63. Aboriginal California and Great Basin Cartography*

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"As seen on the map, the distribution of the Yuki seems irregular. This is not because their location ran counter to natural topography, but because it followed it. Their country lies wholly in the Coast Range mountains, which in this region are not, on the whole, very high, but are much broken. They contain some valleys, but the surface of the land in general is endlessly rugged. The Yuki habitat is, however, not defined, except incidentally, by limiting mountains and ranges, but is given in block by the drainage of such-and-such streams. The native did not think, like a modern civilized man, of his people owning an area circumscribed by a definite line, in which there might happen to be one or many watercourses. This would have been viewing the land through a map, whether drawn or mental, and such an attitude was foreign to his habit. What he did know was that the little town at which he was born and where he expected to die lay on a certain river or branch of a river; and that this stream, or a certain stretch of it, and all the creeks flowing into it, and all the land on or between these creeks, belonged to his people; whereas below, or above, or across certain hills, were other streams and tributaries, where other people lived, with whom he might be on visiting terms or intermarried, but who had proprietary rights of their own" (Kroeber, 1925, pp. 160-161).

The passage quoted above is taken from A. L. Kroeber's Handbook of the Indians of California. The statement is important, for it establishes a generalization which has been applied in drawing up the detailed map of California tribes contained in Kroeber's book. Inspection of the large colored map in the Handbook will show how consistently stream drainages and watersheds served as tribal boundaries, and indeed, the same situation holds on the modern map of California county boundaries (Coy, 1923). The concept of drainage and watersheds as forming territorial boundaries of tribes has proved applicable beyond California, as, for example, in Kroeber's detailed map of American Indian tribes (Kroeber, 1939, p. 8 and map 1A in rear pocket).

As a student of California Indian culture, Kroeber's statement that, "viewing the land through a map, whether drawn or mental, . . . [was] an attitude . . . foreign to . . . [the California native's] habit" may be, and probably is, true with reference to the Indian either visualizing or sketching a map of the territory occupied by his group. Dr. Kroeber, a person more intimately familiar with the California tribes, and an indefatigable researcher in ethnogeography, doubtless had good reason to state that such ideas were foreign to the native's habit, the implication being that there

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being no need or reason for such cartographic conceptions, they did not occur to the Indian. I can myself attest to the fact that even today non-map-oriented individuals are not rarities in California. Almost any archaeologist engaged in archaeological site reconnaissance has had the experience of hauling out a U.S.G.S. topographic quadrangle, showing it to some provincial, and hearing him say, "I don't understand maps--never use 'em" or something of the sort. He is not familiar with maps, but he knows where he is, and he can direct you to a specific spot some miles away by citing natural features as guidemarks.

This brings me to the point of this article, viz., that the California Indian may not have thought in terms of maps, but when he was asked for directions, or requested to draw a map, he could often do so.[1] There is abundant evidence of this fact in the historical documents which record the earliest meetings of Indians and Caucasians. It was the Indian who knew where he was, the Caucasian who was inquiring about what lay ahead. Answers to such inquiries were most often rendered in gestures and signs, but occasionally a native would draw a map on the earth.

The earliest instance seems to be that described by Fr. Juan Crespi on Sunday, August 6, 1769, when the Portolá expedition was among the Fernandeño group of Gabrielino and the camp was visited by numbers of natives. Crespi says, "They had heard of the sailing of the packets to the coast and channel of Santa Barbara; they drew on the ground the shape of the channel with its islands, marking the route of the ships" (Bolton, 1927, p. 151).

Frémont, while at Pyramid Lake, Nevada, on January 15, 1844, interrogated the local Northern Paiute people and reports, "We could obtain from them but little information respecting the country. They made on the ground a drawing of the [Truckee] river which they represented as issuing from another lake [Tahoe] in the mountains three or four days distant, in a direction a little west of south; beyond which, they drew a mountain [Sierra Nevadas]; and further still, two rivers [Sacramento and/or American or Feather or San Joaquin] on one of which [Sacramento?] they told us that people like ourselves travelled" (Frémont, 1945, p. 219).

Frémont, on December 6, 1843, when somewhat south and east of Klamath Lake, Oregon, among the Klamath tribe says, "The stream we had struck [Pit River] issued from the mountain in an easterly direction, turning to the southward a short distance below; and, drawing a course upon the ground, they made us comprehend that it pursued its way for a long distance in that direction, uniting with many other streams, and gradually becoming a great river. Without the subsequent information, which confirmed the opinion, we became immediately satisfied that this water formed the principal stream of the Sacramento River. . . ." (Ibid., p. 206).[2]

In the journal of J. Goldsborough Bruff under date of November 7, 1850, is the entry, "The older Hough related to me their first visit to Honey Lake, as they called it, from a sweet substance which they found exuding

from the heads of wild oats in the basin. (I have named it L. Derby). An aged Indian visited their camp, and they made signs to him that they were in search of a deep-basined lake, where there was gold, and they showed him a small lump of the metal. The old savage, then took a pair of macheres (large flat leathers to throw over the saddle) and sprinkled sand over them, drew a model map of the country there, and beyond it, some distance. He heaped up sand, to form buttes, and ranges of mountains; and with a straw, drew streams, lakes and trails: then adjusted it to correspond with the cardinal points, and explained it. He pointed to the sun, and by signs made them understand, the number of day's travel from one point to another. On it he had traced, (as I found on their explanation,) Mary's Humboldt River, Carson River, Pyramid lake, and the emigrant routes, -- above and below. He moved his finger, explanatory of the revolutions of wagon wheels, and that white people travelled along, with guns, on the said routes. On his map, he had exhibited the lake they were then at, and another in a deep basin, with 3 buttes beside it, and said that gold was plentiful there; and also, that 10 months ago the whites had visited it, and fought with the Indians" (Bruff, 1949, pp. 453-454).

In 1849 A. J. McCall describes the making of a sand map by Northern Paiute at Lassen's Meadows:

"While at the Meadows I met a friendly and intelligent Indian who made for me a map in the sand, a topographical map of the route over the [Sierra] Nevadas. The sand was piled up to indicate mountains and with his fingers he creased the heap to show the canyons and water courses. To indicate wood and timber he stuck in sprigs of sage, and spears of grass where grass was to be found, and made signs to inform us where the Indians were friendly or dangerous. It was really an ingenious affair and he was well acquainted with the country" (McCall, 1882, p. 72).

In 1853 Lt. A. W. Whipple encountered Chemehuevis near the Colorado River, and describes (Whipple, 1856, p. 111) how one ". . . drew a sketch of this country, giving the Pai-ute names of tribes, and the rivers where they dwell." In another section of the same report are reproduced 3 Indian maps, one a Tewa Pueblo map of the Rio Grande towns (Whipple, Ewbank and Turner, 1856, p. 9), another a Yuma map of the Colorado River with tribes located (Ibid., p. 16), and the third the Chemehuevi map of the Colorado showing tribal locations (Ibid., p. 16). The Yuma and Chemehuevi maps are also described and reproduced by Möllhausen (1861, vol. 1, pp. 433-34). Möllhausen calls the Chemehuevi, quite correctly, Paiute. It is presumably the Yuma map that is referred to by Kroeber (quoted above) as ". . . the only native map ever published from California."3/

In Mallery's volume on North American Indian pictography (Mallery, 1886, p. 157-58) occurs the following description of a sand map made by a Southern Paiute in Southern Nevada.

"Dr. W. J. Hoffman states that when at Grapevine Springs, Nevada, in 1871, the Pai-Uta living at that locality informed the party of the exact location of Las Vegas, the objective point. The Indian sat upon the sand and with the palms of his hands formed an oblong ridge to represent Spring Mountains and southeast of this ridge, another gradual slope, terminating on the eastern side more abruptly; over the latter he passed his fingers to represent the side valleys running eastward. He then took a stick and showed them the direction of the old Spanish trail running east and west over the lower portion of the last-named ridge. When this was completed the Indian looked at the members of the party, and with a mixture of English, Spanish and Pai-Uta, and gesture signs, told them that from where they were now they would have to go southward, east of Spring Mountain, to the camp of Pai-Uta Charlie, where they would have to sleep; then indicating a line southeastward to another spring (Stumps) to complete the second day; then he followed the line representing the Spanish trail to the east of the divide of the second ridge, above named, where he left it, and passing northward to the first valley, he thrust the short stick into the ground and said, 'Las Vegas.'"

Stephen Powers (1877, p. 384) records that a Yokuts Indian, to illustrate a myth about how the Sierra Nevadas and Coast Ranges were formed, ". . . drew in the sand a long ellipse, representing quite accurately the shape of the two ranges. . . ." Whether this can be called a map as such is unclear, but the basic idea is present and for present purposes we shall consider this instance as evidence of the translation of topographic features into a plane map.

The instances cited above refer to the following tribes and dates: Fernandeño, 1769 (Crespi); Havasupai, 1775 (Escalante); Oregon Klamath, 1843 (Frémont); Pyramid Lake Paviotso, 1844 (Frémont); Honey Lake Paviotso, 1849, 1850 (Bruff, McCall); Chemehuevi and Yuma, 1853 (Möllhausen, Whipple); Southern Paiute, 1871 (Mallery); and Yokuts, 1877 (Powers). In these instances we may be reasonably or fully certain that the Indians' mapping technique was not acculturated, but was aboriginal. From more recent times there are at least two examples of Indian-made maps which might theoretically be ascribable to Caucasian influence, but even admitting the possibility, it seems unlikely. Kroeber reproduces a sketch map drawn between 1911 and 1916 by the famous Yahi, Ishi, and says this map ". . . is of interest because it proves the California Indians to have been not totally devoid of faculty in this direction. They usually refuse pointblank to make even an attempt of this kind, alleging utter inability, and it is only in the extreme south of the State that some rudiments of a sense of tracing topography appear. The Mohave readily draw streams and mountains in the sand, and the only native map ever published from California [see supra] is a sketch of this type. The Diegueño ground paintings also evince some elements of cartographic endeavor, although in ritualized form" (Kroeber, 1925, p. 344, fig. 32).[4]

The second recent Indian map was drawn by an Owens Valley Paiute, and

depicts the Big Pine creek drainage area (Steward, 1933, p. 326, fig. 10). It was drawn some time between 1927 and 1931, is of modern date and hence may be suspect as representing a facility present among this group in pre-Caucasian times. The map was executed by a man then about 100 years old, which means that he was alive when the first whites were seen, and was too old to have gone to school. I am inclined to think that these facts, together with the 1849 and 1850 sand-maps of the same general Paiute group at Honey Lake, indicate the Owens Valley map as representing persistence of an old and original trait.5/

It will have occurred to the reader that there is a definite weighting of instances of sand-map making among groups who live in semi-arid regions. Whether such maps were more used by the natives of the less well-watered portions of western North America, or whether, in the period of Caucasian discovery and exploration, it was in those less attractive regions that geographical advice was more deliberately sought and acquired from the natives, is something which I do not believe can be answered with the evidence at hand. Forest tribes, arctic coast dwellers and plains peoples all make similar maps in the sand or draw them on bark or hide, so we can suppose no very absolute rule to obtain here as regards environmental determinism. If I were pressed to give my own opinion, I should say that the abundance of references attesting to sand-maps among the Shoshonean peoples is probably a matter of historical and documentary chance, but I would not rule out the further possibility that the practice was emphasized by those thinly populated tribes who occupied the regions of deficient rainfall. At any rate, to such tribes these maps might often be of critical importance in the matter of arranging a rendezvous, or any number of other reasons which might theoretically apply.

This little review of the cartographic ability of certain California and Great Basin Indians has served to illuminate, however imperfectly, one aspect of the natives' knowledge of the actual world.6/

There is nothing remarkable in these little maps scratched in the sand, for primitive peoples all over the world can make such charts of areas known to them.7/ In the extensive amount of intertribal trade and the involved network of trails of California Indians (Sample, 1950), such simple maps appear to have a rational functional context.

Notes

1. Kroeber, despite the interpretation I have given his statements, would agree with this, as witness his remarks in the Handbook, p. 344.

2. The facts are uncertain here, for Frémont was lost in the marshy area east of Klamath Lake and was not on Pit River, though his Indian map may have, as he thought, been intended to show the Pit.

   Some years earlier Emmons, while attached to the Wilkes Expedition, inquired among the Oregon and Northern California tribes about maps. His questionnaire included this interrogation, "Are they expert in drawing maps or charts of the rivers, or sections of country which they inhabit?" The answer supplied by Emmons was: "Should judge not. I endeavored upon more than one occasion to obtain information of the unexplored country adjoining them by tracings in sand, but could not" (Emmons, 1853).

3. When Escalante was at Oraibi in 1775 he spoke with a Havasupai who drew him a map with charcoal on a breastplate showing details of the route from Oraibi to Havasu Canyon (Bolton, 1950, pp. 2-3). This instance is of interest in attesting to map-making in still another Yuman tribe.

4. On the Diegueño ground-paintings, see Kroeber, 1925, p. 644.

5. While no reliable Indian testimony exists to show that the sometimes rather elaborate petroglyph designs are route or regional maps, there is widespread belief among aficionados of archaeology that these are "Indian maps." Steward (1929, p. 226) has commented upon this matter, and I endorse his statement. He says, "Many of the elaborate combinations of connected circles, wavy lines, etc., have been regarded [i.e., assumed] as maps. This seems to be a plausible explanation and may be true in some instances. Nevertheless many such arrangements have been studied by the authors and it is clear that they do not represent at all the country surrounding the site where they are found. It seems hardly possible such maps could have been of great use unless someone were on hand to explain their meaning to the wanderer and in that case they would scarcely be necessary."

6. Cosmological concepts, such as that of the Yurok (Waterman, 1920, pp. 189-193, fig. 1), the Luiseño (Kroeber, 1925, pp. 662-664), or the Pomo (Loeb, 1926, p. 300), are of a higher level of abstraction even when they include the material, visible world in the schema.

7. For North America, see Noronoa (1951), and for two early studies on a world-wide basis see Dröber (1903) and Andree (1878, pp. 197-221). On maps from the ancient Near East see Lutz (1924) and Lucas (1948, p. 185); for the Eskimo see Cadzow (1924, pl. 6, pp. 144-46); Sølver (1957), and Jenness (1922, p. 229); for Africa [Warega tribe] see Driberg (1929, p. 49); for Peru [Inca] see Means (1936, pp. 342-43).

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64. Determining the General Source of California *Olivella* Shells

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As *Olivella* shell beads are frequently found in California Indian sites, it is useful to have a simple system of determining the origin of the shells. Species identification is difficult unless the entire shell is intact, but since the archaeologist usually only needs to know the general geographic source of the shell, two characteristics of the callus or raised "glassy" area next to the aperture can be used to distinguish Gulf of California species from those of the California coast. Fortunately, the callus is enough harder than the rest of the shell that it generally remains in good condition, so that structural differences in the callus may be used to distinguish the origin of fragments as well as shell beads which lack apex and base due to the stringing process. These two differences appear to be independent of the size, age, proportions and coloration of the shell; to judge from the specimens in the paleontological collections at the University of California at Berkeley and at Los Angeles and at the Los Angeles County Museum, the differences must have existed since the Late Miocene.

Olivella species from the West Coast, *O. biplicata* and *O. baetica*, respectively, are shown in Figs. 1a, b. Both species are now found from Vancouver, British Columbia, at least to Magdalena Bay, Baja California, although the slender, smaller *O. baetica* is more common south of Point Conception, California. Figs. 1c, d, e, f show Gulf of California species; illustrated are *O. dama*, *O. undatella*, *O. tergina* and *O. anazora*, respectively.

The Coast species are distinguishable by the curved, short callus which does not extend towards the apex of the shell beyond the aperture, i.e., the callus does not go above the open space. The Gulf species show a straight, long callus which extends toward the apex to the suture above the attachment of the outermost side of the aperture: the callus goes well beyond the top of the opening (see Figs. 1g, h).

A second characteristic which is not as definite as the boundaries of the callus is the shape and indentations of the ridge at the base of the callus. The Coastal species show a single, high ridge sometimes divided by as many as four or five but generally fewer indented lines; whereas the Gulf species have a relatively flatter ridge with many lines almost as deep as the level of the rest of the callus--sometimes the shells appear to be engraved with a series of lines rather than having slight ridges. This character does not appear to be satisfactory on all fossil shells, and occasional modern specimens vary almost to the point of overlapping the opposite type. In a series of specimens, however, the two groups are quite distinct.