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5-5-76

Mr Donald Crabtree, Research associate
Idaho State University Museum
Pocatillo Idaho 83201

Dear Don

I am sending you a copy of a paper on ridge-back tools some, of which we examined when I visited with you last. I have not enclose any of the figures or drawings since you have seen the material.

This paper has been sent to American Antiquity for review. I thought you might like to look at it with a critical eye, since I refer to your examination

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and comments in the manuscript,

I hope things are well with you + your lovely wife. I did enjoy my visit with you while in Idaho. an your suggestions as to study procedures was of immense value.

Please feel free to make any comment you feel is indicated

Sincerely

Morlin Childers

Please Say hello to Bill and his wife

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# Ridge-Back Tools of the Colorado Desert

## ABSTRACT

Knapping experiments and examinations of flaked stone objects distributed throughout portions of southwestern Imperial Valley and northern Baja California indicate that criteria other than presence or absence of percussion bulbs can be used to support the artifactual nature of certain fractured stones.

Cultural material referred to in this report as "ridge-back" has been observed, except for isolated pieces, only on older alluvial terraces and fans in the Pinto-Yuha drainage system which originated in the Sierra Juarez of Baja California and drains east and northeast into the Laguna Salada and the Salton Sink. The greater portion of the material is restricted to six sites, separated by as much as 40 kilometers (Figure 8B).

## PREVIOUS WORK

The ridge-back industry was described briefly by Childers (1974: 2) as a uniface tradition with trimming blows to produce low-angle edges, with the scars characteristically meeting at a point or ridge along the dorsal side, the pieces being easily distinguishable from the uniface flat-top cores and scraper planes noted for this region (Rogers, 1966: 4; and Carter 1957: 1) by the lower edge angle, longer flakes, and immense size of the largest pieces, and the presence of many pointed forms (Figure 9). The material used crossed all mineral lines, indicating that these factors constituted a technique and not a natural lithic curiosity. Associated tools were flake blades, triangular in cross section, some with a small side blow struck near the point to make a sharp carving tip. Two ridge-back tools were found associated with a human burial in the Yuha Desert (Childers 1974: 2).

In the spring of 1975, after much frustration and puzzlement over "Ridge-back" stones, I conferred with Donald Crabtree at Idaho State University. Crabtree was impressed with the ridge-back specimens and the fact that "look-a-likes" cross all mineral lines. However, he confessed that he could not determine the method by which they were shaped. He was further confounded by the lack of percussion bulbs where secondary flakes appear to have been removed and the apparent lack of striking platforms where specimens were removed from the cores.

At the conclusion of our conference Crabtree recommended that I do some experimenting and attempt to replicate the ridge-back types without bulbs of percussion, using stone that was similar to that of ridge-back types collected.

## DUPLICATION OF RIDGE-BACK FLAKES

Attempts to duplicate these tools have shed some light on the postulated production of ridge-back tools. First and most important was the selection of stone with the proper fracturing qualities and desired texture. During the experiments I was unable consistently to extract ridge-back specimens with out bulbs of percussion from pure quartz, jasper, felsite, chert, or any of the fine-grained materials characteristic of later traditions in this area. Volcanics, metabasalt, felsite, porphyries, quartzite, sedimentary rock, (crystalline sandstone), and other tough materials usually recognized as inferior materials for tool manufacture are desirable. The next consideration in selecting a stone was concerned with morphology. A boulder was needed that readily lent itself to the removal of corners to produce large flake blades with triangular cross-sections.

Experiments demonstrated that large pieces of the desired shape were more easily obtained when the core was firmly embedded in the earth so as to not move when struck. One end of an elongated soft-grained stone punch directed to a selected point on a boulder and struck with a 10 to 15 pound hammerstone could produce a macro-flake of predetermined size and shape.

Successful replication of ridge-backs with low angle dorsal surfaces and thin edges around the entire perimeter is obtained by a special core preparation technique (Figure 10 and 11). By first removing a sequence of large, long flakes from the apex of a boulder, the dorsal surface of a thin-edged ridge-back specimen can be prepared. Next, an indirect percussion blow is applied transversely to a selected point on the prepared surface to remove a typical thin-edged, unifaced ridge-back, often leaving no visible striking platform. Also bulbs of percussion are not apparent, and even the point of impact is frequently obscure when this procedure is followed on the tough stone used in the experiments (Figures 1 through 5).

If a series of macro-flakes is removed from a boulder by blows resulting in overlapping flake scars on the core, definite ridges will result. A blow on a point directly behind a ridge will produce a triangular flake blade (Figures 9A and 9B).

## ARCHAEOLOGICAL CONTEXT

Cultural material referred to in this report as, Ridge-back, has only been observed, except for isolated pieces, on older alluvial terraces in the Pinto-Yuha drainage system which originates in the Sierra Juarez of Baja California and drains east and northeast into the Laguna Salada and the Salton Sink. The greater portion of the material in the study area is restricted to six sites, separated by as much as 40 kilometers (fig. 8A).

Examination of eroded alluvial surfaces and cross-section exposures has not revealed ridge-back tools below the surface. Scrutiny of Ridge-back sites confirms the idea of human preference for massive partially embedded boulders displaying straight fracture lines and tough qualities from which to extract the macro-flakes that resulted in the Ridge-back Tradition. The exact procedure that was followed in the removal of the macro-flakes is somewhat conjectural. However, there are indications that the Knapper's efforts were similar to those the author used in replication experiments.

Massive boulders weighing up to 100 pounds (45 kilos) and more, showing past removal of macro-flakes, are found on or near ridge-back sites (figures 6 and 7). Often these systematically-scarred boulders are partially embedded in the soil.

Recent investigation has revealed additional information concerning this uniface tradition. On some specimens thinning blows appear to have been directed toward the dorsal ridge while other flakes were driven off using the dorsal ridge for a striking platform.

Because of the size of some macro-flakes, a portion of the process possibly involved two or more individuals working together, one holding the punch stone and a second delivering the blow with a heavy hammerstone. Later unifacial retouch shaping blows were directed to sections of the perimeter of some ridge-back specimens.

A technological deviation is apparent at a site located 9 miles from the mountains just south of Plaster City, Imperial County, California in an area where large massive boulders are not readily available for the removal of the largest ridge-back types. At this site bipolar splitting of cobbles and other lithic materials has resulted in many flakes and cores, triangular in cross section, that are similar to the bipolar material noted in San Diego, California (Carter 1957: 1). Other ridge-back sites also have evidence of bipolarly fractured lithic materials, some of which have been additionally shaped by trimming and thinning flakes. These altered bipolar flakes are also assigned to the Ridge-back Tradition. Numerical comparison of bipolarly worked specimens versus prepared core technique at ridge-back sites in the study area suggests that the bipolar technique of making ridge-backs was not favored by the knappers; but was predominant at Plaster City because of the larger boulders from which to extract the largest pieces were not readily available.

Alluvial deposits within study area "A" (Figure 8A) are well cemented with caliche. Carbon 14 tests were made on caliche collected from various elevations, ranging from about 1,200 feet elevation near the mountains down to 400 feet elevation about 5 miles (9 kilometers) away from the mountains. The results of these tests suggest that a drying period began prior to 32,000 years B.P. and may be continuing into recent times; however the youngest Carbon 14 age on caliche collected was in the 20,000 years B.P. range. The Carbon 14 ages on caliche samples suggest a decrease in age with a decrease in elevation and support the idea of progressively dryer times.

A great number of circular areas 12 to 30 feet in diameter are found stair-stepped down these caliche hardened alluvial slopes near ridge-back sites. At times past when available water saturated the soil, it seems reasonable that vegetation was abundant on these now arid alluvial slopes. Hominids collecting herbs and roots could have created these circular clearings that intentionally or fortuitously stimulated plant growth.

Ridge-back specimens are sometimes found standing on edge partially embedded within the perimeter of circular cleared areas. Rock alignments often partially encircle these circular cleared areas and sometimes continue on to bisect or partially encircle another, in an apparently irrational manner (Figure 12). Further study of this practice is indicated; however one possible function of these alignment of rock may have resulted from an attempt by hominids to control drainage.

Many of these unique ridge-back stones would have served well as digging instruments (other tools such as triangular flake blades with carving tips and many concave forms suggest that they could have been used as spoke-shaves and wood-working implements) however, there is a reasonable possibility that many of these ridged forms resulted from a need for flakes and flake blades.

The relative stage of weathering, both mechanical and chemical, suggests that the knapping of ridge-back artifacts evolved in the Pinto-Yuha drainage area before "San Dieguito I" and after the "Malpais" Rogers 1929: 3).

## CORRELATION OF AVAILABLE EVIDENCE

The acceptance of shaped stones without percussion bulbs as artifactural is precarious, but if a close study of natural fracturing on various materials is made for a given area, it is possible to determine how natural forces affect different materials. If during the investigation it can be determined that many stones, with different lines of cleavage, have been fractured into similar shapes, it becomes desirable to determine the probable force that created the similarity. Isolating the responsible force may be difficult, and often impossible, but in the case of the ridge-back materials there is substantial evidence for human involvement.

As previously indicated, ridge-back tools are shaped from coarse grained materials including silicified sediments of locally hardened Palm Spring formation (Woodring 1935: 6). These Pleistocene sediments are hardened at three locations, two in Northern Baja California, archaeological site L C 61, - Pinto Mountains, and on the west side of the Cocapah range south of Mount Signal and north of Paso Inferior. Sediments at the latter location are insufficiently hardened to be of tool making quality and no cultural material is recognized at the site. A third silicified sediment site, Rainbow Rock, documented by Weismyer (1968: 5), is located at the southern end of the Santa Rosa Mountains, Imperial County California, on the west side of the Salton Sea (archaeological site 4-Imp-109).

These three outcrops of Pleistocene silicified sediments are located on faults where they have been uplifted and hardened by mineralized water.

Similarities and differences exist between the 4-Imp-109 site and the

L C 61 site. Both sites contain recent Indian, San Dieguito, and Malpais cultural material, (Rogers, 1929; 4, 1966 5). Ridge-back materials are not found at Imp-109. At L C 61, however, there are a great number of them made from various materials, including the silicified sediments.

By far the greater amount of materials from which ridge-back specimens are derived, are not of local origin. Most boulders and cobbles (i.e., the grey and green porphyries), have been transported some distance, for most are well rounded.

## CONCLUSION

Experiments have indicated that ridge-back flakes can be replicated from a variety of non-cryptocrystalline lithic materials with little or no indication of points of impact or percussion bulbs. It is, therefore, impossible to preclude ridge-back flakes as probable artifacts.

The forces that shaped the many ridge-back tools of the silicified sediments were applied near the L C 61 site where the sediments outcrop but the same forces were applied to other coarse-grained surface lithic materials in the area. However, ridge-back forms are not found at other locations nearby where similar lithic materials occur, so it seems improbable that these stones naturally break this way. An additional indication of human association with these uniquely-shaped stones is the great number of circular artificially disturbed areas, rock alignments, and rock cairns found at ridge-back sites, however, flaked stone materials of other traditions are also associated in some cases, making it not now possible to demonstrate the association of ridge-backs and stone features.

A few ridge-back could be fortuitous, but the great quantity and similarity of both large and small specimens at the site locations (indicated on Exhibit A, Figure 8) strongly suggests that hominids went to great efforts in producing ridge-back specimens.

Hopefully, other investigators will recognize this lithic tradition in other areas as more archaeologists become familiar with the unusual form and the knapping techniques involved.