory (MacNeish, 1956, 1959b). To these might be added the caves of Teshik-Tash, southeastern Uzbekistan (Okladnikov, 1939, 1940; Movius, 1953) and Ust'Kanskaia, in the Ob River watershed (Rudenko, 1961), probably the site of Afontova Gora, in the Yenisei valley (Bonch-Osmolovsky and Gromov, 1936; Gromov, 1945), and a series of open sites in Patagonia. (I shall further note the latter in a discussion of the Naiyuk complex.) The total Kogruk complex does not closely equate with the total collection (or total phase) from any of the sites noted above. There are enough similarities between Kogruk and British Mountain to suggest that both are closely related members of the same flake tool genre, but

resemblances between Kogruk and the others are somewhat more obscure, if not fewer. All, however, appear to share a constellation of tool making techniques which together carry the stamp of the European Paleolithic. Specifically Kogruk claims membership on the basis of types of flakes struck from unprepared, or roughly prepared cores, apparently with batons of wood, bone, or antler; resolved retouching of some flakes and blades; flake and rude blade "points" of various shapes and thicknesses, which retain bulbs of percussion and remnants of striking platforms; a type of thick, single-edged scraper with a rather steep, roughly flaked working edge; and a general restriction of retouching to the edges of implements.<sup>3</sup> Several of these Kogruk traits are also present in the much more heterogeneous and sophisticated Naiyuk assemblage which, typologically, is the closest Kogruk relative in the long Anaktuvuk sequence.

The Naiyuk complex (Pl. II) is from a site adjoining the Tuktu site area (Campbell, 1961b) on a kame terrace four miles north of the summit of Anaktuvuk Pass. Naiyuk flake and blade artifacts of various types of stone occurred in a gravel matrix to a maximum depth of about 10 inches below the dense sod surface. Implement types, which were directly associated in the site, and which appear to represent a single phase, include large, well retouched blades ("points") retaining striking platform remnants; large end scrapers and side scrapers on blades; large, flake end scrapers and side scrapers (including large "Mousterian" *raclours*); large, bifacial knives; large, thick flakes, slightly retouched to form cutting or scraping tools; a single thick, percussion flaked "hand-ax"; and finely worked lanceolate points, most of which are characterized by thin lenticular cross sections, parallel sides, transverse flaking, straight or slightly convex bases, and edge grinding. Flake scars on a few artifacts possibly represent burin blows. And on at least one specimen there is a *Chapeau de Gendarme* striking platform.

A preliminary analysis of the total collection suggests that the complex incorporates elements of at least two supposedly different traditions. On one hand, the lanceolate points typologically belong to what has been termed the "Plano" (formerly "Yuma") tradition (Edwards and Jennings, 1948; Griffin, 1962), represented by numerous complexes in western and northwestern North America (MacNeish, 1959a, 1962; Wormington, 1957). Except for one or two broken points which appear similar

<sup>3</sup> The observations of Drs. H. M. Wormington, Henry B. Collins, Hans-Jürgen Müller-Beck, and Ralph S. Solecki (all of whom are personally acquainted with European Paleolithic materials) have been of more than ordinary importance to comparative evaluations of Kogruk and Naiyuk. Dr. Wormington briefly examined the first Kogruk collection, and Drs. Collins, Müller-Beck, and Solecki have seen both the Kogruk and Naiyuk assemblages. In view of the stated aim of this paper, it is only fair to say that while their comments cause me to look more directly toward Europe for early Brooks Range analogues, none of them have proposed a direct connection between the Anaktuvuk complexes and European industries.

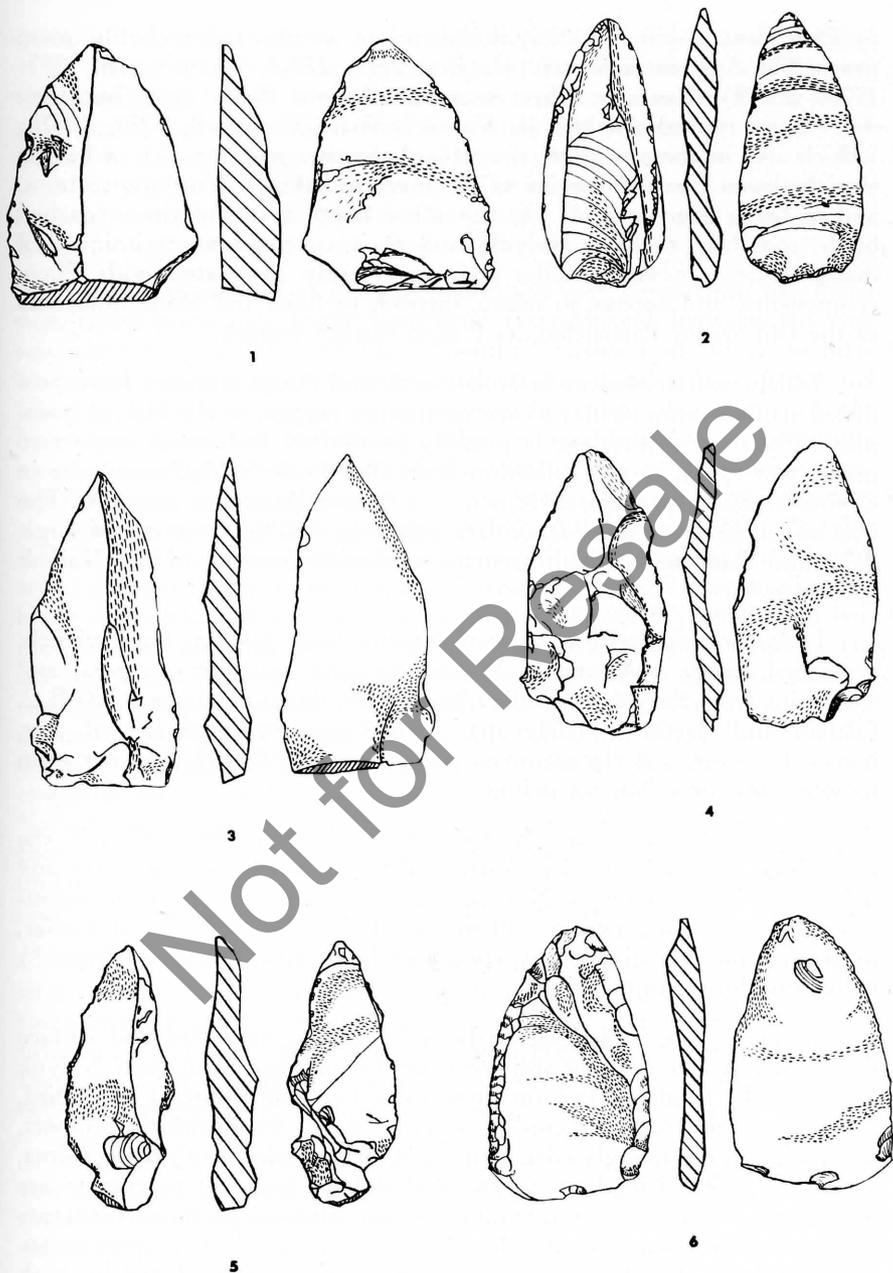


Plate II. Naiyuk artifacts. 1, thick flake, scarred on bulbar surface; 2, blade, retouched on non-bulbar surface; 3, flake or blade, unretouched; 4, 5, flakes or blades, slightly retouched on both surfaces; 6, flake or blade, doubled-edged side scraper. To scale, length of 1,  $2\frac{1}{4}$  inches.

to Plainview specimens, Naiyuk lanceolate points are probably more nearly like Angostura points (Hughes, 1949: 270-4; Wormington, 1957: 137-8, 268-9) than any other commonly known Plano type, but they differ from typical Anaktuvuk Kayuk points (Campbell, 1959, 1962b; [which also in some respects resemble Angostura specimens]) in having straight bases (several specimens), transverse flaking, thin cross sections, and in being edge ground. On the other hand, many of the retouched blade and flake tools of Naiyuk, and their concomitant techniques of manufacture, are very unlike traits previously associated with Plano components, and appear to relate, instead, to flake and blade industries of the Old World Paleolithic, as I shall further remark.

Widely scattered sites in both North and South America have produced artifact series similar to one or another portion of the Naiyuk complex. The total assemblage is possibly as similar, at least in respect to major tool types, to the collection from Olaf Prufer's McConnell site in Coshocton County, Ohio, as it is to any known American complex. The McConnell site contained lanceolate points as well as a variety of large, flake and blade tools which seem to approximate many of the Naiyuk specimens.<sup>4</sup>

I also see similarities between Naiyuk large bifaces, large slightly retouched flakes, and large flake end scrapers and side scrapers, and specimens from Period I of Fells Cave, Chile, dated at about 8,700 B.C. (Rubin and Berthold, 1961: 96). Fells Cave contained few, if any, blades, however, and the stemmed points from its Period I do not even remotely resemble Naiyuk points.

An early horizon, dated at 8,000 B.C. (Epstein, 1960: 97), in the Levi Rock Shelter of Travis County, Texas, yielded blade scrapers and flake tools which resemble Naiyuk specimens, either in form or manufacturing technique, and a "Plainview-like" point (H. L. Alexander, personal communication), but associated large burins, and a Clovis(?) point are absent from Naiyuk.

Finally, in the Americas, artifacts from open, stratified and surface sites in Patagonia are probably very similar to some from both Naiyuk and Kogruk. Implements from those early Patagonian sites (J. B. Bird, personal communication) consist of large flake, woodworking scrapers, often dressed on a single edge only; and "Mousterian-like" flake points, unifacially chipped on both edges. Well-defined bulbs of percussion are present on nearly all of the specimens, and striking platform remnants occur on some. Retouching was primarily accomplished by percussion. It would seem that major elements of the complex ranged widely, both

<sup>4</sup> Dr. Hans-Jürgen Müller-Beck has generously given me access to his detailed drawings of as yet unpublished materials from the McConnell, Levi, and Fells Cave sites.

spatially and temporally in South America (see Lanning and Hammel [1961] for a review of early lithic South American sites; and Mayer-Oakes and Bell [1960] for a discussion of artifacts from the El Inga site, near Quito, Ecuador, which Bird [personal communication] thinks are related to the open site assemblages noted above, as well as to artifacts from early periods in Chilean caves). The importance of a possible connection between the old, rude Patagonian industry and the Brooks Range complexes is not to be overlooked.

Gross comparisons of Naiyuk tool types with those from the Asian sites noted previously imply very close resemblances between the well retouched Naiyuk flake and blade "points," exclusive of the Angostura-like examples: cutting implements; and scrapers; and central Asian and Siberian Paleolithic types. It is noteworthy, also, that some of the Naiyuk scrapers, and particularly, large, bifacial cutting or penetrating tools apparently are like types of the more advanced Paleolithic stage represented at Verkolenskaia Gora, on the Angara River (Bonch-Osmolovsky and Gromov, 1936; Okladnikov, 1959: 73; Petrie, 1927: Pls. XI, XIII). And specialized ways of stone working reflected in the Naiyuk series (as, for instance, techniques of striking platform preparation and blade retouch), and specific Naiyuk artifact forms ("points" and certain *racloirs*, for example) are identical, or nearly so, to those of the European and Near Eastern Mousterian. It must be emphasized that the thin, bifacial, Angostura-like lanceolate points of Naiyuk are most dissimilar to "points" from any Asian Paleolithic stage, and various distinctive implements, including types of thick discoidals, cores, and chopping tools, which occur in early Eurasian sites, are absent from Naiyuk (and Kogruk as well). But, again, as in the instance of Kogruk, there appears to be a common sharing of important tool forms and tool making techniques between Naiyuk, the old central and north Asian complexes, and some of the Paleolithic industries of Europe.

Kogruk and Naiyuk, then, and at least a few other complexes from sites scattered the length of the Americas contain traits which unquestionably resemble elements in the Paleolithic of Europe and in the Paleolithic of Siberia and central Asia. Are these resemblances fortuitous, or do they stand for a Paleolithic genetic connection of one kind or another between America and, ultimately, Europe?

William C. Sturtevant (1960: 8-10) has recently summarized (under two categories of criteria, *viz.*, "analogy vs. homology" and "distributions") the methodological requirements for determining genetic relationships from trait comparisons. These criteria, most pertinent to the present problem, are—the traits compared must be of sufficient complexity; they must be sufficiently similar; the effect of similar natural environments must be ruled out as must independent invention and the

principle of limited possibilities; they must be shown to actually occur in different places, i.e., their attributed distribution must be shown not to be spurious; and finally, the traits must have a continuous spatial distribution.

Sturtevant's cautionary summary is, of course, necessarily and ultimately important to the present problem, but at the moment it is not possible to strictly measure much of the data reviewed in this paper against most of his criteria. For in the absence of highly detailed comparisons, first, among the American collections and, second, of the American materials with the several Old World complexes, the importance in this instance of, for example, possibly spurious similarities of traits, remains unknown. And much the same can be said regarding the practical applications here of most of the rest of those methodological criteria. The most outstanding exception is the requirement of continuous spatial distribution of traits. In archaeology, obviously, known discontinuous distributions do not always stand for actual discontinuities and I shall note that the geographical gap between Siberian and Alaskan Paleolithic sites does not negate any proposition that the sites are related. The spatial gap between the appropriate North American and South American sites seems more important; not primarily because of the distances involved, which are impressive, but because of the variety of ecological zones which have lain for uncounted millenia between the areas in which the sites occur. But, since those zones were successively transgressed by man, and since it is generally held that South America was largely populated during a relatively few thousand years, even the question of close relationships between early northern North American and southern South American cultures must presently remain in argument.

Thus, on the comparative artifactual evidence any case for Paleolithic cultural relationships between Europe and the Americas must presently be stated something as follows: Resemblances of technique and form between some Paleo-Indian and some Paleolithic European artifact assemblages appear too many, and, in several instances, appear too specific to be dismissed out of hand as fortuitous. Therefore, the artifactual data, inconclusive as they may be, raise the distinct possibility of a genetic connection. ("Genetic" is used broadly here to mean historical contact of one kind or another. For a discussion of applications of the term in American archaeology see Willey and Phillips [1962: 29-38]). I conceive that one or more of three major genetic mechanisms were involved in any early contacts between Europe and America: (1) the passing of traits across cultural boundaries without, necessarily, accompanying population shifts, (2) emmigration, the movement, and permanent resettlement, of a people from one locality to another; emmigration is a rapid process and implies, consequently, relatively little time lag between the departure of a population from one locality and its

occupancy of another, although sequential emigrations within a single population may extend through several or many generations, (3) population spread of the type discussed by Giddings (1952), which is not precisely emmigration (nor is it migration), but is instead the slow colonization of new lands by a population which gradually extends its territorial boundaries in response to changing cultural and/or ecological variables; this process, when it results in the eventual shifting of a population to a region greatly distant from its locality of origin, invariably implies considerable time slope. As I shall further note, if there were early genetic connections between Europe and America, one or both of the latter two processes appears most likely to have been the principal mechanism involved.

In view of the new Brooks Range finds, and on the Eurasian record, at least one such possible connection seems reasonable. It is generally agreed that the Paleolithic cultures of Siberia (some of which also appear to have incorporated traits diffused northward from the chopper-chopping tool tradition of south and southeast Asia) derived major elements directly from Europe (see, for example, Clark, 1961; Griffin, 1960; Okladnikov, 1959). From as early as Mousterian times successive European Paleolithic industries contributed traits or constellations of traits to remote north Asian localities. Some of those influences reached eastward at least as far as the Lake Baikal region and the upper Lena River, areas lying considerably closer to Bering Strait than to Europe. A consequential portion of the necessary geographical link between Europe and America is thereby provided by the Siberian Paleolithic.

No absolute dates are available for the early Siberian materials. James B. Griffin's recent interpretation (1960: 802) implies that European traits reached the Baikal (Mal'ta site) and Lena localities as early as 10,000 to 15,000 B.C. He also suggests (1960: 806) that populations from those regions, in response to environmental change, may have moved northward and eastward across Bering Strait between 13,000 and 8,000 B.C. Griffin's estimates are not presently susceptible to verification, but his dates, in conjunction with the known or postulated ages of the American sites or site components in question, provide a plausible way of explanation for an American-European connection.

The radiocarbon dates of about 8,700 B.C. and 8,000 B.C. for the pertinent levels in Fells Cave and the Levi Rock Shelter, respectively, are the only absolute dates for any of the American assemblages treated here. The presence of "Plano" points in the McConnell and Naiyuk complexes does not necessarily mean that they are younger than 8,000 B.C. (see Griffin [1962: 154-5] for a summary statement of the spatial and temporal characteristics of the "Plano tradition"), but the comparative general technological sophistication of the Naiyuk collection as a

whole, implies that the Naiyuk complex, at least, is not as old as the South American, Levi Rock Shelter, Kogruk and British Mountain assemblages. The ages of the Kogruk and British Mountain phase are not precisely known, but on the basis of typology and geological associations of artifacts, I have estimated that Kogruk should be no younger than 6,000 to 8,000 B.C. (Campbell, 1961a, 1962b); and MacNeish (1959a), for similar reasons, thinks British Mountain dates to perhaps 7,000 B.C. The early, open Patagonian sites also lack absolute dates. However, for typological, and in some instances stratigraphic reasons, artifacts from these several components should be as old, if not older, than remains belonging to the 8,700 B.C. level in Fells Cave (the earliest dated level in the southern South American sequence [Jelinek, 1962; 464-5]). Keeping in mind the vagaries of radiocarbon dates, and the weaknesses in the sorts of relative age estimates and postulated cultural relationships offered here, it is perhaps more than coincidental that these several American complexes, which seem to share certain specific cultural characteristics, also seem to group rather closely in time. Further, if the far northern and far southern American sites are indeed related, and if their estimated and absolute ages are even approximately accurate, then it is axiomatic that their antecedents were in the New World at a time respectably earlier than 8,000 or 9,000 B.C.

Griffin's speculation that there may have been an eastward and northward movement of Siberian populations (possessing European traits) into America as early as 13,000 B.C. (and, I would add, if not earlier) is therefore given support by these New World finds. The presence of constellations of European traits, rather than single elements, in several of the American sites more likely indicates population movements than occasional or limited borrowings across cultural boundaries.

The question of access to America from the interior of Siberia during the appropriate time interval has been adequately settled by Chard's summaries (1958, 1961), which note the Bering land bridge, and describe a route of travel along the arctic coast of Siberia from the lower Lena River to Bering Strait, a pass between the mountains and the sea which was probably ice-free during the whole of the Fourth Glacial Stage.

Of more consequence, therefore, than the problem of access itself, is the absence of reported finds of Paleolithic sites, along that route, of the kind which would connect the Baikal and Lena localities to Alaska. That enigmatic gap of more than 2,000 miles presently defies a conclusive explanation. Perhaps, as Chard (1958: 58) has suggested, most of the old sites now lie under the sea, but it is also likely that the answer has to do with the practical problems of conducting adequate archaeological surveys in the area.

Thus, to somewhat embellish Griffin's remarks, the present evidence

suggests that beginning as early as Middle Paleolithic times, successive populations of European hunters moved eastward over the open lands of northern Asia. By as early as 15,000 to 18,000 B.C. (and perhaps earlier), some of those populations had penetrated east to at least the longitudes of the Baikal region and the upper Lena River. Along the way there was probably some mixing with other populations, but much of the land over which they traveled was very probably previously uninhabited, and for those who traversed the more northern regions it is likely that few, if any, men were there before them. That travel through unoccupied terrain would largely serve to explain the strong persistence in eastern Siberia of sizeable, cohesive, constellations of European traits in spite of the distances and generations involved, and perhaps also implies that European physical traits, in considerable strength, reached far eastward across northern Asia.

By at least as early as 13,000 B.C. cultural descendants of those industries reached North America, where, again, the artifactual data, while not as strongly European as those from the Siberian localities, nevertheless reflect considerable cultural integrity through time and space. (It is perhaps possible to avoid the trap of confusing race and culture, and at the same time to suggest that the material culture elements accompanied some European physical traits.)

What were the subsequent histories of those European trait constellations? The new data imply that they achieved wide spatial distribution in the Americas, which further suggests that they influenced later cultural developments in several New World areas. I have previously noted here J. B. Bird's belief (personal communication) that the old industry from the open, Patagonian sites is related to early South American complexes occurring northward from Patagonia as far as Ecuador. If I understand him correctly, he also holds that the old, wide ranging industry was a part of a South American culture base which contributed heavily to at least some of the later lithic cultures of that continent, including those represented by the El Inga assemblages, and successive periods in Fells Cave.

For North America, there are some intriguing, if puzzling, possibilities. The associations in the pertinent level of the Levi Rock Shelter prompt the speculation that there is a connection between Paleolithic Eurasia and the Fluted Point and Plano traditions. And, while the Levi Rock Shelter level is too young to be antecedent to Clovis Fluted, it nevertheless recalls Byers' remark (1959: 235) that an industry "of a general late Levalloiso-Mousterian order" was possibly ancestral to Clovis Fluted and to the American Archaic.

A stronger relationship, of one kind or another, between the Old World and an early American tradition is implied by the presence of

both Eurasian and Plano elements in the Naiyuk, and probably also the McConnell, complex. Since, with few exceptions, the numerous Plano sites in North America do not contain the Eurasian traits of Naiyuk, and since the maximum possible ages of the earlier Anaktuvuk Pass sites are in question, there is no clear evidence for claiming that Naiyuk represents a developmental stage between the Old World industries and the Plano complexes. (The age of the last major glaciation of Anaktuvuk Pass is doubtful [Detterman, Bowsher, and Dutro, 1958; Porter, 1959], but the most recent local geological investigations indicate the last great glacier may have occupied the Pass until as late as 6,000 B.C. [Stephen C. Porter, personal communication]. If that date marks the melting of the glacier, and if I am correct in thinking that the Naiyuk complex is younger than the Kogruk complex, Naiyuk is obviously younger than 6,000 B.C.) Nevertheless, the Naiyuk complex quite decidedly appears to stand for a relationship of some kind between the Plano complexes and Eurasian industries. Perhaps Naiyuk testifies to a blending of two traditions, but this does not rule out the possibility that, on earlier levels at least, several American hunting cultures were ultimately rooted to Europe. The postulated dates of arrival in North America of European traits do not have to be pushed backward very far in order to place them in the New World well before Clovis Fluted, for instance. And in view of the predominant artifact types contained in the American fluted and lanceolate point assemblages, types which must speak for flake or blade origins, it seems not unreasonable to derive them from European technologies; particularly in the absence of convincing alternative descriptions of the progenitors of those distinctively American complexes.

This does not mean that the presently assigned dates for the recent American finds discussed here must necessarily be pushed further down the time scale, since, as I said before, there is reason to think that none of them mark the earliest arrival of the European traits in question, and there is no present way of temporally measuring the survival of those traits in the Americas.

With the possible exception of the rude Patagonian assemblages, the British Mountain and Kogruk complexes typologically relate more exclusively to Eurasia than any of the rest. Both the Kogruk and British Mountain sites lie nearly on the edge of an area which was ice-free during the length of the Wisconsin, but which was absolutely isolated by glacial ice from most of the rest of North America for perhaps several thousand years following. (See Detterman, Bowsher, and Dutro [1958], and Flint [1957: 307, Pl. 3] for descriptions of the Alaska regions which remained unglaciated during the Wisconsin, and Campbell [1962a] for an archaeological evaluation of the area noted above.) That isolation, one might logically suspect, left its mark on early north Alaskan cultures, and British Mountain and Kogruk may well represent relatively late

arctic survivals of industries long resident in the Americas. Naiyuk poses a further question. If, as they appear, the Plano complexes originated to the south, the Naiyuk complex possibly expresses far northern survivals of European traits until such times as Plano influences reached northward from the interior of North America; but this speculation is perhaps contradicted by the McConnell complex. I would suggest that accurate definitions of the ages of these two assemblages, and the relationships between them are of major importance to both the central problem of this paper and the problem of the history of the Plano tradition.

A remaining question deserves comment. What is the testimony of the total ecological record, if it be granted, on the artifactual record, that there may have been a Paleolithic connection between Europe and America, and that a European Paleolithic base may have influenced the development of Paleo-Indian hunting cultures? Geographical distances and long existing geographical features, such as mountain masses, are of general consideration. More specifically, in view of the estimated age or ages of the postulated connection, summaries of the intercontinental climatological and paleontological records during the last glacial age are pertinent.<sup>5</sup>

The distance across Asia, between Europe and America, is not of particular consequence one way or the other. Granted that it is about 6,000 air miles between Europe and Bering Strait, and keeping in mind R. S. MacNeish's wise counsel (offered several years ago in a paper read at the annual meeting of the Society for American Archaeology) to the effect that one should never confuse air miles with "walking miles," neither air nor land miles are, in themselves, of great importance; note, again, the colonization of both of the Americas in what is commonly held, if perhaps inaccurately, to have been a relatively few thousand years.

More important, of course, is the lay of the land. On the latitude of the Arctic Circle, the Anadyr Range, which trends from southeast to northwest across the Chukchi Peninsula, contains rough terrain, but that Range is full of low passes, several apparently less than 1500 feet above sea level. Further to the west there are similar, if somewhat higher, passes through the north-south trending Cherskiy and Verkhoyansk ranges, the latter of which bounds the valley of the Lena. (The inhibiting effect of mountains on the movements of food collectors should not be overemphasized as it commonly is. Because they sometimes separate a productive natural environment from an impoverished one, or because they sometimes conveniently divide two mutually hostile societies, mountains may mark cultural boundaries. But at least among hunters, in the

<sup>5</sup> I thank Caroline McD. Bierer, Joyce Heller, Anne D. Shinkwin, R. H. Eney, and A. S. Stancioff, graduate students at The George Washington University, for assembling and evaluating sources relative to upper Pleistocene ecology. I assume responsibility, however, for selecting the climatological and paleontological interpretations used here.

absence of extensive mountain glaciers or ground so steep that it cannot be traveled, excuses are usually found to see what is on the other side. In fact, in some areas, because passes constrict the movements of game herds, mountains become the more favorable places of settlement. In the Brooks Range [as massive and as high as the Anadyr, Cherskiy, and Verkhoiansk mountains] nearly all of the major passes were historically occupied by hunters in order to intercept migrating caribou; the same animal [*Rangifer*], incidentally, which has long been resident in the eastern Siberian ranges. My point here is that while the arctic coastal corridor described by Chard [1958, 1961] was probably the only route across the top of northeast Siberia which remained open at all times during the last glacial age, it was only one of several practical routes during times of reduced glaciation. And, for the reason noted, it should be remembered that those Siberian mountains may well have encouraged, rather than inhibited, the early exploration and settlement of far north-eastern Asia.)

Eastward, from the Lena valley to Europe, there is relatively little high ground. Directly to the east of the Lena, the Central Siberian Plateau contains few, if any, elevations higher than 1600 feet above sea level. Beyond the Plateau, the Siberian and East European plains, divided by the low, narrow Urals, are lower, most of the land lying less than 700 feet above sea level. Some of the Central Siberian Plateau is hilly, and some of it is broken; the Siberian and East European plains are flat or rolling. That broad reach, from the Lena River to Eastern Europe, contains no large bodies of water, nor other extensive barriers, such as deserts; indeed, historically, it has represented a nearly continuous grassy prairie. Some parts of it consist of extensive areas of tundra marshes, lakes, and streams, which during the warm season variably affect, according to species, the movements of large game, but which greatly restrict human overland travel. That those sorts of wet arctic and subarctic areas provide excellent traveling for man and beast alike during three-fourths of the year, however, is sometimes overlooked. Physiographically then, and in spite of the distances involved, the north Eurasian traverse is not a difficult one at present.

It is not my intention to minimize the physical difficulties of mountain and steppe-tundra travel, nor am I unaware of those psychological hazards which persuade man to stay at home, be he primitive or otherwise. Wormington (1957: 251), in reference to the present geographical area of discussion, quotes Rainey's statement (1953: 46) that "North-western America and northeastern Asia, under present climatic conditions, together form one of the most formidable barriers to human communication one can find anywhere in the world." And she further comments (1957: 251) that "to the primitive the unknown and the unseen are strange and terrifying, and primitive man does not willingly depart

from known familiar things to face the unknown. Only some strong compulsive force, such as the need for food, will cause him to make a drastic change."

I am willing to accept Wormington's remark, keeping in mind that there have been enough "strong compulsive" forces to cause primitive man to explore practically every nook and cranny of every continent but Antarctica. But Rainey's statement is misleading. As I have noted, for those parts of northeastern Asia treated here there are no mountain, desert, or sea barriers. (The same is true for far northwestern North America.) Rainey (1953: 46) refers to the barrier of climate in both northern forest and tundra. But the literature on tundra or steppe-dwelling peoples and my observations in north Alaska, make me think he has taken a far too pessimistic view of the latter ecological zone. As in the instance of mountain ranges, the northern cold season is not in itself a barrier to man, at least not to the more recent species. On the contrary, in much of the arctic, winter is a highly advantageous time of year.

For example, it is about 150 miles via the John River from the summit of Anaktuvuk Pass southward to the Koyukuk River. More than two-thirds of the way the river is bordered by swampy, pond-filled thicket and forest. In winter a man in a reasonable hurry, walking the river ice, can travel from the summit of the Pass to the Koyukuk in four or five days. If he resorts to a dog sled, it will take him 24 to 36 hours. In summer, if he walks, the same journey takes ten days to two or three weeks, depending upon the conditions of tributary streams he must ford, and what luck he has eating along the way. One further example: For all practical purposes it is impossible during the warm season for a man afoot to traverse the long and wide Arctic Coastal Plain of north Alaska because of its uncounted thousands of lakes. But from October to June he can go afoot in any direction across it at a rate of 20 to 30 miles a day, and if he can keep a compass heading, he can travel it in a straight line, for there are no terrain features which he must avoid. If primitive man is to live at all in the cold regions, he must learn to live in them the year around, and I suspect that in the open lands of the north, Paleolithic Europeans as well as Nunamiut Eskimos learned to exploit the advantages of winter. (As I shall further remark, the barrier of the subarctic forest, where the hunting is poor and the winter snows lie deep, is far more formidable during the season of cold than the arctic mountains or prairies.)

This does not mean that the northern summer is prohibitively formidable either, although mid-summer for some far northern hunting societies is a time of relative want. But in many far northern regions warm season overland travel is severely inhibited, and I am thereby led

to the conclusion that the long winters and short summers of the arctic and subarctic were nearly essential to the earliest explorations and colonizations of much of northern Asia and northern America.

Returning, momentarily, to present day physiography, and turning to the American side of Bering Strait, low lying prairies stretch with few interruptions from the Chukchi Sea eastward to Hudson Bay. There are few essential physiographic differences between this reach and that across northern Eurasia, and the general physiographic (and total ecological) requirements of living and traveling in both are historically similar.

But at the present time there is no such continuity between far northwestern North America and the more southern interior of the continent; more specifically, there are no good overland approaches between, for instance, northern Alaska and the Great Plains. A possible route from the area of Bering Strait lies north around the eastern end of the Brooks Range; eastward across the top of Alaska to the Mackenzie River (the Arctic Coastal Plain, between the northwest corner of Alaska and the mouth of the Mackenzie, is good walking in winter, but, as noted, literally impassable in summer. The Arctic Slope, which parallels the Arctic Coastal Plain and lies between the plain and the northern scarp of the Brooks Range, is an open, gentle, east-west highway at all seasons [Campbell, 1962a]); and thence southward in the Mackenzie valley to the area of Great Slave Lake and drainages which lead on southward toward the Plains. An alternate approach is southward from the northwest Alaskan coast to the Yukon valley, and thence east and south to the head of the Yukon River (about latitude 59°N.), where passes lead out through the Rockies in the direction of northwest or west-central Alberta.

However, while no "absolute" physiographic barriers occur along either passage, much of both lie through a water-filled boreal forest. This means (according to the testimony of both the ethnographic and ecological records) that in order for human communities to successfully live (and travel) in these immense forest wildernesses they must be highly proficient in the ways of (1) water transportation, and (2) deep snow transportation, and, in addition, they must primarily base their economies on something other than large game mammals. Again, in reference to the relationship between hunting societies and climate, this leads to the conclusion that early explorations and colonizations of some northern hemisphere areas (including, very possibly, the Great Plains of North America) were accelerated by cold intervals (retreating forests), and slowed or prevented by warm intervals (advancing forests). This proposition is hardly new, but it should be kept in mind that it does not contradict the theory that encroaching forests dislocate hunting societies, thereby causing them to seek new hunting territories. It simply means

that the greater the open lands, the greater the potential ranges of hunters who occupy them, and, here, it suggests a review of recent interpretations of the last glacial stage with an eye for ways in which glaciations may have encouraged, rather than inhibited or prevented, early discoveries of North America and the subsequent spread of populations on this continent.

In North America, the Wisconsin glacial stage, generally thought to have ended about 8,000 B.C., apparently spanned 50,000 years or more (Dreimanis, 1960: 113, 116; Frye and Willman, 1960: 5) and reached its maximum advance 16,000 to 18,000 B.C. (for radiocarbon dates of the Wisconsin maximum see Flint and Rubin [1955], Horberg [1955], and Suess [1956]; see Karlstrom [1955] for correlations of interior Alaska localities). According to the recent classification of Frye and Willman (1960), major preceding events in the life of Wisconsin ice included the Farmdale interval, which perhaps spanned from 20,000 to 25,000 B.C., and the Altonian substage, a long lived advance, which extended from about 25,000 B.C. to the beginning of the Wisconsin.

During the maximum it seems likely that all of North America north of the southern Canadian boundary was ice-covered except for a very large area in the lowland interior of Alaska, Alaskan coastal areas from about Kuskokwim Bay around the top and eastward to the mouth of the Mackenzie River, the Arctic Coastal Plain, and portions of the Arctic Slope. Wisconsin maximum ice completely covered all of New England and also invaded portions of all those states that adjoin the southern Canadian boundary (see Flint's summary map [1957: Pl. 3]). There is no reason to think that at any other time during the Wisconsin stage glacial ice was as extensive as it was 18,000 or 20,000 years ago, although during the Altonian substage very large areas of northern North America were ice-covered, and, of course, there was much glacial ice in the north for varying periods before and after advance or readvances.

In Siberia, the Zyrianka glacial stage appears to have begun about 63,000 B.C. and to have lasted for 55,000 years. According to recent Russian interpretations it contained three major advances: the early Karaul and the slightly later Nyapan, which together spanned 33,000 years, and the youngest, Sartan, which perhaps reached its maximum at 8,000 B.C. The very short Kargin interval of about 2,000 years duration separated the Nyapan and Sartan advances (Ravsky and Alekseev, 1960: 159-61; Sachs and Strelkov, 1961: 61, 65-7). There is also at least one interval implicit in the available descriptions of the Karaul-Nyapan advances, but apparently Russian geologists have not defined its length or given it a name.

In general there appear to be good correlations between major Wisconsin and Zyrianka events (Ewing and Donn, 1961; Gromov, Kras-

now, Nikiforova and Schanzer, 1960: 15). It is noteworthy, however, that the maximum extensions of Zyrianka ice occurred during the Karaul advance, early in the Zyrianka glacial stage rather than late, as in the Wisconsin and, while recent Russian work indicates that there was more glacial ice in Siberia during Zyrianka times than was previously believed, Zyrianka maximum ice was never as proportionately extensive as was that of the Wisconsin maximum. During the Zyrianka maximum, ice covered a large land area lying between the Kara and Laptev seas, but it extended southward only to the Arctic Circle. Further east, a large multi-lobed glacier reached from the Lena valley nearly to the Sea of Okhotsk, and southward on the mainland to about the latitude of 60°N. Even during that early, maximum advance, however, there were large ice-free areas in Siberia north of the Arctic Circle; for example, there were tens of thousands of square miles of open ground between the Cherskiy and Anadyr ranges, and with the exception of portions of the previously noted multi-lobed glacier and glaciers on the Kamchatka Peninsula, all of eastern Siberia was ice-free south of the Arctic Circle (see Ewing and Donn [1961], Ravsky and Alekseev [1960], Sachs and Strelkov [1961], and Vaskovski [1959] for temporal and spatial descriptions of the Zyrianka stage).

In Europe, except for Alpine ice, the maximum glaciation during Würm times extended south beyond the Scandinavian Peninsula only about as far as present Breslau, Germany. That ice coalesced with a western Siberian glacial sheet which reached eastward to the eastern side of the Taymyr Peninsula. South of the Arctic Circle, however, its easternmost limit lay at about 83°E. (Flint, 1956: 5; Tsapenko and Makhnatch, 1960: 110).

As reviewed by Movius (1960: 358-64), the Würm glaciation in central and northern Europe spanned from about 68,000 to 8,000 B.C. Major Würm phases included the Early Würm stage, from 68,000 to 40,000 B.C.; the Gottweig interstadial, from 40,000 to 29,000 B.C.; the Middle Würm stage, from 29,000 to 12,000 B.C. (which contained two phases separated, between 25,000 and 23,000 B.C.; by the Paudorf oscillation); and the Late Würm stage, from 12,000 to 8,000 B.C., and I have omitted some subsequent "retreats," "oscillations," and "readvances."

These summaries show that there are good correlations between the beginning and terminal dates of the last major glacial stages in North America, Siberia, and Europe, and that there are also some internal parallels. Of particular consequence here, however, is the discrepancy between the age of the Zyrianka maximum and those of the Würm and Wisconsin, for the early retreat of the Zyrianka maximum appears to have subsequently left the top of Asia ice-free from the Chukchi Sea to the Taymyr Peninsula. Some of that corridor may have been occupied,

at one time or another, by sea or lake waters, but the apparent fact of its long existence, together with the known glacial geography of the rest of Siberia, and of Europe and North America suggest that glacial barriers were never great enough to have prevented man from traversing the breadth of Eurasia to Alaska at any time since the beginning of the Third Interglacial. Nor, except at the time of the Wisconsin maximum, did ice barriers completely block the open lands of far northwestern North America from the rest of the continent.

During times of glaciation the wide corridors, of course, changed direction and dimension according to the movements of the glaciers; but that for long periods these routes were variously bounded by ice, raises the question of how generally suitable they were for human settlement and travel, and, more specifically, what subsistence resources they contained. In North America, long, severe winter, and tundra biomes (conditions of glacial climates) unquestionably opened the boreal forest barrier for long intervals before and after the Wisconsin maximum, and, on both continents provided the sorts of terrain necessary to northern hunters. The presence of those biomes also implies the potential presence of certain mammalian food resources.

It is not presently possible to discuss specific Asian or North American faunal assemblages in relationship to specific Fourth Glacial corridors or other ice-free areas within the glaciated regions, nor do the data permit faunal descriptions according to short, in sequence, time intervals. But the literature illuminates two or three noteworthy general characteristics of faunal distributions in the geographical areas under consideration (since economies based on land mammal hunting typically require open lands species which are numerous, large, herbivorous, and gregarious, with few exceptions only forms which most obviously meet those criteria are noted here).

For central, unglaciated Alaska, the Wisconsin or late pre-Wisconsin megafauna included, among others, mastodon (*Mammut americanum*), woolly mammoth (*Mammuthus primigenius*), probably several horses (*Equus* sp.), at least one camel (*Camelops* sp.), several bison (*Bison* sp.), at least one caribou (*Rangifer* sp.), and more than one muskox including, at least, the genus *Ovibos* (Flint, 1957: 471; MacGowan, 1950: 119; Rainey, 1940: 304-7; Scott, 1962: 185-6). In view of the supposedly preferred habitats of those forms listed above which are now extinct, and on the basis of radiocarbon dates, it is quite certain that many of them survived in the tundra regions of Alaska, and elsewhere in northern North America, until 10,000 to 6,000 B.C. (see Hester [1960] for pertinent radiocarbon dates).

For northern Eurasia, the summaries of Colbert (1937: 179-80), Flint (1957: 449, 474), Hay (1924: 25, 176-7), Loukashin (1937: 331-2),

and Sauer (1944: 539-40, 549), among others, show that several forms nearly identical to those of North America ranged the width of that continent during Third Interglacial and Fourth Glacial times. Old World elephants and bison spread over northern Eurasia, and early in the Pleistocene had reached North America. American horses and camels colonized northern Eurasia even earlier. The Old World *Rangifer* (reindeer and caribou) has had wide, abundant, inter-continental distribution since at least the beginning of the Fourth Glacial Stage. These data mean that during the last major glacial stage a large, homogeneous fauna occupied the northern regions of North America and Eurasia, and that it persisted essentially intact from long before the beginning of the Fourth Glacial until 8,000 or 10,000 years ago. In other words, during the last glacial stage big game, in abundance, occurred across Eurasia and in the open lands of North America, and, with few exceptions, the same or similar forms occurred everywhere within that range.

This is the gross picture. It is certain that from time to time during the past 60,000 or 70,000 years encroaching glaciers displaced that fauna from large continental areas. Is it likely, also, that during or near times of maximum extensions of glacial advances, when ice-free areas were greatly reduced in size, increasing cold and increasing proximities of glaciers in one way or another drove the game herds from even the remaining northern corridors and other open ground localities? On the basis of some archaeological and ecological observations, I think not.

First, the Kogrük site at Anaktuvuk Pass appears to have been inhabited by hunters during a time when glacial ice may have occupied portions of the Pass floor, and when very little, if any, vegetation existed on the kame terrace upon which the site is situated (Campbell, 1962a). It is possible that the Kogrük hunters camped there for purposes other than hunting, but more likely, I think, they were there to intercept large game traveling through the Pass, from one open grazing area to another.

Second, there is a noteworthy characteristic about the ranging habits of the West Greenland caribou which inhabit the area about Søndre Strømfjord, on the Arctic Circle. In summer, I have found herds of them grazing 200 yards from the massive western front of the ice cap, and, while in that region there are thousands of square miles of open ground lying well away from the glacier, many of the caribou prefer to stay relatively close to the ice the year around. In winter, Eskimos from the coast must travel to the head of the fjord and beyond (5 to 20 miles from the glacier front but more than 100 miles from the sea) in order to hunt them. Excavations, in that region, of a far inland Eskimo winter camp show that the caribou have maintained this ranging pattern for several human generations, at least (perhaps several centuries); ap-

parently, therefore, the caribou preference for the pastures lying close to the glacier has nothing to do with recent European or Eskimo activities. These observations are not conclusive, but they do support the contention that a glacial climate or the immediate proximity of glacial ice does not discourage large, cold-adapted mammals. The combined climatological and paleontological evidence may thus be interpreted to mean that at no time during the last glacial stage were there intercontinental environments of the kind which would have excluded man from living in the northern regions.

A final question concerns the water gap presently separating northwestern North America from northeastern Asia. A number of anthropologists have discussed the importance of a former Bering land bridge to early contacts between America and Asia, and Chard (1958, 1961) has specifically commented on its possible role as a route of access for peoples moving into America from Asian areas lying far south of Bering Strait. It is sufficient here to note that recent geological studies (Haag, 1962; Hopkins, 1959) indicate that during the last glacial stage lowering sea levels at least twice created bridges (during the Altonian substage, and again at the Wisconsin maximum); broad, flat valleys which extended generally north and south for probably several hundreds of miles. The Wisconsin maximum bridge, apparently a grassy, tundra plain which remained for some time following the advance, very possibly attracted the herbivores which were followed by the hunters with which this paper is concerned.

In summary, while the question of Paleolithic connections between Europe and the New World is hardly settled, the presently available data suggest the possibility that (1) eastward expansions by European hunters, which began at least as early as Mousterian times, eventually resulted in colonizations of the New World by peoples whose technological inventories contained constellations of European traits, (2) that some subsequent American flake and/or biface industries, including the Fluted Point and Plano traditions, at least in part developed directly from that European Paleolithic base, and (3) that while European populations or cultural influences could have reached America, via northern Asia, at practically any time during the Fourth Glacial Stage, the colonizations in question most likely occurred shortly after the Wisconsin maximum.

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