

Reports, of the
UNIVERSITY OF CALIFORNIA,
ARCHAEOLOGICAL SURVEY.

No. 21

SOME ARCHAEOLOGICAL SITES AND CULTURES
OF THE CENTRAL SIERRA NEVADA

By Robert F. Heizer and Albert B. Elsasser

Issued April 20, 1953

The University of California Archaeological Survey
Department of Anthropology
University of California
Berkeley 4, California

SOME ARCHAEOLOGICAL SITES AND CULTURES
OF THE CENTRAL SIERRA NEVADA

By Robert F. Heizer and Albert B. Elsasser

Contents

	Page
Introduction.....	1
Environment of the area.....	1
Ethnographic background.....	2
Description of sites	
Placer County, California.....	5
Nevada County, California.....	6
Plumas County, California.....	7
Eldorado County, California.....	7
Alpine County, California.....	8
Douglas County, Nevada.....	9
Culture disclosed	
Projectile points.....	11
Drills.....	14
Choppers.....	15
Scrapers.....	15
Blades.....	15
Grinding tools.....	16
Metates.....	16
Manos.....	17
Bowl mortars.....	17
Bedrock mortars.....	17
Pestles.....	17
Polished stone artifacts.....	17
Bone artifacts.....	17
Aboriginal sites with reference to altitude.....	18
Identification and antiquity of culture complexes.....	19
Notes.....	23
Bibliography.....	24
Appendix A. Boatstones in California.....	26
Appendix B. High altitude occupation in the Yosemite Park Region (J.A. Bennyhoff).....	31
Appendix C. Chips from an Indian Workshop (B.P. Avery).....	33
Appendix D. Dr. S.L. Lee's ethnographic notes on Washo Culture.....	37
Explanation of illustrations.....	41

Illustrations

	Following page
Map 1. Sierran sites located by 1952 survey.....	1
Plate 1. Flaked implements from site Pla-5.....	42
Figure 1. Chipped artifacts from Eldorado and Placer County sites.....	42
Figure 2. Artifacts from Sierran sites.....	42
Figure 3. Metates from site Pla-5.....	42
Figure 4. Boatstones from California.....	42
Figure 5. California and Nevada boatstones; chipped basalt blade.....	42

Introduction

In August, 1952, the present authors and Thomas Bolt carried out an archaeological reconnaissance of the high Sierra from Markleeville (Eldorado County) in the South to Hobart Mills (Nevada County) in the North, and from Cisco (Nevada County) in the West to Spooner Lake (Douglas County, State of Nevada) in the East. The boundaries of our reconnaissance area were roughly $39^{\circ}25'$ to $38^{\circ}30'$ N. Lat. and $120^{\circ}25'$ to $119^{\circ}50'$ W. Long.

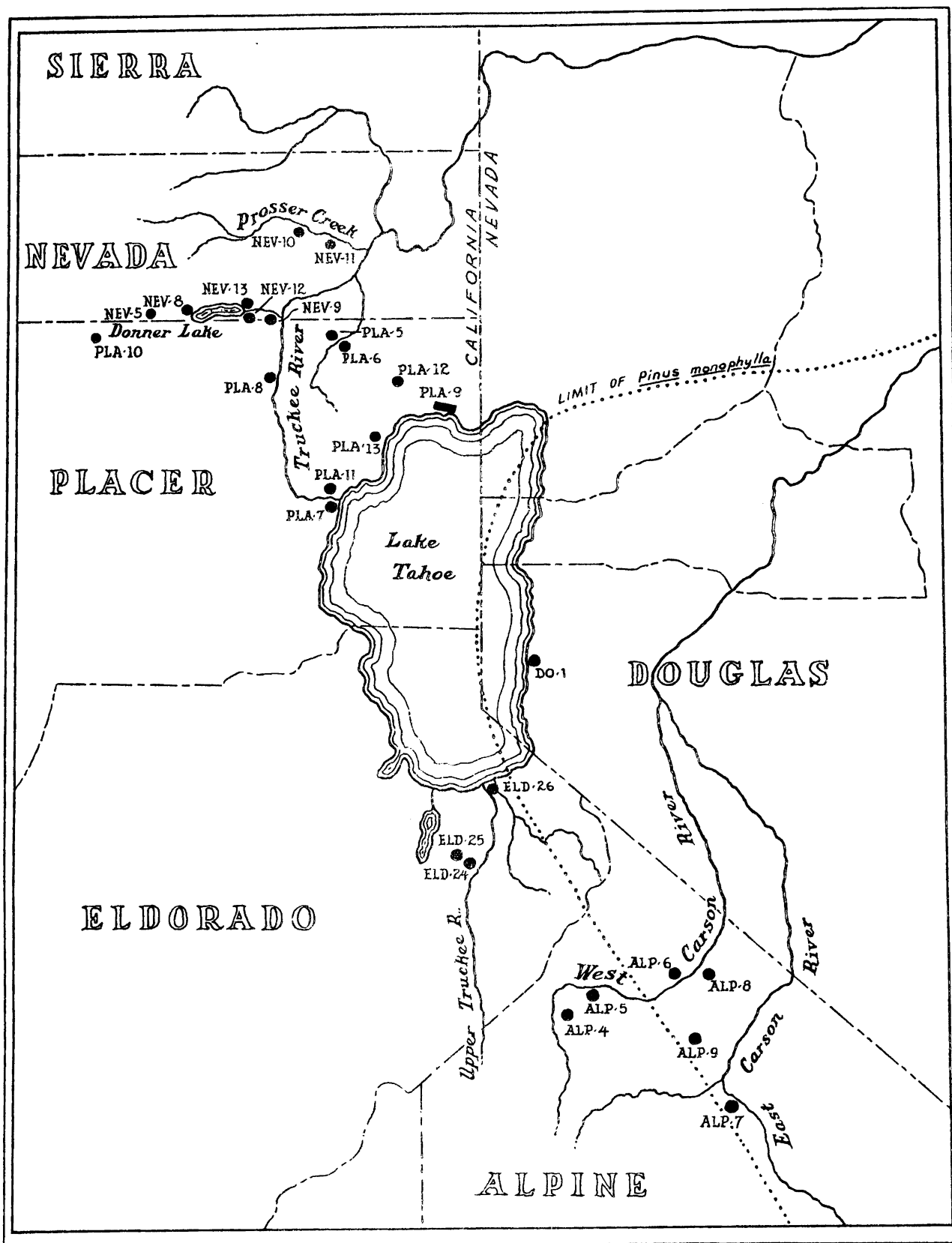
Our work was supported by a grant from the Claypool Fund established by Mr. W.C. Claypool, Smithfield, Utah, and we express our appreciation here to Mr. Claypool and President Robert Gordon Sproul, administrator of the Fund. We express our special appreciation to Mr. Loring J. Barker and his son, James, of Berkeley, California for calling to our attention site Pla-5 and for their gift to the UCAS of a large collection of chipped implements from the site. Our results, while not outstanding in any way, nevertheless represent a solid contribution to Western prehistory. The area surveyed by us has never, so far as we can determine, been searched by archaeologists, and our collections and data therefore represent completely new information. Our problem was not clearly defined before we went into the field, but we were particularly anxious to try to determine something concerning the aboriginal settlement pattern in the high Sierra above the winter snow line. Sites were noted by us at elevations between 5500 and 7800 feet.

Environment of the Area

Our region lies in the Transition life zone, just east of the Boreal life zone of the Sierran crest. The plant cover consists of sagebrush mixed with pine, of which Lodgepole Pine (*Pinus contorta*) occurs most widely. Along the streams are willow and quaking aspen. Water is no problem, there being an abundance of streams, lakes, and springs.

The climate is mapped by Russell (1926) as Microthermal (Ds) where the mean annual precipitation is 20 to 35 inches. The summer is warm and there may be some rain up through July. Snow begins to fall in November, and until April the weather is cold, and nights are freezing. At Truckee the average July temperature is 61° F. and the average January temperature 25.9° F. The maximum recorded temperature at Truckee is 101° F., the minimum -28° F.

This could not have been very favorable country for all-year round settlement to aboriginal peoples with their simple houses. The oak does not grow in our area, and although deer and rabbits are fairly common, these could hardly have served as standard dietary items to a snowbound group. Much or most of the larger non-hibernating animal life apparently retreated in winter to lower elevations where heavy snowpack did not accumulate. Further, winter food would be difficult to secure on a day-to-day basis without adequate snowshoes and arctic-type clothing. Actually,



MAP I. SIERRAN SITES LOCATED BY 1952 SURVEY

snowshoes were known to the Washo. Lowie (1939, p. 329) encountered a man who had used them on the Lake Tahoe shore. Also, the rabbitskin blanket might serve as winter clothing. (Lowie, 1939, p. 327). The point is that the snowshoe here, as among other Sierran tribes such as the Maidu (Dixon, 1905, p. 160) and Miwok (Kroeber, 1925, p. 807), was a crude and imperfect affair which was generally used in an emergency, but not regularly for winter travel or hunting. Mere possession of snowshoes and warm clothing were not enough either to enable or encourage the Washo to try to winter in the Sierras. The probable scarcity of large game (which retreated to lower elevations); lack of a local and abundant staple food which could be gathered in sufficient surplus to enable winter stores to be saved; the general discomfort and hazards involved in spending four or five months snowbound; lack of a suitable winter dwelling -- all of these must be considered as factors discouraging winter occupation of the snow-bound Sierras. Logic, therefore, compels us to conclude that this region must have been one in which aboriginal occupation was seasonal, the habitable period extending from May to September or October.

The famous Pyramid Lake cutthroat trout (Salmo henshawi) which weigh from 2 to 35 pounds, migrate annually between Lake Tahoe and Pyramid Lake, spawning in the Truckee River and streams tributary to Lake Tahoe. This spawning event may have served as an encouragement for native groups to leave the hot desert lowlands further east and spend the summer in the cool Sierra where they could catch fish, hunt deer, and rabbits, and gather wild grass seeds.

Inspection of the California State Division of Mines "Geologic Map of Northern Sierra Nevada" published in 1932 shows that our area is characterized by volcanic rocks. From a point halfway between Tahoe Pines and Emerald Bay and extending south, Jurassic basic intrusives (granite, granodiorite, gabbro, etc.) predominate, with some small scattered patches of Pleistocene basalt. North of Emerald Bay there are some Jurassic basic intrusives, but the geology is characterized by wide flows of Pliocene and Pleistocene basalts. These facts are of some interest, because glassy black and gray basalt is the preferred tool material in Placer and Nevada County sites north of Lake Tahoe, while basalt is generally replaced as a tool material to the south by obsidian and cherts. The occurrence and use of various lithic materials is summarized in Tables 1 and 2.

Ethnographic background

The whole of our area was occupied aboriginally by the Washo. This tribe, whose original numbers probably did not exceed 1500, speaks a language which is a member of the Hokan stock. This linguistic affiliation indicates their ultimate origin to the west in California. Kroeber (1925, p. 569) says, "It is tempting to conjecture... that they are an ancient California tribe, which has gradually drifted, or been pressed, over the Sierra. But there are no concrete grounds other than speech to support such an assumption."

Table 1

Summary of Material Found at Different Sites*

	Pla 5	Pla 6	Pla 7	Pla 8	Pla 9	Pla 10	Alp 4	Alp 7	Eld 24	Eld 26	Nev 8	Nev 9	Nev 10	Nev 11	Totals	
Basalt	x	x	x	x			x	x	x			x	x	x	x	199
Rhyolite	x	x					x									3
Obsidian	x	x		x	x	x		x	x	x				x		144
Chert		x			x	x	x	x	x							199
Jasper					x				x							18
Chalcedony					x											1
Quartzite									x							24
Quartz																8
Granite		x		x			x									--

* Numerical entries refer to flakes of all sizes.

x above dotted line signifies that artifacts of material in question were found; x below dotted line indicates that flakes were noted.

The Washo were in contact with three alien groups, the Paviotso of the desert to the east, and the Miwok and Maidu across the Sierras to the west. With each of these there were occasional "wars," and it appears that unfriendly relations usually obtained (Lowie, 1939, p. 301).

Ethnographic records of the Washo are pitifully few. There is Barrett's brief sketch (1917), Kroeber's summary of the meager data (1925, pp. 569-573), and Lowie's ethnographic notes (1939). A listing of Washo culture elements is given in O. Stewart's Northern Paiute trait list survey (1941). Minor bibliographic items include accounts of basketry and basket-making (Cohn, 1909) and arrowpoint manufacture (Rust, 1897).

From these sources we learn that Washo culture is a blend (whose ingredients may be crudely separated out by analysis of ethnographic traits) of California and Great Basin culture (Kroeber, 1925; Barrett, 1917, pp. 24-25).

Thus, ties with the California area are: the conical dwelling made by piling up bark slabs; semi-subterranean assembly house; "community" or bedrock mortar; emphasis on coiled basketry decorated with named geometric patterns; language affiliation; soaproot meal brush; looped with hot rock lifter; flat mush stirring paddle; hopper-mortar; feather-decorated coiled basketry.

Affiliations of Washo culture with that of the Shoshonean tribes to the east in the Great Basin proper are: long net for catching rabbits by driving technique; special "boss" for rabbit and deer hunt; rabbitskin blanket; heavy dependence for food on nuts of pinon (Pinus monophylla) with the complex of implements and activities used to secure and prepare these (hooked pole, roasting of nuts, carrying baskets); mano and metate; twined basketry techniques and basket forms (e.g. winnowing trays); temporary brush house; antelope hunting method by "charming;" private ownership of clumps of pinon trees.

An obvious archaeological problem is to determine whether the archaeological manifestation of Washo culture can be identified, and we may anticipate our conclusions by saying that we have succeeded in making this identification.

Description of Sites

The following remarks on individual sites are intended merely to characterize the type of site for the area as noted by us. Details on location and size are entered on the Site Survey record forms on file in the UCAS office. Our survey was necessarily incomplete due to the rugged nature of the terrain and brief time available. In a completely unknown area, we thought it best to range widely in order to get some general idea of the type of sites and cultural material rather than concentrate on a smaller area about which we might learn a great deal, but could not tie to even the immediately adjoining locality.

Placer County

Pla-5. On the higher parts of low terrace landscape above Martis Creek. Elevation 5800'. Site area covered with sagebrush. Scattered over the surface are artifacts such as rhyolite metates, basalt projectile points and drills. The number and type of artifacts suggests a large campsite. Further, the large number of basalt chips strongly suggests workshop activity. A roadcut through the site shows basalt chippage and artifacts throughout a two foot depth. Some basalt chips show a high degree of patination. This site has been used as a gathering area by numerous private collectors. UCMA collection comprises several hundred flaked implements gathered by Mr. L.J. Barker and his son, and a smaller lot collected by us in 1952.

Pla-6. A low terrace lying between Martis Creek and the surrounding hills of Martis Valley. Elevation between 5900 and 6000'. A large site, probably a campsite. It might perhaps be an extension of Pla-5, judging from the similarity of artifacts at both sites. On the other hand, it could have been a separate site, with Martis Creek serving as the boundary between it and Pla-5.

Pla-7. At the head of the Truckee River, near the point where it flows out of Lake Tahoe. Elevation 6200'. Probably a campsite, where fishing must have been of great importance. This assumption is made on the basis of the location of the site rather than of the artifacts found, which were basalt projectile points and blade fragments. Barrett (1917, p. 8) says "In the higher mountain section of the Washo country, notably at Lake Tahoe, fishing was, perhaps, the most important phase of this culture ... during the summer months."

Pla-8. Near the mouth of Deep Creek, where it debouches into the Truckee River, about eight miles north of Lake Tahoe. Elevation 6000'. The site follows the usual pattern of what we are calling campsites except that the occurrence of artifacts, chiefly of basalt, and of basalt chips, seems to be larger than usual here. A roadcut (State Highway 89) reveals that the basalt chips and artifacts occur to a depth of about thirty inches in ash-darkened soil which looks like midden. A checker on duty at the State Inspection Station about three miles north of the site told us that along the Truckee River between Lake Tahoe and Truckee city snow lies on the ground from November to April with a maximum winter accumulation of fifteen feet.

Pla-9. Along the northern shore of Lake Tahoe; elevation about 6200'. There are private collections existing which contain artifacts found along the beaches connected with the present towns of Kings Beach and Tahoe Vista. The artifacts include small, finely worked chert and obsidian projectile points and obsidian blades, all from surface sites. One large basalt blade (Fig. 5g) and other artifacts (Fig. 2f) have been recovered in highway and building excavations. The beaches mentioned above appear not to be endowed with more natural advantages than other beaches from two to three miles on either side of them.

It is therefore not unreasonable to suspect that here is a shore area about four to six miles long which had innumerable campsites, either on the sandy beaches proper or in the trees directly behind these beaches.

Pla-10. Around the southern and western shores of Ice Lake, a small alpine lake about three miles west of Donner Summit. Elevation 6900'. This site, probably a late-summer camping spot, showed little evidence of such camping -- no more than a few basalt projectile point fragments and some basalt chips. The land surface appears here to have been strongly affected by snow drifts and water run-offs. This might account for the relative dearth of artifacts found in a seemingly favored area. The Mandeville collection at Kings Beach (north end of Lake Tahoe) contains a number of small points from this site, only one of which was sketched (Fig. 1w).

Pla-11. Across the Truckee River from Pla-7. Elevation 6300'. Another campsite, so located as to suggest great local importance of fishing. An obsidian projectile point fragment, somewhat water-worn, was found here, exposed at a depth of 24 inches in the road-cut. Note that at Pla-7, basalt was the only implement material found.

Pla-12. A campsite, with occupation debris scattered around the shores of Watson Lake (locally also referred to as Lost Lake). Elevation 7800'. Heavy basalt points of the general type noted at Pla-5, but absent at nearby Tahoe shore site Pla-9, were found. The specimens are at present in the Barker Collection.

Pla-13. At Carnelian Bay, Lake Tahoe. Surface occurrence of heavy projectile points made of basalt. A wide meadow crossed by several streams makes this an attractive lakeshore camp area. Aboriginal camp area now rather intensively built over by summer homes.

Nevada County

Nev-5. About two miles due west of Donner Lake, between U.S. Highway 40 and the main line of the Southern Pacific Railroad. On a large, smooth face of a gently inclined glacial-smoothed field of granite. Elevation 6900' to 7000'. This is a petroglyph site which, because of its proximity to the modern highway and the railroad, has been seen and photographed by many visitors. The granite face of at least two acres has been subjected to much decomposition and exfoliation. Photographs taken in 1952 reveal that the processes of erosion have not yet destroyed the inscriptions. An inventory of all the elements, such as spirals, ovals, circles and straight line combinations and crossed lines has probably never been made, hence it is difficult to estimate, for example, the degree or rate of erosion during the last thirty years. Photographs taken in 1926 compared with those taken in 1952 suggest that the erosion has not been inconsiderable during the intervening years.

Nev-9. On a knoll above the right bank of Donner Creek just before the latter empties into Truckee River. Elevation 5900'. A fairly

large campsite, with basalt tool fragments and chips scattered at random over the surface.

Nev-10. On a knoll above the right bank of Prosser Creek, at a point where the railroad trestle crosses the Creek. Elevation 5800'. Site is characteristic of sites found in this general area (for example, like Nev-9, eight miles distant). Nev-10 is a campsite with basalt tool fragments scattered thinly and at random over the surface.

Nev-11. On a terrace above right bank of Prosser Creek, fifty yards west of State Highway 89, at a point where the latter crosses Prosser Creek. Elevation 5700'. Another example of a campsite characterized by an abundance of basalt chips and tool fragments. Cattle have been grazing on the land, apparently for some decades. This might be the explanation of the large number of broken basalt blades and projectile points lying on the surface.

Nev-12. Around the shore at the southeast end of Donner Lake. Elevation 6000'. This site is similar to Nev-8, previously reported, which is at the west end of Donner Lake. Both sites are level areas with similar basalt tool fragments and chips scattered on them. It might be noted that on the shore sites of Lake Tahoe (e.g. Pla-9) were found projectile points of chert and obsidian, of delicate form. At the Donner Lake sites even obsidian chips seemed to occur rarely, chert not at all.

Nev-13. At Donner State Historical Monument about one-half mile due east of Donner Lake. Elevation 6000'. This site is perhaps coterminous with Nev-12, thus suggesting a large hunting or fishing area at and around the lake shore. Noted were basalt flakes and points.

Plumas County

Plu-7. The description of this site, which was reported by Dr. Cordell Durrell of the Geology faculty at the University of California at Los Angeles, resembles greatly that of sites in Nevada and Placer Counties, much closer to Lake Tahoe. Plu-7 is located in the Red Clover Valley, near the point where the Bagley Pass Road joins the Red Clover Valley Road. Elevation 5400'. On the surface are found basalt chips, and occasional implements such as scrapers and points (collection in UCMA).

Eldorado County

Eld-24. Located on an unnamed road about one-quarter mile west of U.S. Highway 50. Overlooking the left bank of the Upper Truckee River at a point where it is joined by a small stream from the northwest. Elevation 6400'. A campsite, with small rock shelters. At the northern margin of the granite outcrop which contains the rock shelters are low, flat boulders with mortar holes in them. Around these flattish boulders there is granitic soil which is continuous with that of a small meadow to the north of the outcrop.

The color of this soil near the boulders is much darker than that of the clearing as a whole. In this dark soil a test pit was dug and from it were recovered basalt projectile point tips, chert and obsidian projectile points and point fragments, and obsidian flakes (Fig. 1). Scattered sparsely in the clearing are basalt flakes.

Eld-25. About one-quarter mile beyond Eld-24 and on the north side of the road. Elevation 6400'. A bedrock mortar site in the form of a large boulder with eight mortar holes in the upper surface. About 200 feet to the northwest is a second boulder, also with mortar holes. There is no midden soil around either rock, and in the area around and between the two rocks no flaking refuse or artifacts were found.

Eld-26. Along the right bank of the Upper Truckee River, one quarter of a mile north of U.S. Highway 50, between the highway and Lake Tahoe. Elevation 6230'. A temporary campsite, probably a good spot for fishing and hunting. At this site were found only obsidian chips and one obsidian point fragment (Fig. 1). No basalt or other tool material was seen.

Alpine County

Alp-4. On the eastern side of Hope Valley, in and around a prominent grove of aspen trees, about one-quarter mile east of West Carson River, along a small unnamed stream which rises at a spring on the western slope of Pickett Peak. Elevation 7200 to 7300'. This site is apparently well situated as to availability of food and water. It was probably used in historic times by Washo groups. Artifact material includes granitic stone, basalt, rhyolite, chert and obsidian. Chipped stone artifacts found were of the two latter materials.

Alp-5. At the west end of West Carson Canyon near a small unnamed, unmapped creek, on the north slope of Pickett Peak. Elevation 7100' to 7200'. A campsite with lithic artifact material -- basalt only found. Other indications of habitation are burnt mammal bones weathering out of one or perhaps several fire places.

Alp-6. On a high cliff on the north wall of West Carson Canyon, one and one-half miles west of Woodfords. Elevation ca. 6200'. A temporary campsite said to be a Washo refuge -- a fire-blackened rock shelter or cave. The almost inaccessible site was not visited by the authors. A local Washo informant told us of the presence here of basketry fragments and other "trash" in the shelter.

Alp-7. Near Hangman's Bridge, over East Carson River, on the west side of State Highway 4. Elevation 5500'. A cave or rock shelter site formed by the erosion of the lower part of an igneous rock (andesitic tuff) formation into the form of an inverted bowl. The shelter measures about forty feet from side to side, is about twenty feet high at the outer lip, and has a maximum overhang of about twenty feet in the center. A test pit revealed that there is a "wet" deposit of midden and silt about thirty-six inches deep, which contains probably three layers, the lowest and thickest one probably

representing aboriginal occupation. In this level were found animal bones, many obsidian chert flakes, a few projectile points of the same material, and one bone artifact (Fig. 1). The next overlying stratum is a thin one consisting of black soil which is shot through with such objects as cut iron nails, glass bottle fragments and pieces of charcoal. This layer indicates that the spot was used for camping by Caucasian travelers at the time when the old wagon road was at about the same level as the floor of the shelter. Above the latter layer is a thin, relatively sterile cover of silt which has flowed into the shelter from above. This probably dates from the time of abandonment of the old wagon road.

Alp-8. Around the Woodfords Store, in Woodfords, at the east end of West Carson Canyon where the Ebbetts Pass Road joins that of Kit Carson Pass. Elevation 5600'. A campsite known to have been used historically by Indians, and probably used also prehistorically as a camping spot.

Alp-9. About three miles northwest of the town of Markleeville, one and one-half miles west of Woodfords-Markleeville road, at the base of a cliff near the route of an old "California Trail." Elevation 6300'. Probably a work shop area -- obsidian projectile points seem to have been made here. Site is said to be near an ancient Indian skirmishing site.

Douglas County, Nevada

Do-1. Located along U.S. Highway 50, where it skirts the Nevada shore of Lake Tahoe, between Glenbrook and Zephyr Cove. Site is commonly known as Cave Rock. Elevation 6500'. A partially smoke-blackened cave or rock shelter, measuring about 70' from the drip-line beyond the mouth to the back wall of the cave. Cave proper is about 18' wide at mouth, 10' high, and extends almost horizontally for 30' to the back wall, which is about 8' high and 8' wide. Undoubtedly used as a temporary camping spot. Glacial gravels and rock fall make an irregular cave floor and a large talus jumble outside. A small test pit dug in the occupation deposit disclosed a cobble chopper at a depth of twelve inches. No other artifacts found. Well-preserved rat or bat guano is deposited in parts of the shelter to a depth of about eight to twelve inches. One sample of this guano had no charcoal mixed with it -- this might indicate that this "deposit" had been laid down after regular human occupation, or at least that the shelter was not intensively occupied.

This may be the cave mentioned by a Washo as being "four or five miles from Glenbrook" in which a "wild man" lived before the whites came (Lowie, 1939, p. 331).

Culture Disclosed

The artifact materials recovered consist almost entirely of flaked implements. A few hammerstones, manos and metates and pestles were found.

Thus, we are not in any position to throw much light upon the culture content of the prehistoric occupants of our area beyond inferring some details of hunting and food preparing. Since we found no evidence to contradict the assumption that the high elevation with heavy winter snowfall prevented permanent occupation, we may assume that these high-altitude summer campers of antiquity travelled light, bringing with them a minimum of necessary gear, most of which they took away with them when they returned to lower elevations in the Fall.

Some idea of the limited range of implement types noted may be gained from an inspection of Table 2.

TABLE 2

ARTIFACT OCCURRENCE BY SITE (EXCEPT POINTS AND FLAKES)

Artifact	Pla 5	Pla 6	Pla 7	Pla 8	Pla 10	Alp 4	Alp 7	Eld 24	Eld 25	Nev 8	Nev 9	Nev 10	Nev 11	Totals
Metate frags., rhyolite	6	7												13
Mano, granitic		5				1								6
Mano, basalt			1					1						2
Pestle, granitic		1												1
Pestle, basalt		1												1
Grinding stone, granite				1										1
Grinding stone, basalt						1								1
Bedrock mortars								1	1					2
Hammerstone, basalt	1	1				3								5
Hammerstone rhyolite		3				1								4
Chopper, basalt													1	1
Blade frag., chert						1								1
Blades & frags., basalt	626	77	3	11	1					4	2	5	26	756
Scraper, obsidian				1										1
Scraper, chert						1								1
Scraper, basalt	23	17	9	20		1	1			3	3		4	81

TABLE 2 (Continued)

Artifacts	Pla 5	Pla 6	Pla 7	Pla 8	Pla 10	Alp 4	Alp 7	Eld 24	Eld 25	Nev 8	Nev 9	Nev 10	Nev 11	Totals
Bone, gambling							1							1
Bone, unmodified							47							47
Quartz crystal frag.										1				1
Obsidian graver		1												1
Cores, basalt	2	1	1											4

Projectile Points. Points are here defined as measuring not over 8.0 cm. in length. They may have served as tips for arrows and spears, or knife blades. In most cases their weight and size are such that they appear rather heavy for the type of arrow used in recent times by the Washo (cf. Rust, 1897; Barrett, 1917, Pl. 6), and there is the possibility that anciently (in pre-Washo times?) a heavier bow was employed, or a different projectile weapon such as the spearthrower was in use.

From site Pla-5 comes the largest lot of chipped points (Pl. 1) from a single site (806 specimens). These have been divided into 11 major types with various subtypes as follows:

Type 1. Leaf shape

- Subtype a. Bi-pointed, spindle shaped (Pl. 1A, figs. 4-7).
- b. With rounded base (Pl. 1A, figs. 8-11).
- c. With rounded base and point (Pl. 1A, figs. 1-2).
- d. Crescentic (Pl. 1A, fig. 3).

Type 2. Triangular

No outstanding variants except that length is variable (Pl. 1A, figs. 12-14).

Type 3. Shouldered, with contracting stem.

- Subtype a. Pointed stem (Pl. 1A, figs. 15-17).
- b. Stem with rounded end (Pl. 1A, figs. 19-21).
- c. Stem with squared end (Pl. 1A, figs. 22-25).
- d. Stem with concave end (Pl. 1A, fig. 18).

Type 4. Side-notched

- Subtype a. With no discrete stem; square or convex end (Pl. 1D, figs. 1-3, 15-17).
- Subtype b. With concave base (Pl. 1D, figs. 11-14).
- Subtype c. With rounded base (Pl. 1D, figs. 7-10).
- Subtype d. With squared base (Pl. 1D, figs. 4-6).

Type 5. Barbed or tanged. (This type is close to 3).

- Subtype a. With end of stem projecting beyond level of tangs. Notches almost corner notches. (Pl. 1D, figs. 18-20).
- Subtype b. With end of stem not projecting as far as tang level. Base notched. (Pl. 1D, fig. 21).

Type 6. Quadrangular, with angular contracting base (Pl. 1C, figs. 1-3).

Type 7. Long parallel-sided stem with rounded end, basal edges ground. (Pl. 1C, figs. 4-5).

Type 8. Long narrow blade with concave edges (Pl. 1C, figs. 6-7).

Type 9. Large barbed point, contracting stem with square base (Pl. 1C, fig. 8).

Type 10. Side-notched with chipped blunted tips (reworked projectile points for use as hafted scrapers?) (Pl. 1C, 9-10).

Type 11. Side-notched points with shouldered tips (reworked projectile points for use as hafted perforators or drills?) (Pl. 1C, figs. 11-15).

Table 3 gives information on the number, size and average weight of each main type. The material used at Pla-5 for points was black basalt of a sort which flakes very well, although it does not lend itself to the production of thin, evenly-surfaced points. This basalt is locally abundant and doubtless was the best raw material which could be found. Of the over 800 points from this site, only 3 are of other material than basalt (1 obsidian, 2 jasper). The large amount of flakes representing the by-product of implement manufacture, and the surprisingly large number of points (both complete and broken) in an area limited to seasonal occupation leads us to suggest that we have here an ancient projectile point manufacturing site where people came to make finished implements which they took with them when they returned to their winter lowland homes. The flaked pieces which were left to be picked up later by us are either broken pieces which were rejected during manufacture, or were lost and not recovered, or were not sufficiently well made to be worth carrying away. A large portion of the complete points do appear to be well made and perfectly usable specimens.

Table 4 shows the occurrence of 17 classifiable projectile points from 5 other sites visited by us. The distribution, probably because of the

TABLE 3
NUMBER AND WEIGHT OF POINTS FROM PLA-5

Type of point	Number of pieces	Complete points weighed	Average weight (grams)	Average dimensions (mm.)	
				Length	Width
1. Leaf shaped	173	110	5.9	58	20
Subtype 1a	26				
1b	144				
1c	2				
1d	1				
2. Triangular	18	6	6.1	39	25
3. Shouldered	289	155	4.1	50	20
Subtype 3a	84				
3b	115				
3c	85				
3d	5				
4. Side-notched	316	153	5.0	45	21
Subtype 4a	75				
4b	48				
4c	97				
4d	96				
5. Barbed	45	27	3.6	32	27
Subtype 5a	41				
5b	4				
6. Quadrangular	8	4	6.4	42	23
7. Long stemmed	2	1	12.5	60	23
8. Concave sided	3	3	4.5	50	17
9. Large barbed	1	1	25.2	73	50
10. Blunted tip	3	2	6.3	37	18
11. Shouldered tip	8	7	4.8	40	25

small numbers of specimens from such a wide area, does not appear to show any significant localization of types.

One group of sites produced mainly small side-notched points, most of which are made of obsidian or other siliceous material (chert, chalcedony, jasper, etc.). These are quite distinct in form, material and find-location from the projectile points of basalt described above. The small side-notched points, furthermore, are the same in all respects as the tips for arrows made in the historic period by the Washo who lived in the area covered by our survey. It is indicated, therefore, that those sites (Eld-24, Eld-26, Pla-9, Pla-10, Alp-4) at which numbers of small points occur are the former seats of Washo villages or camps. We have not classified the small points by shape, but have shown them in Fig. 1. The reader may also compare in Fig. 1 the archaeological examples with modern Washo arrow points. For accounts of Washo arrow point chipping see Rust (1897) and Appendix D of this paper.

TABLE 4
SUMMARY OF POINT TYPES FOUND AT VARIOUS SITES *

Type	Pla-7	Pla-8	Pla-13	Nev-8	Nev-11
1 a		1		1	
b		1		1	
2					1
3 b	1	1	1	2	
4 a					
1		1			
2				1	
b				1	
d		1	2		
5 a				1	

* Omitted here are sites which produced small Washo-type arrow points (Fig. 1).

Drills. Drills or punches of flaked stone with one expanded end and a narrow point are a notable trait for our area. From Pla-5 we have 40 specimens which are divisible into 3 subtypes:

Type A. With large circular flat base and short tip (Pl. 1B, figs. 8-9).
9 specimens from Pla-5.

Type B. With small circular flat base and long tip (Pl. 1B, figs. 5-7).
12 specimens from Pla-5.

Type C. With irregular and unshaped base and long point. (Pl. 1B,
figs. 1-4). 11 examples from Pla-5.

The abundance of drills requires some explanation, and in view of the improbability that these pieces were being used as wood perforators, it may be suggested that they served for perforating skins of animals killed. Perhaps, during their summer sojourn in the Sierran meadows, deer or rabbit skins were fashioned into clothing and these items used as trade material or taken back to the winter villages (cf. Lowie, 1939, pp. 326-327).

Choppers. Table 2 shows the occurrence of what we have classed as choppers. These are crude heavy flake or core unifacial or bifacial tools which probably served heavy duty purposes such as chopping bones, cutting small trees or limbs and the like. They are so variable in size and form that they cannot be said to constitute a form which was made according to a tradition -- they are, rather, heavy chopping instruments which were probably fashioned on the spur of the moment for a specific requirement and, once used, were discarded.

Scrapers. Scrapers made by retouching the margin of a heavy flake are fairly abundant (see Table 2). They may have served to scale fish, scrape willow twigs or dehair hides. Here again we have a generic form, there being no particular attention to shaping the scraper and the existence of a potentially useful edge of a large flake was apparently taken as encouraging flake-sharpening.

Blades. From Tahoe Vista (area of site Pla-9) during sand removal work by a county highway work crew there was turned up at a depth of about 3 feet the unusual basalt blade with heavily patinated surface shown in Fig. 5g. The piece was collected by and is now in possession of Mr. J. Mandeville of nearby Kings Beach. The surface flake scars are distinctively broad and flat and quite unlike anything else seen by us from the whole area. What is of particular interest is the practical identity of this blade with one of tan flint recovered from the deep levels of Leonard Rockshelter and bearing a radiocarbon date of about 5000 B.C.² The Leonard Rockshelter blade is illustrated (however poorly) elsewhere. The similarity in size, crude serration along half of the edge, and flaking technique may indicate that the Leonard type blade (also unique for that locality) is an ancient Western form which will become established as a type when more investigation in the western Great Basin is carried out. We do not press this point, but nevertheless feel that there may be some genetic connection in these two occurrences.

When the chipped specimens from Pla-5 were sorted, only the size and shape variations appeared to be worth considering at any length. The material used for the blades was almost entirely basalt. Obsidian was apparently not used at all. The only variation in the material seems to be in the quality of the basalt itself.

The complete specimens are consistently leaf-shaped, some having the spindle shape, i.e., "bi-pointed," some having a rounded base. The so-called blade fragments are generally triangular in shape.

Of 87 complete blades, all but five seem to cluster about an ideal size which is from 70 to 80 mm. long and 25 to 35 mm. wide. The odd five are larger, ranging from 100 mm. long and 40 mm. wide to 175 mm. long and 75 mm. wide. Of 712 specimens in the fragment category, 86 are larger than the "ideal" sized complete specimens. The remaining 626 are about the same size as or smaller than the "ideal."

With these data, we can now profitably speculate upon the nature of the implements. A few of the smaller complete blades might simply have been large unfinished projectile points. The degree of secondary chipping on some of them is about equivalent to that on the projectile points. These therefore give the appearance of very large projectile points. The majority of the smaller complete points and fragments, on the other hand, have the same sort of rough secondary chipping on them as have the larger complete blades and fragments. There is no evidence that the inhabitants of the area attached knives or spearheads to wooden handles or shafts. It is thus only a guess that the implements were mounted -- they might have been used equally well as hand scrapers or knives or small choppers. The real question is whether these implements were used in their present, rough state, or were blanks that for some reason were never finished.

A final question concerns the fragments. The writers suspect that no small number of these fragments, especially the larger ones, might be complete tools. The bases for this suspicion are as follows: (a) In a sample of approximately 1000 specimens thought to be blades or fragments thereof, there are less than a dozen mid-sections present, and the majority of the fragments were thought to be either pointed tips or rounded bases of larger tools; (b), the ratio of small fragments to small blades (ca. 8 to 1) is less than half that of large fragments to large blades (ca. 17 to 1); (c), the size of the smaller leaf-shaped blades is approximately that of the larger "fragments." (Note also that the absolute number of the larger leaf-shaped blades is only 5) If these fragments truly represent pieces of larger blades, there should be many more mid-sections represented.

Grinding Tools. Although not abundant, there is evidence of the use of both the metate-mano and mortar-pestle grinding assemblages. Both implements were known to the recent Washo (Barrett, 1917).

Metates. From Pla-5 and Pla-6 were recovered, both on the surface and the exposed roadcut which runs through these areas, 13 flat slab metates, most of them fragmentary. The grinding surface is slightly concave, and they were made from selected slab-form waterworn cobbles which had an original flattened surface (Fig. 3). None are shaped on the exterior. The grinding surface has been pecked to roughen it in order to make for more efficient milling. Apparently the smoothing through use of both the upper and nether grinding surfaces leads to clogging of the polished surface which must occasionally be made sufficiently irregular to catch and hold the grains in order to reduce them to meal. Shapes and cross sections of metates are shown in Fig. 3.

Manos. The handstones or manos used with the metates are of somewhat wider occurrence than the grinding slabs. Manos from the adjoining sites of Pla-5 and Pla-6 are made of granite and basalt. Three others (from Pla-7, Alp-4, and Eld-24) were found. Manos from Pla-5, 6, 7 are shown in outline and cross-section in Fig. 2.

Bowl Mortars. No portable bowl mortars or fragments thereof were seen by us either at the sites or in local collections, but it is probable that they do occur because there are shaped stone pestles from the area (2 examples from Pla-6 -- see Fig. 2p,q).

Bedrock Mortars. Community mortar sites, so common throughout most of California,³ are found only rarely in this high Sierra region. In view of the absence in the mountains from Lake Tahoe north of the pinon tree (Pinus monophylla)⁴ and the lack of acorns, the community mortar may not have been needed, grinding of seeds being done preferably with the metate. We are here, at any rate, at about the ultimate eastern border of the bedrock or community mortar distribution, and it is probable that its near absence is in some way connected with the corresponding lack of the acorn. Further south in the Yosemite region J. Bennyhoff, as detailed in his Appendix B of this paper, found bedrock mortars were most common in the lower elevation vegetation belts where oaks were common.

Pestles. Two pestles from Pla-6 (Fig. 2, p,q) are made of rhyolite and basalt. They are of the sort probably used in a bowl mortar as judged from wear not only on the tip but on the sides as well. This sort of wear-polish does not occur on pestles used exclusively with the hopper-mortar. No bedrock mortars were noted in the Martis Valley area.

Polished Stone Artifacts. A limited number of ground or polished stone artifacts were recovered. (Seed-grinding tools are sometimes called polished, but this feature is largely derived incidental to use.) From Pla-5 comes a fragmentary polished schist pendant 2 mm. thick and 20 mm. wide with a rounded end bearing a biconically drilled hole. A shallow groove has been rubbed along the midline of one surface. It is shown in Fig. 2s.

From a spot just west of Tahoe Vista at the north end of Lake Tahoe (site Pla-9), a local resident (Mr. Ludlow), while removing a pine stump 3 feet in diameter at the base, and at about a depth of 30 inches from the surface, found a three-quarters grooved diorite ax. This piece is shown in Fig. 2r. The finder and present owner is not a collector and did not even know what the piece was. No presumption of anything but a bona fide discovery of a Southwestern grooved ax is to be entertained, and another addition to what is becoming a respectably long list of such imported ax heads may now be noted. ⁵

The polished "boatstone" from Pla-5 (Fig. 5f) is discussed in Appendix A.

Bone Artifacts. Surface sites exposed to severe climatic alterations experienced in this area can hardly be expected to yield animal bones. In none of the exposed portions of the sites (e.g. roadcut exposures at Pla-5, Pla-6, Pla-8) did we note any bone whatsoever. It may have disappeared, or it may have never been present or only very rarely.

From a small test pit in the cave south of Markleeville (site Alp-7) we found 47 unworked animal bones which represent food leavings. In addition, a polished mammal bone tube decorated with 4 vertical rows of short incisions 6.0 cm. long and 1.0 cm. in diameter was found in the deep (aboriginal) deposits. It is shown in Fig. 2t.

Aboriginal Sites with Reference to Altitude

Enough has been said about the evidence pointing to the temporary character of the sites noted by us to make further discussion of the point superfluous.

In the vicinity of site Nev-10 on Prosser Creek, according to a local resident, a prehistoric burial ground was once found. A cemetery with a number of graves implies continuous occupation, and even though the winter might be severe, year-round occupation along lower Prosser Creek would certainly have been possible. We suggest that when an intensive survey is made here that midden sites may be found. At sites Alp-7 and Alp-8 year-round occupation would have been feasible. Alp-7 may be a winter camp-site, a possibility which may be tested when the cave is excavated.

Table 5 shows the elevation of sites noted by us. We would, on the basis of evidence now at hand, say that permanent occupation at elevations over 5500 feet in prehistoric times would be hazardous or impossible.

TABLE 5

ALTITUDES OF VARIOUS CALIFORNIA SIERRA SITES

Elev.	Nevada Co.	Placer Co.	Eldorado Co.	Alpine Co.
7800		Pla-12		
7700				
7600				
7500				
7400				
7300				
7200				Alp-4
7100				Alp-5
7000				
6900	Nev-5	Pla-10		
6800				
6700				
6600				
6500				
6400			Eld-24, 25	
6300		Pla-11		Alp-9
6200		Pla-7, 9, 13	Eld-26	
6100				Alp-6
6000	Nev-8, 12, 13	Pla-8		
5900	Nev-9	Pla-6		
5800	Nev-10	Pla-5		
5700	Nev-11			
5600				Alp-8
5500				Alp-7

Identification and Antiquity of Culture Complexes

We recognize in our material two culture complexes which differ both in time, location, and content. The earliest culture we have named "Martis Complex" from its location in Martis Valley along Martis Creek, and select Pla-5 as the type site. The later culture we have designated "Kings Beach Complex," and name Pla-9 as the type site. Generally speaking the two cultures are geographically exclusive -- i.e., distinctive traits of one rarely occur in the same site with those of the other. Pla-10, however, has produced both types of projectile points diagnostic of the two complexes. In any event this mutual exclusiveness is probably more apparent than real, and when a more intensive search for sites is made, additional locations will probably be found that prove to have been successively occupied.

Martis Complex sites may have been located with reference to good hunting and seed-gathering localities, while Kings Beach Complex sites appear to be located primarily with reference to fishing sites. This generalization may not be true, however, since some excellent fishing stations are occupied by Martis Complex sites (e.g. Pla-7, Pla-8, Pla-11).

Martis Complex sites are: Nev-8, Nev-9, Nev-10, Nev-11, Nev-12, Nev-13, Pla-5, Pla-6, Pla-7, Pla-8, Pla-11, Pla-12, Alp-5 (?).

Kings Beach Complex sites are: Pla-9, Pla-10, Eld-24, Eld-25, Eld-26, Alp-4, Alp-8 (?).

Sites of indeterminate affiliation are Alp-6, Alp-7, Alp-9 and DC-1 (Nevada).

The Martis Complex includes the following elements:

1. Basalt preferred material for chipped implements. (Table 1)
2. Obsidian and chert used very rarely. (Table 1)
3. Projectile points fairly large and heavy, roughly chipped, variable in form. (Pl. 1, A-D)
4. Mano and metate for seed-grinding. (Figs. 2,3)
5. Cylindrical pestle and bowl-mortar (?). (Fig. 2)
6. Boatstones (and atlatl ?). (Fig. 5f)
7. Economic emphasis on hunting and seed-using.
8. Basalt flake scrapers with pressure-retouched edge abundant.
9. Expanded-base finger-held flaked drills or punches common. (Pl. 1B, 1-9)

The Kings Beach Complex includes the following elements:

1. Obsidian and siliceous flint preferred for projectile points. (Table 1)
2. Basalt used very rarely for chipped implements. (Table 1)
3. Bedrock mortar for seed-grinding (sites Eld-24, Eld-25).
4. Projectile points small, light, side-notched. (Fig. 1)
5. Economic emphasis on fishing and seed-using.
6. Probably ascribable to late prehistoric Washo tribe.
7. Bow and arrow offensive weapon (inferred).
8. Scrapers rare; drills absent.

Our trait lists are neither long nor impressive but they are all our limited data allow. The economic basis of both complexes was necessarily similar due to limitations imposed by the Sierran Transition life zone environment. The recent Washo apparently depended in large part on fish while in the Sierras in the summer (Barrett, 1917, p. 8), and because we equate the Kings Beach Complex with the Washo, the Martis Complex sites which are often in spots unfavorable for fishing imply that fishing was not so important as hunting. The large numbers of projectile points and drills (perforators for making clothing?) in the Martis Complex also indicates emphasis on hunting.

Our identification of an early (pre-Washo) culture whose preferred tool material was refractory basalt may indicate the Martis Complex as having membership in a wider group of early cultures in which basalt was the usual material for flaked implements. To the east are the ancient Granite Point culture of the lower Humboldt Valley, Nevada (Heizer, 1951; Elsasser and Elsasser, n.d.) which is believed to have flourished in the Anathermal Age of the post-glacial period (Antevs, 1948), and the Fallon culture of the Carson Sink region (Grosscup and Roust, n.d.) of the same period.

To the south, in the Southern California desert, is a series of basalt-using cultures named Mohave and Pinto whose time and order are surrounded by great confusion, but which are almost certainly ancient (Antevs, 1952; Brainerd, 1953).

To the west, in the lower Sacramento Valley, the Early Horizon cultures of pre-2000 B.C. placed more emphasis upon non-glassy rocks (flint, chert, slate, schistose rock, basalt) than upon obsidian (Heizer, 1949, pp. 21-22, Table 7).

These various cultures -- Granite Point, Fallon, Mohave, Pinto,

Martis and Early Sacramento -- no doubt cover a wide span of time, and may only be connected (if at all) in belonging to a general time horizon (say 10,000 B.C. to 1 A.D. if we follow Antevs, 1952, Chart 3). The common emphasis on implement material other than obsidian may mean that in this period we are dealing with separate groups, small in number, and which had few intimate contacts with each other. Obsidian, which is available only in a few places (Heizer and Treganza, 1944) may at this time have been used abundantly only by the owners of the obsidian quarries and their immediate neighbors ⁶ -- more distant groups being forced to rely upon local stone and only occasionally receiving obsidian by intergroup trade. Then, since the beginning of the Christian era, the enlargement of native populations and expansion of territories led to increased contacts and there developed a regular and large scale barter in obsidian which was sufficient to supply all or most needs for flaked implements. This hypothesizing does not attempt to explain more than the phenomenon of the increasing use of obsidian in far western North America throughout time until, in the late prehistoric period, it is used to the practical exclusion of other materials.

The present authors tentatively suggest, on the slender evidence of the boatstone from Pla-5 (discussed in Appendix A) and main dependence upon basalt for flaked implements, that the Martis Complex may have flourished some time in the first two millennia B.C. This time estimation may be too little or too much, and until more is known of the archaeology of the Nevada area immediately east of the Sierran flank we can hardly anticipate its correction. The Kings Beach Complex, which we equate with the Washo tribe, has an indefinite antiquity but a known termination in the historic present. Since it is not so widespread as the Martis Complex, it appears to have had a relatively shorter duration and perhaps 1000 A.D. is about all the age we can now assign to it.

It has been our own observation in several areas in California and Nevada that where several cultures have been present at different times, some sites will be stratified and others will be single-phase sites. Where the specific situation is such that no alternative is presented for the location of a living site, or where one spot is preeminently suitable (for example a dry open cave or the area bounded by two confluent streams), here we may find a stratified site where earlier evidence of inhabitation is buried beneath the refuse of later occupants. Most stratified sites known to us in California seem to fall into the category of those occupying preeminently suitable locations. Thus, in the broad overflow plain of the Sacramento Valley the annual inundation required either moving out in the wet season or establishing the village on an eminence. The few natural clay elevations in the overflow plain were, largely through sheer necessity, chosen as village sites by successive peoples, the outstanding example being that of site Sac-107, where no less than three culture groups lived at different times (Heizer, 1949, pp. 7, 12). In west central Nevada the best cave and shelter sites around the shores of Humboldt Lake were occupied by successive culture groups -- Lovelock Cave and Leonard Rockshelter may be cited as examples (Loud and Harrington, 1929; Heizer, 1951). Open sites around the shoreline of Humboldt Lake, on the other hand, are not stratified. Apparently no specific location on the lake edge was so markedly advantaged that it was repeatedly selected for settlement. Although examples from California might be multiplied, the main point we consider

to have been illustrated is that, where a choice is presented for village locations, there is a tendency for people to settle in a spot which has not before been used. Among the reasons for avoiding, as it were, establishing a village at a spot once occupied by an earlier settlement, a religious or supernatural one may have been operative. Indians in Nevada and California are ordinarily fearful of spots which were occupied by peoples unknown to them, hence the frequent attributing to caves in the limestone belt of the Sierra Nevada the distinction of being the homes of cannibal giants (cf. Heizer, 1952, pp. 6-7), or the avoidance as "dangerous" of artifacts which occur in Maidu territory but which were made in an earlier period, such as tubular stone pipes and stone bowl mortars (Dixon, 1905, pp. 138-139), and of a similar dread of pre-Washo (?) projectile points which occur in Washo territory (see Appendix D, this paper). Any spot where such dangerous objects were concentrated (i.e., an old village site) would scarcely be selected for reoccupation by peoples who professed such beliefs unless no other expedient was available. In the latter case, some rationalization was no doubt available in order to assuage the fears of the occupants. In addition, reoccupation of an old site with its deposit of midden containing all sorts of dangerous and mysterious objects as well as burials, would never be a very comfortable place to live because of the omnipresent danger that some bad luck might be accidentally generated through digging up some object or disturbing a grave.

These observations are fairly simple ones, but they do give us an acceptable explanation (even if only a partial one) for the fact that some sites are stratified and others are not. In the instance of the high Sierra site survey which is reported in this paper, it may help to explain why site Pla-5 produces an apparently unmixed assemblage of Martis Complex artifacts. Site Pla-9, on the other hand, is situated along a most attractive stretch of the north shore of Lake Tahoe, and was almost certainly visited earlier by the Martis Complex population. A hint of the earlier peoples in this locality is to be seen in the large blade which was compared to an ancient one from Leonard Rockshelter in Nevada.

We present this idea as an afterthought and as something worth future testing in the field. Advances in unravelling our local pre-history can be promoted not only through excavation, but in seeing relational order with reference to cultures and site positions. George Brainerd has discussed this problem in a different, but most stimulating way in another paper in this series (Brainerd, 1952).

Notes

1. Steward (1938, p. 27) calculates that an exclusive pine nut diet would require two pounds per person each day.
2. Heizer (1951, fig. 42e, p. 93).
3. UCAS files record some 300 bedrock mortar sites in California. These have been plotted on a 1/500,000 USGS base map and show a definite concentration in the Sierra Nevada and coastal Southern California areas.
4. For the western limit of distribution of Pinus monophylla see Steward, 1938, Fig. 4.
5. For details of such axes in California see Heizer, 1946. Additional examples are mentioned by Gebhard (1946, p. 54). Two hitherto unreported full-grooved axes found west of Mather in Tuolumne County (site Tuo-25) are in the Hallinan Collection (notes on file in UCAS office).
6. In Napa Valley, an area which we know fairly well archaeologically, there was one great deposit of excellent obsidian at what is locally called Glass Mountain. The earliest known culture complex in the Napa region (there are six sites of this complex now on record) is characterized by only slight to medium use of obsidian, extensive use of black basalt for making scraper-planes, choppers and heavy flake scrapers, the metate-mano, and mortar-pestle seed-grinding contrivances. The general roster of stone implements may be compared closely with that from the Borax Lake site somewhat further north (the fluted points are missing, but concave-base and base-thinned points are common)(Harrington, 1948) and is generically similar to that of the earlier culture stratum in Round Valley (Treganza et al, 1950) and to that in certain sites near Willits, Mendocino County (Meighan, n.d.). In these several instances (with the possible exception of the Borax Lake site, which is situated directly at an obsidian quarry), basalt and similar non-glassy rocks were definitely preferred. This recital of facts has relevance to the main discussion in presenting the possibility that the basalt-using cultures of the far west may have required a considerable span of time in which to relinquish the old habit of using basalt and to acquire the new techniques of using obsidian, for the Napa basalt-culture sites are very near unlimited quantities of obsidian, yet exclusive reliance upon obsidian did not prevail until the later prehistoric culture periods. Our point here is that in addition to the reasons suggested in the text of this paper for the late reliance upon obsidian, the factor of cultural conservatism should be considered as tending to maintain and preserve the older basalt implement-flaking technique complex.

BIBLIOGRAPHY

Abbreviations

AMNH-B	American Museum of Natural History, Bulletins.
BAE-B	Bureau of American Ethnology, Bulletins.
UC-AR	University of California Anthropological Records.
UCAS-R	University of California Archaeological Survey, Reports.
UCPAAE	University of California Publications in American Archaeology and Ethnology.
UCPG	University of California Publications in Geography.

- Antevs, E.
1948 Climatic changes and pre-white man. In The Great Basin. Univ. Utah Bull., Biol. Ser. Vol. 38, No. 20, pp. 168-191.
- 1952 Climatic history and the antiquity of man in California. UCAS-R 16, pp. 23-31.
- Barrett, S.A.
1917 The Washo Indians. Bull. Publ. Mus. City of Milwaukee, Vol. 2, No. 1.
- Brainerd, G.W.
1952 On the study of early man in California. UCAS-R 16, pp. 18-22.
- 1953 A re-examination of the dating evidence for the Lake Mohave artifact assemblage. American Antiquity, Vol. 18: 270-271.
- Cohn, C.A.
1909 Arts and crafts of the Nevada Indians. First Biennial Rept., Nevada Historical Soc. for 1907-1908, pp. 75-79.
- Dixon, R.B.
1905 The Northern Maidu. AMNH-B 17, Part 3, pp. 119-346.
- Elsasser, A.B. and W.H. Elsasser
n.d. The surface archaeology of site Pe-5 and other lakeshore sites, Pershing and Churchill Counties, Nevada. Ms.
- Gebhard, P.
1946 Concerning grooved axes in California. American Antiquity Vol. 12, p. 54.
- Grosscup, G.L. and N. Roust
n.d. The archaeology of Hidden Cave, Churchill County, Nevada. Ms.
- Harrington, M.R.
1948 An ancient site at Borax Lake, California. Southwest Museum Papers, No. 16.
- Heizer, R.F.
1946 The occurrence and significance of Southwestern grooved axes in California. American Antiquity, Vol. 11: 187-193.

- 1949 The archaeology of Central California, I: The early horizon. UC-AR, Vol. 12, No. 1.
- 1951 Preliminary report on the Leonard Rockshelter site, Pershing County, Nevada. American Antiquity, Vol. 17: 89-98.
- 1952 A survey of cave archaeology in California. UCAS-R 15, Paper No. 17, pp. 1-12.
- Heizer, R.F. and A.E. Treganza
1944 Aboriginal mines and quarries of the California Indians. Calif. Journ. Mines and Geology, Vol. 40, pp. 291-359.
- Kroeber, A.L.
1925 Handbook of the Indians of California. BAE-B 78.
- Loud, L.L. and M.R. Harrington
1929 Lovelock Cave. UCPAAE, Vol. 25, No. 1.
- Lowie, R.H.
1939 Ethnographic notes on the Washo. UCPAAE, Vol. 36, No. 5.
- Meighan, C.W.
n.d. The archaeology of site Men-500, Mendocino County, California. Ms.
- Russell, R.J.
1926 Climates of California. UCPG, Vol. 2, No. 4.
- Rust, H.N.
1897 Tom the arrowmaker. Land of Sunshine, Vol. 8, pp. 13-15.
- Steward, J.H.
1938 Basin-Plateau aboriginal sociopolitical groups. BAE-B 120.
- Stewart, O.C.
1941 Culture element distributions: XIV, Northern Paiute. UC-AR, Vol. 4, No. 3.
- Treganza, A.E., C.E. Smith and W.D. Weymouth
1950 An archaeological survey of the Yuki area. UC-AR, Vol. 12, No. 3.

APPENDIX 5

BOATSTONES IN CALIFORNIA

The occurrence of a type of ground stone artifact of the general type called "boat-shaped stones" at Pla-5 is important. (Fig. 5f). The special characteristics of this type of object are: a flat bottom or broad longitudinal groove on the under surface; an upper convex surface; a groove over each end of the convex or upper side. The boatstone from the surface of site Pla-5 is of interest in assisting us in placing the age of the site, for such boat-shaped pieces are associated pretty consistently, where they have been found in archaeological sites whose culture period is identifiable, with the Middle Horizon culture of the Lower Sacramento Valley or its equivalent in the western Sierra Nevada slopes. Such pieces are rare, however, and most examples known to us were picked or dug up by accident and are unaccompanied by any detail except provenience. The boat-shaped stone is definitely not a trait forming part of the Late Horizon complex of Central California. Since the atlatl is believed to have been the chief projectile weapon of the peoples of the Middle Horizon cultures¹ the distinctive boat-shaped stones may have served as atlatl weights. This identification, while endorsed by us, is not pressed here since its demonstration must await the presentation of what we believe to be additional evidence of the atlatl in the form of artifacts identifiable as engaging-hooks and dart tips.

The Pla-5 piece (Fig. 5f) is fragmentary but its original size and form can be reconstructed. The illustration is sufficiently clear so that it is unnecessary to give a detailed description. The piece is made of a low grade gray soft talcose rock.

Other examples of this type of artifact in California and Nevada are cited in the table on the following page.

With reference to the age of boatstones in California we are able to reach only a general conclusion because of the paucity of supplementary data concerning their stratigraphic and cultural context. The three specimens from Indian Gulch, Eldorado County, as detailed by Holmes (1901) are part of the "auriferous gravel culture complex." That reasonably ancient artifacts actually were found in place in Sierran gravels is, we think, quite obviously true, since every find so claimed (cf. Holmes, 1901, for a listing and review of these, and Heizer, 1948, pp. 3-10, for literature) cannot represent an intentional or accidental fraud or mistaken observation. On the face of it, then, artifacts have come from gravel strata in the Sierra Nevada, but how accurate is the information accompanying these on depth of occurrence and how reliable is the dating of the gravels remain, and will always remain, open questions without answers. A. Treganza's recent demonstration that artifacts occur in situ in old auriferous gravels in the Farmington area, Stanislaus County (Treganza, 1952) opens, for the first time since Holmes' study of over half a century ago, the whole problem for new attack. Review of the old and imperfect evidence we believe, will not be the means of resolving this important and difficult problem. New searches for artifacts in situ

Find Location	Present Whereabouts	Illustration
Indian Gulch, Eldorado County, California	UCMA 1-4559	Holmes, 1901, Pl. X Holmes, 1919, Fig. 27 This paper, Fig. 4a
Indian Gulch, Eldorado County, California	UCMA 1-4560	Holmes, 1901, Pl. X Holmes, 1919, Fig. 27 This paper, Fig. 4b
Indian Gulch, Eldorado County, California	UCMA 1-4561	Holmes, 1901, Pl. X This paper, Fig. 4c
Murphys, Calaveras County, California	UCMA 1-69677	This paper, Fig. 4d
Site Las-75, Lassen County, California	UCMA 1-115503	This paper, Fig. 4e
Near Santa Cruz, Santa Cruz County, California	UCMA 1-204201	This paper, Fig. 4f.
Site Sac-28, Sacramento County, California	UCMA 1-98253	This paper, Fig. 4g
8 miles north of Auburn, Placer County, California	Univ. Oregon Museum No. 2-6240	This paper, Fig. 5a
Humboldt Lakebed, Churchill County, Nevada	UCMA 1-65835	This paper, Fig. 5b
Tule Canyon, Esmeralda County, Nevada	In finder's possession	Murbarger, 1951, p. 7 This paper Fig. 5c.
Santa Barbara County, California	?	Yates, 1889, Pl. 4, Figs. 30-31. This paper, Fig. 5d.
Site Sac-99, Sacramento County, California	UCMA L-18716	This paper, Fig. 5e
Kings-Kaweah region, southern Sierra Nevada, California	O.P. Noren Collection	Hewes, 1941, Fig. 14b,3.
Alpaugh, Tulare County, California	Mayer Collection	Gifford and Schenck, 1926, Pl. 19 a-g.
Martis Valley (Site Pla-5) Placer County, California	UCMA 1-137029	This paper, Fig. 5f.

and cooperation with geologists are indicated as the most promising approach. This discussion has pertinence in the present context, for it represents the general basis for our opinion that any of the existing auriferous gravel artifacts may be ancient.² Boatstones which occur as part of the auriferous gravel finds, are not demonstrably an element of the late prehistoric cultures of California. So far as known, not one has ever been recovered from excavation of a site whose age is "Late." Surface specimens may be recent or ancient -- there is simply no way of telling. All this seems to indicate the boatstone as an artifact type with an antiquity of several millenia.

One specimen from site Sac-28 (Fig. 4g) is of undoubtedly high antiquity. The site yielded a number of human burials accompanied by artifacts whose general type is clearly associated with the Middle Horizon. The burials lay under eighteen feet of valley alluvium, and it is clear that a long time was required for this thickness of valley floor sediments to accumulate by river overflow.³

A second Middle Horizon example (Fig. 5e) comes from site Sac-99, which is situated on the American River between Sacramento and Folsom. It is fragmentary and has apparently been reworked into a pendant by the process of drilling a biconical hole near one end where the lashing groove ordinarily is found.⁴

Beyond this our evidence does not carry us in an attempt to place the California boatstones in a definite cultural or chronological niche. If they fall into the broad Middle Horizon culture period, their maximum antiquity may be around 4000 years (Heizer, 1951).

It is possible that the Central Valley -- Sierra Nevada -- Santa Barbara -- western Nevada boatstones are genetically connected with artifacts of generally similar form in the Gulf Southwest States (Patterson, 1937) and in the states east of the Mississippi River, but the question can only be settled by analyses such as those which have been initiated by Haag (1942), Beardsley (1948), Hurt (1953), and Griffin (1946, pp. 40-41).

Notes

1. For argument attempting to show the use of the atlatl in the Early Horizon cultures, see Heizer (1949, pp. 20-23).

2. We do not mean by this that all of the reported auriferous gravel finds are ancient, but that many of them, provided we had the necessary data on their occurrence, might be demonstrably ancient. Their antiquity is, therefore, presumptive.

3. For discussion of alluvial deposition in the Interior Valley floor see Heizer (1949, p. 39).

4. Several boatstones are broken (in Figs 4 and 5 those parts of specimens below the indicated line of breakage are reconstructed) across the middle. Since this position of the break is so uniform, one may suppose that this point marks the line of greatest weakness of the stone when lashed, by means of end grooves, to a shaft.

BIBLIOGRAPHY FOR APPENDIX A

Abbreviations

BAE-B	Bureau of American Ethnology, Bulletins
SI-AR	Smithsonian Institution, Annual Report
UC-AR	University of California Anthropological Records
UCAS-R	University of California Archaeological Survey, Reports
UCPAAE	University of California Publications in American Archaeology and Ethnology

Beardsley, R.K.

1948 Cultural sequences in Central California archaeology. American Antiquity, Vol. 14: 1-28.

Gifford, E.W. and W.E. Schenck

1926 Archaeology of the Southern San Joaquin Valley, California. UCPAAE, Vol. 23, No. 1.

Griffin, J.B.

1946 Cultural change and continuity in Eastern United States archaeology. In Man in Northeastern North America, Papers of the R.S. Peabody Foundation in Archaeology, Vol. 3, pp. 37-95.

Haag, W.G.

1942 Early horizons in the Southeast. American Antiquity, Vol. 7: 209-222.

Heizer, R.F.

1948 A bibliography of ancient man in California. UCAS-R No. 2.

- 1949 The archaeology of Central California, I: The Early horizon. UC-AR, Vol. 12, No. 1.
- 1951 An assessment of certain Nevada, California and Oregon radiocarbon dates. Society for American Archaeology, Memoir No. 8, pp. 23-25.
- Hewes, G.W.
1941 Reconnaissance of the Central San Joaquin Valley. American Antiquity, Vol. 7, pp. 123-133.
- Holmes, W.H.
1901 Review of the evidence relating to auriferous gravel man in California. SI-AR for 1899, pp. 419-472.
- 1919 Handbook of aboriginal American antiquities. BAE-B 60.
- Hurt, W.R. Jr.
1953 A comparative study of the preceramic occupations of North America. American Antiquity, Vol. 18, pp. 204-222.
- Murbarger, N.
1951 Golden treasure of Tule Canyon. Desert Magazine, Vol. 14, No. 14, pp. 4-9.
- Patterson, J.T.
1937 Boat-shaped artifacts of the Gulf Southwest states. Univ. Texas Anthrop. Papers, Vol. 1, No. 2.
- Treganza, A.E.
1952 Archaeological investigations in the Farmington Reservoir area, Stanislaus County, California. UCAS-R No. 14.
- Yates, L.G.
1889 Charmstones. SI-AR for 1886, pp. 296-305.

APPENDIX B

HIGH ALTITUDE OCCUPATION IN THE YOSEMITE PARK REGION ¹

J.A. Bennyhoff

The Yosemite Park region was occupied in historic times by the Central and Southern Miwok Indians (Merriam, 1907, pp. 345-347; Barrett, 1908, map 3). Detailed ethnographic information on the location of settlements is available only for Yosemite Valley (Merriam, 1917). Archaeological remains are found throughout the Park, ranging in altitude from 4000 to 10,700 feet.

The largest sites are found in the Transition Zone,² at elevations below 6000'. While hunting and fishing were important activities, the staple food in this zone was the acorn of the black oak (Barrett and Gifford, p. 142; Clark, p. 41), and 82% of the sites had bedrock mortars associated with them. The number of grinding holes in the mortar rocks found near a single site varies from one to over 400; Presnall (p. 34) reports on one of these with 473 holes. Of the sites found in this zone, 33% have less than 6 holes, 23% have between 7 and 15, while 26% have 20 or more mortar holes. Only two sites have more than 100. The re-occupation season after season of many of these sites is indicated by the size of mortar holes, which range up to 9" in depth. Most of these village sites were occupied only during the warmer season, roughly between April and November (Barrett and Gifford, p. 129). Historical accounts indicate that the more favored locations were inhabited by reduced populations during the winter also (Powers, p. 365; Bunnell, pp. 81-84). Some 12% of the sites were small temporary camps, which can be located only by the surface obsidian flakes.

Small villages, seldom with more than 15 associated mortar holes, are found in the lower Canadian Zone, scattered in the upland meadows adjacent to the deep canyons. These sites are above the oak and yellow pine belt so that acorns and pine nuts had to be carried some distance to the village. However, most of the sites in this zone, and all the sites in the Hudsonian Zone, represent campsites with only surface obsidian. About 28% of these higher altitude sites are quite extensive, with an abundance of obsidian refuse, and must have been occupied season after season. The remainder represent small camps with only occasional occupation. Plant foods were quite limited above 6000' and fish were absent above the high waterfalls. It can therefore be assumed that hunting was the major activity associated with these sites. Some of them, especially in difficult terrain, must have been stopping places on trails. The region was penetrated by hunting groups as soon as the melting snows permitted and was occupied between late spring and early fall.

Locations were selected for settlement on the basis of available water, good drainage, sunny exposure, limited vegetation, and an accessible hinterland. Boulders suitable for mortar rocks were needed in the oak belt. Dry rock shelters were used for storage and limited occupation in Yosemite Valley (Smith; Beatty).

Notes

1. This preliminary report presents a brief summary of the survey of selected areas of Yosemite National Park, conducted by the National Park Service and the University of California Archaeological Survey during the month of July, 1952.

2. The division of the Yosemite region into life-zones has been based primarily on Jepson (1951, pp. 4-8).

BIBLIOGRAPHY FOR APPENDIX B

- Barrett, S.A.
1908 The geography and dialects of the Miwok Indians. Univ. of Calif. Pubs. in American Archaeology and Ethnology, Vol. 6, No. 2.
- _____ and E.W. Gifford
1933 Miwok Material Culture. Public Museum of the City of Milwaukee, Bulletin 2, No. 4.
- Beatty, M.E.
1933 More Indian caves discovered. Yosemite Nature Notes, Vol. 12, No. 1
- Bunnell, L.H.
1911 Discovery of the Yosemite and the Indian war of 1851. Revised edition.
- Clark, G.
1904 Indians of Yosemite.
- Jepson, W.L.
1951 A manual of the flowering plants of California. Berkeley.
- Merriam, C.H.
1907 Distribution and classification of the Mewan stock of California. American Anthropologist, n.s., Vol 9, pp. 338-357.
- 1917 Indian village and camp sites in Yosemite Valley. Sierra Club Bulletin, Vol. 10, pp. 202-209.
- Powers, S.
1877 Tribes of California. Contributions to North American Ethnology, Vol. 3.
- Presnall, C.C.
1930 Indian rancherias found. Yosemite Nature Notes, Vol. 9, pp. 33-35
- Smith, J.S.
1930 Yosemite Indian caves. Yosemite Nature Notes, Vol. 9, pp. 5-6.

APPENDIX C

CHIPS FROM AN INDIAN WORKSHOP ¹

B.P. Avery

"During a recent journey along the high Sierra, at various points from Lake Tahoe to Mount Shasta, the writer was interested in observing the evidences of Indian handicraft. There is no reason to believe that any tribes permanently abode at great elevations in the Sierra Nevada, if anywhere within the deep snow-line. In the summit valleys, about the lakes, and at the sources of streams, where wild children of Nature would find it most convenient and pleasant to live, the elevation above the sea is from 5,000 to 7,500 feet, and the snow falls in winter to a depth of ten to twenty feet, continuing on the ground from November or December, when the fall commences, until June or July. Most of the lakes at this season are frozen and covered with snow; even the smaller streams are often banked over with snow; and the game has fled to the lower portions of the range. But while the high Sierra was not the constant home of the Indians, they resorted to it regularly in the summer season, extending from June or July to November, except where they were denizens of the great lower valleys, which supplied them with all they needed in every season, and were, moreover, occupied by the less warlike tribes, who were seldom able to cope with their hereditary foemen of the mountains. The summit region of the Sierra Nevada furnished good fishing in its lakes, and some of its streams. Deer, and mountain-quail, and grouse abounded. Huckleberries, thimble-berries, wild plums, choke-cherries, gooseberries, and various edible roots were tolerably plentiful. The furry marten, weasel-like animals, woodchucks, and squirrels were tempting prey. The water was better and the climate cooler than those at a less elevation. Hence this region was the resort of Indians from both slopes of the range, and often the possession of a picturesque valley by lake or river was decided by battle between tribes from Nevada and California. The Hetch-Hetchy Valley, or "Little Yosemite," for instance, was, up to a very recent date, disputed ground between the Pah - Utahs, from the eastern slope, and the Big Creek Indians, from the western slope, who had several fights, in which the Pah-Utahs (commonly called Piutes) were victorious. This statement was made to the California Academy of Sciences by Mr. C.F. Hoffmann, of the State Geological Survey, on the authority of Joseph Screech, a mountaineer of that region; and similar statements have been made to the writer by old mountaineers, with reference to the Yosemite Valley and other former aboriginal resorts along the summit of the Sierra. As the mountain Indians, and those of the Nevada plateau, were comparatively nomadic in their habits, they left few or none of those large black mounds, indicating long and constant residence, which were left so abundantly by the mud-hut builders of the Sacramento basin. Pieces of bark stripped from fallen pines or firs, and slanted on end against tree-trunks or poles, with a circle of stones in front for a fire-place were the usual shelter of the California mountain tribes, except that in the northern extremity of the State, where the winter climate is more rigorous, some of the tribes -- notably the Klamaths [i.e Klamath River tribes: Yurok, Karok, and Shasta] and their congeners -- built log-huts, employing bark and brush shelters only in their summer fishing and hunting excursions.

Speaking generally, therefore, the mountain Indians have left few traces of themselves, except the stone implements which are occasionally unearthed, or still found in the possession of the wretched remnants of once powerful tribes. Along the summit of the Sierra Nevada there is scarcely any memento of them to be found, except the arrow-heads shot away in hunting or fighting, or the broken arrow-heads and chips from the same to be gathered at places which have evidently been factories of aboriginal weapons. The most notable find of this latter sort made by the writer was at the Summit Soda Springs -- a most picturesque spot at the head of the northernmost fork of the American River, nine miles south of Summit Valley Station on the Central Pacific Railroad. Here at an elevation of about 6,300 feet above the sea, the river breaks through a tremendous exposure of granite, which it has worn into narrow gorges several hundred feet deep, except where it runs rapidly through valley-like glades or coniferous woods, in which the new soil is covered with a rank growth of grasses, flowering plants, and shrubs -- where the deer come to drink at the salt-licks, and the piping of quails is constantly heard, alternating with the scolding cry of jays and the not unpleasant caw of the white-spotted Clark crow. Just in the rear of the public house kept at this locality, the river tumbles in slight falls and cascades over slanting or perpendicular walls of richly colored granite, shaded by beautiful groves of cedar and yellow pine, which grow in the clefts of the rock to the very edge of the stream, and crown the dark cliffs above. On the rounded tops of the ledge overlooking these foaming waters, on both sides of the stream, the Indians used to sit, chipping away with stone upon stone, to make arrow-heads. This was their rude, but romantic workshop; and the evidences of their trade are abundant on the sloping rock, in the coarse granitic soil which forms the talus of the ledge, and in the blackened litter of their ancient camp-fires.

Before these deposits had been disturbed by visitors to the springs, fragments of arrow-heads and chips of the materials composing them could readily be found upon the surface, where not covered by the bushes. Their flat shape and light specific gravity caused them to wash to the top, and one had only to look carefully, lightly raking with finger or stick the superficial gravel, to find many a curious specimen. In this peculiar quest many persons, including ladies, who cared nothing for the scientific or artistic suggestions of the simple objects sought, developed a strong interest. It kept them out of doors with Nature; it gave them a pretext for remaining in the air by a lovely scene; it aroused that subtle sympathy which is excited in all but the dullest minds by the evidences of human association with inanimate things, and particularly by the relics of a race and a life which belong to the past.

The Indians who congregated at this point, summer after summer, whether from Utah or California, employed in arrow-head making every variety of flint rock, of slate, spar, and obsidian or volcanic glass. The larger heads were made of slate and obsidian, which materials served also for spear-heads, used formerly in spearing fish, and commonly from two to four inches long. Obsidian seems to have been better adapted for all sorts of heads than any other material. It could be shaped with less risk of breaking in the process, and could be chipped with flint to a much sharper edge and point. The points of some of the small obsidian heads gathered by the writer are so keen, even after long burial or surface floating, that a slight pressure will drive them into the skin of the

finger. The greater number of small arrow-heads found, as well as the larger proportion of chips, consisted of the flints, including jasper and agate, variously and beautifully colored and marked; of obsidian, of chalcedony, of smoky quartz, and feldspar; very rarely of quartz crystal and in only one instance of carnelian. While the larger heads measure from an inch and a half to two, three, or four inches in length, with a breadth of half an inch to an inch or an inch and a half at the widest part, the smaller heads measure only from three-quarters of an inch to an inch in length, their greatest breadth being selcom more than half an inch. The latter were evidently intended for small game chiefly, and especially for birds and squirrels. The workmen seem to have had more difficulty in making them, for they are often found broken and imperfect. This was due not alone to their size, but also chiefly to the difference in material when the small vein-rocks were used, these breaking with a less even fracture, and being full of flaws. Persistence in the use of such uncertain material, when obsidian was so much better adapted to the purpose and equally abundant, would seem to have been dictated by a rudimental taste for the beautiful.

A collection of the jasper, agate, chalcedony, and crystal chips and heads presents a very pretty mixture of colors, and the tints and markings of these handsome rocks could not but have influenced their selection by the Indians, who spent upon their manipulation an infinite amount of care and patience. It is interesting to note even so slight an evidence of taste in these savages of the Sierra, especially when we remember that it was supplemented by the artistic finish they gave to their bows and to the feathered shaft that bore the arrow-head, no less than to the quiver of wild skin in which the arrows were carried. Here is the tip of a beautifully cut jasper head. We can fancy the chagrin of the Indian maker when an unlucky blow from his stone implement, or an unsuspected flaw in the flint, caused it to break off. In one instance several fragments of the same head of this material were found and fitted together. There is some reason to suppose that the selection of the above materials may occasionally have been decided by the superstitious attribution to them of occult qualities. Nearly all aboriginal tribes, and even some civilized races, have attached a peculiar sanctity and potency to certain stones, and the Chinese to this day give a religious significance to the jade. It is uncertain, however, to what extent such notions obtained among and influenced the simple savages of California.

None of the rocks used at this Indian Workshop were obtained in the locality. The writer was able to trace their origin to the shores of Lake Tahoe, across the western crest of the Sierra, and not less than twelve or fifteen miles from the Soda Springs by any passable trail. There they are so abundant as to have partly formed the beautiful gravel beaches for which the lake is famous. The obsidian proceeded from the ancient craters that adjoin the lake, the source of those enormous ridges of volcanic material which form its outlet, the cañon of Truckee River. ² Doubtless the flints, slates, and obsidian of this region formed objects of barter with the lower country Indians, who seem to have anciently used them, for the writer remembers seeing arrow-heads of such materials among the Sacramento Valley tribes twenty-four years ago. On the Lake Tahoe beaches are sometimes found spear-heads of obsidian five inches long, with perhaps an inch of their original length broken off, generally at the barbed end. On the shore of the Ice Lakes, in Anderson Valley

[site Pla-10], the writer picked up a skillfully cut and very sharp spear-head of grayish-white flint, which must have been over four inches long before the barbed end was lost. Similar materials to the above were used, and still are used to some extent, by the mountain Indians in the northern Sierra, as far as Mount Shasta, the rocks of the crest furnishing them everywhere along the line of volcanic peaks which dominate the range. About the flanks of Mount Shasta, especially on the McCloud River side, obsidian is very plentiful, and, with some beautifully variegated flints, seems to have been most used. The writer found extensive chippings of it at several points on the head-waters of the Sacramento, notably at Bailey's Soda Springs, thirteen miles south of Strawberry Valley, where the Castle Rocks -- fantastic crags of granite -- push up through the slates and lavas of the neighborhood 2,500 feet above the river. Here, as at the Summit Soda Springs, nearly four hundred miles to the south, the Indians had chosen one of the most charmingly picturesque spots for an arrow-head factory. But here something else than an instinct for the beautiful moved them in their choice of locality. There is fine trout and salmon fishing in the river, while there are no fish at all in the upper north American near the Summit Springs, owing to the falls, which prevent fish from ascending.

Again, the snow-fall is not so great on the Sacramento as to drive the Indians away in the winter. Its bank is their preferred home at all seasons. There they still fish and hunt, and are more nearly in a primitive condition than their kindred farther south, who are now few in numbers and more or less domesticated with the Whites. Of course, since the Indians of the Sierra Nevada came into familiar contact with the Whites, they have adopted fire-arms, in preference to bows and arrows, when they can obtain them, and even where they retain the latter are very apt to use metal or artificial glass in making arrow and spear heads. In a good measure, also, they have abandoned the use of the stone-mortars employed for so many ages by their ancestors, and which about Mount Shasta, as perhaps in other old volcanic regions, were made of trachyte, as certain other implements were made of red lava. Going back to the days before the Pale-face invaded their land, one can easily recall groups of these aborigines, seated on the picturesque lake and river -- spots they always chose for their homes or summer resorts -- sorting out the beautiful stones they had procured for arrow-heads, and chipping away slowly as they chatted and laughed, ³ while the river sung, or the cataract brawled, or the piny woods soughed, as musically and kindly to them as to us."

Notes to Appendix C

1. Reprinted from Overland Monthly, Vol. II, No. 6, pp. 489-493, December, 1873.

2. The author is apparently in error here since obsidian is not otherwise reported to occur in this locality. The obsidian used in the Tahoe region was probably secured from the Paiute to the south (see Appendix D) who owned the territory in which lay Mono Crater, the main source of this implement material for most tribes within a radius of about 100 miles (Eds.).

3. For the methods of manufacturing chipped arrowpoints in aboriginal California (including the Washo) see article by R.J. Squier in UCAS-R 19, Paper No. 20, 1952.

APPENDIX D

DR. S.L. LEE'S ETHNOGRAPHIC NOTES ON WASHO CULTURE

[In this brief appendix is reprinted portions of some observations concerning the Washo, collected by an early Carson City resident, Dr. S.L. Lee. The publication from which these notes are taken is entitled Dr. S.L. Lee Collection (Nevada State Printing Office, Carson City, 1934). The first ten pages are devoted to an appreciation of Dr. Lee and a summary of the contents of his remarkable collection which was presented to the State of Nevada in 1934. Ed.]

"As to foodstuffs the early Washo lived principally upon game and fish, although the pine nut (obtained from the Pinus fixilis) and grass seeds gave them an excellent substitute for bread.

The pine nuts were gathered in the fall, being plucked by hand or brought down by poles and placed in immense willow baskets (was-tom-ows) and carried into camp where, through heat, the nuts were extracted from the cones. ¹

Sometimes these nuts were made into a thick soup. They were first ground by the squaws by placing them on mitatis (hollowed out granite or sycite stones) and crushed with a flat or cylindrical pestle made from the same character of stone.

The meal was placed in a large, watertight willow basket (gay-au-lau, sing am) covered with water and boiled through the agency of hot rocks. As the water lowered the heat of the stones they were removed and others were added until the mush was thoroughly done. The grass seed was similarly treated.

They not only had those breadstuffs but exchanged their pine nuts with the California Digger Indians for an edible acorn; the latter, cooked after the same manner, yielded a jelly rather than a soup. ²

The Indians were as improvident and heedless of the future as children. It was a common custom for a buck, after a harvest or the making of a good trade with the Diggers for acorns, to have his whole provision of food cooked at one time, and invite the whole band or tribe to the feast." [Extracted from "The Noble Red Man," p. 20.]

The Last Arrowhead Maker

"Poker Charley is the only Indian I have ever known void of superstition or willing to impart anything he knows concerning his people, whether of a religious, political, or domestic nature. The only question with him being, 'How much?' If I was willing to pay his price he would tell me what he knew of the subject in question.

He is very old, and now almost blind. I once asked him how old he was. Of course he did not know, but asked me, 'You savve white man, heap starve long time ago at Truckee?'

I answered, 'Yes,' knowing that he was alluding to the Donner party.

He said, 'My brother, Jimmie, see him.'

I asked, 'Why did not Jimmie take them some ewah?'

He said, 'Him heap praid (afraid). He never see white man before.'

I than asked him how old he was when those people died there and he said, 'O, I'm big boy. I'm hunt deer.' So he must have been at least 16. Assuming that such was the case, he must be at least 85 years old.

For a period of 30 years or more I had endeavored to ascertain from the Indians how they made their arrow and spear points from stone. I met with continual defeat until I asked the question of Charley. He informed me that he did know, that he and Lame Tom of Markleeville, Calif., were the last of the Washoe arrowhead makers.

When I requested him to make me some he said he had no rock. Upon inquiry, I learned that he could get some at Topaz, in Mono County, Calif., 50 miles to the south. I asked how much he wanted to make the trip and was informed that \$2 would settle the bill.

The next day, however, he told me that he would require 50 cents more, as it would be necessary to get some sole leather to half-sole his moccasins.

In about a week he returned with about a pint of thin pieces of obsidian (volcanic glass). His next step was to make a 'mo-get-sel' -- so he named the implement with which he fashioned the points. To construct it he had me cut off a prong from a pair of deer horns in my office. He then quartered the piece lengthwise. When that was done he took them to camp and kept them in water for a few days to soften them. He then scraped with glass one of the pieces and reduced its diameter to that of an ordinary lead pencil. This piece of buckhorn was some six inches in length. Then he paralleled it with a piece of greasewood, a very tough, slightly flexible wood, of the same size as the horn, but an inch longer. He lashed the two together with buckskin, allowing the horn to extend an inch below the wood. ³

He placed a piece of buckskin in the palm of one hand, elevated the forearm to an acute angle from the body, the hand almost horizontal and the fingers pointing over the left shoulder. He then placed a piece of the obsidian on the buckskin in his hand, closing his fingers upon it. Taking the mo-get-sel in his right hand he brought the rounded and protruding piece of buckhorn against the edge of the stone, getting the proper bite, as it were. With a quick downward motion he would detach acicular fragments from it, reversing the edges from time to time until the point was completed.

Sitting in my back office he made me several dozen of those beautiful points which are still in my possession. He charged me 25 cents apiece for them.

Dr. Otis T. Mason, Curator of the New National Museum in Washington, D.C., hearing through some unknown channel that I had such an implement, asked if I would loan it to the museum. I did not send mine, but got Charley to make me a pair of them, one large, the other small, and presented them to Dr. Mason. He informed me that it was the only implement for the making of arrowpoints that had ever been secured by the Smithsonian Institute. I afterwards sent a pair to the Richmond (Virginia) Museum." [Pp. 21-23]

Legend of the Arrowhead

"In the '70's there lived in Carson City a very bright Washoe Indian boy who went by the name of Skimmerhorn. He was a wit and quite a student of his people's folklore. I once handed him a large spearhead and asked him what Indians made it. As I approached him with it he backed away, thrust his hands in his pockets, his face meantime betraying great fear.

He said that no Indian made it, that it was the work of the Wulp (wolf) who made it up there (pointing skyward) and placed it in many places on the earth. That if unclean hands touched it, death would immediately follow. Only the medicine man was immune and that he had to wash his hands five times before he dared touch it. After the wolf had placed them on the earth the medicine men found them, and after having performed the above ablution of hands taught the bucks how to make them. Thus they were in possession of implements to supply themselves with game and to protect themselves from their enemies whether of man or beast.

This Skimmerhorn once owned a very fine pony. It died or was stolen and a friend of his meeting him on foot asked him why he was not riding.

He replied, "Him gone. I work for the Winters most all time. I want go Leno (Reno) or Carson City -- I walk on the ground."

As corroborative of Skimmerhorn's statement that the wolf was the artificer that gave his people the first spearpoint, I am reminded of a similar statement made by Joe, spoken of previously.

He was carrying wood into my office and I was busy mounting some arrowpoints on a card. I had them spread out on top of my safe, which he had to pass both going and coming, and I noticed that each time he would give it a wide berth.

Once I picked up a large one, and holding it in my hand asked: 'Joe, what Indians made this?'

He backed away from me in evident fear and answered: 'No Indian make him.'

'Who did, then?' I asked.

'Wulp make him.' he replied.

When I asked him where, he pointed to the sky and said, 'He make him, and throw him down on ground. You pick up a little one you find him this way (the point being toward you) and you die. You pick up big one (having fallen the same way) and you die perty d___ quick.'

The points in question had been made by a much earlier race and differing greatly in morphology from those made by the modern tribes.

I have found in Nevada three distinctive types of those missiles, differing both in form as well as material. The first were of black basalt, crude in workmanship and the barbs almost parallel with the base of the spearhead or arrowhead. 5 The next type, and probably hundreds of years later in manufacture, embraced in the materials used, crystallized quartz (jasper), basalt, carnelian, agates, and obsidian. They were of similar size to the first type, but the workmanship was excellent and the barbs pronounced. The third type, such as were being used when I came to the State, were mostly of obsidian and jasper, although glass from broken bottles was used extensively after the arrival of the whites. I have a number of points made from the latter in my collection.

The bows were made of cedar or juniper, and the back of them covered with deer sinew.

The arrows were made from the wild rosebush. A fissure was made in the lower end of the arrow. The base of the arrowhead was thrust into it and deer sinew drawn around the arrow in a figure of 8, the sinew passing into the notch in the point. After this operation was completed a glue or cement made of deer blood and pitch covered the fastenings described." [Pp. 38-39].

Notes to Appendix D

1. Lee may be referring either to Pinus monophylla Torr. and Frem. or to Pinus flexilis James. Nuts of both pines are gathered and roasted in the same manner. For details see J.H. Steward, "Basin-Plateau Aboriginal Sociopolitical Groups." Bur. Amer. Ethnol., Bull. No. 120, 1938, pp. 27-28.

2. The exchange of pine nuts and acorns between the Washo and their trans-Sierran neighbors (Maidu and Miwok) was described to us by Washo in the summer of 1952, and is also attested by S.A. Barrett, "The Washo Indians." Bull. Publ. Mus. City of Milwaukee, Vol. 2, No. 1, p. 14.

3. One of these is illustrated by H.N. Rust, "Tom, the Arrowmaker." Land of Sunshine, Vol. 8, 1897, pp. 13-15.

4. The Maidu of California share this belief (and include as supernatural objects stone bowl mortars and stone pipes). R.B. Dixon, "The Northern Maidu." Bull. Amer. Mus. Nat. Hist., Vol. 17, Part 3, 1905, pp. 138-139, Fig. 11a.

5. Dr. Lee's ideas are rather similar to those expressed in the final section of the main paper by the present authors.

Explanation of Illustrations

Plate 1: Flaked Implements from Site Pla-5. (Scale 1/2).
(Numbers are UCMA catalog numbers)

- A. Figs. 1-2. Projectile points, type 1c, Nos. 1-135660, 135659.
Fig. 3. Projectile point, type 1d, No. 1-135663.
Figs. 4-7. Projectile points, type 1a, Nos. 1-135594, 135589,
135598, 135587.
Figs. 8-11. Projectile points, type 1b, Nos. 1-135692, 135618,
135605, 135628.
Figs. 12-14. Projectile points, type 2, Nos. 1-135396, 135399,
135144.
Figs. 15-17. Projectile points, type 3a, Nos. 1-135385, 135312,
135284.
Fig. 18. Projectile point, type 3d, No. 1-135388.
Figs. 19-21. Projectile points, type 3b, Nos. 1-135246, 135266,
135271.
Figs. 22-25. Projectile points, type 3c, Nos. 1-135384, 135319,
13535h, 135395.
- B. Figs. 1-4. Drills, type C, Nos. 1-135210, 135212, 135002, 135007.
Figs. 5-7. Drills, type B, Nos. 1-135230, 135226, 135227.
Figs. 8-9. Drills, type A, Nos. 1-135209, 135216.
- C. Figs. 1-3. Projectile points, type 6, Nos. 1-135640, 135656,
135635.
Figs. 4-5. Projectile points, type 7, Nos. 1-135232, 135233.
Figs. 6-7. Projectile points, type 8, Nos. 1-135263, 135049.
Fig. 8. Projectile point, type 9, No. 1-135234.
Figs. 9-10. Projectile points, type 10, Nos. 1-135393, 135453.
Figs. 11-15. Projectile points (reworked for use as hafted
perforators or drills?), type 11, Nos. 1-135241,
135240, 135499, 135457, 135387.
- D. Figs. 1-3, 15-17. Projectile points, type 4a, Nos. 1-135527,
135517, 135454, 135532, 135487, 135535.
Figs. 4-6. Projectile points, type 4d, Nos. 1-135578, 135439,
135504.
Figs. 7-10. Projectile points, type 4c, Nos. 1-135581, 135485,
135502, 135541.
Figs. 11-14. Projectile points, type 4b, Nos. 1-135520, 135558,
135555, 135559.
Figs. 18-20. Projectile points, 5a, Nos. 1-135413, 135418, 135404.
Fig. 21. Projectile point, type 5b, No. 1-135235.

Figure 1: Chipped Artifacts from Eldorado and Placer County Sites.
(Scale 1/1)

- a - q. Projectile points from site Pla-9 (Kings Beach Complex). All
obsidian except b, j, l, m, which are of chert.
r - v. Modern Washo arrowpoints (after Rust, 1897).
w. Site Pla-10 (white flint).
x-h'. Projectile points from site Eld-24 (Kings Beach Complex). All
obsidian except h' (white chert), e' (red chert), f' (brown
chert), h' (basalt).

- i'. Site Eld-26 (obsidian).
- j'-k'. Site Alp-4 (j', mottled purple chert; k', white chert).
- l'. Site Pla-9 -- spear or knife blade (basalt).
- m'. Site Alp-7 (obsidian).
- n'-p'. Site Pla-9 -- spear or knife blades (n', yellow red jasper, o', brown-white mottled flint, p', white chalcedony).

Figure 2: Artifacts from Sierran Sites. (Scale: a-q, 1/3; r, 1/1; s, 1/1; t, 1/1) (Numbers where shown are UCMA catalog numbers)

- a. Pla-5. Mano, granite.
- b. Pla-6. Mano, granite
- c. Pla-7. Mano, basalt.
- d. Pla-5. Mano, granite.
- e. Pla-6. Mano, andesite.
- f. Pla-5. Mano, vesicular basalt.
- g. Pla-5. Mano, andesite.
- h. Pla-5. Mano, rhyolite.
- i. Pla-6. Mano, granite
- j. Pla-5. Mano fragment, andesite.
- k. Pla-5. Mano, granite.
- l. Pla-6. Mano, andesite.
- m. Pla-5. Mano, andesite.
- n. Pla-6. Round mano (?), granite.
- o. Pla-5. Round mano (?), basalt.
- p. Pla-6. Pestle fragment, rhyolite.
- q. Pla-6. Pestle, basalt-andesite.
- r. Pla-9 vicinity. Three-quarters grooved ax (diiorite).
- s. Pla-5. Fragmentary polished schist pendant.
- t. Alp-7. Bone tube, polished and incised.

Figure 3: Metates from Site Pla-5. (Scale 1/4) (Numbers are UCMA catalog numbers)

- a. Andesite; No. 1-137034.
- b. Andesite; No. 1-136985.
- c. Granite; No. 1-136987.
- d. Andesite; No. 1-136986.

Figure 4: Boatstones from California. (Scale 1/1)

- a. Indian Gulch, Eldorado County, UCMA No. 1-4559.
- b. Indian Gulch, Eldorado County, UCMA No. 1-4560.
- c. Indian Gulch, Eldorado County, UCMA No. 1-4561.
- d. Murphy's, Calaveras County, UCMA No. 1-69677.
- e. Site Las-75, Lassen County, UCMA No. 1-115503.
- f. Near Santa Cruz, Santa Cruz County, UCMA No. 1-204201.
- g. Site Sac-28, Sacramento County, UCMA No. 1-98253.

Figure 5: California and Nevada Boatstones; Chipped Basalt Blade (Scale 1/1)

- a. Near Auburn, Placer County, California. University of Oregon Museum No. 2-6240.
- b. Humboldt Lakebed, Churchill County, Nevada. UCMA No. 1-65835.
- c. Tule Canyon, Esmeralda County, Nevada.
- d. Santa Barbara County, California.
- e. Site Sac-99, Sacramento County, California.
- f. Site Pla-5, Placer County, California.
- g. Site Pla-9, Placer County, California. (Chipped basalt blade)

Note: In Figs. 4 and 5, Find locations are approximate only except where UCAS site number is given. "X" indicates position on boatstone where cross-sections are shown.

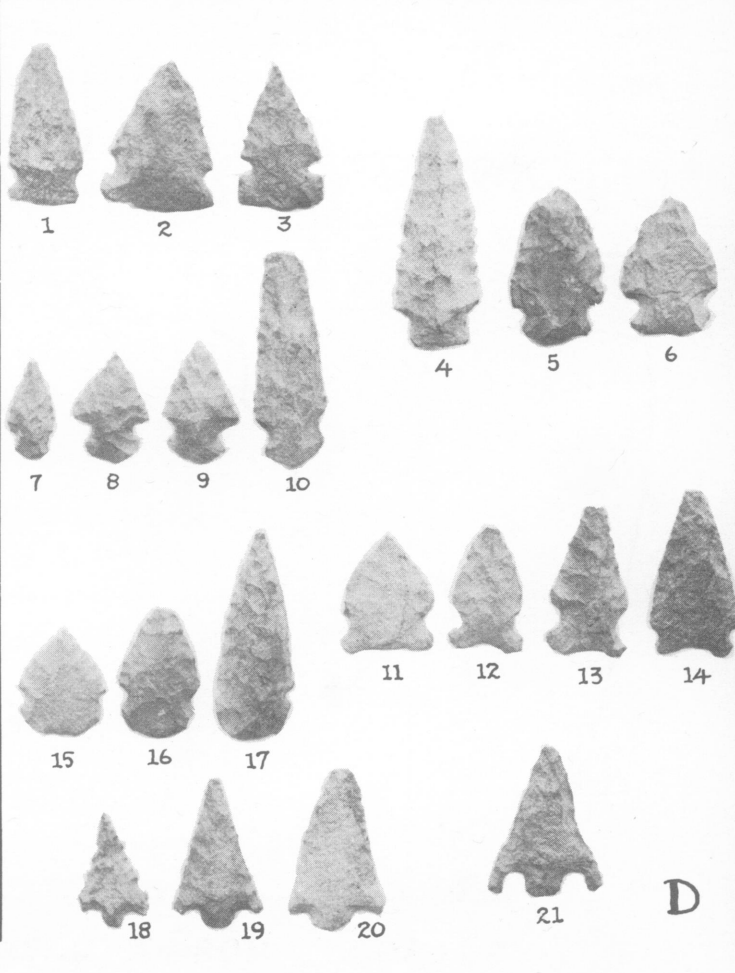
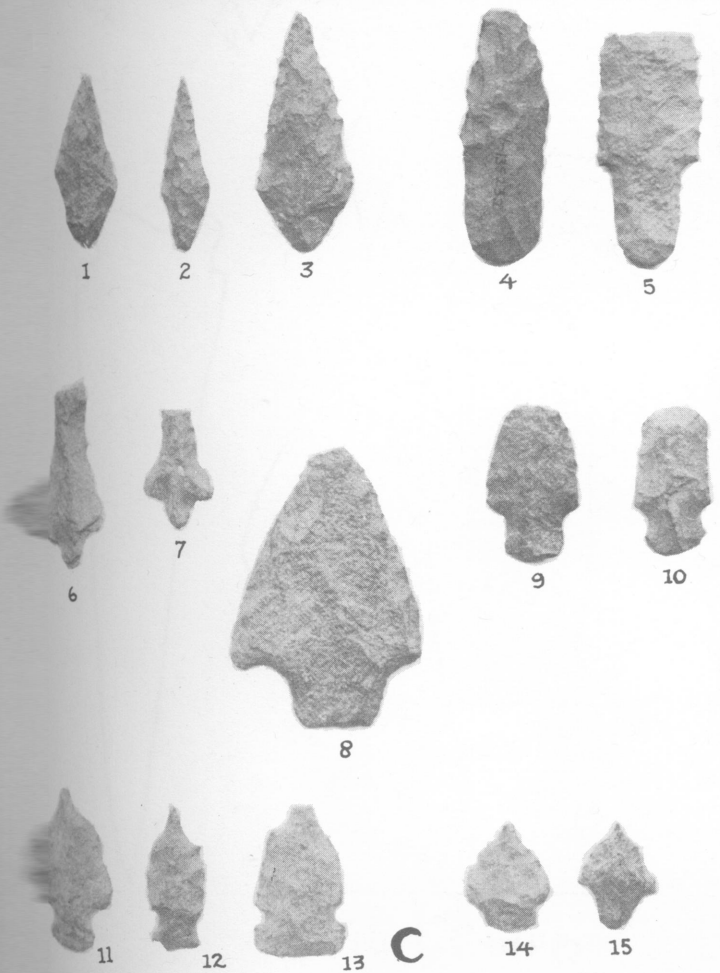
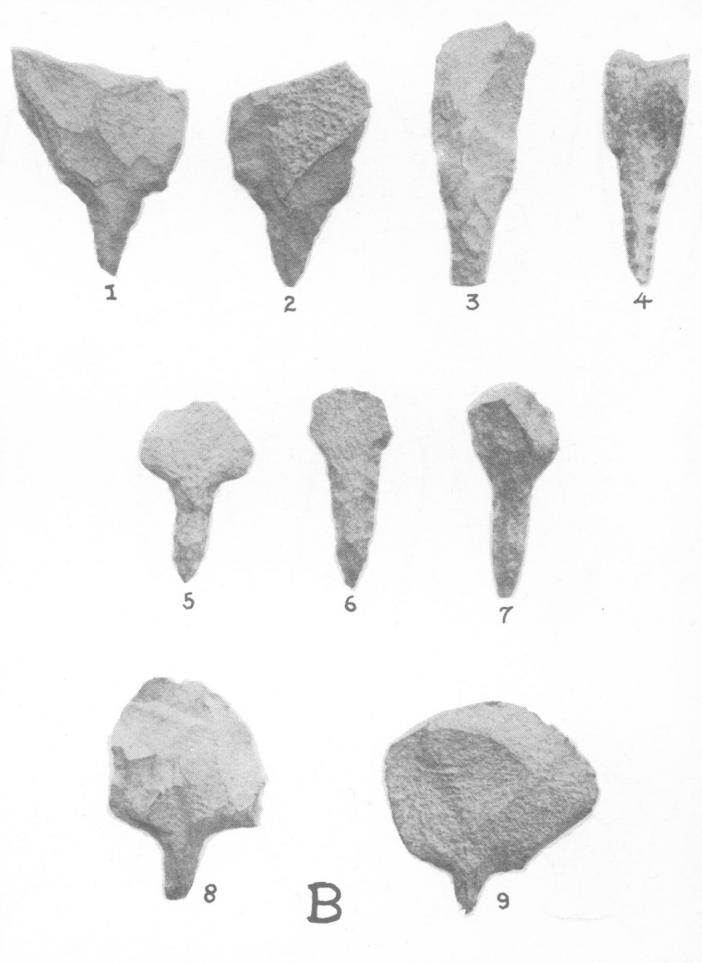
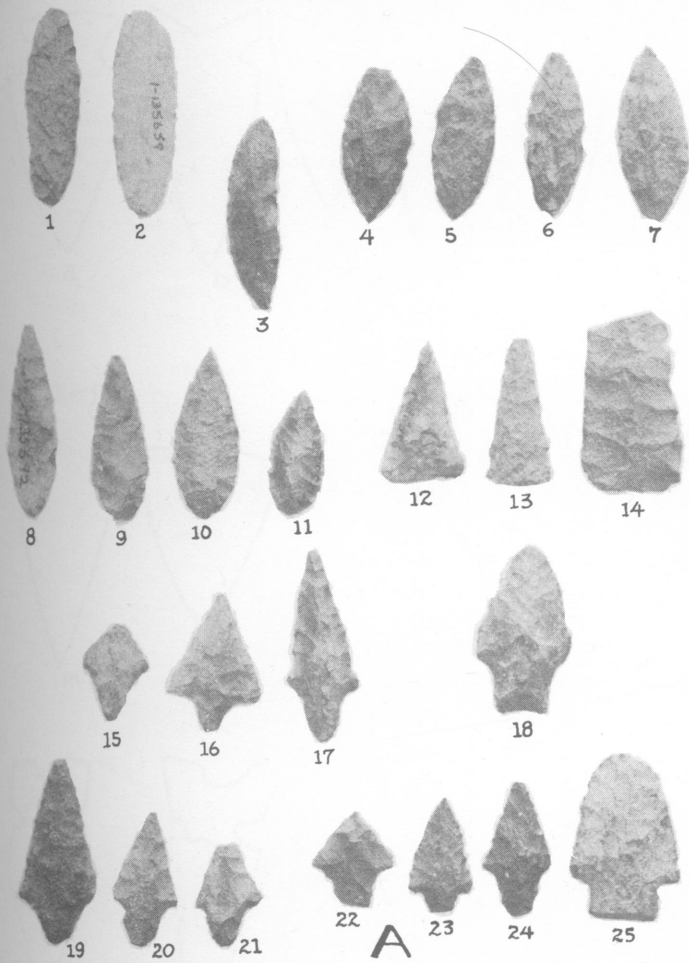


PLATE 1 FLAKED IMPLEMENTS FROM SITE PLA-5

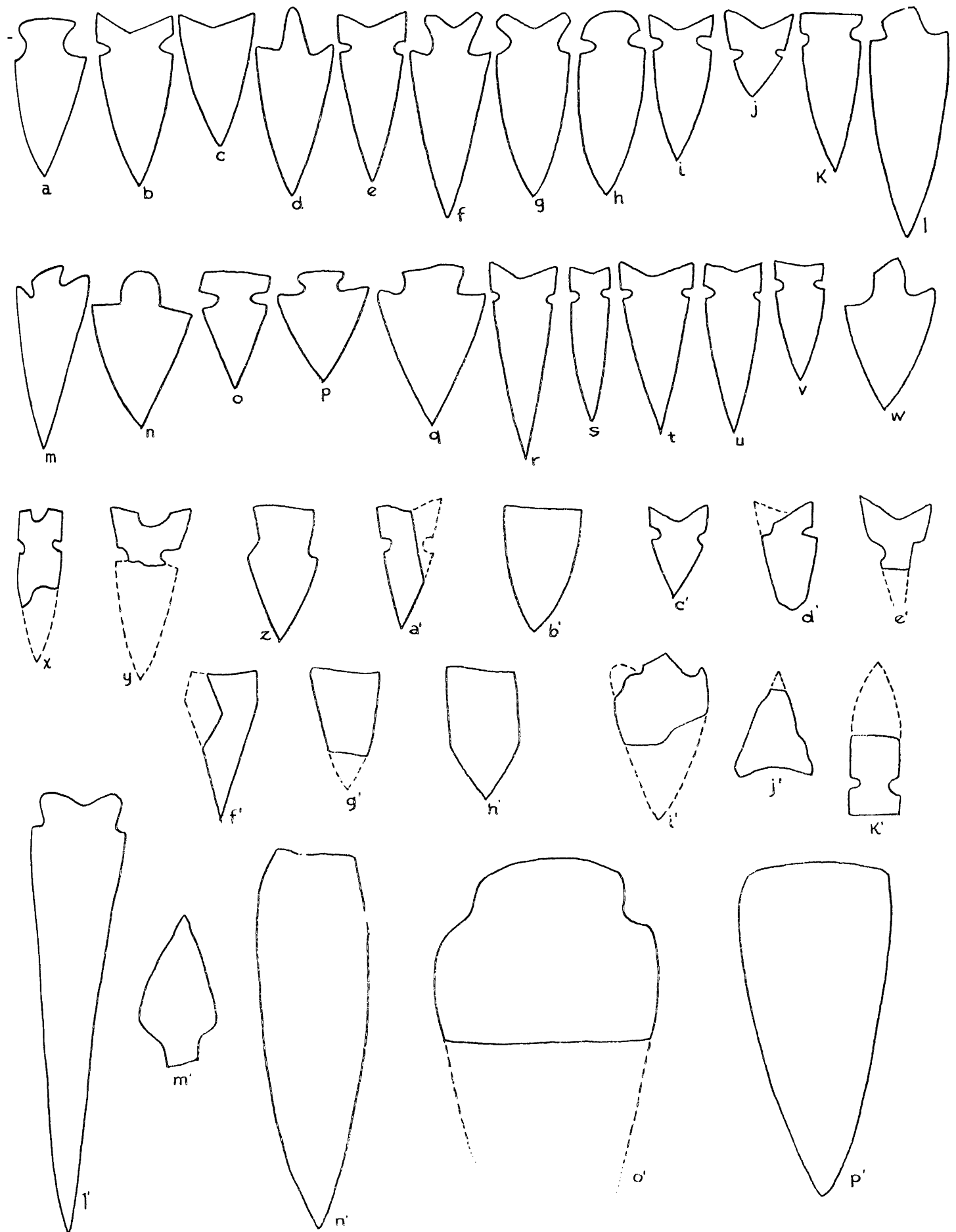


FIG. I CHIPPED ARTIFACTS FROM ELDORADO
AND PLACER COUNTY SITES

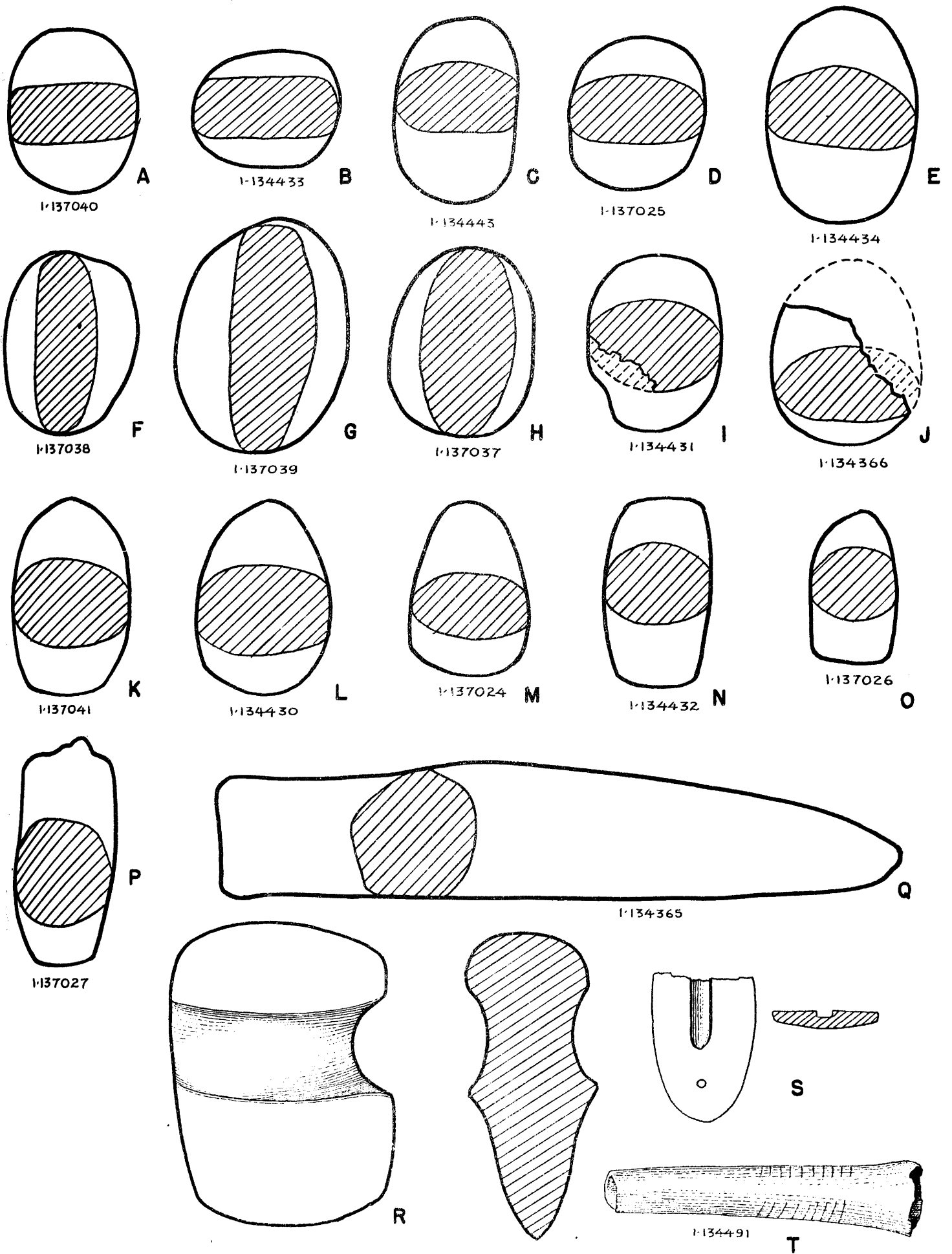
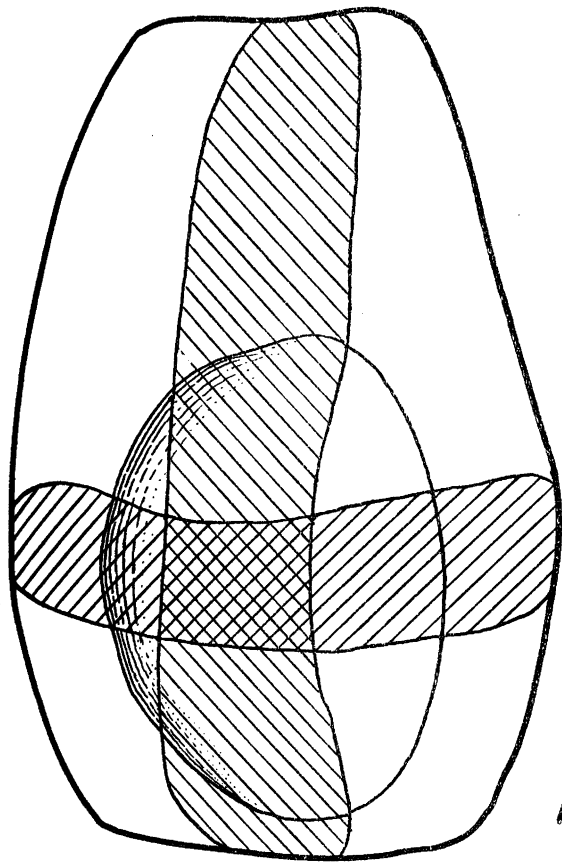
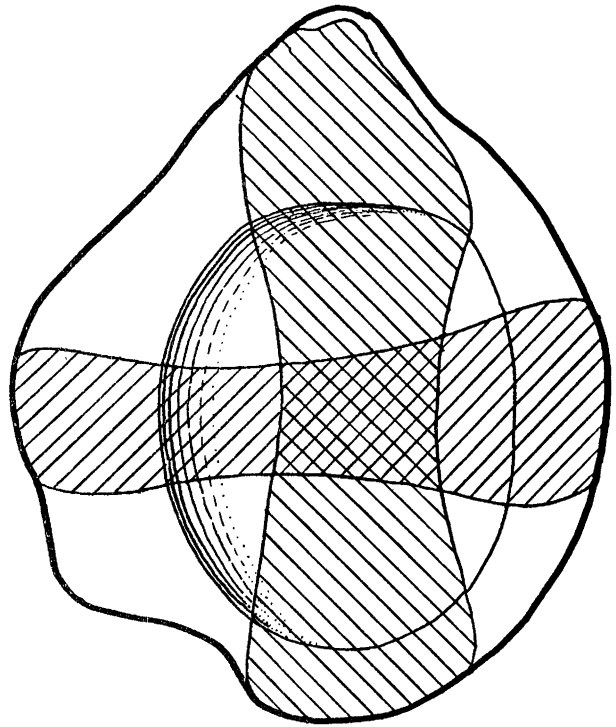


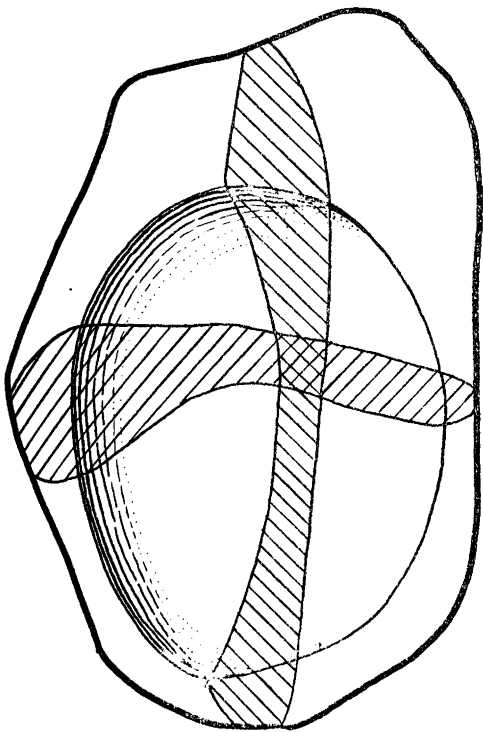
FIG. 2 ARTIFACTS FROM SIERRAN SITES



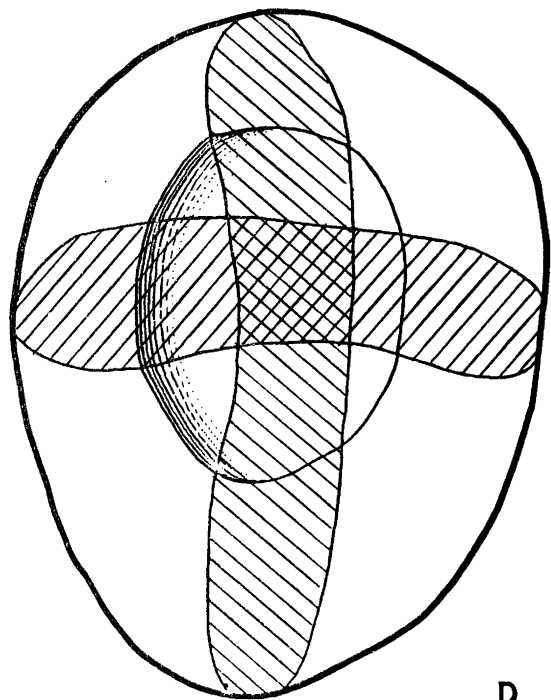
A



B



C



D

FIG. 3 METATES FROM SITE PLA-5

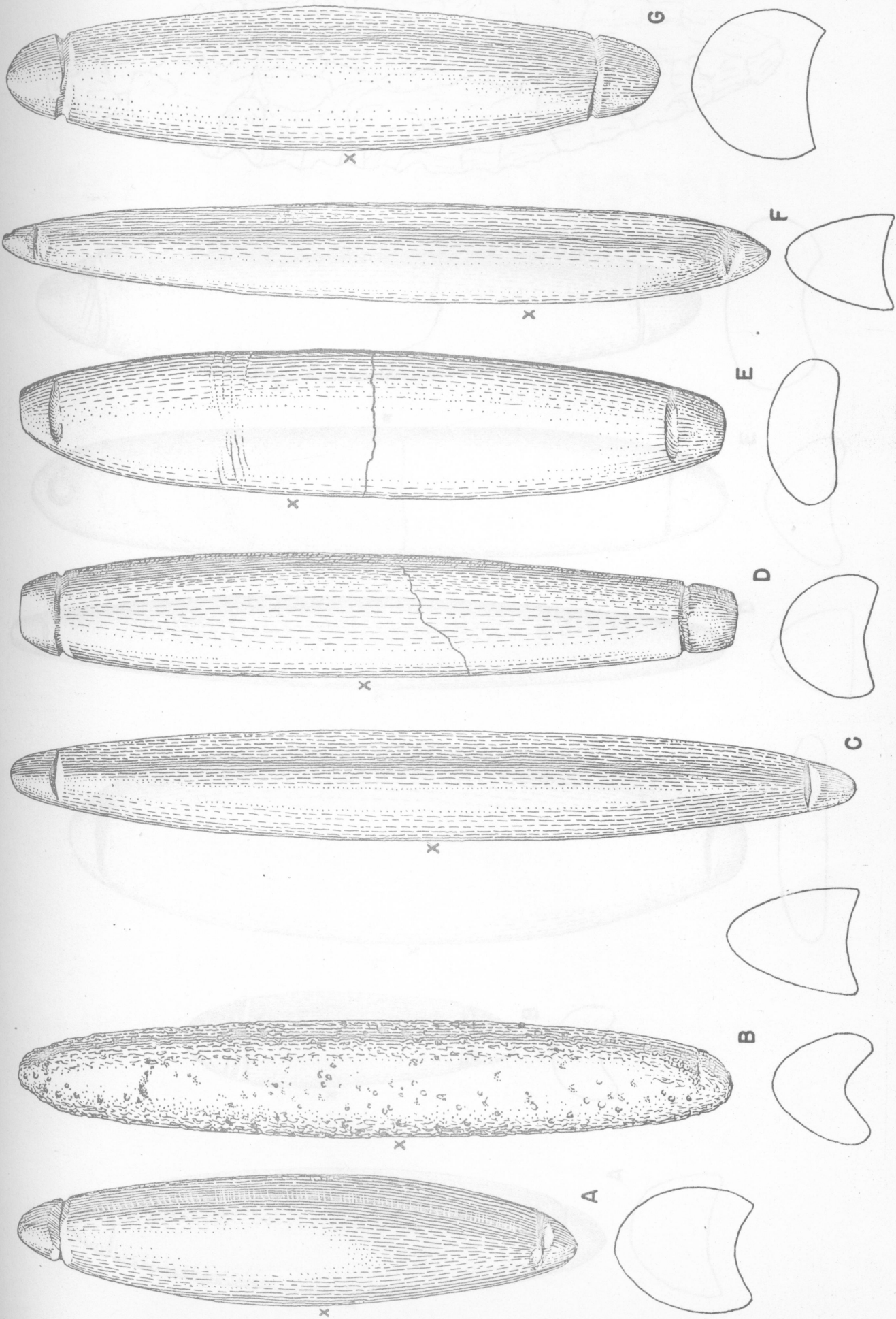


FIG. 4 BOATSTONES FROM CALIFORNIA

FIG. 5 CALIFORNIA BOATSTONE BLADE

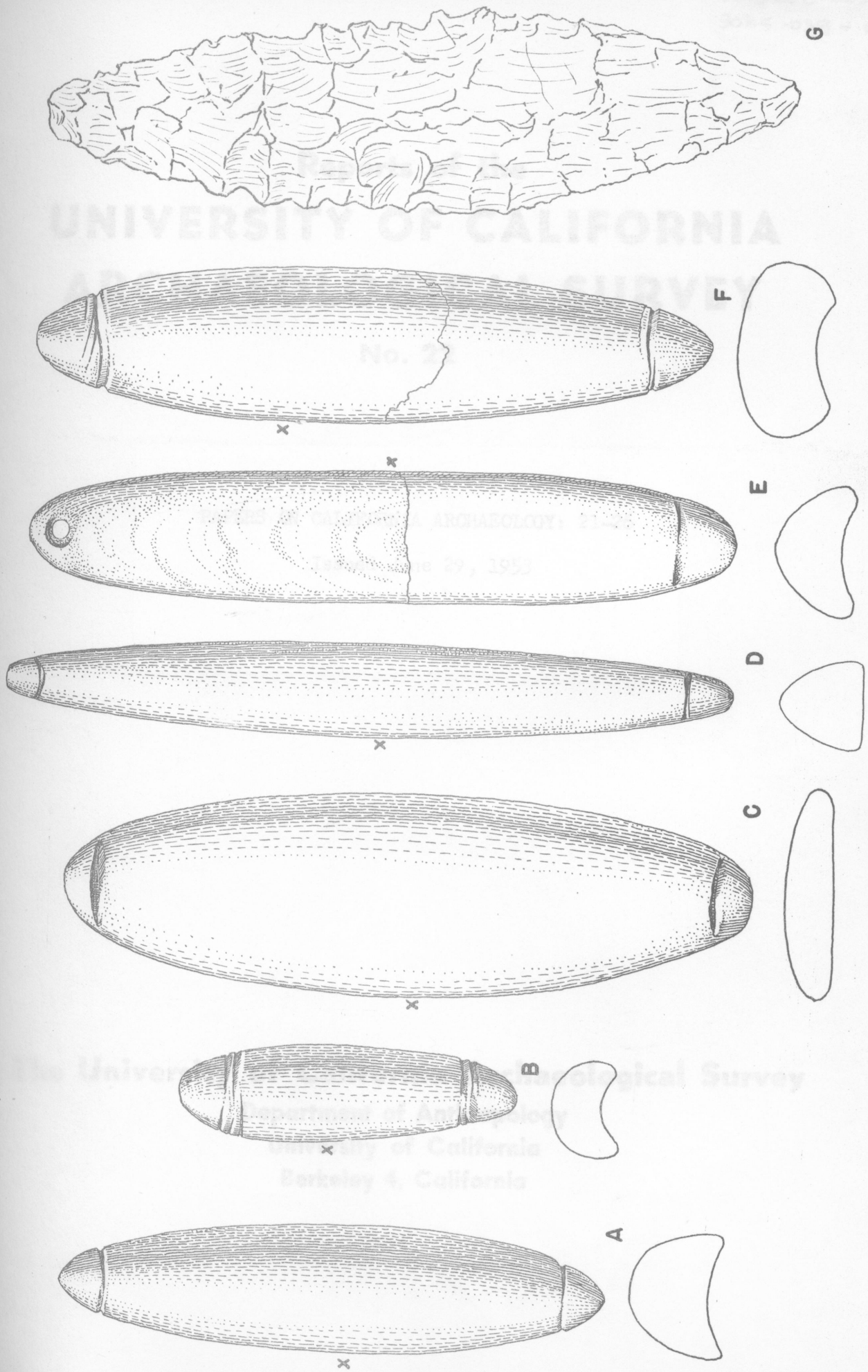


FIG. 5 CALIFORNIA AND NEVADA BOATSTONES; CHIPPED BASALT BLADE