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## Macahui: The Unmaking of an Enigma

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**MACAHUI**, an extensive cluster of hundreds of artificially cleared areas, is located on a series of low terraces, formerly covered with desert pavement. These clearings are located just south of the U.S.-Mexico border, about 25 km. west of Mexicali, in the Sonoran desert of northeastern Baja California (Fig. 1). The clearings vary considerably in size and shape, but most frequently are circular and about 8 m. in diameter (Figs. 2 and 3). Distinct rock borders are not usually found around the clearings.

Key questions in the archaeological interpretation of desert pavement clearings concern their ages and the reasons for their creation. However, satisfactory answers to these questions are often difficult to obtain. The "Topock Maze" of southeastern California has long been a focus of some controversy (Haenszel 1978).

In the general region considered here, similar clearings have been the subject of archaeological attention since the 1920s and



Fig. 1. Location of Macahui, Baja California, Mexico.

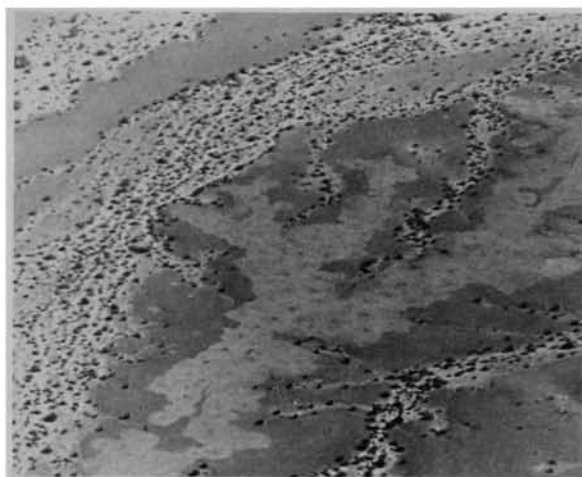


Fig. 2. Aerial view of a portion of Macahui. (Photo by Fernando Rodríguez).

1930s. Malcolm J. Rogers (1939) observed the presence of thousands of "sleeping circles" in the deserts of southern California and northern Baja California. Rogers' sleeping circles included both rock-lined features and cleared-pavement features, and they



Fig. 3. Cleared area within Macahui.

were said to have often been found in association with aboriginal trail systems and with surface artifacts. Rogers noted that during the early historic period Jesuit missionaries in southern Baja California had reported the aboriginal construction of rock-lined features for habitation. However, Rogers apparently felt that most of the circles which he observed in southern California and northern Baja California belonged to the very early prehistoric San Dieguito Complex (Rogers 1966). Subsequent investigators have more thoroughly documented and discussed some groups of clearings, suggesting a variety of possible cultural and even natural origins for such features but without arriving at any firm conclusions about their ages and functions (e.g., Whalen 1976; Tuohy 1984; Pendleton 1986:173-180).

Macahui was brought to public attention in 1979 by Fernando J. Rodríguez, chief of communications for the Baja California state government. The name "Macahui" was coined from the area's location between Laguna Macuata (also called Laguna Salada) on the south and the basin of prehistoric Lake Cahuilla on the north. Rodríguez discovered the clearings on foot and subsequently flew over them by plane. He also produced a film on the subject in 1980, entitled "Macahui," with Alberto I. Aguilar. Additional assessments of the features were made by Julio Montané Martí and Angel Jesús Ochoa Zazueta of the Instituto Nacional de Antropología e Historia.

Press, governmental, and popular interest in the clearings has been high, and speculation has been rampant about their age and

function, as reported for instance in the newspapers *El Mexicano* and *La Voz de la Frontera*. An age of 21,000 years was suggested in the press for the clearings, based on the then-alleged age of the controversial "Yuha Man" in nearby California. Associated artifacts were said to date the features conservatively to 10,000 years before the present. However, other estimates reported in the press suggested ages in "thousands of years," "hundreds of years," "fairly recent," or "protohistoric."

An initial impression of the features was expressed that they, like Rogers' sleeping circles, represented habitation areas, perhaps foundations, perhaps even "the largest prehistoric town in the world." Later opinion shifted toward the interpretation of the features as geoglyphs, making up a major ceremonial site. The possibility of Macahui's function as a vast prehistoric cemetery was also suggested (Möller and Aguilar 1982). Altogether, Macahui was touted as having "universal importance for the history of man."

However, the findings were more cautiously regarded by some archaeologists. When the film "Macahui" was presented at the annual meetings of the Southwestern Anthropological Association and the Society for California Archaeology in 1980, the possibility was suggested, by Ken Hedges and William Eckhardt among others, that the features might be the result of modern, rather than prehistoric, activity.

In our investigation of Macahui, evidence on the function of the clearings was considered. Several types of evidence were evaluated, including the patterns of the clearings' occurrence, their associations, their morphology, the characteristics of the pavement immediately around them, and the testimony of the region's contemporary inhabitants. This evidence was used to eval-

uate three hypothesis: (1) that the clearings were made for prehistoric habitation, (2) that they were made as geoglyphs, and (3) that they were byproducts of modern gravel collection.

The most striking aspects about the Macahui clearings are their occurrence in great numbers within a fairly confined area and the desolation of that area, at least under modern conditions. Both facts seem to argue against the hypothesis that the clearings were prehistoric habitation sites. Such large numbers of dwellings or camping spots, clustered so closely that many of the clearings touch or overlap, seem unlikely to have been occupied simultaneously. Perhaps accretion over an extended period, with a taboo against reuse of old clearings, could be postulated. The setting of the features is now notably desolate, but it is fairly close to the Laguna Macuata shoreline and is on a reasonable route for seasonal prehistoric travel between the agricultural lands of the Colorado River delta and the upland resources of the Sierra Juárez to the west.

The number and setting of the clearings pose no obstacles to the hypothesis of a prehistoric function as geoglyphs. Nor does this line of evidence contradict the modern gravel collection hypothesis; the district is located astride Mexico's Highway 2, linking Mexicali and Tijuana, and many of the clearings, if not all of them, are reasonably accessible by truck for the purpose of hauling away gravel.

A notable "negative association" of the features is the scarcity of prehistoric lithic or ceramic artifacts on the pavement in the vicinity of the clearings which we examined. A few such items were noted during our study, but not in close association with the clearings and seemingly not in quantities exceeding the general frequency of isolated artifacts or small artifact scatters on the

desert pavements of this region. The scarcity of artifacts seems to us a telling criticism of the habitation hypothesis for an area of such alleged dense settlement. The geoglyph hypothesis seems much less vulnerable to this criticism.

The detailed morphology of many of the clearings is an important argument in favor of the gravel-collection hypothesis. Many of the clearings have small, roughly central relict areas of uncleared pavement, sometimes with a few unembedded rocks on top of the pavement. The central relict areas seem much too insubstantial to have served any useful structural purpose in dwellings. The rocks in these areas also show no signs of blackening or cracking from use as hearths. Many of the clearings also have a loose scattering of larger rocks near but not quite at the circumference of the clearing, resting on top of the cleared surface. The outer rings of rocks similarly appear too sparse to have helped support a structure, and they presumably would have been in the way of sleepers' use of the clearings.

These morphological details cannot contradict the geoglyph hypothesis in the absence of any independent information on the hypothesized geoglyph-makers' aesthetic standards or ritual goals in constructing the clearings. However, both of the morphological elements seem too irregular in form and too casually used to be likely as intended effects. The excellent preservation of many of the cleared features from any general recent disturbance seems to argue against the irregularities in the elements being products of disturbance.

The morphological details do seem explicable to us in terms of possible gravel collection techniques, however. If gravel were raked inward toward a roughly central pile, it is quite likely that, when the gravel was picked up, by hand or shovel, the residue of

unraked pavement under the pile would often be left alone, perhaps with the addition of a few stray rocks on top. Moreover, if rocks above a certain size were not desired, as the gravel pavement was raked inward these larger rocks would be kicked or tossed out of the gravel rows or piles which were forming and back onto the outer cleared area.

The primary field technique used in the present evaluation of Macahui's function was a controlled "rock counting" study of the intact pavements surrounding a number of the clearings. If the features were prehistoric, produced either as living areas or as geoglyphs, something must have been done with the pavement rocks which were removed from them. The removed rocks are not found as berms around the clearings, nor are there any cairns in the areas which we examined, so presumably the removed rocks would have been tossed by the prehistoric clearers onto the surrounding, uncleared pavement. The pavement in this region is not so completely formed that added rocks would merely bury other rocks. Rather, any localized additions to the pavements should be detectable as higher frequencies of rocks near the clearings in contrast to the natural pavement areas further away from the clearings.

Two locations, with a number of clearing features each, were selected for controlled study. The locations were not randomly selected, but were chosen because they contained numbers of cleared features in close proximity to each other, whose creation, according to the hypothesis of prehistoric origin, should have added noticeably to the amount of rock in the adjacent pavement. These locations also contained other pavement areas farther away from the clearings, which should have remained as natural surfaces without any substantial additions of



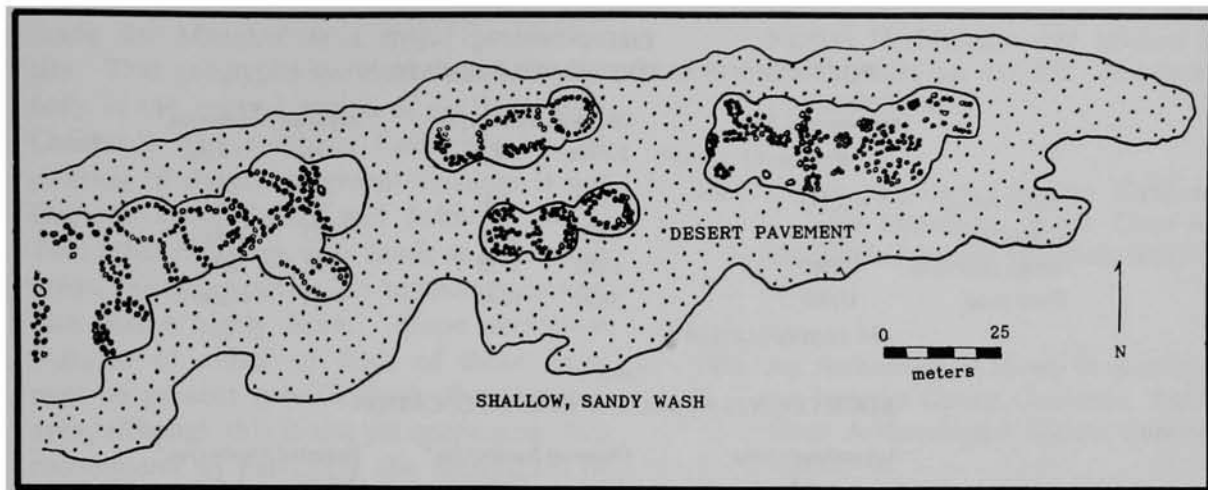


Fig. 4. Map of first rock counting sample location.

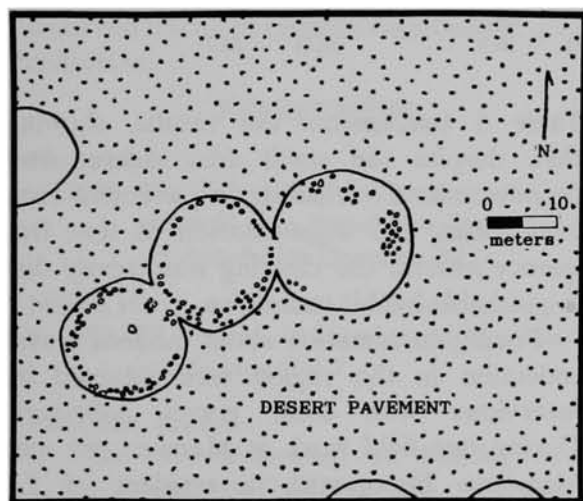


Fig. 5. Map of second rock counting sample location.

rocks from the clearings.

In each location, a rectangular grid of points was laid out across an arbitrary area, and at each point a rectangular counting frame, 44 x 54 cm. in size, was placed on the ground. All rocks lying within the frame were counted in two size categories: those between 3 and 6 cm. in maximum length, and those greater than 6 cm. in length. In the first location (Fig. 4), grid points were placed at 12.5-m. intervals, and points were analyzed as falling within a

clearing, not more than 10 m. from the nearest clearing, or more than 10 m. from the nearest clearing. In the second location (Fig. 5), the points were placed at 10 m. intervals and were analyzed as being within clearings, up to 5 m. from the nearest clearing, or more than 5 m. from the nearest clearing.

Analysis of the rock counts fully supports the gravel-collection hypothesis. Tables 1 and 2 show the mean rock counts per square meter for areas within, near to, or distant from the clearings. The areas near the clearings show no rock enrichment; in fact, they average slightly fewer rocks than the more distant areas.

The tables also show hypothetical rock frequencies for the study locations, supposing that the rocks now present were originally distributed uniformly throughout the pavement and that all of the rocks from the cleared areas which are not present there now were added to the nearby pavement areas. These "expected" figures predict a marked differentiation of rock frequencies in nearby and distant areas, a differentiation which was not found. If the average rock frequencies for nearby and distant uncleared

Table 1  
ROCK COUNTS AT FIRST SAMPLE LOCATION

	Approximate Area in m. <sup>2</sup>	Observed Number/m. <sup>2</sup>		Expected Number/m. <sup>2</sup>	
		3-6 cm.	>6 cm.	3-6 cm.	>6 cm.
Cleared Areas	3,750	7.98	5.37	7.98	5.37
Within 10 m.	4,270	64.53	11.35	77.15	14.91
Farther than 10 m.	2,980	62.95	15.55	44.81	10.45
Total Area	11,000	44.81	10.45	44.81	10.45

Table 2  
ROCK COUNTS AT SECOND SAMPLE LOCATION

	Approximate Area in m. <sup>2</sup>	Observed Number/m. <sup>2</sup>		Expected Number/m. <sup>2</sup>	
		3-6 cm.	>6 cm.	3-6 cm.	>6 cm.
Cleared Areas	1,200	23.15	15.78	23.15	15.78
Within 5 m.	1,500	72.95	21.89	99.34	25.12
Farther than 5 m.	3,400	77.12	22.42	65.48	20.97
Total Area	6,100	65.48	20.97	65.48	20.97

Table 3  
ROCK COUNTS AT REPLICATION LOCATION

	Approximate Area in m. <sup>2</sup>	Observed Number/m. <sup>2</sup>	
		3-6 cm.	>6 cm.
Cleared Area	38	21.04	0.00
Within 5 m.	188	146.70	25.55
Farther than 5 m.	674	113.04	24.25
Total Area	900	123.57	24.08

areas are taken to represent natural pavement frequencies, which would also have been characteristic of the cleared areas prior to clearing, then some 240,000 rocks in the case of the first test location and 71,000 rocks in the second test location are presently missing, evidently removed by gravel collectors.

As a check on the rock-counting method, a replicative experiment was performed on an area of undisturbed natural pavement near Macahui. An area 7 m. in diameter was cleared by tossing the rocks casually onto the surrounding pavement. A grid of 36 points at 5-m. intervals was laid out, and counts were made as in the previous cases.

Table 3 summarizes the results, showing that, despite the small area cleared and despite natural variability in pavement rock frequencies, the augmentation in that frequency around the clearing was clearly distinguishable by this technique.

Finally, information about modern gravel collection in the region was obtained by interviews with local gravel collectors. During our field work at Macahui, we met Marciano Buenrostro, a resident of La Rumorosa, located about 30 km. west of Macahui, who was collecting gravel to build a floor. Sr. Buenrostro confirmed our supposition about the collectors' technique of raking gravel inward to a central pile and discarding oversized rocks. Later inquiries located Miguel Hernández-Jiménez, now resident a few kilometers west of Macahui. Sr. Hernández-Jiménez was able to confirm specifically the large-scale activity of commercial gravel collectors in the Macahui area in the period 1962-1964.

In sum, we believe that the available evidence is sufficient to refute the claims

made for Macahui as a major prehistoric site. That geoglyphs were produced aboriginally in the general region of northern Baja California and southern California by the clearing of desert pavement surfaces is not disputed (e.g., Solari and Johnson 1982). That other clearings were made as habitation areas, "sleeping circles" in temporary camps, also seems highly likely. Some aboriginal features of either or both of these types may be present specifically in the Macahui area, although this is not yet confirmed. We recommend in particular the techniques of detailed morphological examination and controlled study of the surrounding pavement as methods for distinguishing such features from the traces of modern commercial gravel collection.

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#### *To-vah*: A Luiseño Power Cave

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IN addition to those archaeological sites in San Diego County, California, that are easily recognized on the basis of artifact scatters, soil discoloration, and/or bedrock features, important cultural elements exist that generally are not identified. Examples are fairly common in the ethnographic literature, and some features are quite well known. The turtle rock at Potrero described by Lucario Cuevish (Du Bois 1908:115) is a good example, as is the place near Rincon known as *Wasimal*.

*Wasimal* is an unmodified rock which represents a small ground hawk who gave up in the mythical race between the mountain people and the west (Du Bois 1908: 149). There literally are dozens of similar features within the Luiseño territory, but the majority are undescribed and are mostly unknown outside of a select segment of the