Malcolm J. Rogers' 1938 Excavation Techniques at the C. W. Harris Site (CA-SDI-149)

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Abstract

The excavation techniques of M. J. Rogers at the C. W. Harris site (CA-SDI-149) were truly remarkable for 1938, but unfortunately descriptions of his excavation methods and techniques are found in disjointed bits and pieces scattered through field notes and unpublished papers. Rogers had the vision, the creativity, and the need to bring the right people together and stimulate their desire to conduct the "perfect excavation."

Excavation Techniques

Malcolm Rogers excavated at five locations at the C. W. Harris site (Figure 1), but because of space limitations here, only Trench 1 at Locus 1 will be discussed. Trench 1 reached a depth greater than 14 ft (Figure 2) and included the 7-ft-thick basal Stratum E of stream-deposited sands, gravels, and boulders enclosing the San Dieguito component (Figure 3). Stratum D, composed of sand and pebbles with some clay, lay unconformably on Stratum E. Stratum D lacked visible stratification and was culturally sterile. Stratum C contained cobbles, pebble gravel, and sand; occasional felsite flakes and artifacts were redeposited along with this gravel during a flood stage. Stratum B was similar to Stratum D, but coarse slope-wash sand was intermixed with the stream-deposited sands. La Jollan peoples' occupation of the terrace occurred during the deposition of the upper 4 ft of Stratum B. Stratum A, a sandy deposit laid down by historic flood stages of the river, was culturally sterile.

Rogers' primary concern was to demonstrate the association of artifacts with stratigraphic units. The chronological sequence of the strata formed the basis for establishing the relative ages of cultural components. Past environmental conditions were reflected in the stratigraphic record; with adequate control it would be possible to demonstrate that the cultural remains could be associated with particular environmental conditions. In order to demonstrate the association of artifacts with stratigraphy, Rogers achieved vertical control by excavating stratigraphic units, subdivided vertically into arbitrary levels when a stratum was homogeneous and thick, and by substrata when a stratigraphic unit was thick and exhibited complex substrata. Precise vertical location was obtained by using a transit and a datum point to establish relative elevation of features and artifacts. Horizontal control for features and artifacts was maintained by dividing the trench into 5-x-5-ft excavation units and making two triangulation measurements of location from two adjacent walls of the excavation unit within which it was located. In this manner Rogers applied the three-dimensional grid to a single row of excavation units, i.e., a trench.

Excavation of Locus I, Trench 1, Strata A, B, C, and D

At Locus 1, Trench 1, Rogers first removed the culturally sterile Stratum A from an area ca. 50 ft long and 16 ft wide, exposing the surface of Stratum B. A

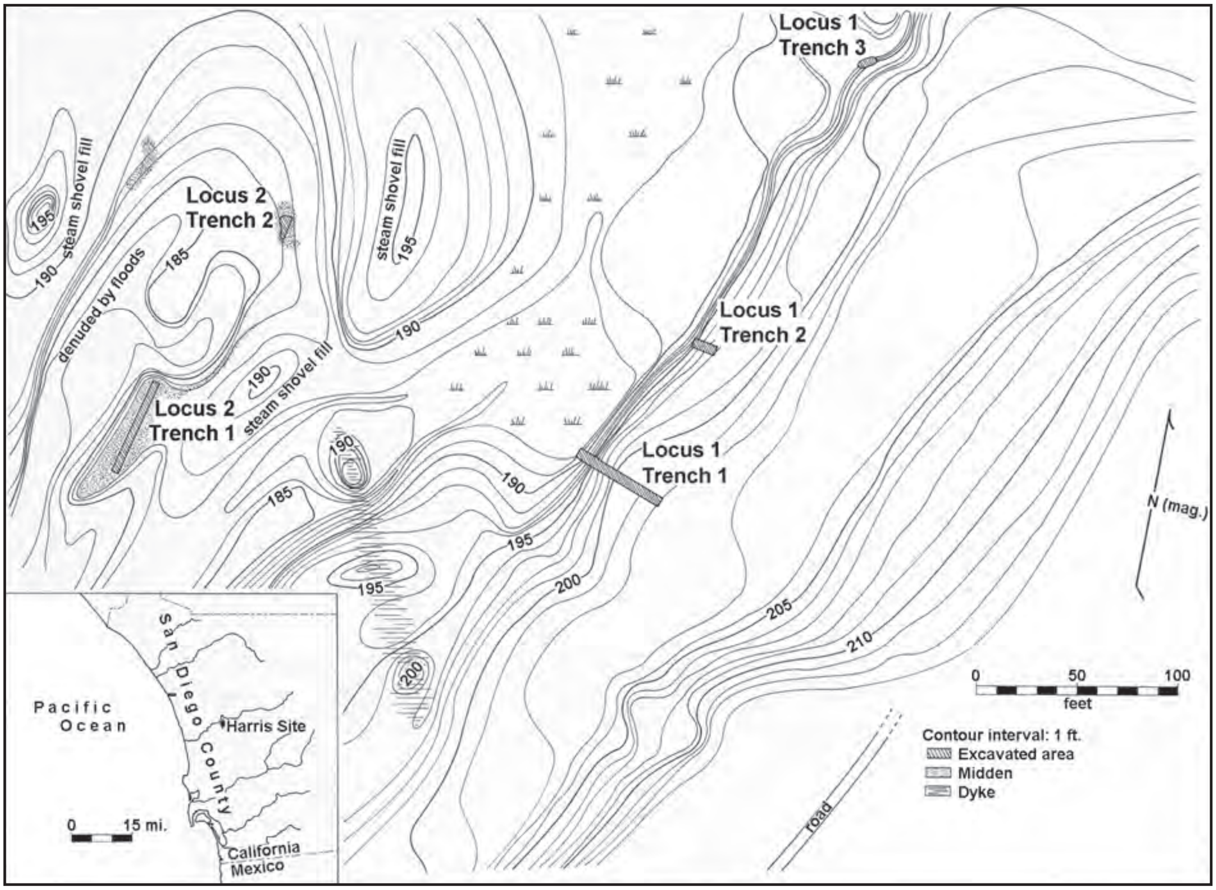
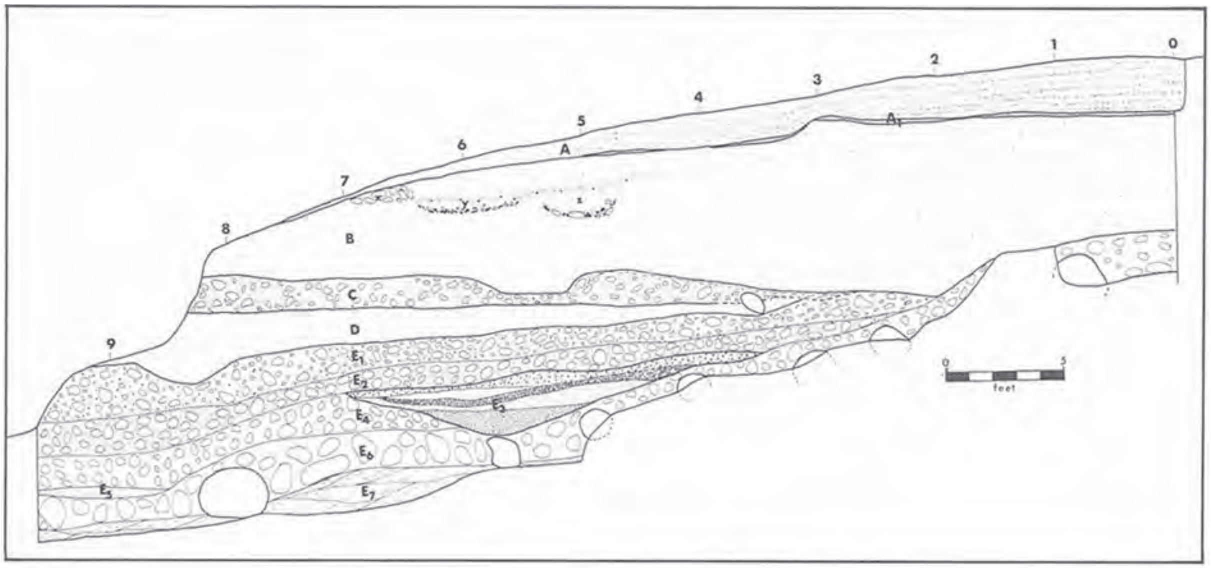


Figure 1. General location (inset) and map of the Harris site (CA-SDI-149).

Figure 2. Malcolm Rogers holds a stadia rod at one end of Trench 1, showing the depth of the trench. The stadia rod sits on the floor of the trench below the level where Rogers is standing. View to south. Copyright San Diego Museum of Man

trench 48 ft long and 5 ft wide was then established at right angles to the terrace edge (Figure 4). The trench was divided into 5-x-5-ft excavation units numbered in sequence from the south end. Excavation began with removal of arbitrary 12-in levels; depth was measured from a datum point established at ground level at Stake 3. Rogers' technique was to "peel off" arbitrary 12-in layers and to pass the midden through ¼-in screen (using water-screening) (Figure 5). Where the stratum was thicker than 12 in, additional arbitrary 12-in levels were added. Artifact locations were recorded by (1) excavation unit, (2) stratum, and (3) level (either arbitrary level or natural stratum). For example, "Stratum $1B_1$, $1B_2$" indicates Trench 1, Stratum B, and levels or substrata 1 and 2 (Rogers 1938–1939a:July 25).



A. Laminated silty light and dark sand.
A_1. Red sand and small gravel; outwash from hill to South-east.
B. Layer of red terrestrial derived earth blending into a more clayey phase at bottom.
C. Heavy silty sand with gravel ranging up to 5 inches.
D. Coarse Micaceous sand with variable clay content.
E_1. Stratum of water laid sand with boulders ranging to 10 inches.
E_2. Layer of yellow sand, gravel and small boulders, many of which are oxidized and decomposed.
E_3. Lenses of sand and gravel.
E_4. Layer of clayey sand with many decomposed boulders.
E_5. Sorted yellow sand.
E_6. Stratum of sand, gravel and boulders ranging to 30 inches.
E_7. Stratum of alternating lenses of yellow sand and blue clay.
X. Feature 3 - stone wall.
Y. Feature 2 - hearth.
Z. Feature 1 - hearth.

Figure 3. Profile of east wall of Trench 1, Locus 1, at the Harris site.

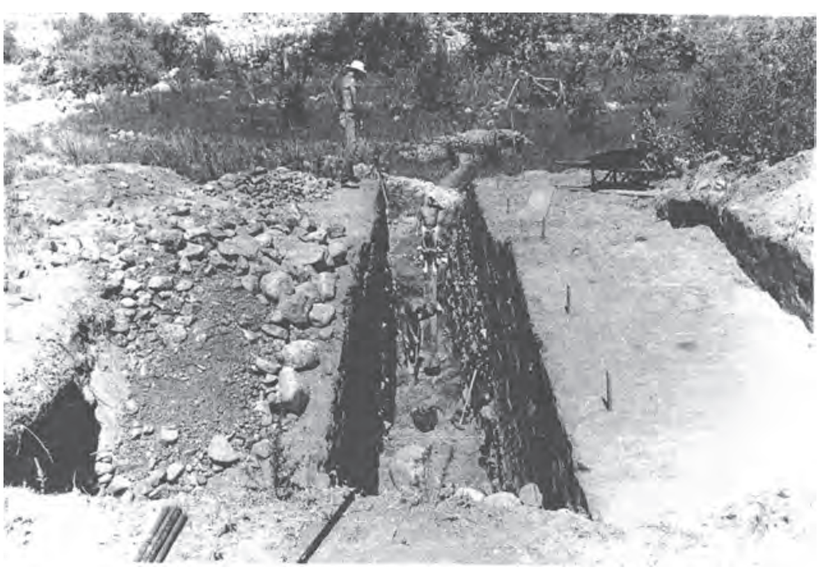


Figure 4. Trench 1, view to the north, showing removal of Stratum A. Copyright San Diego Museum of Man.

Figure 5. Water screening at the Harris site, 1938. Copyright San Diego Museum of Man.

Stratum B in Trench 1, then, was 48 ft long and 6 ft deep. Six arbitrary levels controlled the vertical dimension, and nine 5-x-5-ft excavation units controlled the horizontal dimension. Each artifact was given a field number that described its location in the site. For example, “$1B_2$” is unit 1, stratum B, arbitrary level 2 (Figure 3).

In the rocky Stratum C, Rogers recognized three substrata and excavated each as a unit. The first, designated Substratum C_1, was the upper 4 in and consisted of scattered gravel resting on the rock mass proper. The second, Substratum C_2, was 8 to 12 in thick, and this rock mass proper extended down to substratum C_3. Substratum C_3, 3 to 6 in thick, was composed of small gravel and sand which graded almost imperceptibly into Stratum D. Stratum C was also divided into nine 5-x-5-ft units for horizontal control (Figure 3).

Stratum D, in contrast, was composed of yellow sand with waterworn pebbles and had no internal stratification; it was approached as a geological stratum and subdivided vertically into arbitrary excavation levels. Artifacts were limited to the upper few inches, with a few flakes resting on the contact between Strata D and E (Figure 3).

In summary, for Strata B, C, and D in Trench 1, the primary controls were the natural strata and excavation units. Stratum B was subdivided into arbitrary levels. Stratum C was subdivided into three natural substrata, and Stratum D was subdivided into arbitrary levels. No triangulation measurements or elevations were taken in any of these strata.

Stratum E in Locus I, Trench 1

Stratum E was a very thick (ca. 7-ft), complex stratum consisting of a series of substrata of water-deposited gravels and sands, each representing a somewhat different stream environment (Figure 3). In the field notes, the substrata were recorded as E, E’, E’’, E’’’, E’’’’, and so on down to E’’’’’’. To clarify this system Rogers changed these designations from E to E_1, E’ to E_2, etc., with E’’’’’’ changed to E_7. Stratum E vertical control was maintained by excavating each natural substratum as a unit and recording the elevations of the stratigraphic unit, the artifacts, and the features relative to the datum plane. Horizontal control was again maintained by subdividing the trenches into standard excavation units (5-x-5 ft), with the precise horizontal location of the artifacts determined by triangulation measurements from two adjacent walls of the excavation unit. Each substratum was excavated, removed, and processed as a unit in its entirety before excavation of the next was begun. This technique allowed all cultural remains to be relocated to their original position in relation to the stratigraphic units.

Stratum E_3, a stream channel cut into Stratum E_4, consisted of four substrata, all of which fit chronologically and stratigraphically between Strata E_2 and E_4 (Figure 3). Stratum E_3 is the only instance where two or more substrata are grouped as a single substratum within Stratum E.

It was Stratum E_3 that led Rogers to extreme excavation techniques. After the excavation of Trench 1 was "completed," Rogers had the deeper, north end of the trench backfilled to the level of the channel, and then he began further investigation of Stratum E_3. To expose more of Stratum E_3, he made undercuts (Figure 6), beginning about 24 in above the surface of E_3 and sloping back into the sidewalls of the trench to meet the surface of Stratum E_3. These undercuts were 22 in deep in the east face of the trench and 40 in in the west face. Excavation units in the undercuts were identified as West Lateral and East Lateral of excavation units $5E_3$, $6E_3$, and $7E_3$. Precise location of artifacts was recorded in the field notes by measurement from the sidewall of the trench into the undercut and from the north or south end of the excavation units.

Undercutting is a technique not often used for very good reason as recorded by Hayden on August 24 (Figure 7):

Figure 6. Undercutting the east wall of Trench 1, Locus 1, within Stratum E. Copyright San Diego Museum of Man.

Figure 7. Cleaning up the collapse of the undercut unit in sidewall of Trench 1, Locus 1. Copyright San Diego Museum of Man.

> Just before noon the undercut W [wall] of trench collapsed, a section of W face 25' N-S and 6' E-W at max. width sliding into trench. Falling rock gave advance warning and no tools were lost. Halseth badly frightened. Ten feet (N-S), [excavation units] 6 and 7 had been carried W'ward 40 inches into bank [side-wall], and work began on [excavation unit] 5 when bank [side-wall] caved in, splintering the timbers placed earlier [Hayden 1977:W-198, Progress Notes and Archaeological Notes, July–August 1938].

Nevertheless, they continued undercutting the next day.

Artifact Catalog and Data Recorded

The catalog for Rogers' (1938–1939b) excavation is incomplete. The artifacts from Strata B and C are listed by classes, excavation unit, and level in Rogers' notes. The small number of artifacts in Stratum D are recorded by unit only. There is no indication that any of these artifacts were formally cataloged. Rogers did, however, prepare a catalog for the artifacts from Stratum E.

Each artifact was given a catalog number with a CI (for Carnegie Institution) prefix, followed by numbers in chronological order beginning with 1. Following the catalog number is the critical information regarding the artifact: class of artifact, material, dimensions of the artifact, number of pieces if not a single artifact, elevation, and the field number. The field number is a code for the location of the artifact within the excavations. An example from the catalog (Rogers 1938–1939b: CI-101) illustrates how this information was recorded: "CI-101 - End scraper. Dark felsite, unoxidized. 21 x 39 x 73mm. Elevation 92.8. Field Number 5E'f."

The field number 5E'f provides as much information as the rest of the catalog entry. Artifact CI-101 was recovered from excavation unit 5, substratum E' (i.e., E_2) and was the sixth artifact recorded from this Stratum E_2 in excavation unit 5 (Figure 3). If recovered from the undercuts in Trench 1, Locus I, it was given an additional designation of either "West Lateral [side wall]" or "East Lateral [side wall]."

The precise horizontal position of each artifact was recorded by triangulation measurements from two adjacent walls of the excavation unit, but these measurements are found only in Hayden's field notes and were not included in the catalog. By combining the information recorded in the catalog and Hayden's field notes, it is possible to identify the precise stratigraphic, vertical, and horizontal location of nearly every artifact in Stratum E, including those in the undercuts. For example, the location of a sharp felsite scraper with field number "7E'''m, W Lat." is described by Hayden (August 25, 1938:23) as "34 [inches] W of W face of trench I, in sandy gravel, 2 inches above stratum bottom, 8 inches S of N line of [excavation unit 7]."

Discussion

In the 1930s the two leading authorities on late Pleistocene and Holocene geology in the West were Ernst Antevs and Kirk Bryan. In spite of some disagreements in their views, both concurred that the Pleistocene ended about 15,000 years ago and was followed by a transitional period (called the Pluvial). Following the Pluvial, a drier, hotter period between about 7,500 and 4,500 years ago was followed by a short period of cooler/wetter climate (Little Pluvial) that lasted until the beginning of the modern climatic regime (Bryan 1950). Archaeologists relied on these climatic periods worked out by geological experts for chronologically placing their sites (e.g., Campbell 1936; Campbell et al. 1937; Rogers 1939).

This was the scientific environment when Rogers was excavating at the Harris site. He knew it was very important to make certain that his excavations were concordant with the accepted climatic scheme for the past. Rogers (1938) had viewed the Lake Mojave shoreline sites and his San Dieguito component at the Harris site as relatively young (ca. 4,000 years old). In 1938 he met and corresponded with Antevs (1938) regarding stratigraphy at the Harris site. Rogers knew that Antevs (and others) would not agree with the 4,000-year-old date. From Rogers' perspective, Stratum E at the Harris site held the potential for supporting his proposed dates for the San Dieguito artifacts. Every minor variation in Stratum E had great importance to Rogers, and he recorded all of them in detail. His detailed approach even included the orientation of artifacts, presenting data, for example, that they were stream-laid because the heavier ends were upstream and lighter ends downstream (Rogers 1938–1939a:August 25, 1938). Rogers' desire to produce data that supported the age he had assigned to San Dieguito made it necessary for him to develop methods and techniques to record extremely detailed information. Rogers' "problem" led to the "invention" of modern excavation techniques 20 years before they were in general use in North America. That he did not use these methods consistently should not detract from this achievement.

Concluding Comments

Modern histories of archaeology and recent text books generally claim that three-dimensional recording evolved from the work of Augustus Lane Fox Pitt Rivers via the contributions of Sir Mortimer Wheeler (e.g., Renfrew and Bahn 1991:28–29; Stiebing 1993:257). Hawkes (1982:170) and Wheeler (1954:64–68, 1956:97) claimed that in 1936 Wheeler worked out the grid system on the basis of trial and error at Maiden Castle. Wheeler acknowledged his debt to Pitt Rivers, who was usually recognized as the "father of scientific archaeological excavation" during the latter half of the twentieth century. Wheeler, arguably the greatest archaeological excavator of the twentieth century, wrote:

> Pitt-Rivers' method was to record every object in such a manner that it could be replaced accurately in its findspot on the recorded plan and section. That is the essence of three dimensional recording, and three dimensional recording is the essence of modern excavation [Wheeler 1954:11–12].

More recently, Warren and Rose (1994:3*)* wrote that "scientific excavation" refers to excavations with methods and techniques designed to address research questions stemming from a body of theory and knowledge, and "although the questions asked may vary widely with the archaeologist and the archaeological site, the essence of the excavation methods is still three dimensional recording." The grid system and excavation by natural stratigraphy are respectively viewed as the basis for horizontal and vertical control in modern three-dimensional excavations.

Mortimer Wheeler, however, was not the first to conduct excavations by use of both the grid system and natural stratigraphy. While that claim might well belong to William Pengelly with his excavation of Kent's Cavern in 1865 (Warren and Rose 1994), it has also become apparent that the grid system was independently invented numerous times at various points around the world. In fact, Sidney M. Wheeler, an archaeologist with the Civilian Conservation Corps (and no relation to Sir Mortimer) invented the grid system for excavation of caves in southeastern Nevada in 1934, two years before Sir Mortimer Wheeler excavated at Maiden Castle (Wheeler 1938; Winslow 1996).

Rogers' 1938 excavations developed in response to the need for data regarding spatial relationships of artifacts and natural strata as well as position and orientation of artifacts. Pengelly was addressing the same kinds of questions at Brixham Cave and Kent's Cavern, as I suspect S. M. Wheeler was also doing in the caves of southeastern Nevada, as was Sir Mortimer Wheeler when he discovered complexities of occupational remains for which his trenching method was no longer viable. All these excavators had important questions that could best be addressed by the study of geological processes, processes of site formation, and stratigraphic relationships. To address these issues required the three-dimensional approach to recording the relationship of cultural remains to geological deposits.

Some may ask why we should consider comparing William Pengelly, S. M. Wheeler, and M. J. Rogers with the great Sir Mortimer Wheeler. I say, "Why not?" The issues of "invention" and of significant techniques deserve reexamination regarding attributions and accolades. Each archaeologist was working within the scientific milieu of his time and place; each was addressing research problems that required some form of a three-dimensional record of archaeological data. Each independently invented that form of recording. As Warren and Rose (1994:35) suggested, "To credit one man with the paternity of scientific methods of excavation is to miss the historical and cultural processes in the intellectual development of the field." When comparing the intellectual context in which Rogers created his excavation methods with the intellectual context of others who seemingly invented similar methods from thin air, it becomes apparent that "advancements" in archaeology are better understood when placed in their broader historical and intellectual contexts than when simply attributed to a single genius—a "father of scientific archaeological excavations."

Acknowledgments

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