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HELL GAP: PALEO-INDIAN OCCUPATION ON THE HIGH PLAINS

by

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ABSTRACT

A resume of archaeological investigations in the Hell Gap Valley of southeastern Wyoming is presented. This research produced a detailed sequence of Plains Paleo-Indian occupation of this section of the High Plains from about 9000 to 5500 B.C. Identifiable complexes recognized include Goshen, Midland, Folsom, Agate Basin, Hell Gap, Alberta, Cody, and Frederick. Materials recovered represent camping activities rather than the better known game kills, and add dimension to our knowledge of Plains Paleo-Indian cultures.

Archaeological excavations in the Hell Gap Valley of southeastern Wyoming were conducted by Harvard University and the University of Wyoming from 1959 through 1966 with the support of the National Geographic Society, Harvard University, and the American Philosophical Society. These investigations revealed the most complete sequence of Paleo-Indian cultural remains yet uncovered on the High Plains. Detailed analysis of artifactual, faunal, and other material is still in progress, and to date only brief and informal sketches of the research have appeared in print (Haynes, Irwin, Irwin-Williams, and Agogino 1965; Irwin, Irwin-Williams, and Agogino 1965). Sufficient information is now available to permit a somewhat more complete resume of the succession of Paleo-Indian occupations at Hell Gap. It is hoped that such a resume will be of use not only for specialized studies of Plains Paleo-Indian culture, but also in more general syntheses and considerations of late Pleistocene-early post-Pleistocene human ecology (*e.g.*, Irwin and Wormington 1970; Irwin-Williams and Haynes 1970).

THE ENVIRONMENTAL CONTEXT

The five archaeological localities (four Paleo-Indian, one late prehistoric) which constitute the Hell Gap group are in a small wooded valley in

southeastern Wyoming. The valley is at 42° 24' north latitude and 104° 38' west longitude, at an altitude of about 5000 feet (Fig. 1). It is some ten miles from the town of Guernsey on the North Platte River, which provides the principal drainage for the region. The low north-south trending hills, locally termed the "Haystack Mountains," are cut by the Hell Gap valley and by several other comparable small valleys and provide a transitional "Canadian" environment characterized by an open forest of yellow pines and junipers interspersed with several species of grass, yucca, and prickly pear cactus, with willow, box elders, poplars, and other deciduous species in the drainage bottoms (Fig. 2). The mountains themselves are part of the Hartville uplift, and Hell Gap valley, which follows a major fault, exposes Tertiary sediments on its west side and Pre-Cambrian outcrops on its eastern slopes. To the east, the valley opens onto the broad expanse of short-grass-dominated High Plains of eastern Wyoming.

The character and location of the valley offered numerous advantages to aboriginal populations. From it, the faunal and floral resources of both the High Plains and local semi-montane environments are easily accessible. The relatively deep valley itself provides shelter from adverse elements, and winter temperatures average 10° warmer than on the adjacent plains. Water is currently available in the valley bottom in springs and seeps. Geologic evidence indicates that a permanent stream was once present and, as late as the 19th Century, an ephemeral stream flowed through the valley. Tertiary deposits in the Hell Gap Valley and in other nearby outcrops contain beds and nodules of excellent quartzite and chert. Aboriginal use of these materials and

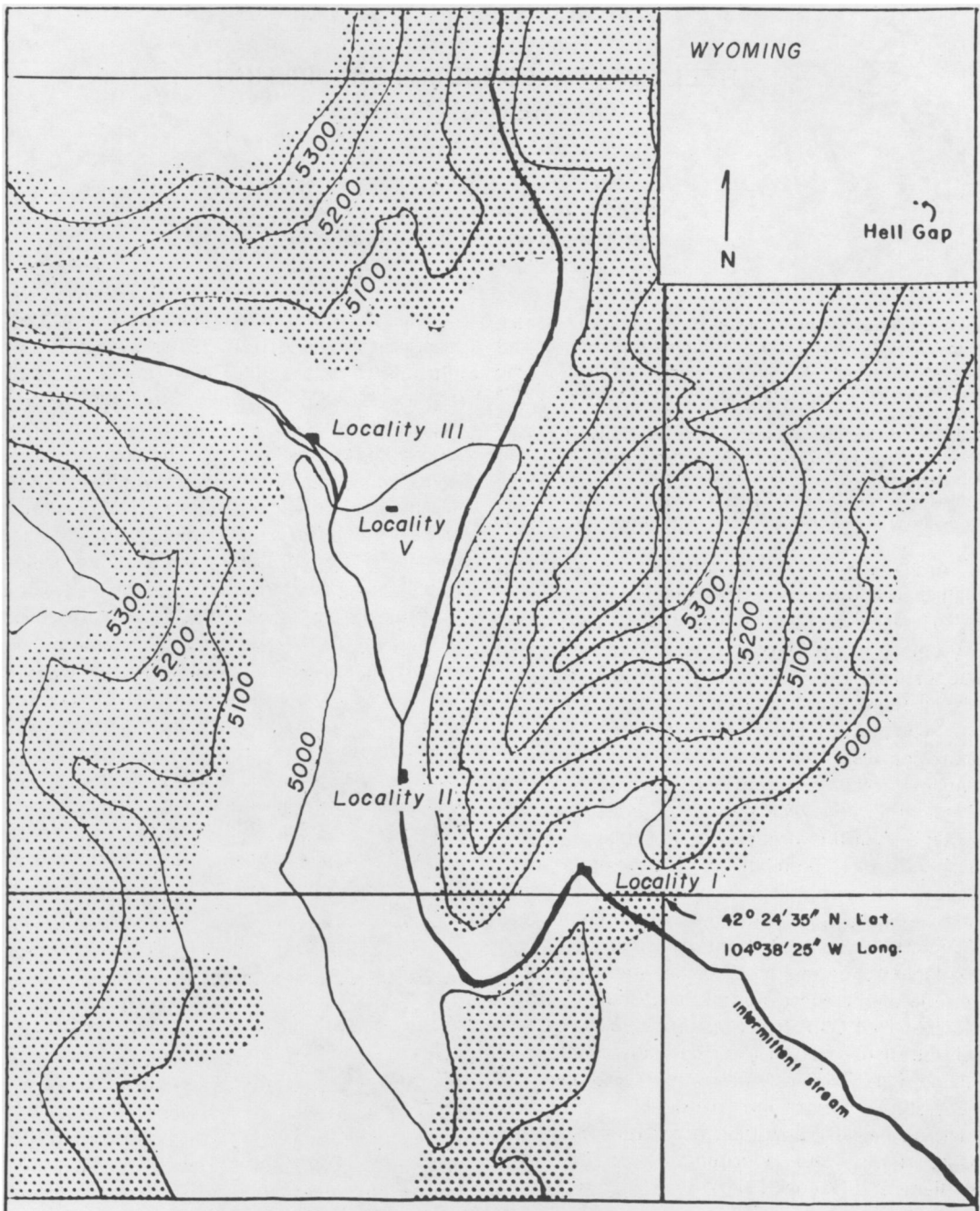


Figure 1. The location and topography of Hell Gap Valley, Wyoming.



Figure 2. Aerial photograph of Hell Gap Valley, showing the same area as in Figure 1.

quarrying activities were so extensive that pits up to ten feet deep (locally known as the "Spanish Diggings") were cut into these Tertiary deposits. These quarries were used throughout the aboriginal occupation of the region, so that it is difficult to ascertain what proportion of them date from the Paleo-Indian period. However, at least one pit, investigated in 1966, predates the Altithermal period, and workshop debris from several other pits includes partly finished bifaces employed in the Paleo-Indian period as preforms for characteristic lanceolate points.

RESEARCH BACKGROUND

The existence of Archaic material at Hell Gap was reported to Agogino in 1959 by James Duguid and Charles McKnight. Investigation soon showed that much Paleo-Indian material was also present, apparently in a stratified sequence along the steep stream banks. Preliminary tests by Agogino and Haynes in 1959 and 1960 supported this and confirmed the presence of Hell Gap, Agate Basin, and Cody Complex materials in Hell Gap valley. In 1961 Irwin and Irwin-Williams, representing Harvard University, joined Agogino, and full-scale excavations were carried out from 1961 through 1966. C. Vance Haynes conducted a continuing study of the geomorphology and geochronology of the region; P. J. Mehringer investigated the possibility of obtaining paleoclimatic data through palynologic analysis; and Michael Roberts is continuing studies of the microfaunal and macrofaunal remains.

SITE SITUATIONS

The site localities in Hell Gap valley may be outlined as follows (Fig. 1):

Locality One (I) is in a small open area on the northeast bank of the stream at a sharp bend near where it emerges from the confines of the canyon. Surrounded by hills on three sides, it occupies a particularly well protected position.

Locality Two (II) is about 300 meters upstream from Locality I, and lies at the base of a sheer granite cliff on the east bank of the stream where it leaves the fault zone and flows through granite outcrops.

Locality Three (III) is about 600 m. northwest and upstream from Locality II, at a point where the stream bed leaves the fault zone and cuts the Tertiary sedimentary platform which forms the west edge of its drainage basin. It occupies a large open area on the northeast bank

of the stream and is somewhat less well protected than Localities I and II.

Locality Four (IV) is a small, single component late prehistoric camp apparently occupied about A.D. 1200. The remains there are beyond the scope of the present discussion.

Locality Five (V) is in a large open space about 150 m. southeast of Locality III. It lies in a terrace (possibly of Kaycee age, see discussion below) midway between the main stream channel on the west and a small tributary valley on the east; it is not as well protected as Localities I and II.

Two other localities whose archaeological remains relate to the Hell Gap sequence are outside the main valley and are mentioned only briefly:

The *Patten Creek Site* is some five miles northwest of Hell Gap. It is near a large permanent spring at the base of steep bluffs containing readily available deposits of Tertiary quartzite.

The *Greene Site* is some 40 miles northeast of Hell Gap at the base of steep bluffs of Tertiary age.

GEOLOGIC SKETCH

The earliest Pleistocene deposits in Hell Gap valley are coarse alluvial gravels occupying terrace remnants above the present valley floor, and may equate with the Arvada formation elsewhere (Leopold and Miller 1951). The earliest Quaternary sediments exposed in any of the archaeological localities are buried stream deposits (Fig. 3, Units A and B) of Pinedale age, possibly equating with some part of the U-Cross formation elsewhere. At Localities I and II, Unit B sands are capped with an olive-green silt with intermittent humic zones dated at about 11,000 B.C. The deposition of these silts was followed by a period of weathering and then by the deposition of a series of yellow alluvial and eolian silts (Units C and D, respectively). These partly reworked loess deposits were evidently laid down between about 10,000 and 9000 B.C. Remains of mammoth and materials of the Clovis industry have been recovered in this unit within five miles of Hell Gap valley. The succeeding depositional unit, E, overlies D disconformably. It consists of a series of tan silts of eolian origin partly reworked from older silts, and contains a discontinuous series of carbonaceous layers frequently associated with archaeological remains.

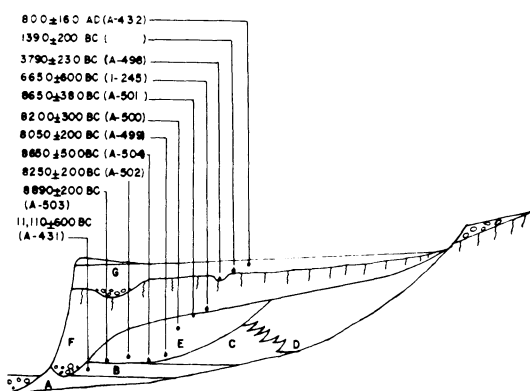


Figure 3. Schematic geologic section of Hell Gap Valley (no scale; after Haynes 1965). Units: *A*, gravel. *B*, sand, olive, massive, mottles of iron oxide. *C*, *D*, loess deposit, in part aeolian, in part alluvially deposited. *E*, grey to tan silts with intermittent humic zones. *F*, massive silty colluvium, intermittent humic zones and calcareous subsoils toward base. Zonal soil profile, with clay-enriched B horizon and calcareous subsoil toward top. *G*, alluvium and colluvium, dark brownish grey, weak soil structure.

Materials belonging to the Goshen, Folsom, Midland, Agate Basin, and Hell Gap complexes occur in the lower portions of this unit and are separated by a minor erosional cycle from those of the Alberta and Cody complexes in its upper portions. The temporal span of the unit is evidently between about 9000 and 6400 B.C. Unit F is composed largely of tan silts but also contains a gravel facies of a stream which removed parts of earlier deposits. Near its base it includes materials of the Frederick and Lusk complexes indicating an age of about 6500 to 5500 B.C. Higher in the section, at the nearby Patten Creek site, are artifacts of the Patten Creek I Complex and, near the surface of the unit, were sparse materials of the McKean Complex, dated elsewhere between 3000 and 1500 B.C.

Shortly after this, a soil formed on Unit F and was subsequently cut by renewed erosion and stream dissection. The gravel, alluvial sands, and silt of Unit G overlie this surface and fill channels cut during the episode. A brown soil developed on Unit G and was truncated by more recent erosion by the modern ephemeral stream. Unit G may equate with some part of the Kaycee formation elsewhere, and the subsequent erosion may correlate with that responsible for Leopold and Miller's Moorcraft and Lightning terraces

(Leopold and Miller 1951). Materials of the Archaic Patten Creek and Sudberry complexes and the early ceramic Patten Creek III Complex (dated at about A.D. 1000) have been recovered from this unit. Finally, near the surface of Unit G are the late prehistoric materials of Locality V, suggesting a date of A.D. 1200 to 1400.

PALEO-INDIAN OCCUPATIONS IN THE HELL GAP VALLEY

Locality I

Excavations here revealed an excellent stratigraphic sequence including remains of most of the Paleo-Indian complexes present in Hell Gap valley. Horizontal distributional studies indicate that, although these early camps all occurred near a major bend in the stream, the focus and extent of occupational areas varied considerably. All yielded Paleo-Indian artifacts, chipping debris, faunal evidence, and the remains of small scattered hearths. The ongoing distributional study of these remains will provide information on the association of artifact types, chipping debris, etc., and will assist in the reconstruction of the ancient patterns of occupation.

The small Goshen Complex camp at Locality I was at the base of geological Unit E, and yielded artifacts and workshop debris as well as faunal remains (principally bison), but no evidence of structures. A small Folsom camp was also near the base of Unit E. Although vertical separation between the two occupations was slight, their horizontal distribution was distinct. Both camps probably represent brief occupations. Very slightly above the Folsom remains were a few artifacts assignable to the Midland Complex (better known from Locality II). The subsequent Agate Basin component was very extensive, but was separated from the earlier occupations by only a slight vertical distance. It consisted of a deposit about 10 cm. thick, yielding a good sample of artifacts, workshop debris, and large quantities of bone (principally bison). The materials are concentrated in the south end of Locality I, near the creek bed. Despite the thickness and concentration of material, there is no apparent break in deposition, and one long-term or a series of nearly continuous occupations are evidently represented.

Remains of the Hell Gap Complex occur in a diffuse zone about 15 cm. thick, separated from the Agate Basin deposit by 1 to 7 cm. The horizontal distribution of the two components

differs considerably, with Hell Gap material concentrated in the center of the excavated area, at a greater distance from the stream. Occupational debris is distinguished by the relatively high proportion of projectile points to other tools and the relative scarcity of faunal remains. Evidently it represents a temporary camp, possibly used in conjunction with hunting activities nearby. The succeeding Alberta component occurs on a single living surface with a very restricted vertical distribution, principally in the north part of the locality, farthest from the creek. This occupation was followed by one identified with the Cody Complex, which likewise occurred on a single ancient surface with a distribution centered in the north end of the excavation.

The Frederick occupation which succeeded the Cody Complex in Hell Gap valley was separated from the latter by the erosional cycle which terminated the formation of Unit E, and by the deposition of the initial 5 to 12 cm. of Unit F. Two separate Frederick living surfaces were defined, each yielding large quantities of artifacts, chipping debris and faunal remains. Initial field analyses indicate that the faunal remains are distinguished from those of earlier components by the relatively small proportion of bison bones and relatively large quantities of deer remains. In the later of the two Frederick components, a circle of stones and associated materials (Fig. 7) suggest the remains of a light shelter. The structure was evidently very small, averaging about 2 m. in diameter; two hearths were just outside it. William Mulloy reports a similar stone circle associated with materials of the Cody Complex (Mulloy, personal communication), and that comparable stone circles are common in Archaic (Middle Horizon) sites in Wyoming. Similar circles of stones were used to weigh down the edges of skin-covered tepees by the historic Plains Indians.

Locality II

Locality II produced abundant remains from camps of four Paleo-Indian complexes. Camp organization was at least partly determined by the site topography, which induced a long, narrow distribution between the creek on the west and the base of the nearly parallel granite cliffs on the east. The earliest identifiable component was in geologic Unit E and yielded remains of the Midland Complex, including quantities of artifacts, chipping debris, and

faunal remains. Although these occur on a single surface, horizontal distribution suggests there were two camps, or two foci of one camp. In one of these were several small post molds, apparently representing three structures. Two post mold rings (Figs. 8-9) evidently belonged to small structures about 2 m. in diameter; the other evidently is part of a larger structure perhaps 4 m. in diameter.

The Agate Basin living floor was separated from the Midland by 1 to 5 cm. of sterile deposits. In the center of the excavation this occupational zone is separated into two parts by 1 to 7 cm. of sterile deposit, which may or may not represent a significant chronologic difference. Within the Agate Basin occupation area were two post hole rings representing small structures about 2 m. in diameter (Fig. 10).

Higher in the section was a zone about 15 cm. thick which produced a sparse sample of Hell Gap Complex materials. Still higher, in Unit F, was a zone which yielded a small but consistent sample of the Lusk Complex, believed to post-date the Frederick occupation at Locality I. The Lusk Complex is better known from the Greene site, 40 miles northeast of Hell Gap. Finally, a deep Archaic period hearth was dug into the earlier deposits of Unit F, and dates about 4000 B.C.

Locality III

The first test excavations in Hell Gap valley were conducted at Locality III in 1959, and certain stratigraphic problems initially produced some confusion. A single thick charcoal-blackened layer in Unit E yielded faunal remains, chips, and artifacts, including projectile points, of both Hell Gap and Agate Basin types. A charcoal sample from the bottom of the level dated about 8900 B.C. Subsequent excavations showed that the occupational zone split into two distinct strata away from the creek. Sparse but diagnostic remains of the Agate Basin Complex were recovered from the lower, and Hell Gap Complex materials were found in the upper stratum. The carbon-14 date is probably referable to the Agate Basin occupation. Two sparse post-Hell Gap occupations of Locality III were present but contained no diagnostic artifacts.

Locality V

Locality V yielded the remains of two Paleo-Indian occupations. The earlier was sparse and produced no diagnostic materials. However, the occupational level was traced for a considerable

distance to Locality III, and the materials probably correlate with the Agate Basin occupation there. The principal occupation at Locality V occurred during Cody times and is represented by an intense concentration of artifacts, workshop materials, and faunal remains.

PALEO-INDIAN MATERIAL CULTURE COMPLEXES AT HELL GAP

(See also Irwin 1968)

Goshen Complex (Figs 4, 6)

The material culture from the earliest Paleo-Indian occupation at Hell Gap, from Locality I, has been termed the Goshen Complex. It displays numerous similarities in projectile point typology and has other parallels with the Plainview Complex, first identified at the type site in Texas (Wormington 1957:107-108). Given the range of styles represented at the type locality, a tendency to confuse generalized concave-based lanceolate points with the Plainview type has unfortunately developed, resulting in some confusion concerning both the diagnostic features and chronologic range of Plainview. Rather than add to this confusion, it is preferred to label the Hell Gap material by a different term.

Typical projectile points of the Goshen Complex are lanceolate with parallel to slightly convex or concave sides and concave bases. In overall outline they resemble the Clovis form. Flaking technology is excellent, probably executed by a combination of percussion and then pressure flaking. Most flake scars are uniformly directed at right angles to the long axis of the point. Most points are basally thinned by the removal of multiple flakes. Specimens are uniformly very thin and are edge ground along the lower one-third of their length. Also characteristic of the complex are simple convex-edged side scrapers and other side scraper forms; end scrapers with a lateral spur or beak, and small numbers of other end scraper types; spur perforators on small flakes; and utilized flakes. Also recovered were numerous bifacial pieces representing early stages in the manufacture of points and a single large tear-shaped bifacial knife. This industry contains the highest incidence of true blades of any Paleo-Indian complex at Hell Gap. This technologic feature, plus various similarities in projectile point outline and preference for scraper types, suggests parallels between the Plainview and Clovis complexes. True Clovis materials have been recovered from nearby locali-

ties, but none occurred in the Hell Gap valley itself. No Carbon-14 date is available for the Goshen Complex at Hell Gap, but its stratigraphic position indicates a pre-Folsom, post-Clovis placement, about 9000 B.C.

Folsom Complex (Figs. 4, 6)

Remains assignable to the Folsom Complex from Locality I were rare but do document Folsom occupation of Hell Gap valley. The most diagnostic type for this complex is the well-known Folsom projectile point. This is a lanceolate point, relatively shorter than the Plainview, with a basal concavity often interrupted by a central nipple which formed the striking platform for the removal of the flute. Retouch was carried out by both percussion and pressure. In addition to finished specimens, several pieces representing various phases of production were recovered. Other characteristic Folsom implements recovered were beaked end scrapers, and triangular end scrapers with flat bits intersecting one or both adjacent edges at acute angles. Side scrapers of several types are present but are not as prominent as in the Goshen assemblage. Also recovered were numerous spur perforators and steeply retouched or simply utilized thin flakes.

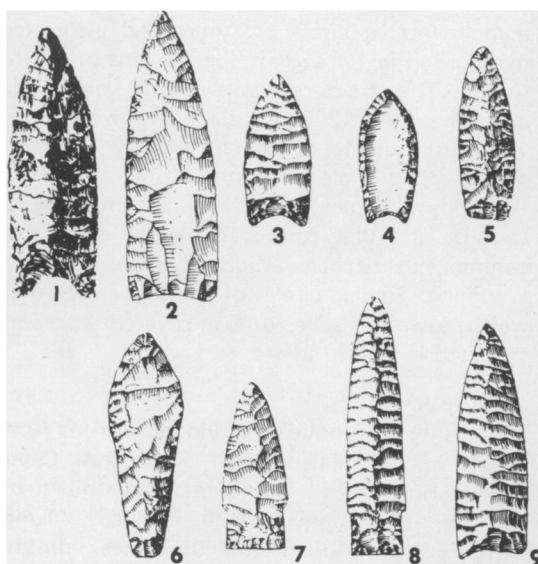


Figure 4. Paleo-Indian projectile points (modified from Irwin 1968; scale variable). 1, Goshen. 2, Clovis. 3, Midland. 4, Folsom. 5, Agate Basin. 6, Hell Gap. 7, Alberta. 8, Eden. 9, Frederick.

Radiocarbon data from other localities indicate an age of about 8800 to 8600 B.C. for the Folsom Complex.

Midland Complex (Figs. 4, 6)

The Midland Complex is represented in Hell Gap valley by a concentrated occupation at Locality II and a few remains overlying the Folsom Complex at Locality I. The characteristic projectile points superficially resemble those of the Folsom assemblage. The points are lanceolate in outline, with concave bases occasionally interrupted by central nipples which, however, do not seem to have been functional. The pieces are very thin and characteristically display very well controlled, probably pressure, removals designed to reach from the lateral margins well past the median line. They commonly received very fine final edge retouch. Basal thinning is sometimes present but is not marked. Most points were edge-ground along the lower portions of their lengths. The thinness of Midland points may well have served the same function as the fluting of Folsoms; however, the manufacturing process involved is evidently distinct, and Midland points should not be considered simply Folsoms which proved too thin for fluting (see Judge 1970; Agogino 1969; and Irwin and Wormington 1970 for discussions of the Folsom-Midland problem). At the same time they are distinguished from Plainview points by their relatively shorter proportions, lack of extensive basal thinning, and very fine terminal edge retouch.

Other characteristic tools include numerous convex side-scrapers, double side scrapers, and a few other side scraper forms, as well as beaked and angle-edged end scrapers. Also recovered were spur perforators, utilized flakes and retouched flakes, various denticulate forms of bifaces, and a single large teardrop-shaped bifacial knife. All these characteristics, with the exception of the relatively larger number of side scrapers, are paralleled in the Folsom assemblage.

In addition to the lithic material culture, Locality II produced evidence of two structures defined by circular alignments of post holes (Figs. 8-9): a small structure, about 2 m. in diameter, and a larger one, about 4 m. in diameter. These are the earliest known definite remains of Plains Indian dwellings. The Midland phase is dated by Carbon-14 at between 8440 and 8740 B.C. at Hell Gap. This exact chronologic information plus the sparse materials from Locality I suggest that the Midland occupation of

Hell Gap valley may have postdated the Folsom occupation.

Agate Basin Complex (Figs. 4, 6)

Agate Basin is the best represented of the Paleo-Indian occupations at Hell Gap, with materials at all three principal localities (I, II, III), and possibly at Locality V. The diagnostic projectile point form differs considerably from those of earlier periods. The emphasis on extreme thinness, which dictated several of the characteristics of the Folsom and Midland types, is no longer present. Agate Basin points are typically relatively long and slender, lanceolate, and with convex edges reaching maximum width somewhat above the midpoint. Initial flaking was evidently done by percussion, final retouch by a combination of very regular centrally-directed pressure and percussion flaking. Points are edge-ground along about 40 percent of their length. Other characteristic tools include a large variety of well made single and double side scrapers, notched flakes, spur perforators, simple retouched flakes, and utilized flakes. End scrapers, principally of the beaked and angle-edged forms are present, but are less prominent than previously (see Irwin and Wormington 1970, for comparative treatment). There are also some interesting new tools, including a very large form of thin elongated bifacial knife (Fig. 5,5). Bone tools are never common in the Paleo-Indian complexes at Hell Gap, but a delicate eyed needle and a notched and flattened implement are among the Agate Basin materials.

Agate Basin remains at Locality II included three small structures (Fig. 10): three superimposed circles of post holes averaging just over two meters in diameter. There is some correlation between the distribution of occupational debris and the circles, but there were no internal features within the structures. Carbon-14 dates for the Agate Basin Complex at Hell Gap and elsewhere cluster between 8500 and 8000 B.C.

Hell Gap Complex (Figs. 4, 6)

Camps of the Hell Gap Complex were present at Localities I, II and III, but the cultural remains were considerably more sparse and scattered than those of the Agate Basin Complex. The diagnostic projectile point seems to be a stylistic development out of earlier forms through a shift in proportion and in treatment of the lower (hafting) section.

It is characterized by a constricted section

below a point about two-thirds of the length from the base to the tip. Here, the maximum width is considerably greater than that of any of the Agate Basin pieces. The tip is characteristically somewhat blunted. Points were produced by a combination of careful percussion-pressure flaking, but they lack the regularity of some of the Agate Basin pieces. As with the Agate Basin type, the form of the base varies from straight to slightly concave or convex. A median ridge is produced by the flaking techniques and results in a lenticular cross section. The points are edge-ground along the lower 50 percent of their length. The proportions of most of the other characteristic implements are reminiscent of those of the Agate Basin Complex: various forms of side scrapers predominate, while end scrapers, principally of the angle-edge or beak varieties are present in smaller numbers; large elongated bifacial knives like those of the Agate Basin; and notched pieces, spur perforators, and retouched and utilized flakes (see also Irwin and Wormington 1970). The most interesting innovation is the addition of asymmetrical, one-shouldered bifacial knives (Fig. 5, 4).

Hell Gap materials were recovered from all three principal locations in Hell Gap valley, but they occur in low concentrations throughout a relatively thick stratigraphic unit. Projectile points occur in an unusually high proportion, while faunal remains are relatively sparse. The occupations may well represent brief hunting camps rather than the more intensive occupations of the earlier periods. No dwelling remains were noted. The relatively greater quantity of Knife River flint (from North Dakota sources) suggests the possibility of strengthened northern ties and/or more northerly ranges for group movement. A charcoal sample from below the Hell Gap occupation at Locality II dated about 8300 B.C., and a sample from the Hell Gap level at the nearby Sisters Hill Site dated about 7700 B.C. Accordingly, a range of perhaps 8000-7500 B.C. for the Hell Gap period is indicated.

Alberta Complex (Figs. 4, 6)

Remains of the Alberta Complex occurred in small quantities only at Locality I in Hell Gap valley. The characteristic projectile point may represent, in part, a continuation of stylistic trends already noted in the preceding period, particularly the tendency to constrict the lower section of the point and the delineation of a definable "stem." With the shift to the Alberta

style, however, several other important changes are noticeable: the stem is proportionally shorter, averaging about one-third the length of the piece; it is now well defined by basal retouch and is parallel-sided or expanding. The blade also tends to be markedly parallel-sided. Centrally directed flaking tends to produce a diamond-shaped cross section. Grinding is confined to the stem area defined by the abrupt shoulders. Accompanying tools are sparse and probably do not represent the full range of the complex. They do reflect a few shifts from the Hell Gap period, particularly in the increasing importance of end scrapers over side scrapers and in the growing popularity of the thin "raclette" scraper (see also Irwin and Wormington 1970). There were a few sharpened bone splinters but no bifacial knives.

Like the Hell Gap, the Alberta occupation of the Hell Gap valley was evidently not intensive and, in the same way, projectile points occur in disproportionately large numbers. However, flaking debris, faunal remains, and other camp refuse occur in more consistent quantities. No evidence of structures was recovered. The single relevant Carbon-14 date of 6600 B.C. was above the Alberta level at Locality I and, accordingly, provides a *terminus ante quem* for the occupation, which may have taken place between that date and, perhaps, about 7000 B.C.

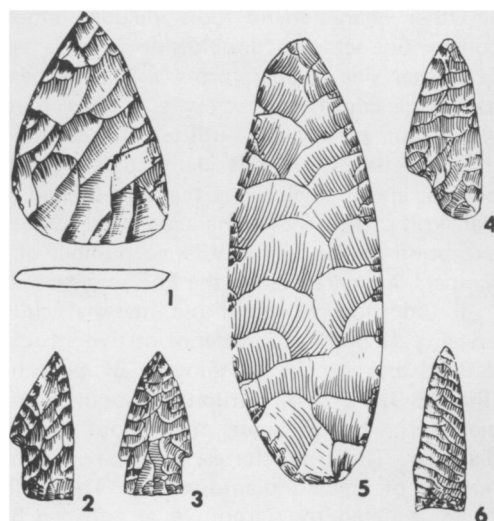


Figure 5. Paleo-Indian knives. 1, oval knife. 2, Cody I knife. 3, Cody II (Scottsbluff) knife. 4, Hell Gap knife. 5, large bifacial knife. 6, Frederick knife.

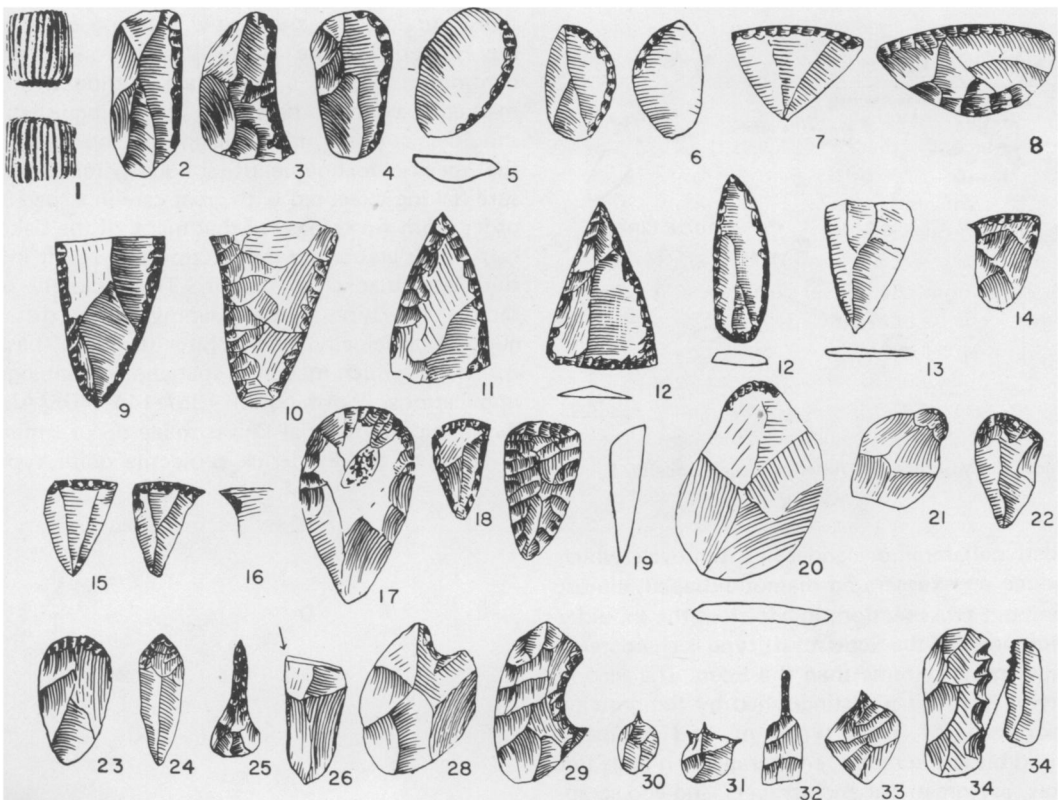


Figure 6. Paleo-Indian tool forms (modified from Irwin 1968; scale variable. 1, bone beads, Frederick Complex. 2, straight side scraper. 3, concave side scraper. 4, convex side scraper. 5, ventrally retouched side scraper. 6, bifacially retouched side scraper. 7, transverse side scraper. 8, thinned-back side scraper. 9, double side scraper, convex adjacent edges. 10, double side scraper, convex-concave or convex straight. 11, triangular double side scraper, with straight or slightly convex edges. 12, double side scraper, worked on all edges. 13, thin flake "raclette" scraper. 14, triangular end scraper with spur. 15, 16, triangular end scrapers with acute side-bit angles. 17, large round convex-bitted scraper. 18, triangular end scraper, worked on all edges. 19, triangular end scraper, worked over entire dorsal surface. 20, larger scraper on flat discoidal flake. 21, small flake scraper with projecting bit. 22, end scraper with asymmetrical bit. 23, end scraper with rounded bit. 24, end scraper with angular bit. 25, bifacial drill. 26, burin. 27, knives (see Fig. 5). 28, notched flake, variable size, slight retouch. 29, notched flake, controlled size, well retouched. 30, spur, short narrow. 31, spur, multiple. 32, spur, elongated, flattened tip. 33, beak. 34, denticulate.

Cody Complex (Figs. 4, 6)

Remains of the Cody Complex were present at Locality I and in a dense concentration at Locality V. Characteristic of the industry are projectile points of both Scottsbluff and Eden types. Since both commonly occur together, and there is at present no definite indication of chronologic implications, both are included under the term "Cody Complex," as originally suggested by Wormington (1957:136-137). "Typical specimens" at either end of the Scotts-

bluff-Eden range are characterized by a long narrow lanceolate outline with a relatively short stem set off from the blade by well-defined shoulders. The relative proportions of the blade and stem and the lesser degree of stem inset distinguish these types from the Alberta but, at the same time, underline important continuities between them. Well-executed centrally directed flaking was generally employed, but well-defined Eden points are distinguished from typical Scottsbluffs by particularly even, perfectly con-

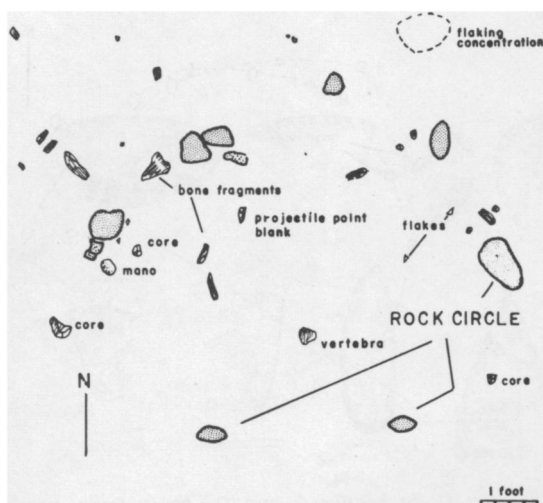


Figure 7. Structure A, Frederick Level, Locality I.

trolled collateral or ladder-like removals which produce an exaggerated diamond-shaped, almost rhomboid cross section. In addition, the shoulder (stem inset) of the Scottsbluff type is characteristically more extreme than the Eden. The accompanying tool kit is distinguished by the growing importance of new types of end scrapers: ground-bit end scrapers, end scrapers on large flat flakes, asymmetrical end scrapers, and end scrapers retouched over the entirety of the ventral surface. Earlier forms of end scrapers (beak and angle edge) are no longer common, and side scrapers, though varied, are of secondary importance. The raclette scraper which became prominent in the Alberta period continues to be important, as are notched flakes, spur perforators, denticulates, and utilized and retouched flakes. Several stemmed and shouldered bifacial pieces similar to what has been called the Scottsbluff II type were evidently used as knives. Another bifacial knife form is an asymmetrical single-shouldered piece distinct from the typical "Cody knife" form. A few casually worked worn bone fragments were recovered.

No structural remains were noted with the Cody Complex at Hell Gap. The single Carbon-14 date for the Cody occupation indicates an age of 6650 B.C., consistent with radiocarbon data for comparable materials at other locations.

Frederick Complex (Figs. 4, 6)

Remains of the Frederick Complex were recovered at Locality I and represent in many

respects a radical shift from earlier occupations, especially in typology and character of faunal remains. The typical projectile point seems essentially unrelated to the slowly evolving tradition represented by the Agate Basin-through-Cody continuum. It has a lanceolate outline with a markedly concave base and no distinguishable shoulder or stem. More diagnostic, however, is the specific technique of oblique parallel pressure-flaking executed with great care in a specific order from tip to base so that many of the flakes carry over across the mid-section and result in a thin lenticular cross section. These closely resemble the type termed Jimmy Allen, distinguished principally by a greater degree of basal concavity, which may have spatial or chronologic implications (Wormington 1957:144-146). Also diagnostic are bifacial knives made on or similar in form to the Frederick projectile point type.

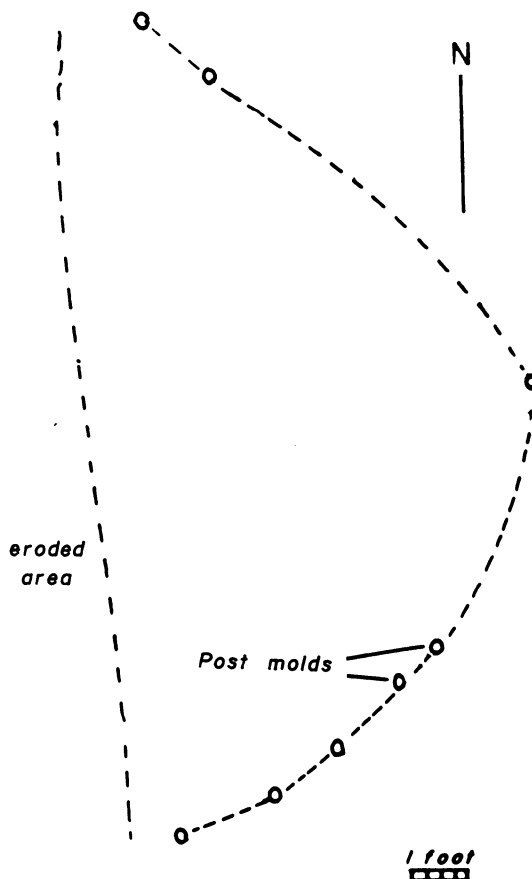


Figure 8. Structure A, Midland Level, Locality II.

The remainder of the tool kit displays both similarities to and differences from earlier periods (see also Irwin and Wormington 1970). The scraper class is dominated by end scrapers, particularly the ventrally retouched, asymmetrical, and ground bit forms. Raclette scrapers, along with several types of side scrapers, are present but are of subordinate importance. Spur perforators, notched flakes, retouched and utilized flakes, and several rubbing stones also occur. The bone industry is better developed than in the earlier complexes and includes well made bone awls and several well made incised bone beads (Fig. 6, 7).

The structure uncovered at Locality I differs from those in the Agate Basin and Midland occupations on the one hand and shows close parallels to those of later High Plains groups on the other. Instead of post hole circles, the dwelling was defined by a circle of small boulders similar to those used by historic tribes to hold down the hide coverings of tipi-like structures. Preliminary information on faunal remains from the Frederick occupation indicates a somewhat more varied use of resources, including not only bison, but also deer, numerous small animals, and a few freshwater shell fish. Radiocarbon dates from the Frederick Complex at Hell Gap and the related Jimmy Allen Site suggest a duration of about 6400 to about 6000 B.C.

The Lusk Complex

The situation in eastern Wyoming after the end of the Frederick Complex period is still somewhat nebulous. The few projectile points and tools from Locality II are not sufficient to define a complex. However, similar materials

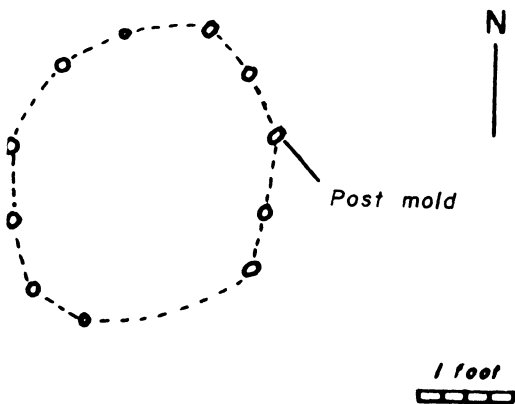


Figure 9. Structure B, Midland Level, Locality II.

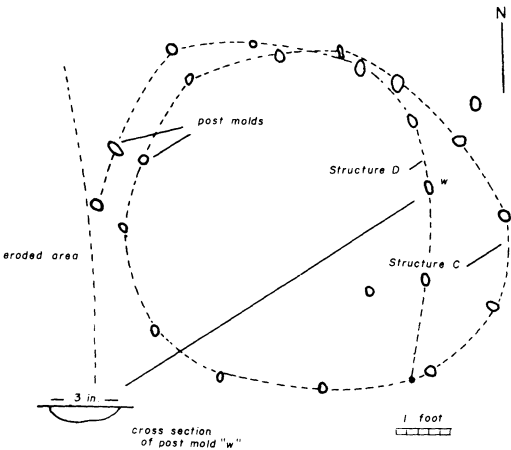


Figure 10. Structures C and D, Agate Basin Level, Locality II.

were recovered from the Greene Site near Lusk, Wyoming, about 40 miles north of Hell Gap and, together, the collection permits some preliminary commentary. The Lusk projectile point type is lanceolate in form with a concave base, and is frequently somewhat constricted along its lower third. Points are frequently plano-convex in cross section and were evidently often made on flakes or blades. The preparation of the point blank and the final oblique parallel pressure-flaking is generally similar to that employed on Frederick points. The chipping, however, is generally more haphazard and less well-controlled. Lusk points differ from the Frederick type in this feature and also in the generally lower width-to-length ratio. These points are similar to what has been termed the Angostura type in the literature, but which has never been adequately described and about which many ambiguities still exist (Wormington 1957; Wheeler 1954; Agogino, Rovner and Irwin-Williams 1964). The rest of the Lusk Complex tool kit is poorly known but seems generally similar to that of the Frederick. Materials from the Greene Site (Greene 1968) include a variety of end scrapers, a few side scrapers, raclettes, retouched flakes and blades, drills, denticulates, and choppers, as well as several ground-stone implements, including a mano and metate. A radiocarbon date from Greene of about 5900 B.C. indicates that Lusk may be the successor to the Frederick Complex on the High Plains of eastern Wyoming. The varied tool assemblage, like the varied faunal assemblage

associated with the Frederick Complex, may reflect continuing readaptation toward a broad-spectrum economy, more consistent with shifting climatic-environmental conditions.

Any discussion of the Archaic complexes in the Hell Gap region is beyond the scope of this paper. In brief, however, excavations at the nearby Patten Creek Site indicate a long series of Archaic complexes which seem to show no direct relations to the preceding Paleo-Indian developments. Evidence from Patten Creek and from Locality IV in Hell Gap valley also documents the presence of pottery-using cultures in the late Prehistoric period.

SUMMARY

Paleo-Indian occupation of the Hell Gap valley and its significance in terms of research on Early Man in North America in general may be summarized as follows.

Prior to the Hell Gap investigations, the Paleo-Indian cultures of the High Plains were known largely from surface collections or from isolated animal kill-sites. Accordingly, their chronology and relationships, sequential or otherwise, were frequently obscure. In addition, with only kill-site materials available, no balanced view of Paleo-Indian culture was possible. The new data from Hell Gap promises to contribute toward solutions of both of these problems.

The remarkable concentration of materials at Hell Gap makes possible the construction of the most complete sequence of Paleo-Indian cultures available to date and its placement in a dated geologic context:

Goshen	.....	circa 9000 to 8800 B.C.
Folsom	.....	circa 8800+ to 8600 B.C.
Midland	.....	circa 8700 to 8400 B.C.
Agate Basin	.....	circa 8500 to 8000 B.C.
Hell Gap	.....	circa 8000 to 7500 B.C.
Alberta	.....	circa 7500 to 7000 B.C.
Cody	.....	circa 6800 to 6400 B.C.
Frederick	.....	circa 6400 to 6000 B.C.
Lusk	.....	circa 6000 to 5500 B.C.

The archaeological remains from Hell Gap valley are evidently all camp-living site situations rather than kill-sites. As final analysis of these materials is completed, new data will become available on Paleo-Indian structures, community organization, and activities related to the more complex and stable camp situation. Ultimately it

will be possible to focus, both at Hell Gap and elsewhere, on the specific character of the systemic interdependence between these early human populations and the changing resource base which supported them.

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