28. NOTES ON THE ARCHAEOLOGY OF MONO COUNTY, CALIFORNIA

By Clement W. Meighan

This paper reports on archaeological survey work done by the writer in Mono County, California, during the month of August 1953. The project was a joint venture of the U.C. Archaeological Survey, Berkeley, and the Department of Anthropology and Sociology, Los Angeles. Expenses of the work were defrayed by the U.C.A.S. and by a Faculty Research Grant to the writer. The accomplishments of the field work were in large part due to the energetic and competent labor of the graduate students from the Los Angeles campus who hiked over many miles of Mono County's terrain in recording the sites. Work of these students, J.C. Hurst, M. Kowta, and P. H. Kunkel is here gratefully acknowledged.

Prior to the 1953 project, virtually nothing was known of Mono County archaeology, and the records of the UCAS included information on only a few sites. The present project adds records of 315 additional sites to the total and permits some evaluation of the place occupied by Mono County in western prehistory. Since the county contains some 4000 square miles of territory, including deserts and some of the most impressive peaks of the Sierra Nevada, it was obvious that our limited survey could not hope to give a thorough coverage of the entire county. Therefore, a sampling procedure was followed in which five selected areas were examined. The regions chosen were selected partly to give areal coverage of the county, but primarily because of differing environmental conditions which the different zones displayed. Such differences should be reflected in the human settlement pattern, and in fact some of the areas showed a much more intensive aboriginal occupation than others.

Although the survey covered a very small portion of Mono County, it is felt that a reasonably complete outline of the archaeology of the region was obtained. Only one major environmental zone was omitted -- the high Sierra Nevada region on the western edge of the county. This high-altitude area has recently been the subject of considerable study. An extensive survey of the Sierra region just west of Mono County was made in 1952 in Yosemite National Park (Bennyhoff, 1953). Publication of the final report on this project may be expected to give an adequate reflection of archaeology at the higher elevations of Mono County, and the writer therefore concentrated his attention on the less well-known eastern areas. The Sierra north of Mono County has also been reported upon, and some comparative material is available for study (Heizer and Elsasser, 1953).

Before discussing the areas surveyed in 1953, some general information on Mono County may be helpful. Physiographically, the county forms part of the western margins of the Great Basin, the high and steep Sierras serving to mark the western border of the county and of the Great Basin itself. The principal streams are the Owens River, which flows south into Owens Valley and the desert lowlands of Inyo County, and the branches of the Walker River which flow north and east into

Nevada. Both rivers arise in the highlands of Mono County. A number of short creeks flow eastward from the Sierra snow fields. Elevations in the county range from 4000 to more than 14000 feet, and most of the major life zones recognized by botanists and zoologists occur at some area of the county (cf. Jepson, 1951, p. 4).

A brief description of the areas surveyed is given below:

Area I -- Chidago Canyon (see pl. 1). Located in the southeastern corner of Mono County, the Chidago Canyon area is on the eastern edge of the extensive volcanic tableland which occupies most of the central and southern part of the county. The elevation is close to 4400 feet, and the life zone is Sonoran. Trees are absent, water is extremely sparse, and the region is characterized by sparse desert scrub plants. Animals are few in number and include rabbits (Sylvilagus, Lepus), wood rats (Neotoma), and coyotes (Canis latrans).

Ethnographically, this region was used by the Paiute of Bishop who owned the seed-gathering rights to the volcanic tableland. Our site Mno-52 is apparently the location of the seed-gathering camp mentioned by Steward (1933, map 2). Seeds gathered were called wai and were derived from the desert grasses Oryzopsis hymenoides (Indian Mountain Rice) and Oryzopsis miliacea (Rice Grass). The seeds, which were generally roasted and ground to a flour, were a very important food, second only to pine-nuts according to the Indians (Steward, op. cit., p. 244).

About seven square miles of this area were intensively surveyed, and 36 sites were recorded in the sample area. The most prominent feature of the region is the extensive use of simple stone construction, of which the following examples were noted:

1. "House rings" of stone occurred at 13 of the 36 sites recorded. The rings varied in diameter from 8 to 16 feet and in height from a single line of rocks to dry-laid walls up to 40 inches high. The rings vary from one to six per site and are of two kinds: one form is a closed circle, the other has an opening a few feet wide on the east side. Thirteen of the former and 18 of the latter were recorded. The rings with openings appear to have been house circles, judging from the presence of manos, chipping debris, pottery, and sparse charcoal within them. Presumably these rings supported a brush superstructure of some kind although no evidence of such roofing material was found.

The closed circles probably served for house foundations and/or animal blinds. Some of the closed circles are located on occupation sites; others are on the edges of bluffs, in canyons, and similar locations which would be advantageous for hunting blinds. They are commonly found without accompanying occupation debris and seem to have been used for very short periods.

2. A small cave had the entrance partly walled off in order to increase the sheltered living space on the inside (see pl. 1A).

3. A low wall, averaging 12 to 18 inches high, extended for a hundred feet along the base of a rock cliff. The wall was virtually continuous but was broken in three or four places where jutting rocks extended out from the cliff. This structure is ideally suited for an animal blind, and it was undoubtedly used in some sort of communal animal drive in which the game was driven toward the cliff to be slain by waiting hunters.

Steward's informants denied knowledge of the stone house rings, but the presence of pottery and small projectile points in some of them strongly suggests that they were used in the latest archaeological period. No artifacts of Caucasian origin were found at any of the Chidago Canyon sites, but they appeared to represent an immediately prehistoric period.

Sites of the Chidago Canyon area were in general quite small, many being less than 100 feet in diameter. No depth of midden was observed at any site. The sites appear to represent temporary hunting and gathering camps, used for short periods probably in winter and spring when water was available.

Area II -- Benton Range (see pl. 2B). This area includes the central portion of the Benton Range a few miles west of Benton Hot Springs. This is a transition life zone (Arid Transition of the Great Basin), characterized by desert scrub, piñon pine (Pinus monophylla), aspens (Populus tremuloides), and joint pine (Ephedra viridis). Game animals include deer (Odocoileus hemionus) and an astonishing abundance of rabbits. Edible birds, including grouse and sage-hens, are also present.

Sites in the Benton Range occur between 5500 and 9000 feet elevation; most are between 6000 and 8000 feet. Some 16 square miles of the region were surveyed and a total of 130 sites were found in this area. Sites were concentrated along creeks but were also found at high passes and on the bare mountain tops.

Although arid, the Benton area contains a number of small springs which flow all year, and water was certainly no problem to the aboriginal inhabitants of the region. Although the appearance of the region is that of arid desert land, the Benton Range represents one of the most favorable regions of Mono County for aboriginal habitation.

Ethnographically, the region surveyed was utilized by the people from the Bishop area as a pine-nut region. The land around the present town of Benton Hot Springs was called ütü ütü witü (hot place, from the hot springs) and the pine nut camp locality in the Benton Range was called tupi mada (tupi, rock, and mada, upon) (cf. Steward, 1933, p. 325).

With more than 8 sites to the square mile of surveyed area, the Benton Range has archaeological evidence for intensive occupation and utilization by Indians. The single most important factor in the Indian occupation was undoubtedly the abundance of pine nuts from Pinus monophylla trees which are abundant throughout the Benton Range. Steward comments that pine nuts were the most important Paiute plant food, and

that individuals gathered from 30 to 40 bushels of seeds in the fall (op. cit., p. 241). Since most of the Benton Range experiences snowfall and cold temperature in the winter, it seems logical to suppose that the occupation of the region was concentrated in the summer and fall seasons.

Sites of the Benton Range are larger and more abundant in surface remains than those of the Chidago Canyon region. Only a few of the Benton sites have any depth of deposit, however, and these are small settlements along stream banks. None of them appeared to have more than 30 inches of midden deposit; most were very much more shallow. A single petroglyph location was recorded, at Watterson Meadow. Bedrock metates and mortars were relatively abundant.

One of the most interesting locations in the Benton Range is an extensive obsidian quarry which probably supplied people throughout eastern Mono County. The extensive volcanic activity which is everywhere apparent in Mono County has resulted in considerable quantities of small surface nodules of obsidian, so that occasional natural fragments are found throughout the region surveyed. Larger concentrations, including rather extensive veins of obsidian (both red and black) are found as outcrops in various localities, the most important being Glass Mountain, a peak which rises to more than 11,000 feet about 10 miles north of the Benton Area. Although obsidian outcrops and float chunks occur over most of this large mountain, the Indians apparently utilized obsidian from the lower levels where it was easily obtainable. Small quarry locations are moderately abundant, but only one large quarry site was recorded. The latter was at the east end of Black Mountain, a rise which forms part of the eastern foothills of Glass Mountain. The quarry location extends for approximately half a mile along the base of the ridge, and the entire region is marked by a litter of large obsidian flakes, chips, nodules, and similar debris resulting from Indian activity. The obsidian of the site area occurs as black float nodules a few inches in diameter, which occur in the sandy soil of the mountain slopes. The nodules are of a convenient size for chipping into artifacts, and a number of obsidian blanks were found on the surface (see pl. 4, 22-26). The nodules are sufficiently abundant at the surface so that it is not necessary to dig for them. Some evidences of occupation at the quarry site were present in the form of grinding implements, bedrock metates, and bedrock mortars which occurred on several boulders at the quarry.

The abundance of natural obsidian in Mono County makes this one of the most diagnostic features of site location -- site areas are most quickly discerned by the obsidian chipping waste which litters the surface. The amount of such wastage was heaviest in the vicinity of Black Mountain, but no area surveyed appeared to be particularly restricted in obsidian use.

Area III -- Crooked Meadow (see pl. 2C). A small area of about 5 square miles was surveyed at Crooked Meadow, near the summit of the mountains south of Mono Lake and southeast of the Mono Craters. The elevation of this region is a little over 9000 feet. There are flowing springs

all year around, and the vegetation consists primarily of grass, Jeffrey pine (Pinus jeffreyi) and aspen.

The high elevation of Crooked Meadow leads to low temperatures at night and snow during the winter. There are no piñon pines which could provide pine nuts, and game seems to be rather scarce at this elevation. Deer and squirrels are found here, but rabbits and game birds are much less abundant than they are at lower elevations. The Crooked Meadow region is therefore not a particularly favorable region for Indian habitation.

In spite of the relative scarcity of food resources, however, a total of 5 sites were recorded in the small area surveyed. The sites were small and scattered and represent temporary small camps. Since it is possible to pass through this region without going over the summit area of Crooked Meadow, it is assumed that the sites found were not trailside camps, but rather temporary hunting stations.

Area IV -- East Walker River (see pl. 2A). This region included the banks of the East Walker River, north of Bridgeport, plus the tributary creeks which flowed into it (Frying Pan Creek, Murphy Creek, Rock Springs Canyon). Life resources are quite similar to the Benton Range zone except that the E. Walker River area is better watered and has some additional food resources in the form of fish from the river.

Of the five areas surveyed, the E. Walker River region had the most abundant archaeological remains (9 sites per square mile) and appeared to be extremely favorable to aboriginal habitation. A total of 12 square miles was surveyed in this region, and 109 archaeological sites were recorded. Elevations of the sites ranged between 6100 and 7500 feet. Although sites on the river itself tended to be larger than those at some distance from the stream, there was no particular diminution in number of sites as the altitude increased.

As with other parts of Mono County, most of the sites in this zone are surface locations marked by abundance of obsidian chippings. The Walker River region also has a noticeable amount of red, white, and yellow chert used for artifacts, although obsidian is by far the most abundant single material. No petroglyphs were recorded in this area, and only two sites were found which had stone house rings. Bedrock grinding implements, so common elsewhere, are exceedingly rare in the E. Walker River district, perhaps because there is so much suitable stone on the surface that it is not necessary to have semi-permanent seed-grinding locations.

Area V -- N. Owens River (see pl. 2D). A short survey was made of portions of the Owens River drainage just north of Crowley Lake (the latter is a man-made lake of recent origin). The immediate vicinity of the river at this point is desert with sparse scrub and little in the way of visible food resources. Settlement of this region was undoubtedly attracted to the river itself and to the fish, water plants, and similar resources obtainable from the river. Our survey recorded 13 sites in about 3 square miles, but it should be noted that this figure applies

to settlements of the river banks. The density of settlement away from the river is no doubt considerably lower. Sites observed were extensive in area and occurred on large sand dunes near the river's edge. Average elevation is 6900 feet.

No house rings, petroglyphs, or bedrock grinding tools were noted in the Owens River zone, but since the sample is extremely limited it is possible that such features exist. It may be noted, however, that there is very little stone in the immediate region surveyed, and the alluviation which surrounds the Owens River channel would not readily suggest the presence of the stone features which occur elsewhere in Mono County.

The spot survey of the Owens River zone was made to check for possible early sites, since a recent publication indicates the possibility that very old materials may be found here (Dixon, 1953). The particular sites recorded gave no particular indications of antiquity, and although this region is certainly worth further searching, it is apparent that ancient remains are likely to be much obscured by recent alluviations and by the creation of Crowley Lake, both of which have no doubt buried everything but the more recent village locations.

Artifacts:

A total of 576 artifacts was picked up from the surface of the sites surveyed. Although no more than a few specimens were recovered from each individual site, it is felt that some idea of the dating and cultural affiliation of the remains can be derived from this collection. The great majority of the specimens is composed of obsidian projectile points of some 14 types. These, plus obsidian scrapers, blades, and drills, make up almost the entire collection. Since no excavation was done, more fancy objects (such as shell beads and the like), were not recovered. However, accounts of the local people and examination of some private collections indicate that grooved arrow-smoothers, several varieties of Olivella shell beads, and occasional historic artifacts (glass beads) are found. In passing, it should be mentioned that although there is an abundance of surface material in Mono County, many of the sites have been systematically surface collected for years by local relic collectors, and it is to be expected that most of the more striking objects have long since found their way to someone's mantelpiece or attic.

A summary description of the artifacts recovered is given below.

Pottery:

Pottery was found at two sites in the Chidago Canyon area, associated with stone house rings and bedrock metates and mortars. Sixty-six sherds were found, most of which apparently belong to a single vessel. The pottery corresponds closely to the description of Owens Valley Brown Ware (cf. Riddell, 1951). However, the reconstructible vessel

was definitely of a conical shape. The latter was a rather large container which was over a foot in diameter and some 15 inches in height when complete. The vessel thus corresponds in technique to Owens Valley Brown Ware and in form to Southern Paiute Utility Ware. It seems likely that these two pottery varieties intergrade without too sharp a distinction. The major difference seems to lie in the reduced firing characteristic of the Southern Paiute region and the oxidized firing practiced by the Indians of the Owens Valley and western areas.

The northernmost occurrence of Owens Valley Brown Ware was previously recorded by Steward (1933, p. 267) at Bayonet Camp, a location a mile south of Chidago Canyon. The specimens under discussion came from sites about a mile north of Chidago Canyon, thereby extending the line of pottery distribution a slight distance northward. Since not a single sherd was found in any other part of Mono County, however, it seems clear that Chidago Canyon can be taken as a close approximation of the northern boundary of pottery distribution in this part of the state.

Unfortunately, no projectile points or other objects were found which could give some clues as to the dating of the pottery sites. However, from excavation in sites to the south, it appears likely that the pottery dates from the immediate proto-historic period, and indeed may have been expanding in range at the coming of the whites (cf. Riddell, 1951; Meighan, 1953).

Grinding implements:

Steward reports that the Owens Valley Paiute used bedrock mortars for acorns and metates for other seeds (Steward, 1933, p. 246). Both of these grinding implements were present throughout the regions surveyed in 1953, but the functional distinction noted above seems very unlikely as a general rule. Well-used bedrock mortars with cobble pestles still in place were found in such localities as Chidago Canyon and on the shores of Black Lake -- regions many miles from the nearest possible source of acorns. Since bedrock mortars and metates generally occurred in the same places and seemed to be contemporaneous, such functional distinction as existed was more likely based on differences in grinding techniques (coarse grinding as against fine grinding, perhaps) than on the seeds used. It is doubtful, at any rate, that enough acorns filtered into eastern Mono County to account for the bedrock mortars observed.

Although portable slab metates were observed on several sites, no portable mortars were found in any part of the county. Steward reports a wooden mortar found near Benton (ibid.), and a single archaeological specimen of this sort was found to the south in the Panamint Mountains (Lathrap and Meighan, 1951, pl. 3).

The portable metates observed were natural slabs of basalt, granite and pumice bearing grinding surfaces on one side only. The amount of wear varied from barely perceptible smoothing to concavities up to 4 cm. in depth. In general, such metates were about 40 cm. in length and several centimeters thick; the smallest of them weighed in the vicinity of 30

pounds, so that they are "portable" in name only. However, smaller metates may have existed -- such objects would be likely to be collected by relic hunters whereas larger examples would discourage the collector from carrying them away.

Manos, used with the slab metates and with the more common bedrock metates, were quite variable in material but remarkably consistent in size and shape. Only nine examples were collected; this sample includes two manos of granite, one of basalt with pumice inclusions, one of indurated sandstone, one of red lava, one of vesicular basalt, and one of very soft pumice. The complete specimens ranged from 10.9 to 12.4 cm. in length and from 4.2 to 7.5 cm. in width. Thickness varied between 7.0 and 10 cm. Seven of the nine examples were used on one face only; the other two bore grinding surfaces on both faces. Stones of the correct size and a natural sub-rectangular or oval shape were selected, although the edges may be worked to improve the shape of the natural stone.

Shaped pestles, like portable mortars, were absent from all the regions surveyed. However, cobble pestles of natural, unshaped stones were frequently found in association with bedrock mortars. Such pestles were of basalt or granite and consisted of large sub-triangular stones. The pointed end was used in the bedrock mortar, but except for the grinding end no modification of the pestle was noted. The pestles ranged between about 10 and 20 pounds in weight and were for the most part too large and heavy to have been used with one hand.

Projectile points:

The major part of the surface collection consisted of projectile points. Eleven types are recognized in the 97 specimens which were complete enough to be classified (see Fig. 2; pl. 3). Although not enough points were found in any one place to give much indication of stratigraphic change within a site, there is a marked variation in size and shape of points which strongly indicates at least two periods of occupation. There appears to be a late proto-historic period characterized by small corner-notched points, and an earlier period containing larger and coarser points of several varieties.

Virtually all of the projectile points are of black obsidian; only six examples are of other materials. The latter include two points of red obsidian, one of red chert, one of white chert, and two of basalt. Counting the fragments which could not be typed, only about one per cent of the surface points are made of materials other than obsidian. This observation is of interest for two reasons: first, the overwhelming emphasis on obsidian as an artifact material represents an areal variation which is not found in the higher elevations of the Sierra Nevada, where basalt and other materials are more commonly used (cf. Heizer and Elsasser, 1953). Secondly, it has been noted that the earlier horizons of California aracheology do not use obsidian to anything like this degree (Heizer, 1949; Rogers, 1939). This suggests that the great majority of the material recovered in the 1953 survey represents relatively late sites.

Table 1. Synopsis of traits, Mono County.

++ Abundant
+ Present
R Rare
- Not found

Trait:	Area: I Chidago	II Benton	III Cr. Meadow	IV Walker R.	V Owens R.
Approximate number of sites per square mile surveyed	5.0	8	1	9	4.5
Site areas up to 100 yds. diameter	+	++	+	++	+
Site areas up to 300 yds. diameter	-	+	-	+	-
Piñon pine area	-	+	-	+	-
Stone construction of house circles and blinds	++	+	-	R	-
Petroglyphs	R	R	-	-	-
Bedrock mortars	+	+	-	R	-
Bedrock metates	+	+	-	-	-
Portable mortars	-	-	-	-	-
Portable metates	+	+	-	+	-
Pottery	+	-	-	-	-

Table 2. Distribution of chipped stone artifacts.

Type:	Total found	Length range: (cm.)	Length average (cm)	Material:	Present in areas: 1	2	3	4	5
Projectile Points --									
1	14	3.0-4.6	4.0	obsidian	+	+	-	+	+
2	11	2.3-5.2	3.9	9 obsidian, 1 red chert, 1 red obsidian	+	+	-	+	-
3	14	2.9-6.0	4.0	13 obsidian 1 red obsidian	+	+	-	+	+
4	4	3.5-5.0	3.5	obsidian	+	+	-	-	+
5	4	2.8-6.0	5.0	3 obsidian 1 basalt	-	+	-	+	-
6	23	2.7-5.0	3.2	obsidian	+	+	-	+	+
7	10	2.8-5.2	3.8	9 obsidian 1 white chert	+	+	-	+	-
8	4	2.5-4.3	3.5	obsidian	-	+	-	+	-
9	6	3.8-4.9	4.3	5 obsidian 1 basalt	+	+	+	+	+
10	6	4.2-6.0	4.0	obsidian	-	+	-	+	+
11	1	2.5	2.5	obsidian	-	-	-	+	-
Blades--									
1	28	ca. 5.0-8.0	7.0	obsidian	+	+	+	+	+
2	1	ca. 8.0	8.0	obsidian	+	-	-	-	-
3	1	ca. 8.0	8.0	obsidian	-	-	-	+	-
Drills--									
1	4	2.9-4.4	4.0	obsidian	+	-	-	+	-
2	2	3.6-4.2	4.0	obsidian	+	+	-	-	-
Round Scrapers--									
	6	3.0-5.1	3.9	5 obsidian	+	+	-	+	+
Reamers--									
	6	3.9-6.3	4.7	obsidian	-	-	-	+	-
Blanks--									
	5	7 -11.0	10.0	obsidian	-	+	-	-	-

Flake scrapers:

Amorphous flakes of obsidian which were utilized as scraping or cutting tools and thrown away after one use were exceedingly abundant. The presence of considerable quantities of chipping waste on the surface of sites would encourage the use of flakes which could serve without modification, and several such used flakes could be picked up from the surface of almost every site.

The flakes were of moderate size, averaging about 3 by 5 cm.; some were considerably larger, however, up to 4 by 7 cm. The greatest number and largest size of flake scrapers were found in the vicinity of the Black Mountain obsidian quarry, where chipping debris was most abundant.

Round scrapers:

Six round scrapers, deliberately manufactured and worked on all surfaces, were recovered. These ranged in size from 3.9 to 6.3 cm. in diameter. Their precise use is conjectural, but it may be assumed that they served a heavy-duty purpose which could not be handled by the flake scrapers mentioned above.

Blades:

Three types of blades were recovered, the most common being square-based with more or less rounding of the corners (see Fig. 2; pl. 4). This form appears to be universal in Mono County, both in time and space. All specimens found were of obsidian.

Some of the blades may conceivably have been projectile points, although their large size argues against this interpretation. The notched types were no doubt hafted, but the more common square-based form could have been used in the hand without preparing a handle.

Drills:

Two forms of drill were found. The first type is an expanded-head drill made by chipping a long projection on an otherwise unmodified flake of obsidian. The second variety is deliberately shaped and may have been hafted for use in a hand or bow-drill (see Fig. 2 and pl. 4). The latter are much thicker in cross section than the expanded-head drills, and could have served for such things as drilling tubular pipes. The expanded-head drills are too slender to have been utilized for anything but light work.

Reamers:

A somewhat problematical category of artifacts consists of curved flakes which have a pointed end retouched. They are called reamers here, although they could have served equally well for perforating skins,

scarifiers, or some other purpose. Six clear-cut examples were found, all from the Walker River area (see pl. 4, 12-15).

Blanks:

Five obsidian blanks were recovered (see pl. 4, 22-26). These were apparently intended for use in manufacture of obsidian artifacts. Three examples were found at the Black Mountain obsidian quarry, and the other two came from sites within a few miles of Black Mountain.

Miscellaneous:

A dolomite hammerstone with one end battered (7.3 by 4.3 cm.) was found at site Mno-70.

An obsidian spokeshave (6.5 by 2.0 cm.) was recovered from site Mno-247. It is likely that this artifact type is actually quite common, but such objects could be easily missed on a site which had many thousands of obsidian chips littering the surface. The example recorded is quite clear-cut in form, but many of the flake scrapers may also have been used as spokeshaves.

A cobble chopper (see pl. 4, 21) was found at site Mno-252 (10.9 by 10.6 cm.). In view of the abundance of such crude tools elsewhere, it is remarkable that only one of these should turn up in more than 300 sites surveyed.

Dating and cultural relationships:

Although it is not possible to define the cultural position of the Mono County sites in detail, some general conclusions can be derived from the materials collected. The 1953 survey serves to show the areal affiliations of Mono County quite clearly and throws some light on the dating problem.

No clear evidence of "early man" was found during the survey, and all of the sites recorded probably fall within the last two or three thousand years without much question. However, the lack of early man materials in the present survey does not rule out Mono County as a possible area for early man discoveries; on the contrary, some bits of evidence suggest that quite ancient remains may exist in this region. It is to be expected that the later sites will be much more abundant and also more prominent, and since we were not deliberately looking for early remains it is not surprising that no such site was found.

Because of drainage off the steep eastern slope of the Sierras, alluviation and wind action, and recent volcanic activity, it is likely that older cultural materials in Mono County are buried or otherwise obscured, and chance discovery will probably be the means of revealing such early man materials as exist here. In this respect, attention is

directed to a rhyolite point of Sandia type, recently reported in the Masterkey (Dixon, 1953). It is noteworthy that the 1953 survey did not recover a single specimen of this artifact material, nor a single object which typologically compares to the point described by Dixon. Although this is negative evidence only, the writer feels quite certain that Dixon's point is not from any of the later archaeological periods of Mono County. From present evidence, it seems likely that this isolated point is actually equatable in time with the Sandia specimens of New Mexico; this tantalizing suggestion points up the possibility of ancient materials occurring along the eastern slopes of the Sierra.

Areally, the Mono County material shows no particular relationship to the cultures of Central California. This is not surprising in view of the tremendous geographic barrier imposed by the Sierra. The projectile point types are about the only comparative material from Mono County; taking size into consideration, little in these point types is comparable to the Early Central California material (cf. Heizer, 1949, figs. 11-14). For later horizons, the similarity is also too vague to be indicative of a definable cultural relationship.

Relationship to Sierra sites can be more clearly seen in the projectile points from Mono County, but even between these two adjacent regions there are some differences. Of the eleven point types here defined, ten also occur in Sierran sites. However, the percentage of the various types is different, and it may be significant that my type 3 projectile point (concave-based), which is one of the commonest Mono County forms, is absent from the Sierra. Further, the Sierra projectile points are almost entirely of basalt rather than the obsidian characteristic of Mono County (Heizer & Elsasser, 1953, table 3). The high number of correspondences in projectile point types suggests some sort of cultural affinity between the two regions, but it is not possible to define the relationship with any precision. Aside from the detail differences noted, the picture is obscured by the fact that only a few points were recovered from each Mono County site. Therefore, complexes can be compared only in a general way.

Clear-cut similarities to the Mono County specimens are abundant in objects from sites of the Great Basin and southern California deserts. There is little doubt that the cultural affinities of Mono County have been in the direction of the Great Basin, from the earliest prehistoric times. This is not a surprising conclusion in view of the known ethnographic features of the area, but it is agreeable to be able to document this inference with tangible archaeological remains.

From Lovelock Cave, Nevada, come point types comparable to types 3, 6, 7, and 8 (Loud & Harrington, 1929, pl. 56). A type 3 projectile point was also recovered from the Leonard Rockshelter (Heizer, 1951, fig. 40g). The latter specimen is assigned to the Lovelock Culture, dated by C14 at about 500 B.C. to 1500 A.D.

Further to the north, a Great Basin site in Lassen County (Tommy Tucker Cave) has yielded a representative collection of the Mono County point types, including types 1, 4, 6, 9, and 10. All of these types are

believed to represent manufactures of the proto-historic Northern Paiute, and they probably have an antiquity of only a few hundred years at most (Fenenga and Riddell, 1949, fig. 58).

To the south of Mono County, other Basin sites have yielded comparative material. From a historic Paiute site in Owens Valley, Inyo County, my point types 1, 2, 5, 6, 10, and 11 have been recovered (H. Riddell, 1951, fig. 1). Projectile points from the Panamint Mountains are mostly of types 2 and 6, differing from the Mono County specimens in that the latter are practically always of obsidian whereas the former are characteristically of white or red flint (Lathrap & Meighan, 1951, p. 24; Meighan, 1953).

Still further south, at a distance of hundreds of miles from Mono County itself, many of the characteristic projectile points of the southern California desert areas are identical to Mono types. All of the five types of Pinto points defined by Rogers (1939, pl. 13) occur in Mono County, suggesting that the Pinto Basin complex occurs at least as far north as Mono County. However, most of the Pinto points from southern California are of dacite whereas Mono County types are nearly always obsidian. At least some of the Mono County points of "Pinto" form occur in rather recent sites; unfortunately, the sample of material from each site was so small that it is not possible to determine for sure whether the Pinto complex is actually present in Mono County. This remains as one of the more interesting problems to be solved by future research.

Rogers (op. cit., pls. 13, 20) also illustrates three projectile point types from the Mojave Desert, assigned to Amargosa Complex and comparable to Mono types 5, 6, and 9. Since all of these types also occur in proto-historic and historic Paiute sites, no conclusion on cultural affinities may be drawn at the present time.

In Table 3, the similarities in point types are tabulated for ready comparison.

Some indications of time differences may be gleaned from a statistical sorting of the point types found in the Mono County survey. However, the small size of the sample prevents any but the most crude sort of seriational comparisons, and it is not deemed advisable to attempt a definition of culture complexes at the present time.

My projectile point types 3 (large, concave-based) and 9 (large, side-notched with concave bases) appear to be earlier in time than the other point types. This is seen in the fact that types 3 and 9 were found only twice on sites which yielded the other point types, and there is also the indication of early dating given by the occurrence of these types at older sites elsewhere (cf. Table 3). Of the remaining Mono types, all except type 8 occur in very late period sites and may be presumed to represent the recent period. Type 8 points (wide, side-notched) seem to be rare elsewhere and may represent a distinctive local style of unknown antiquity.

Table 3. Comparison of point types, Mono County and adjacent regions.

Mono County type:	A	B	C	D	E	F	G	H
1	+	+	+	+	-	-	-	+
2	+	-	+	-	-	-	-	+
3	-*	-	-	+	+	+	-	-
4	-	+	-	-	-	+	-	+
5	+	-	-	-	-	-	+	+
6	+	+	+	+	-	-	+	+
7	-	-	-	-	-	-	-	+
8	-	-	-	-	-	-	-	+
9	-	+	-	+	-	+	+	+
10	+	+	-	+	-	+	-	+
11	+	-	-	-	-	-	-	+

A: Inyo-2, historic Paiute site in Owens Valley.
B: Las-1, proto-historic Paiute site in Lassen County, California.
C: Panamint Mountains, California.
D: Lovelock Cave, Nevada.
E: Leonard Rockshelter, Nevada.
F: Pinto sites, Mojave desert, California.
G: Amargosa sites, Mohave desert, California.
H: Central Sierra Nevada, California

---

*Concave-based projectile points occur here, but they are all small (less than 2.8 cm. in length) and more similar to the late types from southern California than to type 3.

Conclusions:

This report has summarized the findings resulting from a record of 300 sites in Mono County, California. It is believed that the cultural affiliations of Mono County lie with the Great Basin region and that this situation has prevailed since the earliest times. Although there are slight indications for sites of great antiquity in Mono County, nearly all of those recorded in the present survey appear to belong to proto-historic times, and there was certainly a marked increase of population in late times. There is some evidence for earlier cultures equatable with the Lovelock, Pinto Basin, and Amargosa cultures; however, the precise nature of these connections remains to be defined.

Ecologically, there is a striking correlation between the areas of greatest aboriginal population and those of greatest density of Pinus monophylla, the piñon pine which must have furnished a major food resource. The ecological zones containing pine-nut resources also appear to have a greater abundance of rabbits and similar small game. In any case, the pine-nut zones have almost twice as many sites per square mile as the other regions surveyed, and in addition the sites in the pine-nut zone tend to be considerably larger than in the other regions.

Although many questions of detail remain to be worked out by future archaeologists, the present survey has provided some general information on a portion of California which was previously unstudied. The many surveys of this sort which have been done during the last few years are rapidly blocking in the major picture of California archaeology and the general pattern of prehistory in this complex region will become increasingly clear as the "unknown" areas are investigated.

C.W. Meighan
Department of Anthropology
and Sociology
University of California
Los Angeles 24, California
(Submitted December 17, 1953)

BIBLIOGRAPHY

Bennyhoff, J.A.
1953. High Altitude Occupation in the Yosemite Park Region. In Heizer and Elsasser, 1953 (Appendix B, pp. 31, 32).

Dixon, Keith A.
1953. A "Sandia" Point from Long Valley, Mono County, California. Southwest Museum, Masterkey, vol. 27, no. 3, pp. 97-104. Los Angeles.

Fenenga, Franklin and F.A. Riddell
1949. Excavation of Tommy Tucker Cave, Lassen County, California. American Antiquity, vol. 14, no. 3, pp. 203-213. Menasha.

Heizer, Robert F.
1949. The Archaeology of Central California I: The Early Horizon. UCAR, vol. 12, no. 1. Berkeley.

Heizer, Robert F.
1951. Preliminary Report on the Leonard Rockshelter Site, Pershing Count, Nevada. American Antiquity, vol. 17, no. 2, pp. 89-97. Salt Lake City.

Heizer, R.F. and Albert B. Elsasser
1953. Some Archaeological Sites and Cultures of the Central Sierra Nevada. UCAS-R 21. Berkeley.

Ingles, Lloyd G.
1947. Mammals of California. Stanford Univ. Press. Stanford

Jepson, Willis L.
1951. A Manual of the Flowering Plants of California. University of California Press, Berkeley.

Lathrap, D.W., and C.W. Meighan
1951. An Archaeological Reconnaissance in the Panamint Mountains. UCAS-R 11, pp. 11-30. Berkeley.

Loud, L.L. and M.R. Harrington
1929. Lovelock Cave. UCPAAE, vol. 25, no. 1. Berkeley.

Meighan, Clement W.
1953. The Coville Rock Shelter, Inyo County, California. UC -AR, vol. 12, no. 5. Berkeley.

Riddell, Harry S.
1951. The Archaeology of a Paiute Village Site in Owens Valley. UCAS-R 12, pp. 14-28. Berkeley.

Rogers, Malcolm J.
1939. Early Lithic Industries of the Lower Basin of the Colorado and Adjacent Desert Areas. San Diego Museum,Papers, No. 3. San Diego.

Steward, J. H.
1933. Ethnography of the Owens Valley Paiute. UCPAAE, vol. 33, no. 3. Berkeley.

Steward, Julian H.
1938. Basin-Plateau Aboriginal Sociopolitical Groups. Bureau of American Ethnology, Bulletin 120. Washington.

Explanation of illustrations:

Map 1. Mono County, showing areas surveyed for archaeological remains.

Fig. 1. Petroglyph elements recorded in Mono County. (Site M-150 = Mno-191.)

Fig. 2. Typology of chipped implements.

Pl. 1. Chidago Canyon area and stone house circles

A. Cave site Mno-62 with stone wall sealing off most of opening.

B. Chidago Canyon area showing typical sparse desert vegetation. Site Mno-62 in upper right.

C. House circle at mouth of Chidago Canyon. Opening on east side.

D. House ring.

E. Mouth of cave (Mno-62). Note metate in lower right.

Pl. 2. Environmental zones and specimens of manos.

A. East Walker River zone, looking southwest from site on the Nevada Border.

B. Benton Ranges area, seen from site above Watterson Meadow (view south). (Note similarity in environment between photos A and B).

C. Crooked Meadow area.

D. Owens River north of Crowley Lake.

E-M. Examples of stone manos. "E" is 11.2 cm. long; others are to the same scale. "H" and "J" are used on both faces; others are used only on the surface showing.

E. Site Mno-43. Basalt mano with pumice inclusions. No. 2.

F. Site Mno-43. Granite mano. No. 3.

G. Site Mno-43. Soft pumice mano. No. 4.

H. Site Mno-56. Sandstone mano. No. 11.

J. Site Mno-193. Granite mano. No. 305.

K. Site Mno-225. Lava mano. No. 351.

L. Site Mno-114. Granite mano. No. 571.

M. Site Mno-114. Lava mano. No. 572.

Pl. 3. Projectile points. All specimens slightly reduced except nos. 33-39, which are reduced about 1/3. Catalog numbers are field designations.

1-4. Type 1.

1. Site Mno-193. No. 282.
2. Site Mno-117. No. 153.
3. Site Mno-323. No. 512.
4. Site Mno-325. No. 434.

5-8. Type 2.

5. Site Mno-59. No. 47.
6. Site Mno-161. No. 214.
7. Site Mno-322. No. 509.
8. Site Mno-191. No. 277.

9-12. Type 3.

9. Site Mno-124. No. 164.
10. Site Mno-189. No. 274.
11. Site Mno-300. No. 443.
12. Site Mno-58. No. 36.

13-14. Type 4.

13. Site Mno-63. No. 64.
14. Site Mno-353. No. 545.

15-16. Type 5.

15. Site Mno-81. No. 122.
16. Site Mno-152. No. 191.

17-25. Type 6.

17. Site Mno-99. No. 137.
18. Site Mno-170. No. 243.
19. Site Mno-59. No. 43.
20. Site Mno-230. No. 365.
21. Site Mno-61. No. 58.
22. Site Mno-300. No. 444.
23. Site Mno-206. No. 295.
24. Site Mno-210. No. 307.
25. Site Mno-193. No. 280.

26-30. Type 7.

26. Site Mno-203. No. 292.
27. Site Mno-321. No. 504.
28. Site Mno-320. No. 497.
29. Site Mno-170. No. 245.
30. Site Mno-340. No. 514.

31-32. Type 8.

31. Site Mno-160. No. 212.
32. Site Mno-76. No. 114.

33-36. Type 9.

33. Site Mno-301. No. 445.
34. Site Mno-50. No. 9.
35. Site Mno-191. No. 278.
36. Site Mno-157. No. 198.

37-39. Type 10.

37. Site Mno-299. No. 442.
38. Site Mno-366. No. 532.
39. Site Mno-236. No. 405A.

40. Type 11.

40. Site Mno-188. No. 271.

Pl. 4. Chipped stone implements from Mono County. Catalog numbers are field designations.

1-6. Obsidian blades. Length of 2 is 7.2 cm.; others to same scale.

1-2. Blade type 1.

1. Site Mno-211. No. 313.
2. Site Mno-72. No. 113.

3. Blade type 2.

3. Site Mno-265. No. 387.

4-6. Blade type 3.

4. Site Mno-161. No. 215.
5. Site Mno-63. No. 79.
6. Site Mno-164. No. 228.

7-11. Round scrapers. No. 11 is 5.1 cm. in diameter; others to same scale. All are obsidian except no. 11 which is red and yellow flint.

7. Site Mno-330. No. 530.
8. Site Mno-57. No. 18.
9. Site Mno-58. No. 40.
10. Site Mno-301. No. 460.
11. Site Mno-325. No. 432.

Pl. 4 (Continued)

12-20. Drills and reamers. No. 20 is 4.2 cm. in length; others to same scale. All are obsidian.

12-15. Reamers

12. Site Mno-311. No. 430.
13. Site Mno-229. No. 360.
14. Site Mno-229. No. 363.
15. Site Mno-237. No. 412.

16-18. Type 1 drills (expanded head).

16. Site Mno-61. No. 57.
17. Site Mno-63. No. 71.
18. Site Mno-272. No. 403.

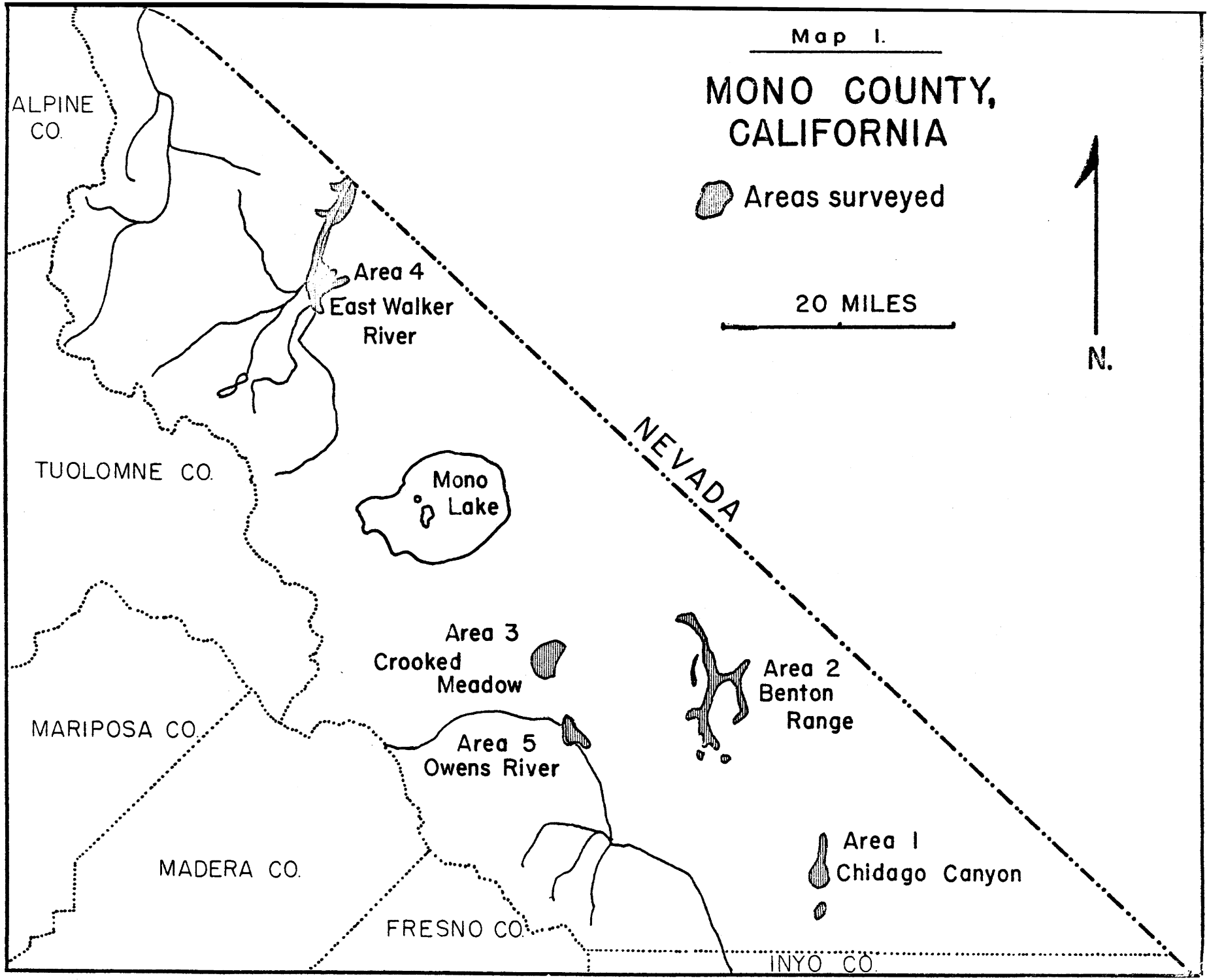
19-20. Type 2 drills (deliberately shaped hafting end).

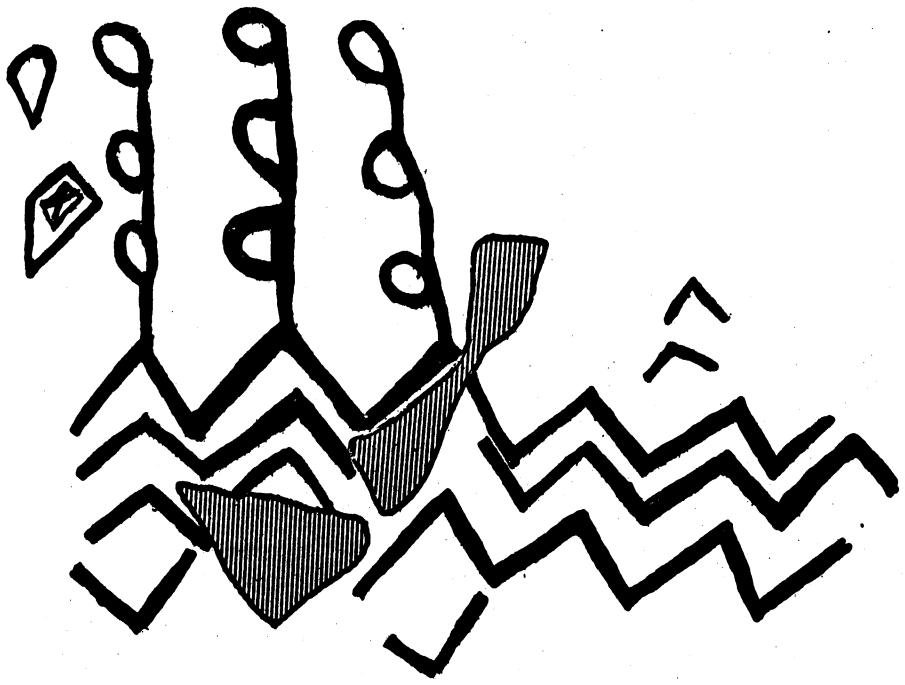
19. Site Mno-63. No. 80.
20. Site Mno-164. No. 221.

21. Cobble chopper. Length 10.9 cm. Site Mno-252. No. 380.

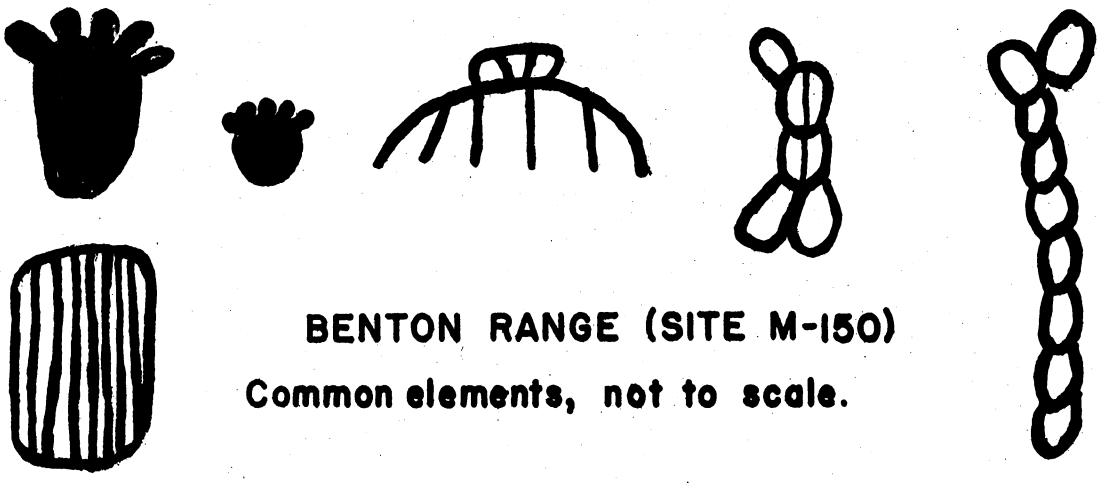
22-26. Obsidian blanks.

22. Length 13.9 cm. Site Mno-110. No. 147.
23. Site Mno-114. No. 560.
24. Site Mno-210. No. 310.
25. Site Mno-196. No. 284.
26. Site Mno-114. No. 569.


Map I.
MONO COUNTY, CALIFORNIA
Areas surveyed
20 MILES
N.
ALPINE CO.
Area 4
East Walker River
TUOLOMNE CO.
Mono Lake
NEVADA
Area 3
Crooked Meadow
Area 2
Benton Range
MARIPOSA CO.
Area 5
Owens River
Area 1
Chidago Canyon
MADERA CO.
FRESNO CO.
INYO CO.



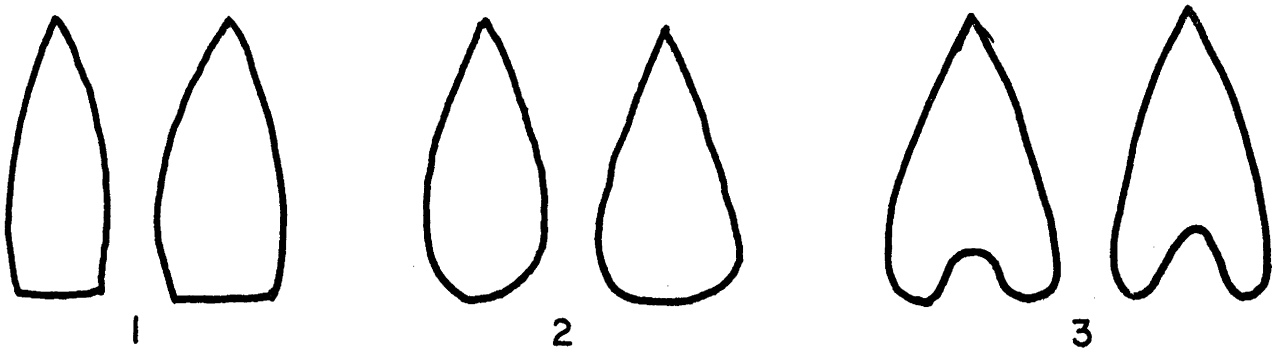
CHIDAGO CANYON (40" Tall)

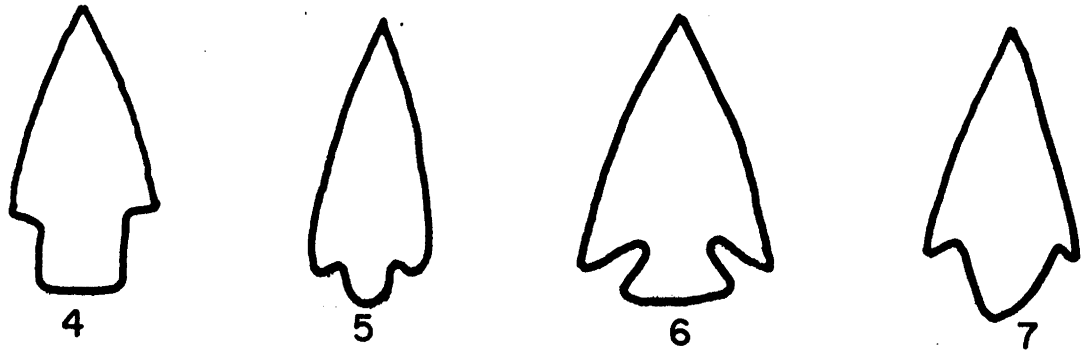


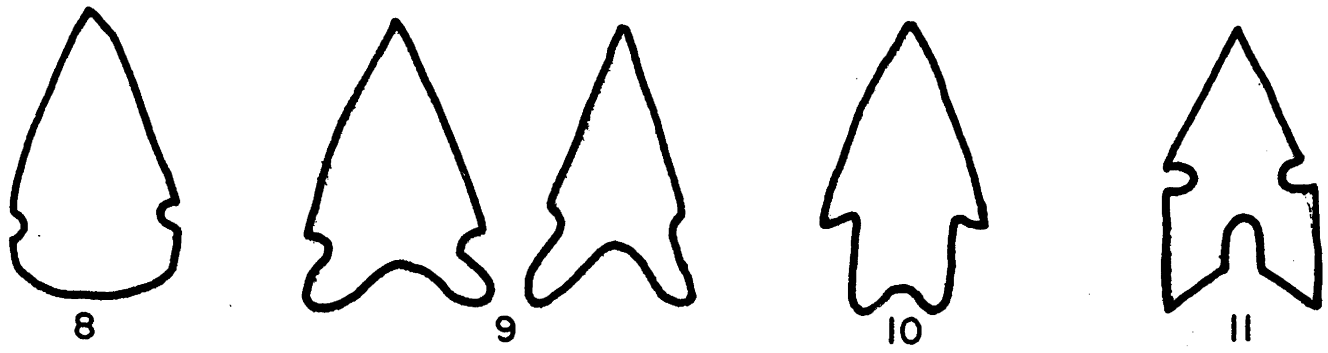
BENTON RANGE (SITE M-150)
Common elements, not to scale.

PETROGLYPH ELEMENTS

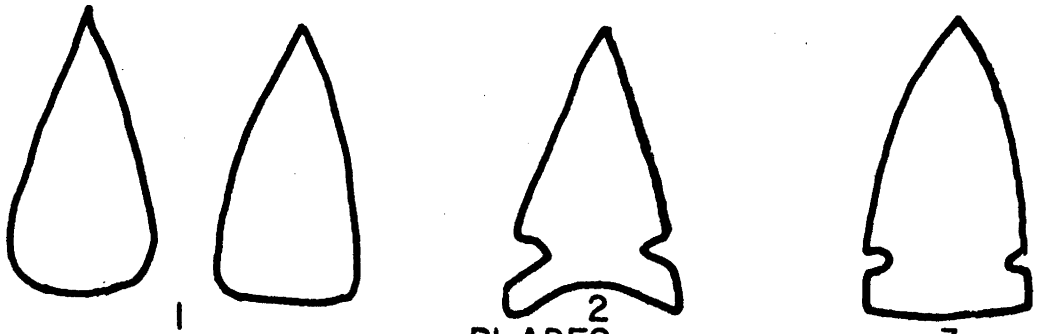
Fig. 1



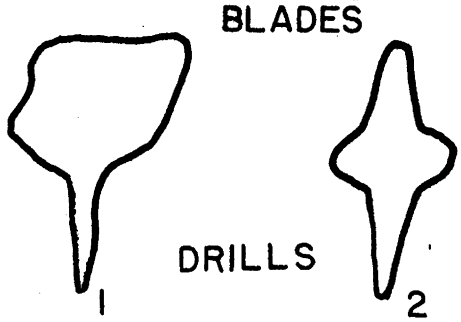




PROJECTILE POINTS



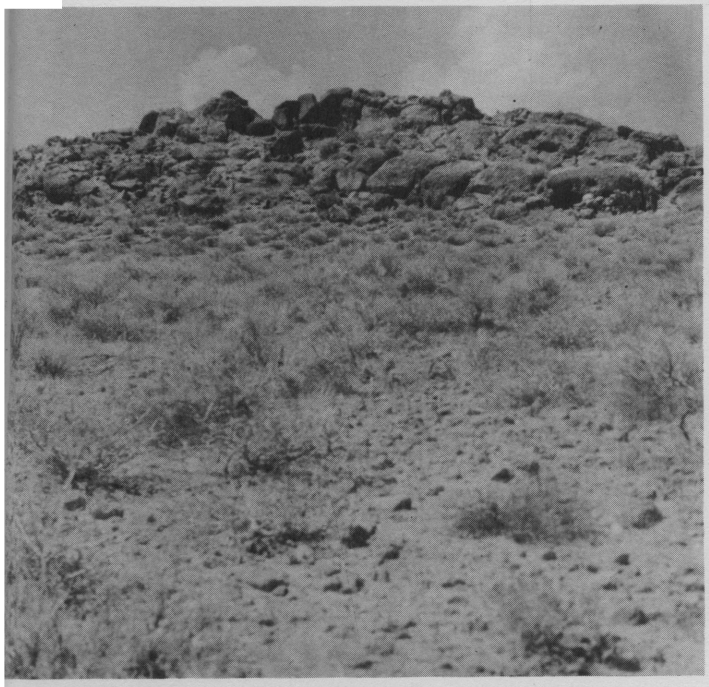
BLADES



DRILLS

Fig. 2

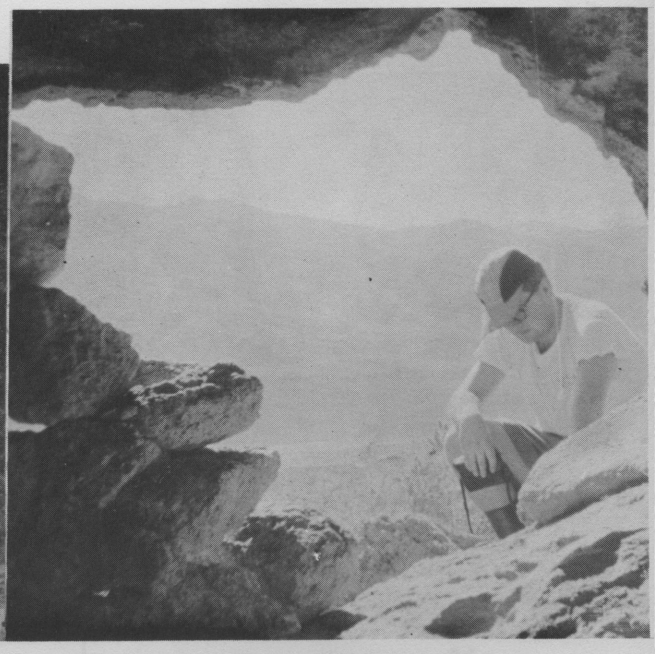
A



B

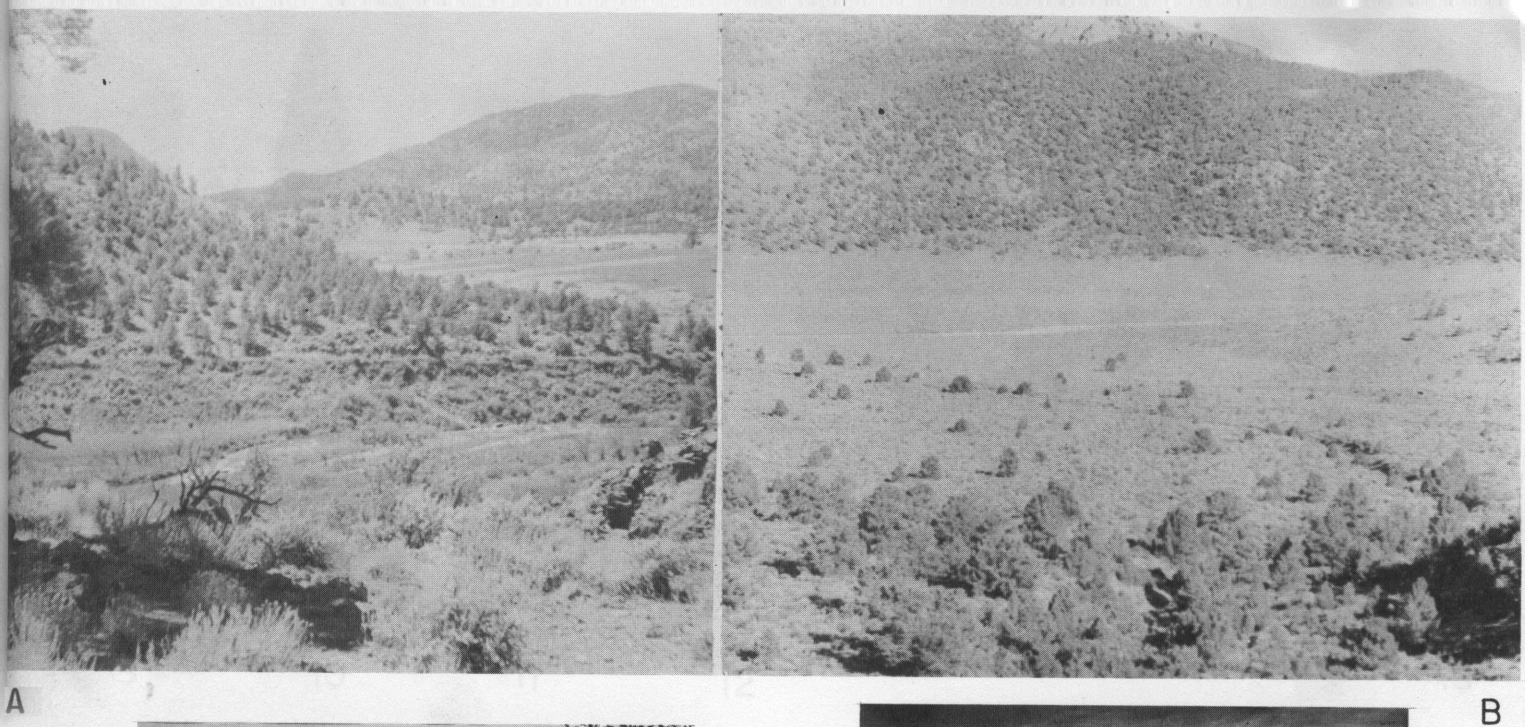
C

D



E

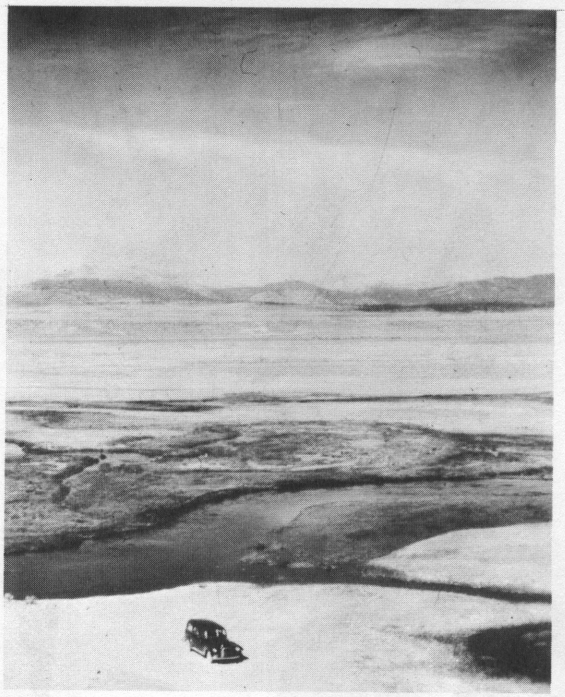
Plate I



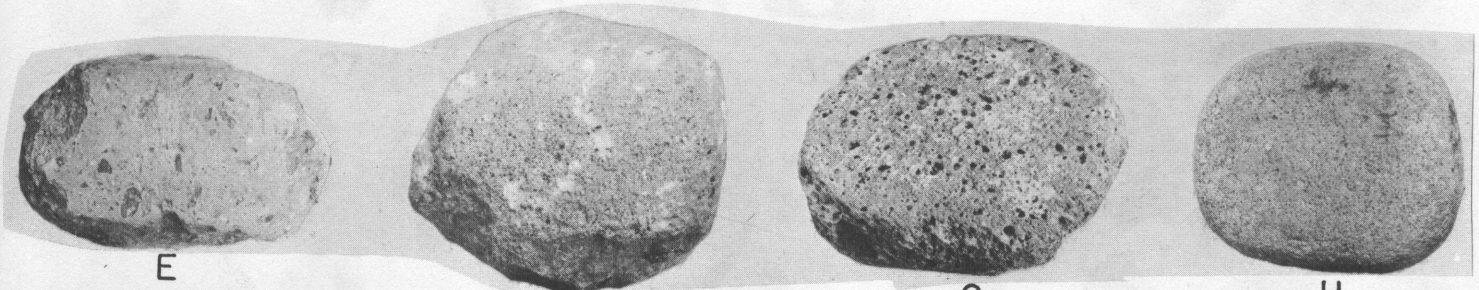
A

B

C



D

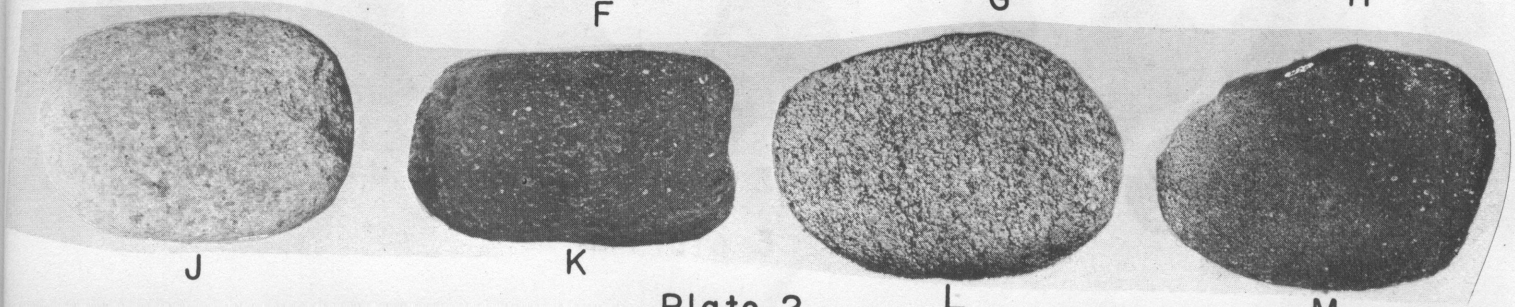


E

F

G

H



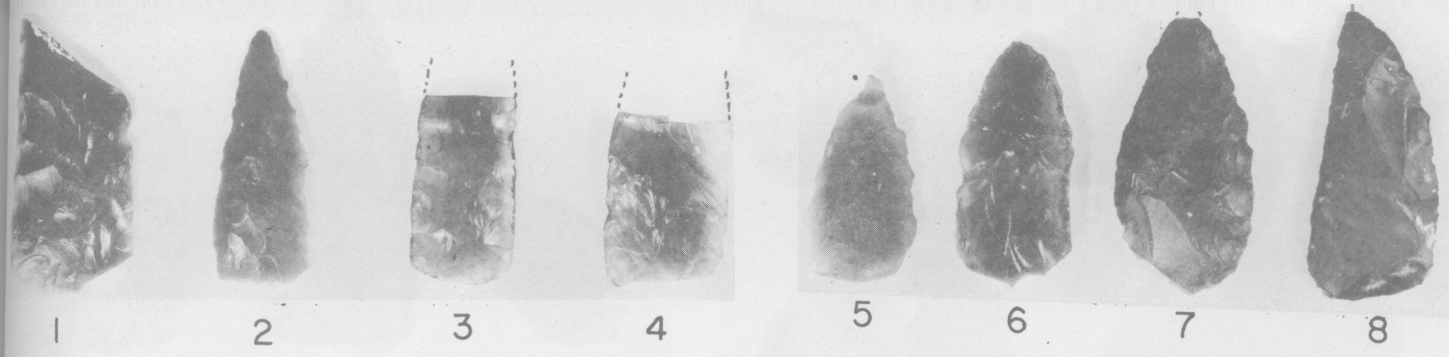
J

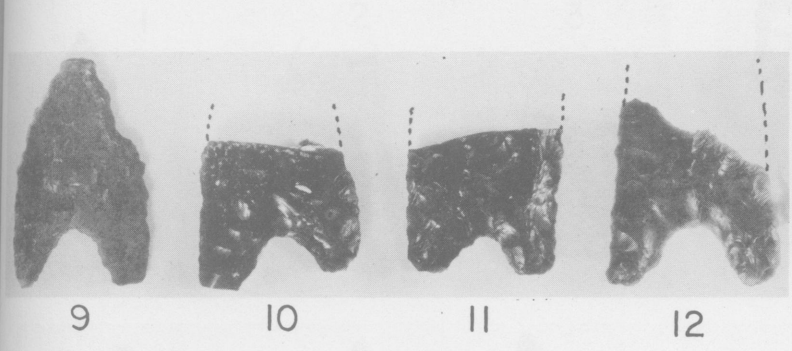
K

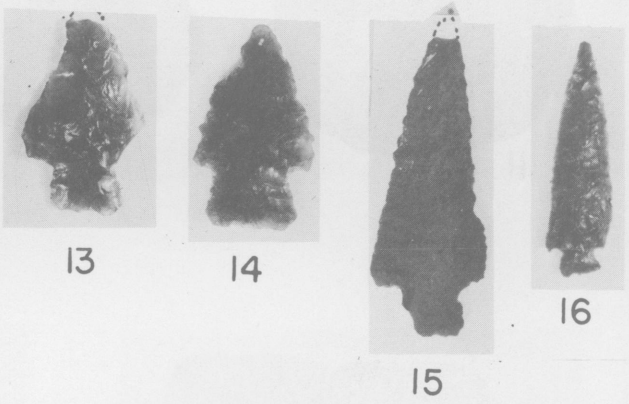
L

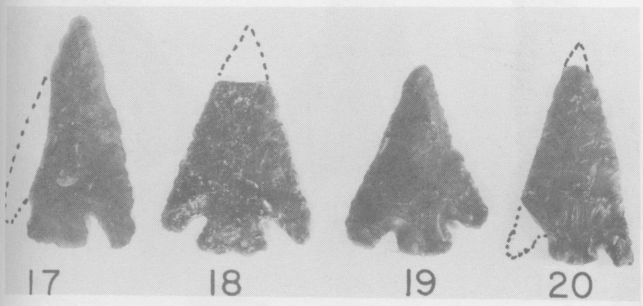
M

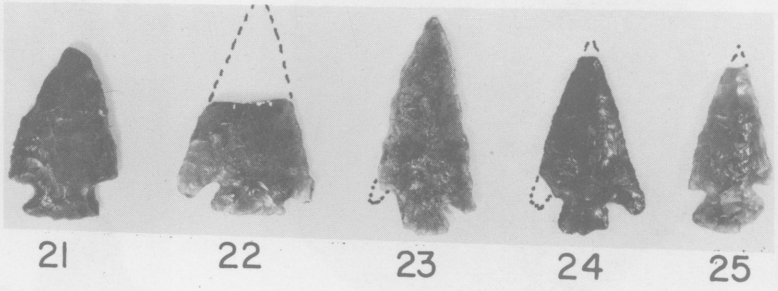
Plate 2


1
2
3
4
5
6
7
8

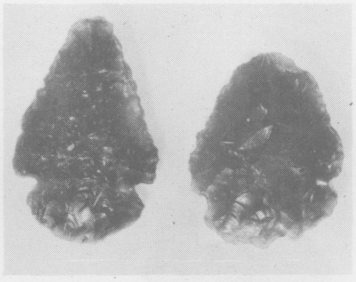

9
10
11
12

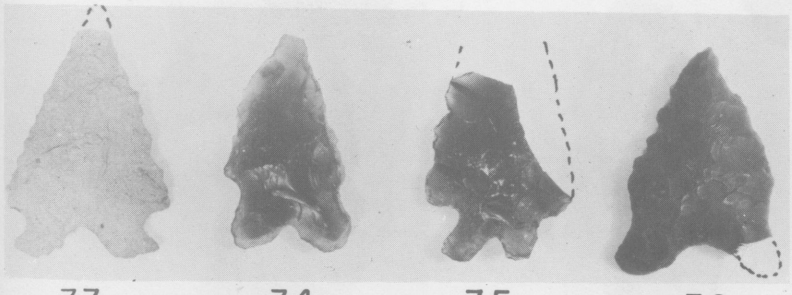

13
14
15
16


17
18
19
20


21
22
23
24
25


26
27
28
29
30


31
32


33
34
35
36

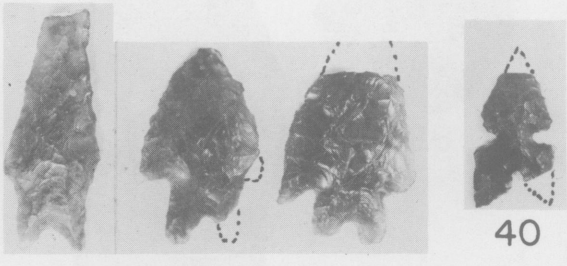
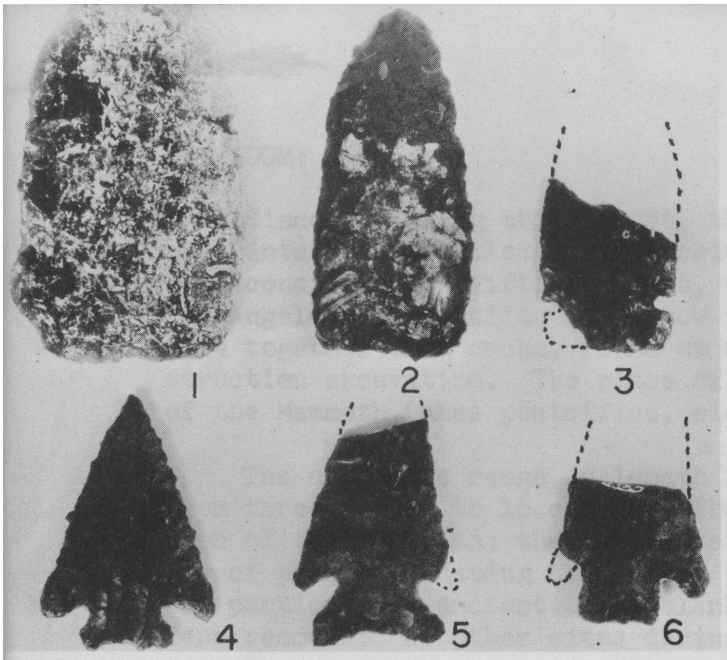
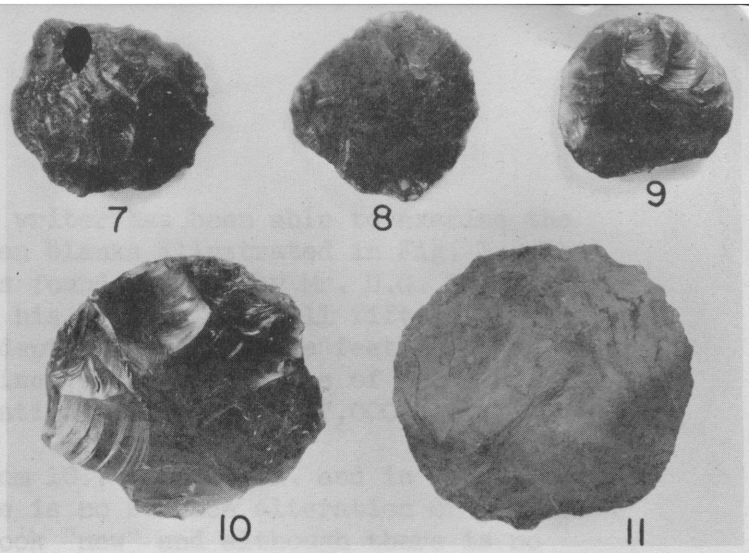
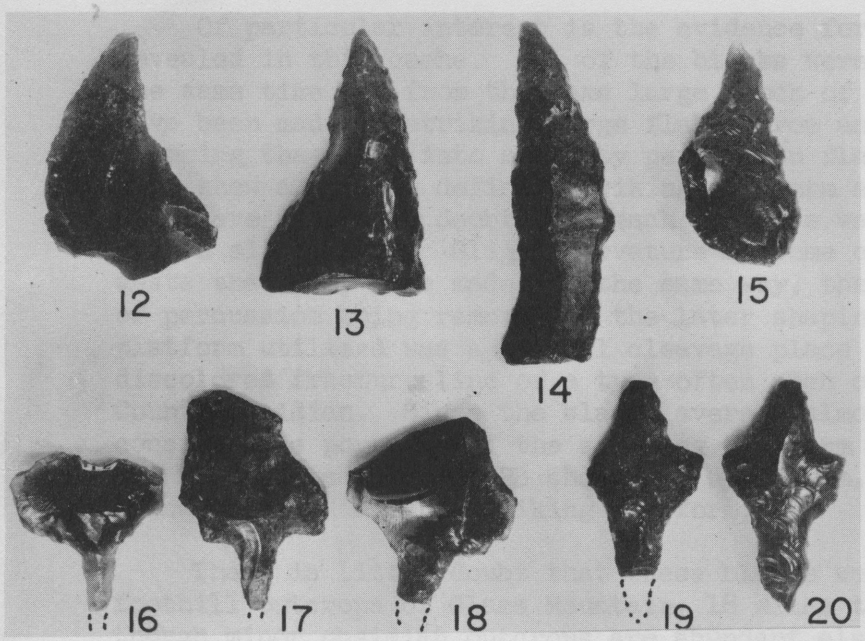
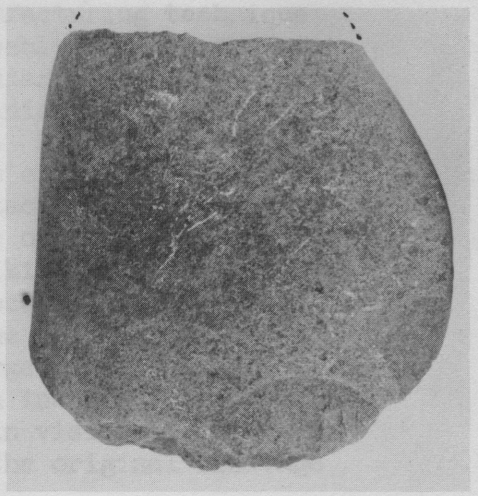

37
38
39
40

Plate 3









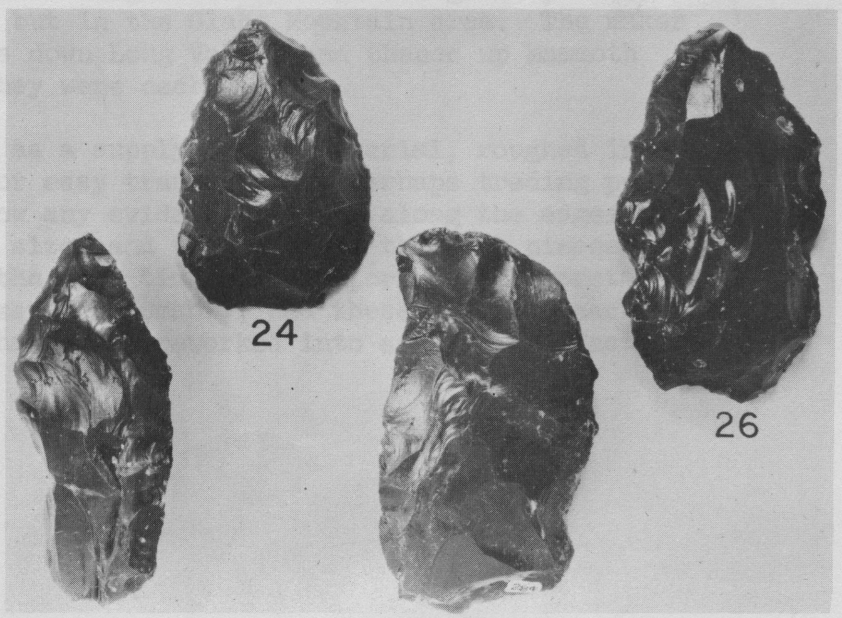


Plate 4

ADDENDUM:

Since finishing this report, the writer has been able to examine the very interesting collection of obsidian blanks illustrated in Fig. 1. This lot, consisting of fifteen blanks, was found in 1938 by Mr. U.G. Smith of Los Angeles; the artifacts are now in his possession. All fifteen blanks were together in a cache, found at a depth of about three feet in a construction excavation. The place of discovery was a couple of miles west of the Mammoth Lakes postoffice, elevation slightly over 7,000 feet.

The artifacts range in length from 10.7 to 22.0 cm. and in weight from three ounces to 16 ounces. There is no surface alteration or patination of the obsidian; the artifacts look "new" and although there is no way of precisely dating them there is no reason to believe that the objects are particularly ancient. The blanks are closely comparable to the specimens recovered at other sites during the survey (cf. p. 17).

Of particular interest is the evidence for manufacturing technique revealed in this cache. All of the blanks were probably roughed out at the same time and from the same large block of obsidian. They appear to have been made by striking large flakes from an obsidian block and then trimming the flake into shape by percussion flaking. Six of the specimens show a clearly defined striking platform at one end (see Fig. 2), and there is little doubt that each of these was detached from the matrix with a single blow. Slight curvature of some of the other specimens suggests that they were made in the same way, the striking platform and bulb of percussion being removed in the later shaping process. The striking platform utilized was a natural cleavage place in the obsidian; it is a discolored fracture line of a type often seen on large pieces of Mono County obsidian. Since the blanks average almost an inch in thickness, considerable portions of the striking platform remain visible. The specimen illustrated in Fig. 2B shows 3.5 by 1.2 cm. of the original cleavage plane utilized as the striking platform.

There is little doubt that these blanks were produced at one of the foothill outcrops of Glass Mountain, 18 miles to the northeast. Although minor obsidian outcrops are abundant elsewhere in Mono County, it is doubtful that one would find a single block large enough to produce this cache of blanks anywhere but in the Glass Mountain area. The maker probably carried the specimens down Long Valley and thence up Mammoth Creek to the location where they were cached.

The cache is interpreted as a supply of raw material, roughed into convenient sizes and shapes for easy transport and perhaps trading purposes. None of the pieces show any evidence of wear along the edges or of other use. The variety of sizes and the evidence that the pieces were made rapidly and all at the same time also support an interpretation of the specimens as blanks. Presumably, had these objects reached their destination they would have been reworked into smaller artifacts.

Explanation of illustration:

Fig. 1. Cache of 15 obsidian blanks from near Mammoth Lakes, Mono County

A. 22.0 by 9.0 by 2.1 cm.; 16 ounce weight.

B. 18 by 8 by 2.5 cm.

C. 18.5 by 8 by 2.6 cm.

D. 18.5 by 8.5 by 2.4 cm.

E. 17 by 8.0 by 2.3 cm.

F. 15.2 by 6.1 by 2.2 cm.

G. 16.5 by 6.5 by 2.1 cm.

H. 14.0 by 6.8 by 1.7 cm.

J. 13 by 7.1 by 2.3 cm.

K. 14.5 by 8 by 2.1 cm.

L. 14.3 by 7.0 by 2.2 cm.

M. 12.7 by 6.0 by 1.6 cm.

N. 13.6 by 7.3 by 2.3 cm.

P. 12.5 by 7.0 by 2.1 cm.

Q. 10.7 by 5.9 by 1.7 cm.

Fig. 2. End views of six of the above blanks, showing the striking platforms utilized in detaching the blanks from the obsidian block. Specimens are lettered according to their designation in Figure 1 above. The striking platform on "B" is 3.5 by 1.2 cm. in size.

Addendum

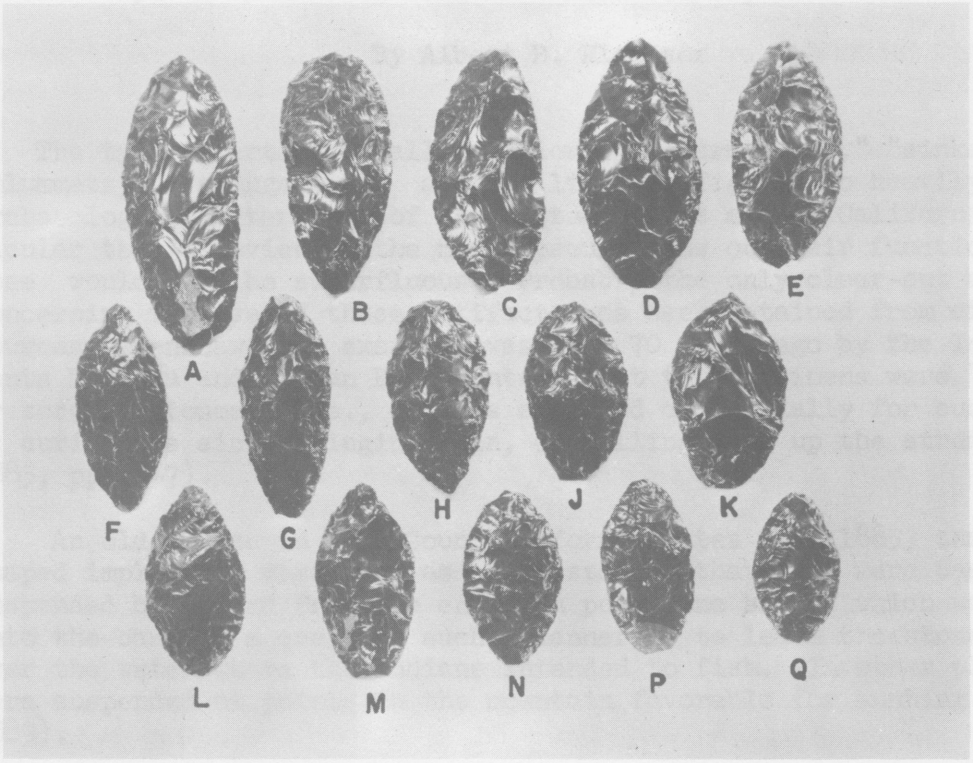


Fig. 1

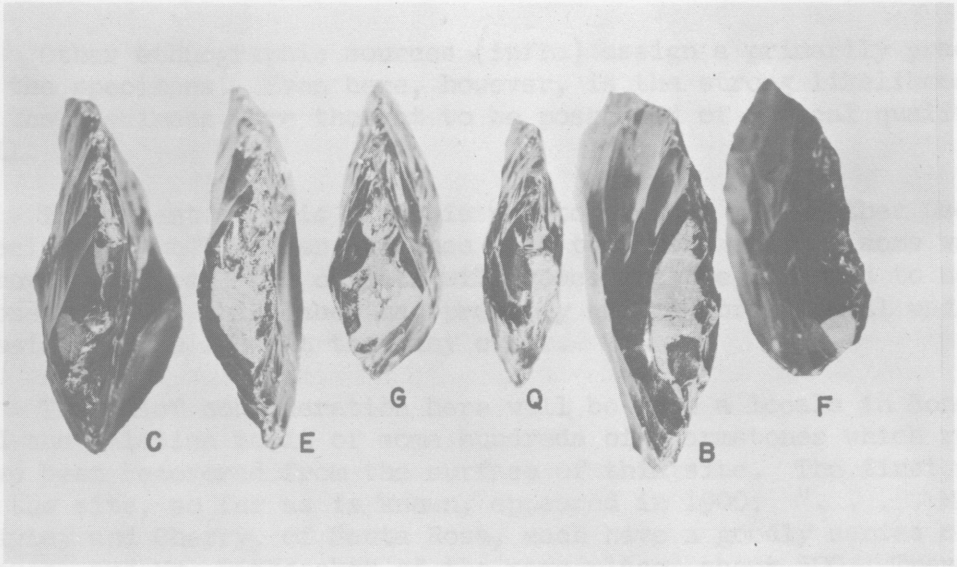


Fig. 2