THE SAN DIEGUITO COMPLEX: A REVIEW AND HYPOTHESIS

CLAUDE N. WARREN

ABSTRACT

The confusing terminology surrounding the San Dieguito complex is reviewed, and a critical evaluation of the content of this complex is undertaken. The San Dieguito complex is redefined and includes Lake Mohave, Death Valley I, and Playa I and II complexes. An age of greater than 6000 B.C. is shown for at least one component of the complex and a date of 7000 to 8000 B.C. is suggested for the complex as a whole.

The hypothesis is developed that the San Dieguito complex is distinct from the Desert culture and represents a generalized hunting tradition which moved into the area along a north-south belt in the western Great Basin.

INTRODUCTION

THE San Dieguito complex is one of the most important cultural manifestations of Early Man in western United States. It dates from earlier than 6000 years B.C., and is distinct from what is generally regarded as "Desert culture." It would seem, therefore, that knowledge of this complex is essential for a complete understanding of Early Man in western North America.

Yet despite the importance of this complex, there exist many serious misconceptions about its nature. The great controversy which surrounds the San Dieguito complex has, in too many instances, been due to the confusing terminology that has grown up around it. A further source of confusion stems from the lack of any attempt to present a synthesis of all the reports of the scholars who have been concerned with this complex. Thus, at least a portion of the problems of the San Dieguito complex has arisen as a result of these misconceptions, and it is hoped that the following paper will serve both to clarify these misconceptions and to define more fully the actual problems which now exist concerning this important complex.

TERMINOLOGY

The manner in which the San Dieguito complex was originally presented and later revised by Malcolm Rogers has been a major, continuing problem in using the reports. Revisions have only served to confuse the original issues, and errors which these reports contained have been perpetuated.

Rogers (1929, 1939, 1945, 1958) classified the San Dieguito material under four different names, some with subdivisions. Still other names have been given by other archaeologists to assemblages that are actually local expressions of the San Dieguito complex, such as Lake Mohave culture. This array of names is further complicated by changes in the sequence and disagreement regarding the absolute age of the assemblages.

Initially, Rogers (1929) recognized two distinct ancient cultures on the San Diego Coast: "Shell Midden People" and "Scraper Maker culture." At that time he felt the "Shell Midden People" to be older than the "Scraper Maker culture" (1929: 466), but later (1939, 1945) he reversed the sequence and changed the terminology. "Scraper Maker culture" became "San Dieguito" and was placed earlier than the "Shell Midden People" who in turn became known as "La Jolla."

In 1939 Rogers described three early lithic "industries" for the Lower Basin of the Colorado River and adjacent desert: Malpais, Playa I, and Playa II. The Lake Mohave culture described by Campbell and others (1937) was presumably included here in the Playa phases. Later (1958), and in Haury (1950), Rogers again revised his terminology, and Malpais, Playa I, and Playa II were called San Dieguito I, II, and III, respectively. Finally, Wallace (1962) grouped the Lake Mohave, Playa, and his Death Valley I complexes under the heading "Lake Mohave complex." These changes in terminology are shown in Tables 1 and 2.

AN EVALUATION OF THE CONTENT OF THE SAN DIEGUITO PHASES

Confusion regarding the content of the phases of the San Dieguito sequence is noted first in Haury's discussion of early remains in Ventana Cave (1950) and in recent papers by Heizer (1964) and Jennings (1964).

TABLE 1. CHANGES IN TERMINOLOGY ON THE SAN DIEGO COAST

Rogers 1929	*Rogers 1939 and 1945*
Scraper Maker Culture	San Dieguito*
Shell Midden People	La Jolla*

* The new sequence reverses these two cultures, so that La Jolla is younger than San Dieguito, not older, as it might appear above.

TABLE 2. CHANGES IN TERMINOLOGY ON THE LOWER COLORADO RIVER AND IN THE CALIFORNIA DESERTS

Rogers (1939)	*Rogers (1958, and in Haury 1950)*	*Campbell and others (1937)*	*Wallace (1962)*
Playa II	San Dieguito III		
Playa I	San Dieguito II	Lake Mohave Culture	Lake Mohave Complex
Malpais	San Dieguito I		

Haury (1950: 193) states: "Looking now to the San Dieguito material and specifically Phase I: This pattern is characterized by blades, planes, choppers, various plano-convex scrapers, and amulets." He cites pages 28–31 of Rogers' 1939 paper as reference. It is thus assumed that Malpais of Rogers' "old sequence" contained the traits listed above (Table 2). Examination of the reference cited, however, reveals that it contains a description of Playa I of the "old sequence" (San Dieguito II), not Malpais (San Dieguito I). Further, no mention of "amulets" is found in the reference cited. Amulets are, however, included in the list of traits for Playa II (San Dieguito III).

That Rogers meant Malpais of the old sequence to be equated with the San Dieguito I of the new sequence cannot be doubted. He states (Rogers 1958: 3):

> In 1939 the position of this basic "Malpais" industry was brought into focus as the parental horizon from which the San Dieguito-Playa complex had sprung. I knew . . . that only one complex was involved, and therefore should have dropped the term "Malpais"; also . . . the San Dieguito and Playa patterns were one and the same. The word "Playa" should never have been used to describe a geographic aspect of the San Dieguito complex, a complex originated probably by a single people. Furthermore, the establishment of three developmental phases had been accomplished, although all three were not always represented in each geographical aspect in the west.

Heizer's (1964) and Jennings' (1964) discussions of Early Man in Southern California perpetuate this error by including the lowest component of the Harris site under the heading of San Dieguito I even though knives (blades), projectile points, and crescents (amulets) were included in the tool assemblage. Rogers, who excavated the Harris site in 1938, felt that both San Dieguito II and III are represented there (personal communication 1959). In the limited excavations undertaken by Warren and True (1961), distinction between these two phases could not be made.

Heizer is further in error in his chart summarizing the terminology (1964: 122). Here he equates the La Jolla complex of the San Diego Coast with San Dieguito III. The vast differences between San Dieguito III and La Jolla make such a correlation completely meaningless. (This error may stem from an editorial error in an earlier chart of Warren and True [1961], in which a line was omitted between two columns, making it appear that this equation was made. The text of the accompanying article, however, explained the correct correlation.)

Perhaps the most critical of all questions in regard to Rogers' sequence of the San Dieguito phases is: What precisely are the distinguishing characteristics of each phase? If we limit the traits only to those listed by Rogers, we should have some basis for a critical evaluation and some idea of how Rogers arrived at his threefold division. The artifact types as described by Rogers for each phase are given in Table 3. An examination of these lists suggests that the phases are differentiated on the basis of traits added and traits discontinued through time. Traits found in San Dieguito I (Malpais) and not in the later phases of San Dieguito are: teshoa flakes, beveled flakes, cobble choppers, notched cobbles (rare), cleavers, and pulping planes. Interestingly, with the exception of notched cobbles, this list of traits can be duplicated in the Pinto and La Jolla assemblages in Southern California. The remaining artifact types listed for San Dieguito I are scraper planes, flake scrapers, biface ovates, cores, hammerstones, keeled scrapers, and spoke shaves. These types also have widespread temporal and areal distributions in Southern California. Rogers himself (1939: 6) seemed to doubt that the San Dieguito I phase is a definable cultural unit:

> Although the combination of the paucity and crudity of the flaked stone items under consideration, with the absence of food-preparation artifacts, causes one to doubt whether a definite culture-pattern is indicated, it is difficult to construe otherwise the combined evidence. Only after many years of effort to dispose of it by fitting all its manifestations into the later archaeology of the region,

TABLE 3. DISTRIBUTION OF ARTIFACT TYPES IN SAN DIEGUITO PHASES*

	San Dieguito I (Malpais)	*San Dieguito II (Playa I)*	*San Dieguito III (Playa II)*
teshoa flakes	x	–	–
beveled flakes	x	–	–
notched cobbles	x (rare)	–	–
cores	x	–	–
hammerstones	x	–	–
cleavers	x	–	–
pulping planes	x	–	–
side scrapers	x	–	x
biface ovates	x	?	?
cobble choppers	x	–	–
flake scrapers	x	x	?
spoke shaves	x	–	x
keeled scrapers	x	x	–
scraper planes	x	x	x
angular choppers	–	x (rare)	x
plano-convex knives	–	x	?
double-convex knives	–	x	x
tabular scrapers	–	–	x
rectangular scrapers	–	–	x
beaked scrapers	–	–	x
side and end scrapers	–	–	x
biface ovate scrapers	–	–	x
borers	–	–	x
reamers	–	–	x
small knives	–	–	x
slender blades	–	–	x
stemmed blades	–	–	x
amulets	–	–	x

*Compiled from Rogers 1939, 1958.

without avail, has the writer come to the conclusion that it must in part constitute an earlier phase of the first well-established lithic horizon. . .

In addition to the stone artifacts, Rogers includes house sites (circular boulder structures) and "large gravel outlined figures" in the San Dieguito I (Malpais) phase. In discussing the Malpais data, Rogers states:

> Although the evidence seems to establish clearly the priority of the cultural material designated Malpais to that of Yuman, and perhaps to certain intermediate industries, *it is not so clear that part of it may not be quarry waste of the intermediate industries.* The bringing together of its various manifestations: e.g., house-site, ceremonials, and implements to form an entity is largely based on inductive reasoning. As a basis for priority: patination, oxidation, typology, nonassociation with known later cultural material, and location implying a climatic condition not known to have existed during Yuman occupancy, have been used (1939: 21; emphasis added). . . .
>
> Even though our present knowledge is not adequate, it seems worthwhile to attempt a correlation of the data, with the idea of providing a working hypothesis. *The writer suspects that because the elements of the Malpais phenomenon do not have geographic cohesion and are in the main discontinuous, that they are not of a common cultural origin* (1939: 70; emphasis added).

Later, Rogers presents a somewhat different conception of these cultural manifestations. Concerning the easternmost extension of San Dieguito I (Malpais) phase, he states (Rogers 1958: 8):

> First, we are dealing with a cohesive pattern which is unique because of its simplicity, age and great territorial distribution. There is, however, nothing unique about the elements in themselves, as they have a time continuum extending into historic times. After its inception and duration the SD-I pattern never appears again as an entity without some additions or deletions. The functional nature of the individual artifact persists through time and its identity in succeeding cultural horizons is marked off principally through refinements and degree of oxidation.

Even in this later work Rogers recognizes the lack of a well-defined "stylistic" pattern in the artifacts. Regarding the variability within his classes of tools he writes: "This lack of conformity within a class is a typical San Dieguito trait in the first phase. Convention is not present and individualism is rampant" (Rogers 1958: 9). In discussing the Arizona material Rogers (1958: 2) notes that the terrace deposits

> . . . were worked by three different peoples, separated in time. The important point is that the first peoples were residents of the terraces and the others were not. . . . The setting apart of the San Dieguito . . . elements from the mélange was accomplished by measuring the degree of chemical alteration exhibited on the facets of two identical artifacts fashioned from the same lithic material.

Malpais (San Dieguito I) is thus defined by a series of artifacts which show little stylistic patterning, have wide temporal and areal distribution, are from widely scattered sites which were often occupied or utilized by peoples of other cultures, and which are temporally placed on the basis of high degree of chemical alteration on the flake scars. These criteria hardly seem sufficient for the definition of a cultural unit.

How Rogers arrived at the chronological placement of San Dieguito I relative to San Dieguito II and III is even more mystifying, although implications are made in his discussion of the later phases. He states rather concisely (Rogers 1939: 28):

> Falling in time as it probably does between the Malpais [San Dieguito I] and Pinto-Gypsum horizons with which it is often intermixed, the Playa Industry [San Dieguito II and III], without stratigraphic evidence, can only be

presented as an entity, and as occupying this position in time, *on the basis of the following data:* first, its geographic and topographic occurrence is in the main differently zoned than are the other industries; secondly, its physiographic position when viewed in the aggregate demands the existence of a climate of slightly greater humidity than that called for by the Pinto-Gypsum zoning but less than that for the Malpais zoning and lastly, the cultural items when made of certain materials employed in all three industries exhibit an alteration of an intermediate degree (emphasis added).

Unfortunately, Rogers has failed, in this instance, to distinguish between data and interpretation. His *interpretations* regarding relationships between "physiographic position" of sites and paleoclimate are to be accepted or rejected at face value. The necessary *data* for evaluating them are not presented. If we disregard these interpretations, the only basis that is left for chronological placement of the San Dieguito I phase is the relative chemical alteration of the artifacts. Given the many variables involved in chemical alteration of stone, this is not a sufficient base. This is especially true when the geographical distribution of San Dieguito I is compared to that of San Dieguito II and III. Rogers' 1939 distributional map shows that these cultural manifestations are found together only in the region of the Mohave Desert and in three relatively small, isolated areas near the Colorado River. In addition to this, the sites are found in different local environmental situations. The Malpais (San Dieguito I) "without exception is confined to rocky terraces and mesalands" (Rogers 1939: 6) while 9 of the 13 campsites of the Playa industry (San Dieguito II and III) are found on terraces of extinct lakes and margins of drainage channels which may have perennial water-holes in their bed; the remaining 4 are near lake beds, streams, or water-holes (Rogers 1939: 27). Differing local conditions for the several sites within each phase, and differences in geographical distribution of Malpais (San Dieguito I) and Playa (San Dieguito II and III) sites make the use of chemical alteration of artifacts unreliable as a criterion for relative dating.

Finally, it has been noted that some of the Malpais artifacts are more similar to the Pinto and La Jolla assemblages of California than to San Dieguito II and III. Rogers (1958: 10) made a parallel statement about San Dieguito I (Malpais) artifacts of Arizona:

> The SD-I pattern (Eastern Aspect) and the Sulphur Spring Phase of the Cochise complex are identical except for the pigment grinding slab (Sayles' milling stone) and mano in the latter.

The similarity of Cochise to the Pinto and La Jolla complexes has been noted elsewhere (Wallace 1954; Warren, True, and Eudey 1961: 24). The Malpais materials may thus be interpreted in a number of ways at the present time. They may represent local, specialized, economic activities of the Cochise, Pinto, and La Jolla complexes, and as such need not include the milling stone or mano. They may also represent a transitional development from the San Dieguito complex and the later manifestations of the Desert culture; or they may indeed represent the ancestral form of the San Dieguito complex. Any interpretation at this time is highly speculative and further investigations are required before this problem can be solved. What does seem clear, however, is that there is insufficient evidence to support the thesis that the widespread cultural traits attributed to Malpais (San Dieguito I) represent a single cultural unit, and that a chronological placement of these cultural manifestations cannot be made with the data presented by Rogers. Malpais, therefore, should not be included in the San Dieguito complex at this time, and the designation "San Dieguito I" is thus deleted from the following discussion, while the old term "Malpais" is retained.

That the San Dieguito complex is a cultural unit has been substantiated by excavation and surveys (Campbell and others 1937; Hunt 1960; Warren and True 1961). However, the division of this complex into two developmental phases is tenuous. In making this division Rogers (1939: 32) made the following statment:

> Certain artifacts which are by no means common and are more restricted in their distribution than those previously described [San Dieguito II] are believed to belong to a later phase. This opinion is supported by several factors other than those already mentioned — such as less erosion, less patina, and the definite appearance of pressure flaking. During this phase, chalcedony and jasper together were utilized more than any other material, and obsidian appears for the first time in the prehistoric picture.

All of the criteria used by Rogers for establishing two developmental phases might as easily be explained in terms of regional differences in environment, ecology, and economy. Rogers has stated (personal communication, 1959) that both San Dieguito II and III are present in the C. W. Harris site; however, the results of his excavations at that site do not seem to support this

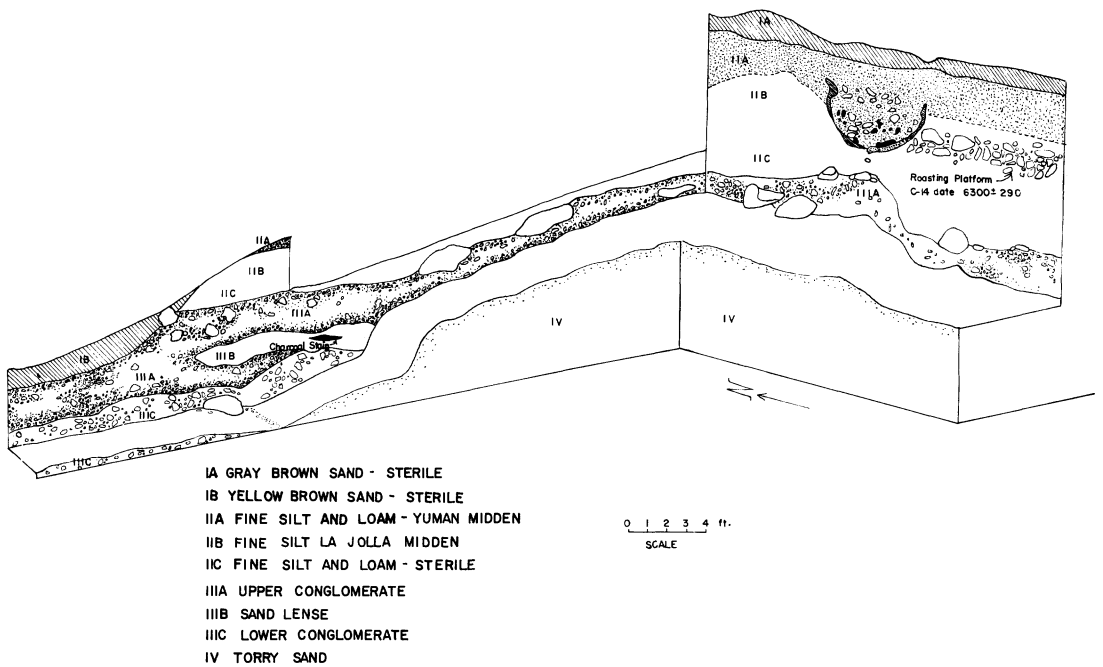

FIG. 1. Stratigraphy of C. W. Harris site from 1959 excavation (after Warren and True 1961). Strata IIIa, IIIb, and IIIc contain San Dieguito artifacts. All three are river-deposited sand and gravel.

statement (Warren 1966). The limited excavations of Warren and True did not provide an adequate sample for testing the plausibility of this division. While lack of evidence does not preclude the possibility of such a division, it seems more in keeping with the available data to consider San Dieguito II and III as a single unit, with the understanding that more complete data might well provide adequate evidence for the definition of developmental phases.

THE SAN DIEGUITO COMPLEX

A sound definition of the San Dieguito complex probably involves problems of regional and temporal differences as well as possible mixing of traits of other complexes with the San Dieguito material in the surface sites of the desert areas. The most valid approach is made by defining the San Dieguito artifact assemblage on the basis of the excavations of the C. W. Harris site (Warren and True 1961). Here the artifacts from a single geological unit clearly form a single cultural unit. Though the artifact types are few in number and range in comparison to those described for the desert areas, they can be considered as a unit for comparative purposes. Where other items are often or consistently associated with this basic unit, they can be tentatively added to the San Dieguito artifact assemblage.

The C. W. Harris site is located on the San Dieguito River in San Diego County, California, at the base of the western slope of the Coastal Range (Fig. 7). The site is enclosed in the flood plain which rises gently to the southeast and is dissected at intervals by small tributary washes. The downstream edge of the site is marked by an igneous dike extending into the river channel, forming a natural dam. This dike not only acts to trap sediment but tends to force subterranean water to the surface at this point. It was probably a significant factor in selection of the site for prehistoric habitation. The stratigraphy of the site is summarized in Fig. 1.

The San Dieguito component is a gravel conglomerate whose surface is 7 ft. below the flood plain surface. The stratum consists of heavy gravel and sand fill, laid down by a braided stream in an old channel cut into the Torrey sandstone. The chipped stone artifacts and flaking detritus recovered from throughout the gravel show absolutely no indication of having been rolled; some of the artifacts were found

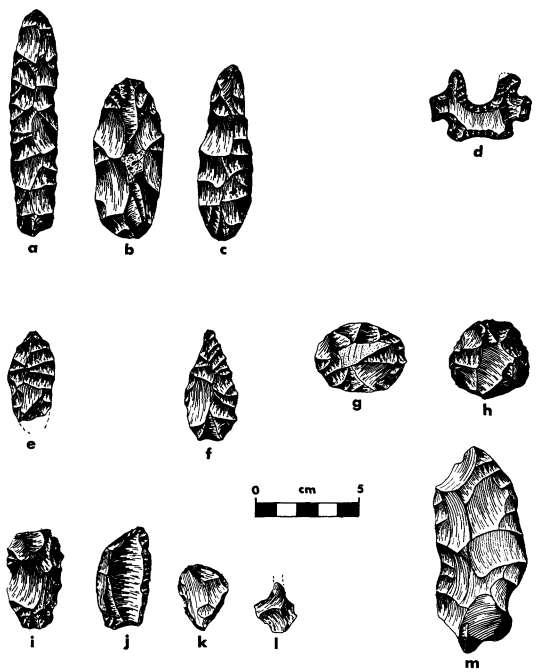

FIG. 2. San Dieguito Artifacts from the C. W. Harris site (after Warren and True 1961). *a–c*, leaf-shaped knives; *d*, crescent (amulet); *e*, Lake Mohave point; *f*, leaf-shaped point; *g*, ovoid scraper; *h*, large domed scraper; *i*, keeled side and end scraper; *j*, rectangular end scraper; *k*, triangular end scraper; *l*, engraving tool; *m*, knife blank.

with the long axis at a right angle to the flow of water. A charcoal-stained lens, presumably the remnant of a hearth, was found enclosed in this stratum. The evidence thus suggests occupation of the gravel bars in the stream. This interpretation is based on archaeological and geological investigations by H. T. Ore and Claude Warren undertaken in 1965.

For an unknown length of time after the deposition of the gravels the site was apparently abandoned and the lowest portion of the overlying silts was deposited (II C). During the period of deposition of the midportion of the silts (II B), the site was occupied by La Jollan peoples. Throughout the upper portions of the silt deposit, cultural remains of Yuman occupation are found. Recent flood deposits overlie the silts and are sterile.

Artifact Assemblage

The following description of the artifacts of the San Dieguito component is abbreviated and somewhat simplified. The reader is referred to the original report on the C. W. Harris site (Warren and True 1961) for more detail.

Scrapers

The most common artifact of the San Dieguito complex is the scraper, which occurs in at least seven different forms.

1. Ovoid side scrapers (27 specimens): Made on flakes with a single unifacially-flaked convex scraping edge opposite the bulb of percussion. Outline varies from circular to long ovoid (Fig. 2 *g*).

2. Keeled side and end scrapers (10 specimens): Long ovoid to rectangular in outline, plano-convex to triangular in cross section. Unifacially or bifacially (3 specimens) worked on long edges and occasionally on ends (Fig. 2 *i*).

3. Rectangular side scrapers (2 specimens): Rectangular in outline, plano-convex in cross section. Secondary flaking occurs on one or two edges.

4. Rectangular end scrapers (9 specimens): Subrectangular in outline, roughly plano-convex in cross section. Made on long flakes with a portion of striking platform and bulb of percussion at one end. Secondary flaking occurs on end opposite bulb of percussion and often along one or both edges (Fig. 2 *j*).

5. Triangular end scraper (1 specimen): Teardrop in outline, plano-convex in cross section. Made on a thin flake by pressure flaking around periphery. Rounded end is primary scraping surface. Bulb of percussion present at pointed end (Fig. 2 *k*).

6. Large domed scraper (6 specimens): Oval in outline, plano-convex in cross section. Made on large, thick flakes and steeply percussion-flaked around the periphery to form domed back (Fig. 2 *h*).

7. Flake scrapers (29 specimens): Irregularly shaped flakes, retouched on one or more edges by pressure and/or percussion flaking.

There are also 18 scraper fragments too incomplete to classify.

Knives

(53 complete and fragmentary specimens): All roughly leaf-shaped in outline and lenticular in cross section, produced by well-controlled percussion technique. Knives appear to form a continuum between two basic forms: (a) parallel-sided with rounded ends (Fig. 2 *a*), and (b) leaf-shaped with one rounded and one pointed

end (Fig. 2 *c*). Many of the knives fall between these two forms so a clear-cut division between the two is difficult to make (Fig. 2 *b*).

Knife Blanks?

(6 specimens): Ovoid to leaf-shaped in outline, but larger and more crudely worked than any of the knives (Fig. 2 *m*). These have thick edges that often exhibit step flaking. One of these implements may be a finished artifact. It is leaf-shaped and is better made than the others.

Projectile Points

(3 specimens): Two distinct types of projectile points are recognized: (a) leaf-shaped in outline and lenticular to plano-convex in cross section (Fig. 2 *f*), and (Fig. 2 *b*) short-bladed, slightly shouldered with what appears to be a long tapering stem, lenticular in cross section (Fig. 2 *e*).

Crescent Amulet?

(1 specimen): "Convex" edge is squared with two plainly discernible corners and with "stems" projecting from the convex edge of each arm. This specimen is eccentric and more elaborate than most reported from other San Dieguito sites (Fig. 2 *d*).

Engraving Tools

(2 specimens): One is a pointed flake modified only by pressure flaking along one edge of the point. The second is made on a thin flake and has an irregular body with a flat pile which is unifacially flaked on alternate faces (Fig. 2 *l*).

Choppers

(2 specimens): One is made on an angular cobble by bifacial percussion flaking along one edge. The edge is battered and exhibits some polish. The second specimen is a large, tabular, water worn cobble battered by use on one end.

Pebble Hammerstones

(4 specimens): Oval pebbles pitted on the edges and/or ends as a result of use.

Core Hammers

(2 specimens): Nodules with flakes removed from the entire surface, which exhibit battering on one or more prominent edges.

Cores

(3 specimens): Two irregular cores and one tabular core with two striking platforms complete the artifact inventory that can be attributed to the San Dieguito complex.

Geographical Distribution of the San Dieguito Complex

Fairly detailed comparisons can be made among the San Dieguito complex and the Lake Mohave, Playa, and Death Valley collections from the California deserts. Less detailed comparisons can be made with other collections from elsewhere in the Desert West to provide a better understanding of the distribution of the San Dieguito complex. Each collection or complex is described below in terms of its geographic distribution and types of sites. Artifacts from the major collections are illustrated in Figs. 2 through 6.

Scraper Maker

This term Rogers originally used (1929) to designate the tool complex from western San Diego County, which later became known as San Dieguito. Rogers (1929: 445) recognized four loci of the San Dieguito complex in this area: three adjacent to one another on the coastal plateau north of San Diego, the fourth located east of the Coast Range, near Escondido. Each locus was described as an area of intensive occupation, with at least one large site which he termed "village." Most sites are found on mesas and ridges; they generally lack midden and are often eroded. The C. W. Harris site is a notable exception.

Playa I and II

These are the names later changed to San Dieguito II and III by Rogers. He states (Rogers 1939: 27) that:

> The main locus of the Playa Industry, based on the evidence of the camp sites, lies in the north-central part of San Bernardino County.

Two other minor loci were centered to the south, around Pinto Basin, and to the east, at Chemehuevis Wash drainage.

Nineteen sites (6 quarry and 13 campsites) are reported by Rogers (1939: 27, 74). Five of the campsites are located on terraces of extinct lakes, four are on the margins of drainage channels, of which two have perennial waterholes, and the remaining four are near a lake bed, stream, or waterhole.

Lake Mohave

Campbell and others (1937) described a large number of artifacts collected from various sites on beach lines of Pleistocene Lake Mohave. All this material lies between 937 and 946 ft. above

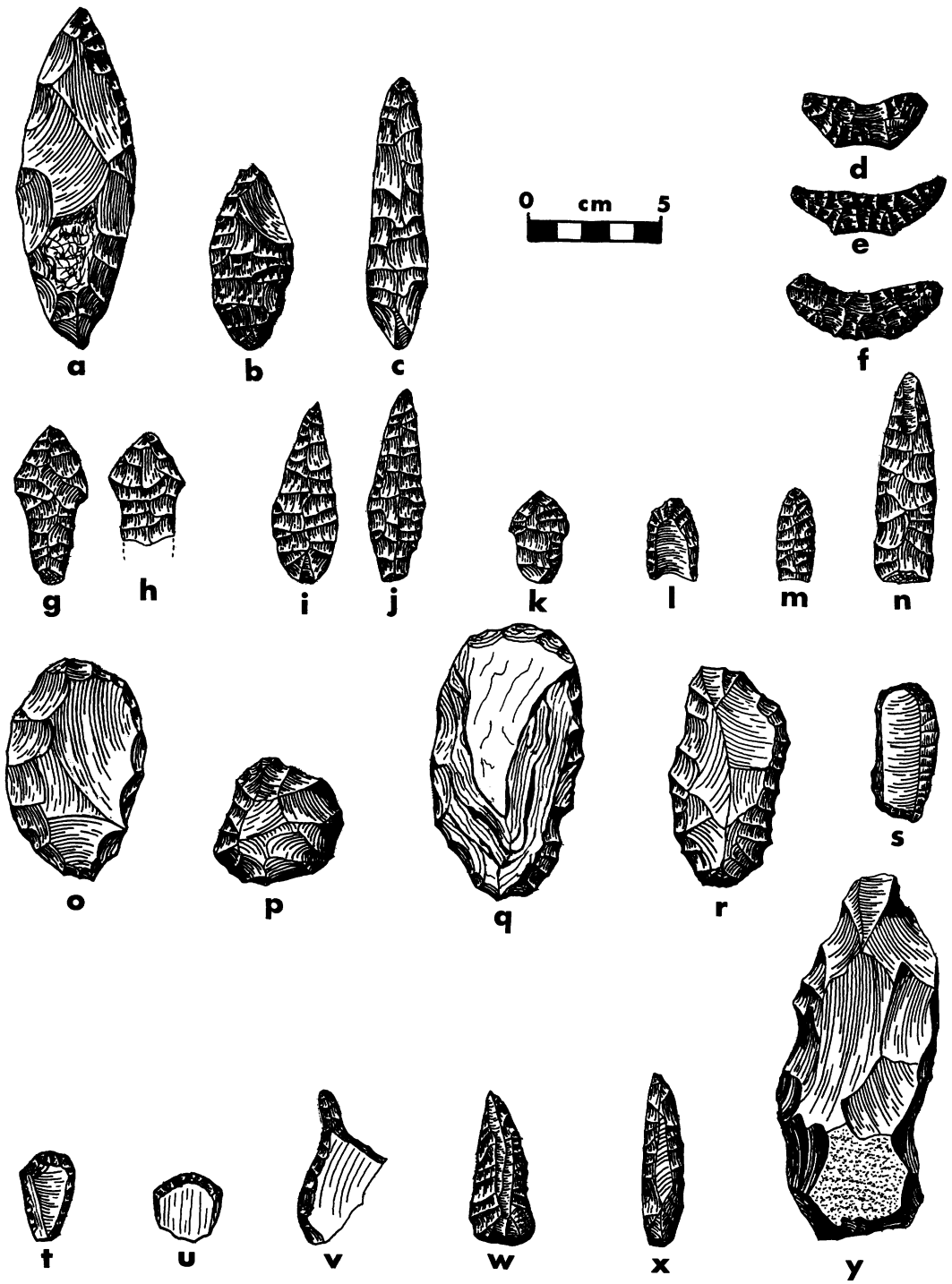

FIG. 3. Playa artifacts (after M. J. Rogers 1939). *a–c*, leaf-shaped knives; *d–f*, crescents (amulets); *g–h*, Lake Mohave points; *i–j*, leaf-shaped projectile points; *k*, Silver Lake point; *l–n*, projectile points similar to Plains types; *o*, ovoid scraper; *p*, domed scraper; *q–r*, keeled side and end scraper; *s*, rectangular end scraper; *t–u*, triangular end scraper; *v–x*, drills and engraving tools; *y*, knife blank.

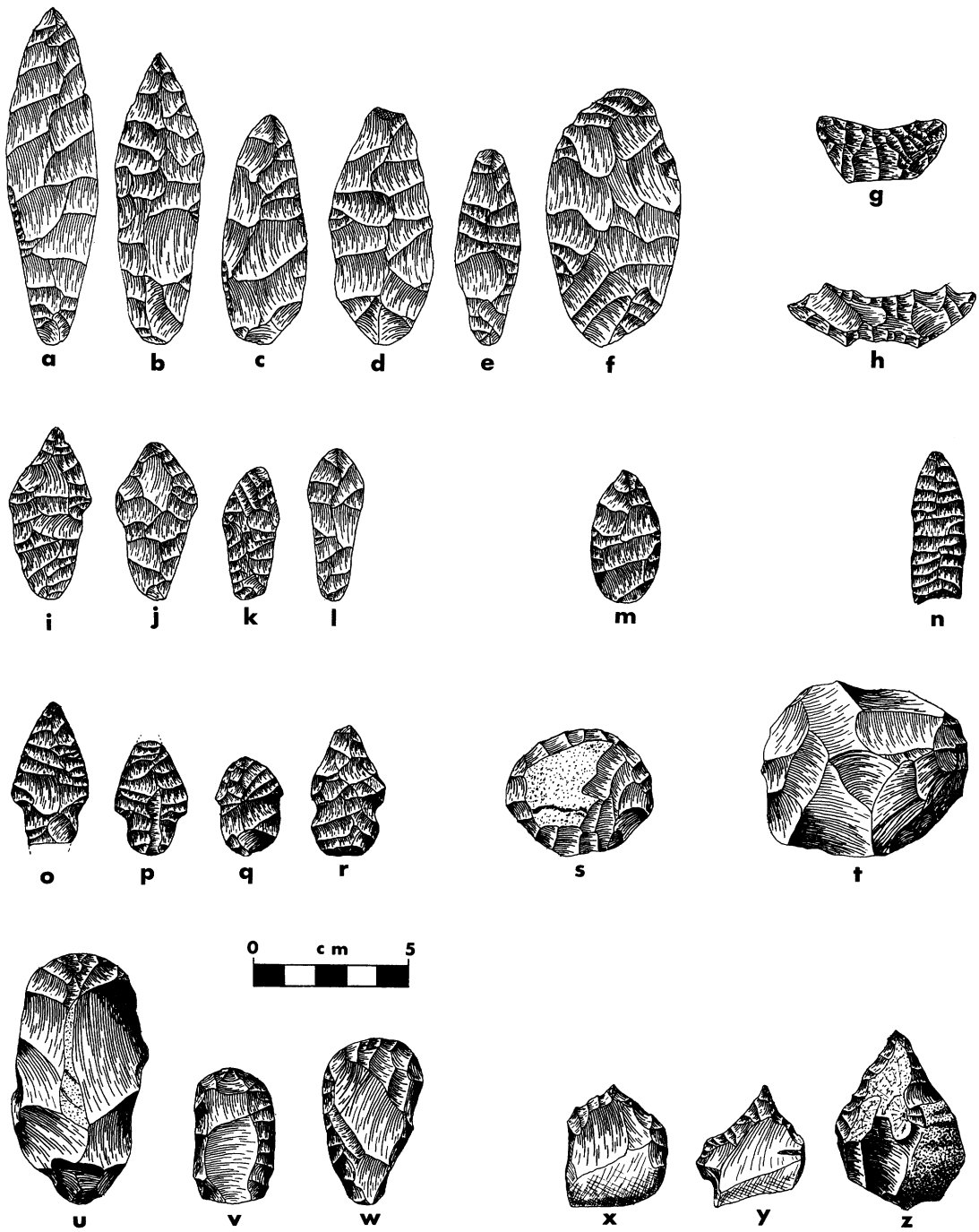

FIG. 4. Lake Mohave artifacts (after Amsden 1937). *a–f*, leaf-shaped knives; *g–h*, crescents; *i–l*, Lake Mohave points; *m*, leaf-shaped point; *n*, projectile point similar to Plains types; *o–r*, Silver Lake points; *s*, ovoid scraper; *t*, domed scraper; *u*, keeled side and end scraper; *v*, rectangular end scraper; *w*, triangular end scraper; *x–z*, engraving tools.

sea level. At present the Playa floors are 907 and 924 ft. above sea level.

Tonopah

Campbell (1949) reports a site containing Lake Mohave-like artifacts from a beach line of Tonopah Lake. No artifacts are illustrated.

Death Valley I

Hunt (1960: 20) describes the Death Valley I sites as being found "on gravel benches near springs. The artifacts left behind by ancient campers are imbedded in the desert pavement and are stained with desert varnish to the same degree as the rest of the pavement."

Panamint Basin

Sites containing San Dieguito traits have been discovered by E. L. Davis (personal communication) on beaches of a Pleistocene lake in Panamint Basin. These data are not yet published and relationships to the lake levels and other pertinent data are not yet available.

Owens Lake

Artifacts resembling those of San Dieguito are reported from an ancient beach on Owens Lake (Antevs 1952; Campbell 1949) which Antevs believes to date from the Anathermal.

Detailed discussion of the artifact types at Tonopah, Panamint, and Owens Lake is not possible at this time because the artifacts have not been adequately described. The remaining artifact assemblages share a number of types, and detailed comparisons of these assemblages have been made by Warren and True (1961). Large, leaf-shaped knives which vary in form from parallel-sided to bipointed to round-based are recorded from both the desert and the San Diego Coast. Small leaf-shaped and shouldered points are reported from all areas; however, the shouldered points appear to be more characteristic of the desert region than the San Diego Coast. Crescents are found in all localities except Death Valley. Ovoid, domed, triangular end, rectangular end scrapers made on long flakes or blades, flake scrapers, and engraving tools are reported for all localities except Panamint Basin, where our information is incomplete. Knife blanks occur in all localities except Lake Mohave. Keeled side and end scrapers occur in the Playa, Lake Mohave, Death Valley, and San Diego coastal collections. Choppers, hammerstones, and cores have the most irregular distribution, each limited to no more than two localities.

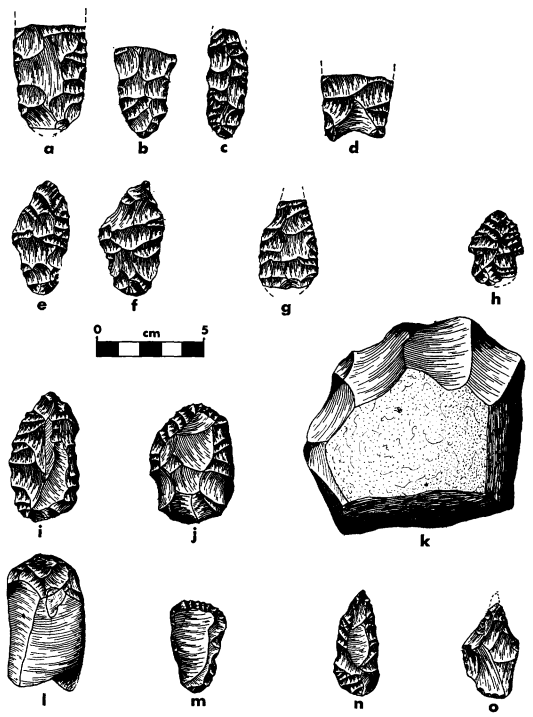

FIG. 5. Death Valley I artifacts (after Hunt 1960). *a–c*, leaf-shaped knives; *d*, projectile point similar to Plains types; *e–f*, Lake Mohave point; *g*, leaf-shaped point; *h*, Silver Lake point; *i–j*, ovoid scrapers; *k*, large domed scraper; *l*, keeled end scraper; *m*, triangular end scraper; *n–o*, engraving tools.

From the distribution of these artifacts, the San Dieguito complex, at the present time, can be defined as comprising: leaf-shaped knives of several varieties; small leaf-shaped points; stemmed and shouldered points generally termed "Lake Mohave" and "Silver Lake" points; ovoid, large domed, and rectangular end and side scrapers; engraving tools; and crescents. Knife blanks may be included but are probably limited to sites where tools were manufactured.

Some regional variation is apparent, with greater numbers of small points and engraving tools occurring in the desert region. Also, various points are reported from the Playa, Lake Mohave, and Death Valley localities that do not appear elsewhere with the San Dieguito material. These include large notched points resembling the Elko eared types, fluted points, and specimens resembling Angostura and Plainview types. Whether or not these are associated with the San Dieguito material or are "acci-

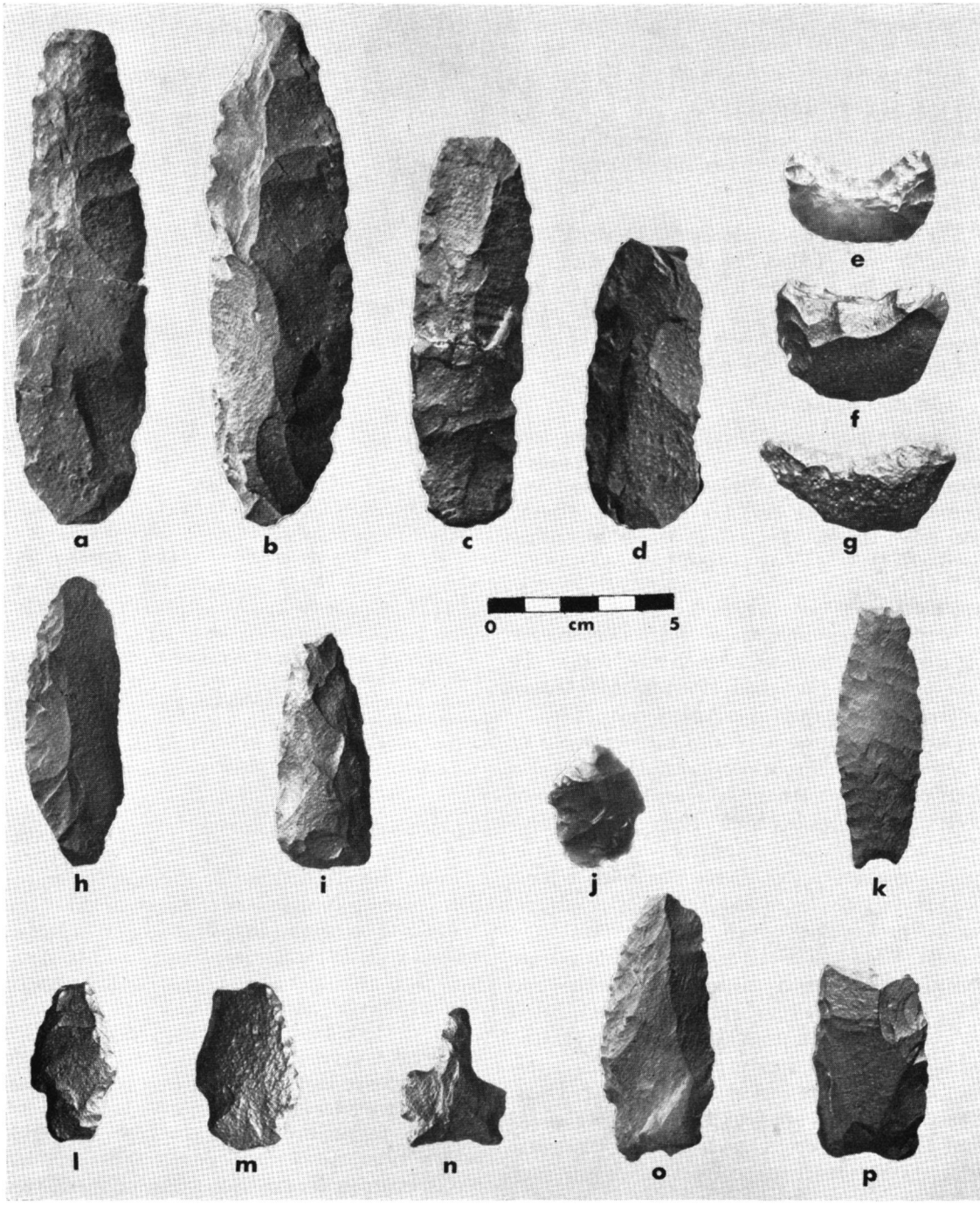

FIG. 6. Panamint Basin artifacts (E. L. Davis, personal communication). *a–d*, leaf-shaped knives; *e–g*, crescents; *h–i*, leaf-shaped points; *j*, *l–m*, Silver Lake points; *k*, point similar to Plains type; *n*, drill; *o–p*, large notched points.

dentally" mixed in the surface collections cannot now be discerned. Though there is perhaps some regional variation and evidence of contact between the desert area and the Plains, of greatest significance at this time is the relatively large number of associated artifact types found in all of the areas investigated, indicating a cultural expression quite different from the early cul-

tures of the Great Plains and the Desert culture of the Great Basin.

Dating the San Dieguito Complex

The only method of dating these tool assemblages at present is through geological relationships. These relationships consistently point to considerable antiquity although in no single case is the evidence as complete or as conclusive as is desirable. Consequently, the chronological placement of the San Dieguito complex has long been disputed. Rogers (1939, 1958) believed it dated from *ca.* 1000 to 2000 B.C., during and following the Little Pluvial. Haury (1950) would date it at about 10,000 years ago, and Antevs (1937, 1952) would place it at the end of the Pleistocene.

Two radiocarbon dates assayed on material from the C. W. Harris site have some bearing on the dating of the San Dieguito components (Hubbs, Bien, and Suess 1960: 220; 1962: 209). The first was run on shell (*Chione californiensis*) collected by M. J. Rogers in August of 1938 and submitted to the Scripps Laboratory in 1959. It was collected from a sand layer that Rogers thought marked the end of the San Dieguito occupation. The date of 2770 B.C. ± 160 years (LJ-136) for this sample is not acceptable for a number of reasons.

First, the sample was collected 21 years before it was assayed, and the conditions under which it was collected and stored have not been indicated. Second, this date falls well within the range of dates for the La Jolla complex, which shows no cultural relationship to San Dieguito. (Later investigations during 1965 and an analysis of Rogers' 1938 work [Warren 1966] has demonstrated that this is not from the San Dieguito component as described here. It derives from an "erosion island" in the center of the San Dieguito River bed that contained artifacts that appear to be neither San Dieguito nor La Jolla, and now seem to represent a previously unrecognized cultural complex.) Finally, the second date from the C. W. Harris site, run on charcoal from a feature in the La Jolla component, was 4350 B.C. ± 240 years (LJ-202). This sample was collected from a "roasting platform" during the 1959 excavations of Warren and True (1961). This platform was constructed of cobbles closely aligned, among which were scattered small bits of charcoal and carbonized seeds. The possibility of disturbance in this feature is extremely slight since the cobbles were in their original position. This date is substantiated further because it falls well within the range of carbon dates for the La Jolla complex.

This feature is separated from the San Dieguito component by 32 in. of partially cemented silts. The amount of time represented by this deposit is not known; however, on the basis of radiocarbon data, the initial date for the La Jolla complex can be set at 5500 to 6000 B.C. The San Dieguito complex, therefore, must date prior to 6000 B.C. (Samples of charcoal and carbonaceous earth were collected from within the San Dieguito component at the C. W. Harris site during the 1965 excavations at the site. These samples were assayed by the University of Arizona Geochronology Laboratory with the following results):

6540 B.C. ± 400 (A-724)
6540 B.C. ± 400 (A-725)
7080 B.C. ± 350 (A-722A)

Dating the San Dieguito remains in the desert areas is more difficult and inconclusive. The problems of dating Lake Mohave material have recently been reviewed by Warren and DeCosta (1964). In brief, the problem is twofold: (1) dating the different lake stands, and (2) illustrating the contemporaneity of the artifacts with one or more of the lake stands. The waterworn artifacts reported by Amsden (1937) from one of the beaches of Pleistocene Lake Mohave suggest that the complex was contemporary with at least one of the stands of the lake. Heizer, however, has recently questioned this interpretation (Heizer 1965). The radiocarbon dates of 7690 B.C. ± 240 (LJ-200) and 8050 B.C. ± 300 reported by Hubbs and others (1960) for *Anodonta* shell in a deposit well below the elevation of the beaches suggest that the last lake stand was no later than this date. If this is true, the artifacts may be of comparable age.

Farther north, Antevs (1952: 28) interprets the Owens Lake material as dating from the Anathermal. He states:

> The big bar (with a crest of 3675 ft.) at Dolomite near the north end must mark the overflow level during the Provo Pluvial, and since that time the channel must have filled with 90 ft. of fan debris. Beaches above 3615 ft. are firm and old looking while these at 3615 ft. and lower are soft. The former may antedate the Long Drought, and the 3615 ft. level may mark the highest stand by the lake in the last 4000 years, or since more than 7000 years ago. The Mohave artifacts occur on and just below the crest of the big bar. They must derive from the Anathermal.

Thus, while no site or locality so far investigated has yielded sufficient data for a conclusive date, the data now available suggest an age of over 8,000 years, and probably in the neighborhood of 10,000 years ago, for the early complexes.

Since there are close similarities among the artifact complexes of these sites, and they probably all date from about the same time, an early cultural pattern which we choose to call the San Dieguito complex may be identified. This complex has a known distribution from the San Diego Coast north and east into the Mohave Desert and north into Death Valley, Panamint Basin and the Owens Valley as far as Owens Lake. Other isolated pockets indicate a probable distribution along portions of the Lower Colorado River and the Colorado Desert of California, and perhaps north into the region of Mono Lake (Davis 1963, 1964).

Grosscup (1956) has reported early material from the Carson Sink that is also reminiscent of the San Dieguito complex. He groups three sites together under the heading "Fallon Phase." The most important site appears to be Hathaway Beach where (Grosscup 1956: 62):

> The artifacts occur on the surface of Pahninid II rhyolite gravel which overlies Pahninid I andesite gravel. In places the rhyolite gravel is eroded away exposing the older gravel. Artifacts are somewhat more frequent in these exposed areas, but in no case were artifacts found beneath Pahninid II rhyolite gravels. Further, no water-worn artifacts were found although a few show a slight deposit of tufa or caliche which might indicate that they had been covered by water at one time.

Grosscup (1956: 62) also estimates an Anathermal age on the basis of the known archaeological sequence in the Carson Sink area.

If the few artifacts which show slight deposits of tufa or caliche represent occupation of the site when the lake stood at about the elevation of the site, then a crude estimate of the age of the site can be made by projecting the elevation against the curve of the level of Lake Lahontan presented by Broecker and Orr (1958). The elevation of the Hathaway Beach site is *ca.* 4185 ft. (Grosscup, personal communication), a level at which Lake Lahontan stood prior to 9,000 years ago.

Grosscup (1956: 62) states that typologically the Fallon material resembles Lake Mohave and Lind Coulee, but that the closest resemblances are to specimens found near Big Springs in southeastern Oregon. Grosscup has been kind enough to provide me with photographs of the Fallon material for study, and on the basis of these I would concur in his conclusions. The Fallon phase appears to be transitional between the San Dieguito complex in the south and the early materials in the northwest as exemplified by Big Springs (Cressman 1936), Early Cougar Mountain Cave (Cowles 1959), Early period at The Dalles (Cressman 1960), and Lind Coulee (Daugherty 1956).

THE SAN DIEGUITO COMPLEX AND EARLY MAN IN THE DESERT WEST

The perception of Early Man in western North America has been changing almost continually during the past decade. Jennings and Norbeck's (1955) statement of the Desert culture placed the Great Basin cultures in what we would view as a meaningful and significant historical position with regard to the cultures of the Southwest. The concept of the Desert culture and Jennings' work at Danger Cave (1957) illustrated the long history of man's adaptation to the desert conditions of the Great Basin. In this sense, the Desert culture concept has been useful and has enhanced our understanding of the prehistory of the area. The Desert culture concept, however, has unfortunately become a "catch-all," and consequently it has, we feel, lost much of its significance.

Jennings and others (1956: 69) believe that the Desert culture and closely similar manifestations have been recognized "from Oregon to the Valley of Mexico and from the eastern foothills of the Rocky Mountains to the Pacific Coast," and while most of the remains date from between 1000 and 6000 B.C., other sites such as Fort Rock Cave, Danger Cave, and possibly Gypsum Cave all date from between 8000 and 9000 B.C. Because of this distribution and age range, the remains of prehistoric cultures which in our opinion do not appear to be adapted to a desert environment and which appear to represent different and distinct ecological adaptations have been interpreted as Desert culture manifestations. The "Lake Mohave culture" and sites from the Plateau may be cited as examples of such interpretations.

The Desert culture was conceived to be the "primary" western culture by Jennings and others (1956: 71–2), and furthermore,

> . . . if the Desert Culture actually developed from a big game hunting base, the time of divergence must be further back than previously considered since a common base has not been found in the Basin or elsewhere. Such

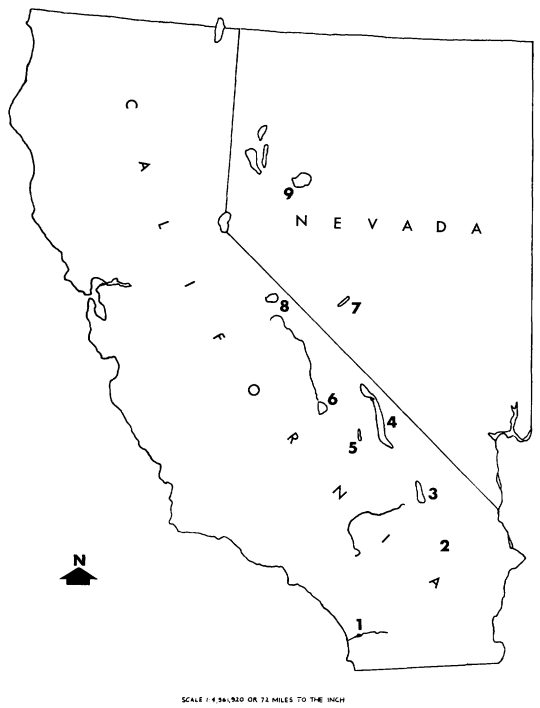

FIG. 7. Distribution of the San Dieguito Complex in California and Nevada: (1) C. W. Harris site, (2) general area of Playa concentration, (3) Lake Mohave, (4) Death Valley, (5) Panamint Basin, (6) Owens Lake, (7) Lake Tonopah, (8) Mono Lake, (9) Carson Sink.

a postulated divergence may well have taken place before human occupation of the Southwest, before human entry into the New World. . . .

There is no discussion of the origin of the Desert culture other than the above statement. We are not here interpreting the San Dieguito complex or related assemblages as the parent culture or cultures of the Desert culture, although this is a distinct possibility. What we do wish to point out is that the Desert culture represents a distinct environmental adaptation, one not suited for survival while crossing the Bering platform. Logically, the Desert culture is best understood as a development in an arid or semi-arid environment. We feel that it probably developed from a generalized hunting, fishing, gathering pattern or patterns in the western United States.

The concept of the Desert culture cannot explain all of the prehistoric manifestations in the American West. It was not originally designed to do so, and to attempt to use it in this fashion only obscures the problems of western prehistory. The Desert culture concept does not explain the origins of the early cultures of the West, nor does it direct investigations toward problems of the ecological adaptations which must in part explain the cultural variations which are found in western North America.

Daugherty has spoken of a cultural tradition in the Intermountain West, out of which the recent cultures developed, and which he identifies as the "Intermontane Western Tradition" (Daugherty 1962: 149).

This tradition is characterized by full utilization of economic resources which in local regions might to a degree emphasize food gathering, hunting, or fishing depending upon the availability of various food resources.

The early period of this tradition dates from 9000 to 6000 B.C. and comprises such artifact types as lanceolate projectile point forms, crescents, varieties of scrapers, and milling stones in the arid regions. Daugherty regards the local cultural expressions of later periods in the Plateau, Great Basin, and Southwest as regional variations of this early cultural manifestation.

This concept is appealing because it serves as an explanation of much of western prehistory, placing the Desert culture in an even broader framework in an attempt to explain its origin. However, the developmental relationships between the early period and later cultural expressions are nowhere adequately described in Daugherty's discussion. Furthermore, the relationships between the early cultural manifestations of the south, such as the San Dieguito complex, and the early remains of the Plateau are poorly understood. The differences in techniques of tool manufacture suggest cultural differences of a magnitude not considered by Daugherty. Furthermore, Daugherty's Intermontane Western tradition is such a broad, generalized concept that it does not ask specific questions and cannot be adequately tested.

We prefer to approach the prehistory of western United States in a manner similar to that of Swanson (1962), stressing the importance of identifying early cultures and their relationships to changing environments. From this base we may then postulate the early cultural base or traditions from which these early cultures originated, and perhaps we may learn something of the mechanisms by which these cultures adapted to their changing environments.

The San Dieguito complex is not an expression of the Desert culture. The mano and milling stone so characteristic of peoples adapted to

the desert environment are not present; in fact, the well-developed use of small hard seeds is in no way suggested by the San Dieguito complex. The large knives and scrapers, which form such a large percentage of the assemblage, do not appear to be especially well adapted to the hunting of small game such as rabbits and rodents. Evidence indicates that the area in which the San Dieguito complex is found was probably not a desert during the time when the San Dieguito people were there. Thus, the San Dieguito complex does not appear to satisfy the criteria for classification as a Desert culture complex.

Warren and True (1961) presented the hypothesis that the San Dieguito complex represented a regional expression of an early hunting tradition in the West. Heizer (1964) criticized this hypothesis, pointing out that the sample of artifacts from the C. W. Harris site is small and that there are no ecological data to support such a conclusion. Granted that the evidence is too scanty to provide grounds for such a conclusion, we nonetheless feel that there is sufficient evidence available to construct a hypothesis worthy of further consideration.

If the San Dieguito complex cannot be understood in terms of the Desert culture, we must look for other explanations of its cultural and historical position. Two possible explanations are immediately apparent: (1) that it derives historically from the early hunting cultures of the Plains, or (2) that it is a regional expression of a non-Desert culture western tradition.

The only traits clearly linking the San Dieguito complex with the Great Plains are a few fluted points and an occasional point reminiscent of the Plainview and Angostura types. These points are sometimes found as isolated individual specimens and sometimes in association with one another as well as other artifacts. So-called Folsom sites have been reported on Owens Lake (Antevs 1952, Campbell 1949), and at Tonopah Playa (Campbell 1949). However, the sites and the artifacts have never been adequately analyzed, and it is impossible to evaluate them at this time. What is more important is that the assemblages of the San Dieguito complex include large, leaf-shaped knives and rather crudely-made points and a series of scrapers that are typologically and technologically distinct from the material of the Great Plains. That there is an occupation in the West of an antiquity comparable to that of Folsom and Clovis assemblages is amply illustrated by the early radiocarbon dates for The Dalles (Cressman 1960), Lind Coulee (Daugherty 1956), Jaguar Cave (Sadek 1965) and Wilson Butte Cave (Gruhn 1966) in Idaho, and Danger Cave (Jennings 1957). That these early western remains are of cultural traditions distinct from the Early Hunters of the Great Plains now appears to be the best supported interpretation. No attempt is made here to explain the occurrence of Folsom, Clovis, and other early point types from the Plains that occur in the Desert West.

This interpretation leaves a whole array of problems surrounding the early cultural tradition or traditions of the West. Relationships of the San Dieguito and apparently related complexes to the paleoenvironment of the West may serve as a means of solving some of these problems and provide an understanding of the early prehistory of the area. The San Dieguito sites so far discovered have lacked the ecological data necessary for reconstructing economic patterns in any detail. It is possible, however, to construct a theory based on some general principles and a few assumptions which would serve (1) to isolate specific problems that may be tested by further archaeological research and (2) to explain the data as we now know them while anticipating that new data may require new explanations.

If there is a cultural tradition in the West that is distinct from the Desert culture and is not derived from the hunting traditions of the Plains, then there is but one alternative interpretation that can be made within the framework of accepted archaeological theory in North America. This tradition must have derived from the North and represents an older, as yet undefined, cultural stratum that is present throughout a large part of western North America. If this cultural tradition was derived from the North, it was probably adapted to forest and grassland environments, but not to the desert conditions of the Great Basin today.

One of the characteristics of the early remains throughout the West is that there appears to be a lack of a specialized economy, like that of the Great Plains. It is here assumed that by examining the economic pattern of early sites in the Plateau, we can develop a generalized picture of these economic activities. The Five Mile Rapids and the Lind Coulee sites represent two different types of sites and would serve to give a broad picture of these economic patterns.

The Five Mile Rapids site, located at a major fishing station near The Dalles, Oregon, has a radiocarbon date of 7835 B.C. ± 220 years (Y-340) and Cressman feels that the earliest occupation of the site began not less than 9050 B.C. (Cressman 1960). During the early occupation of this site large numbers of salmon were taken and small animals were a part of the food supply. Larger mammals were reportedly not much in evidence, but the Full Early stage ". . . is characterized by a rich bone and antler industry . . . ." (Cressman 1960: 59), which seems to indicate that considerable numbers of elk and deer were taken. Since the bones of these animals do not seem to be numerous in the site, it is suggested that they were hunted from camps in the hinterland, and only the desired parts of the animals were brought to the site at Five Mile Rapids. The most impressive element of the faunal remains is the great number of large birds represented. These were primarily scavengers "with strong liking for fish." Finally, the presence of edge-ground cobbles may suggest the processing of roots.

The Lind Coulee site is of interest to us here because it presents quite a different picture. Daugherty (1956: 259) characterizes the economic activities of Lind Coulee in this manner: ". . . it was evident that the primary source of food was the bison, with some dependence on small game animals and water fowl. . . ." The faunal remains listed for Lind Coulee comprise young bird (identification uncertain), egg shells, green-winged teal, large goose (?), abundant bison remains including an immature specimen, deer or antelope, pocket gopher, muskrat, fox, badger, skunk, rabbit (?), rodents, and carnivores (Enbysk 1956: 270).

The occupation level, marked by a darker color due to carbonaceous material, is enclosed in a bed 8 ft. thick. The bed consists of fine and very fine sand with faint horizontal bedding indicating deposition in sluggish water of a slow-moving stream, or an agitated pool or lake (Nering 1956: 263–4). The fact that the artifacts were enclosed in alluvial deposits of this nature clearly indicates seasonal occupation of the site. On the basis of the faunal remains, including mollusca from the Lind Coulee site and neighboring area, Enbysk (1956: 269) feels that

> . . . the environmental picture presented is that of a series of lakes or ponds with shifting connecting channels draining to the southwest into a large lake.

Two radiocarbon assays for Lind Coulee were 7450 B.C. ± 940 (C-827) and 6568 B.C. ± 460 (C-827) which were averaged at 6750 B.C. ± 400, but Daugherty now feels that this date is too young (personal communication).

These two sites, then, suggest that the earliest known occupants of the Plateau were unspecialized hunters, fishers, and gatherers, adapted to a variety of ecological zones. Other, apparently related, sites in the Plateau which either date from a period somewhat later or have not yet been dated, seem to support this conclusion (Warren, Bryan, and Tuohy 1963).

If the San Dieguito material is derived from the north, we may assume that this unspecialized pattern would be adapted to similar ecological zones in the south. There are few data upon which to reconstruct the environment of San Dieguito sites. The best information we have indicates that the desert expression of San Dieguito is associated with high stands of the Pleistocene lakes. Broecker and Orr (1958) have reconstructed the levels of Lake Lahontan and Lake Bonneville, and they recognize two major periods of aridity marked by low lake level. One occurred between *ca.* 11,500 and 14,000 years ago, and another, beginning *ca.* 9,000 years ago, continues until the present. They also indicate that there is some evidence for a short period of aridity about 10,500 years ago.

Pollen analysis of the deposits in Fishbone and Guano Caves, located on the margin of pluvial Lake Lahontan (Sears and Roosma 1961) seems to agree in general with Broecker and Orr's interpretation, and Curray (1961) notes a complex fluctuation in sea level during this same period. Similar changes in the levels of Lake Mohave are suggested by radiocarbon on *Anadonta* shell (Hubbs, Bien, and Suess 1962; Warren and DeCosta 1964). The geological sequence and pollen profiles at Tule Springs may also indicate similar climatic changes (Mehringer 1965).

The Great Basin of 9,000 to 12,000 years ago may be viewed as having a climate which alternated between moist and arid periods, with corresponding fluctuations in lake levels and position of ecological zones. A culture adapted to the more northern moist climate, following a hunting, fishing, gathering pattern in which big mammals were of considerable importance, and supplemented by small game, fish, and fowl, moving into the area during this period, would

be best adapted to those ecological zones where bodies of fresh water were most stable and game most abundant. The north-south trending mountain ranges would provide a series of such zones. This is especially true of the Sierra Nevada and Peninsular ranges, from which a number of streams and rivers flowed into the lakes along the western edge of the Great Basin and the Mohave and Colorado deserts. Here the environment was presumably similar to that of the Northwest. The lakes and streams provided ample water for game animals and water fowl, and the wooded areas presumably met the more open grass and scrub lands to form an ecotone or series of ecotones in which a larger variety of plants and animals was to be found than in the adjacent ecological zones. It is in this area that the San Dieguito remains appear to be most abundant. It is on these bases that an early generalized hunting tradition has been postulated. We recognize this postulated hunting tradition as a theoretical construct, one from which we hope testable hypotheses will logically follow regarding the form of the early cultures in the West and their relationships to the prehistoric environment.

Acknowledgments. I would like to thank B. Robert Butler and Thomas Hearne for critical reading of this manuscript and for their helpful suggestions. I am also indebted to Dr. E. L. Davis for providing photographs of the Panamint Basin artifacts and information regarding them, and to Dr. Gordon Grosscup for supplying study photographs of the Carson Sink artifacts and information regarding that locality. Investigations undertaken by H. T. Ore and Claude Warren in 1965, which led to certain interpretations incorporated in this paper, were financed by National Science Foundation grant No. GS-926.

AMSDEN, CHARLES A.
1937 Lake Mohave Artifacts. In "Archaeology of Pleistocene Lake Mohave: A Symposium," *Southwest Museum Papers*, No. 11, pp. 51–98. Highland Park.

ANTEVS, ERNST
1937 Age of Lake Mohave Culture. In "Archaeology of Pleistocene Lake Mohave: A Symposium," *Southwest Museum Papers*, No. 11, pp. 45–9. Highland Park.

1952 Climatic History and the Antiquity of Man in California. *University of California Archaeological Survey Reports*, No. 16, pp. 23–31. Berkeley.

BROECKER, WALLACE S. AND PHIL C. ORR
1958 Radiocarbon Chronology of Lake Lahontan and Lake Bonneville. *Bulletin of the Geological Society of America*, Vol. 69, pp. 1009–32. New York.

CAMPBELL, ELIZABETH W. CROZER
1949 Two Ancient Archaeological Sites in the Great Basin. *Science*, Vol. 109, p. 340. Lancaster.

CAMPBELL, E. W. C., WILLIAM H. CAMPBELL, ERNST ANTEVS, CHARLES A. AMSDEN, JOSEPH A. BORBIERI, AND FRANCIS D. BODE
1937 Archaeology of Pleistocene Lake Mohave: A Symposium. *Southwest Museum Papers*, No. 11. Highland Park.

COWLES, JOHN
1959 *Cougar Mountain Cave.* Private Publication. Rainier, Oregon.

CRESSMAN, LUTHER S.
1936 Archaeological Survey of the Guano Valley Region in Southeastern Oregon. *University of Oregon, Monograph, Studies in Anthropology* No. 1. Eugene.

1960 Cultural Sequences at The Dalles, Oregon. A Contribution to Pacific Northwest Prehistory. *Transactions of the American Philosophical Society*, Vol. 50, Pt. 10. Philadelphia.

CURRAY, JOSEPH R.
1961 Late Quaternary Sea Level: A Discussion. *Bulletin of the Geological Society of America*, Vol. 72, pp. 1707–12. New York.

DAUGHERTY, RICHARD D.
1956 Archaeology of the Lind Coulee Site, Washington. *Proceedings of the American Philosophical Society*, Vol. 100, No. 3, pp. 223–78. Philadelphia.

1962 The Intermontane Western Tradition. *American Antiquity*, Vol. 28, No. 2, pp. 144–50. Salt Lake City.

DAVIS, EMMA LOU
1963 The Desert Culture of the Western Great Basin: A Lifeway of Seasonal Transhumance. *American Antiquity*, Vol. 29, No. 2, pp. 202–12. Salt Lake City.

1964 An Archaeological Survey of the Mono Lake Basin and Excavations of Two Rockshelters, Mono County, California. *Archaeological Survey Annual Report 1963–64*, pp. 255–392. Department of Anthropology, University of California, Los Angeles.

ENBYSK, BETTY JOYCE
1956 Vertebrates and Mollusca from Lind Coulee, Washington. In "Archaeology of the Lind Coulee Site," by R. D. Daugherty, pp. 267–78. *Proceedings of the American Philosophical Society*, Vol. 100, No. 3. Philadelphia.

GROSSCUP, GORDON L.
1956 The Archaeology of Carson Sink Area. *University of California Archaeological Survey Reports*, No. 22, Paper 43, pp. 58–64. Berkeley.

GRUHN, RUTH
1965 Two Early Radiocarbon Dates from the Lower Levels of Wilson Butte Cave, South Central Idaho. *Tebiwa*, Vol. 8, No. 2, p. 57. Pocatello.

HAURY, EMIL W.
1950 *The Stratigraphy and Archaeology of Ventana Cave, Arizona.* University of New Mexico and University of Arizona Press, Albuquerque.

HEIZER, R. F.
1964 The West Coast of North America. In *Prehistoric Man in the New World*, edited by J. D. Jennings and Edward Norbeck, pp. 149–74. University of Chicago Press, Chicago.

1965 Problems of Dating Lake Mohave Artifacts. *The Masterkey*, Vol. 39, No. 4, pp. 125–34. Southwest Museum, Los Angeles.

HUBBS, CARL L., GEORGE S. BIEN, AND HANS E. SUESS
1960 La Jolla Natural Radiocarbon Measurements. *American Journal of Science Radiocarbon Supplement*, Vol. 2, pp. 197–223. New Haven.

1962 La Jolla Natural Radiocarbon Measurements II. *Radiocarbon*, Vol. 4, pp. 204–38. New Haven.

HUNT, ALICE
1960 Archaeology of the Death Valley Salt Pan, California. *Anthropological Papers*, No. 47. University of Utah Department of Anthropology, Salt Lake City.

JENNINGS, JESSE D.
1957 Danger Cave. *Memoirs of the Society for American Archaeology*, No. 14. Salt Lake City.

1964 The Desert West. In *Prehistoric Man in the New World*, edited by J. D. Jennings and Edward Norbeck, pp. 117–48. University of Chicago Press, Chicago.

JENNINGS, JESSE D. (EDITOR)
1956 The American Southwest: A Problem in Cultural Isolation. In "Seminars in Archaeology: 1955," edited by Robert Wauchope, pp. 59?127. *Memoirs of the Society for American Archaeology*, No. 11. Salt Lake City.

JENNINGS, JESSE D. AND EDWARD NORBECK
1955 Great Basin Prehistory: A Review. *American Antiquity*, Vol. 21, No. 1, pp. 1–11. Salt Lake City.

MEHRINGER, PETER J., JR.
1964 Late Pleistocene Vegetation in the Mohave Desert of Southern Nevada. *Journal of the Arizona Academy of Science*, Vol. 3, No. 3, pp. 172–88.

NERING, LEE G.
1956 Stratigraphic, Mechanical, Chemical and Petrographic Analysis of the Lind Coulee Site. In "Archaeology of the Lind Coulee Site," by R. D. Daugherty, pp. 263–6. *Proceedings of the American Philosophical Society*, Vol. 100, No. 3. Philadelphia.

ROGERS, MALCOLM J.
1929 The Stone Art of the San Dieguito Plateau. *American Anthropologist*, Vol. 31, No. 3, pp. 454–67. Menasha.

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

1945 An Outline of Yuman Prehistory. *Southwestern Journal of Anthropology*, Vol. 1, No. 2, pp. 157–98. Albuquerque.

1958 San Dieguito Implements from the Terraces of the Rincon-Patano and Rillito Drainage System. *Kiva*, Vol. 24, No. 1, pp. 1–23. Tucson.

SADEK, HIND
1964 Distribution of Bird Bones at Jaguar Cave. *Tebiwa*, Vol. 8, No. 1, pp. 20–8. Pocatello.

SEARS, PAUL B. AND AINO ROOSMA
1961 A Climatic Sequence from Two Nevada Caves. *American Journal of Science*, Vol. 259, pp. 669–78. New Haven.

SWANSON, EARL H., JR.
1962 Early Cultures in Northwestern America. *American Antiquity*, Vol. 28, No. 2, pp. 151–8. Salt Lake City.

WALLACE, WILLIAM J.
1954 The Little Sycamore Site and the Early Milling Stone Cultures of Southern California. *American Antiquity*, Vol. 20, pp. 112–23. Salt Lake City.

1955 A Suggested Chronology for Southern California Coastal Archaeology. *Southwestern Journal of Anthropology*, Vol. 11, No. 3, pp. 214–30. Albuquerque.

1962 Prehistoric Cultural Development in Southern California Deserts. *American Antiquity*, Vol. 28, No. 2, pp. 172–80. Salt Lake City.

WARREN, CLAUDE N. (EDITOR)
1966 The San Dieguito Type Site: M. J. Rogers' 1938 Excavations on the San Dieguito River. *San Diego Museum Papers*, No. 5. San Diego.

WARREN, CLAUDE N., ALAN L. BRYAN, AND DONALD R. TUOHY
1963 The Goldendale Site and Its Place in Plateau Prehistory. *Tebiwa*, Vol. 6, No. 1, pp. 1–23. Pocatello.

WARREN, CLAUDE N. AND JOHN DECOSTA
1964 Dating Lake Mohave Artifacts and Beaches. *American Antiquity*, Vol. 30, No. 2, pp. 206–9. Salt Lake City.

WARREN, CLAUDE N. AND D. L. TRUE
1961 The San Dieguito Complex and Its Place in California Prehistory. *Archaeological Survey Annual Report 1960–1961*, pp. 246–338. Department of Anthropology and Sociology, University of California. Los Angeles.

WARREN, CLAUDE N., D. L. TRUE, AND ARDITH A. EUDEY
1961 Early Gathering Complexes of Western San Diego County: Results and Interpretations of an Archaeological Survey. *Archaeological Survey Annual Report 1960–1961*, pp. 1–106. Department of Anthropology and Sociology, University of California. Los Angeles.

IDAHO STATE UNIVERSITY
Pocatello, Idaho
October, 1966