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A Quantitative Assessment of Ethnographically-Identified Activity Areas at the Point Saint George Site (CA-DNO-11) and the Validity of Ethnographic Analogy

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California archaeologists routinely use ethnography as a source of analogy for interpreting the archaeological record. In the past, many have cautioned against the uncritical use of the ethnographic record. In this paper we test the validity of ethnographic descriptions of village layout collected by Gould. Specifically, we test the notion that prehistoric Tolowa villages contained distinct habitation and workshop areas as described ethnographically—a finding qualitatively demonstrated by Gould—through the quantitative analysis of archaeological assemblages from these areas at the Point St. George site (CA-DNO-11). We find a statistically significant difference between the artifact assemblages but little difference between faunal remains recovered in the workshop versus the habitation area. We argue that while the ethnographic record should not be adopted uncritically, certain aspects of the ethnographic record, such as site structure, provide accurate analogies for behavior observable in the archaeological record.

During the summer of 1964, Richard Gould conducted excavations at the Point St. George site (CA-DNO-11), a Tolowa village site located in extreme northwestern California that is well-known for its cultural and scientific importance. He simultaneously conducted ethnographic interviews with Tolowa elders whose ancestors once lived at the site or at nearby coastal villages. As he dug in the rich shell midden covering a large area at the edge of the Point, Gould was perplexed at not finding any evidence of the redwood plank houses that were described ethnographically. When asked about the lack of house features, his Tolowa consultants "showed amusement and made the following remarks: "'…them old-timers never put their houses in the garbage-dump! (Amelia)' or, '…they didn't live in their garbage any more than you would! (Sam)'" (Gould 1966:43). They directed him to the residential area, an area that Gould doubted contained houses as it was steeply sloping (by approximately ten degrees), with no occupational debris or housepit depressions visible on the surface (Fig. 1). However, within the first 20 minutes of excavation in this area, a redwood plank was encountered that was later found to be associated with a house with a blue clay floor. Interestingly, both oral tradition and archaeology at the site provide evidence of an abandonment of the village after a pandemic around A.D. 1700.

This account is often used in introductory courses in archaeology as a classic example that demonstrates the danger of making assumptions about the record—Gould had assumed, as most did (and still do), that the areas with the most surface remains must represent habitation areas. Perhaps more importantly, however, Gould's excavation provided corroboration that Tolowa villages contained discrete activity areas within them—

Figure 1. Tolowa consultants Lydie George (left) and Amelia Brown (right) pointing at house pit in the habitation area of CA-DNO-11 during Gould's 1964 fieldwork. Richard Gould Archives Image 295, California State Parks, Eureka, California. (Photo courtesy of California Department of Parks and Recreation.)

workshops, habitation areas, and cemeteries—each with an expectable set of tools, faunal remains, and features, and that that organization was recorded in Tolowa oral tradition.

The monograph stemming from Gould's study (Gould 1966) included a great deal of ethnography, but also detailed a large-scale excavation project conducted in both the midden area (referred to hereafter as the workshop) and the habitation area. Gould formulated some expectations about activity differences between the two areas and presented largely descriptive evidence to demonstrate that the ethnographic pattern held archaeologically. No attempt was made, however, to quantify these differences or formalize the archaeological manifestations of activities within each area, nor did Gould systematically collect or quantify faunal remains to test his inferences about the storage and butchery of fish and mammals.

In the winter of 2010, we conducted additional test excavations within the workshop area at the Point St. George site in support of a site stabilization project undertaken by the County of Del Norte, the California Department of Parks and Recreation, and the California Coastal Commission (Whitaker and Tushingham 2011). In this paper, we compare our findings from the 2010 excavations, which used modern excavation methodologies and fine-grained analyses, with those from Gould's original excavations in an effort to test the validity of mid-twentieth century and later ethnographic data for the interpretation of archaeological sites. We first discuss potential drawbacks with the use of nineteenth and twentieth century ethnography, summarize Gould's ethnographic data to provide a series of testable expectations, briefly describe both Gould's and our own archaeological methods and findings, and then compare the assemblages from the workshop and habitation

areas. Finally, we discuss the broader implications of our findings for the use of ethnography in general.

POTENTIAL DRAWBACKS TO THE USE OF ETHNOGRAPHIC ANALOGY

The early twentieth century ethnography conducted by Kroeber and his students at U.C. Berkeley provided a wealth of data on contact-period Native Californian groups, a record that is broadly applied by archaeologists throughout the state. Wobst (1978) provided an early critique of the general application of ethnography to the study of prehistoric hunter-gatherers. During the 1990s and continuing into the last decade, archaeologists working in the region have increasingly cautioned against the wholesale use of ethnographic and oral history data in archaeological studies (e.g., Erlandson and Bartoy 1995, 1996; Erlandson and Moss 1997; Laylander 2006). Erlandson and his colleagues caution against an uncritical use of ethnographic data on the grounds that European diseases so altered the lives of Native Californian groups that aspects of culture recorded by nineteenth and twentieth century ethnographers were drastically different from those that existed prior to contact. However, both Erlandson and Bartoy (1996) and Erlandson and Moss (1997) specifically cite Gould's work as an example of a cautious and successful application of ethnography.

Laylander (2006) examined the utility of oral traditions (i.e., myths and legends) in tracing environmental change, ethnic migrations, and the advent of new technologies. He concluded:

> On the whole, California's myths and legends present a substantially credible picture of pre-contact lifeways, including material culture, social institutions, and value systems, although not surprisingly, those traits were sometimes exaggerated or distorted for literary effect. Received from late nineteenth and early twentieth century narrators, the traditions attest to cultural memories that had been preserved across several generations [Laylander 2006:173].

Despite this, and as in other critiques, Laylander cautions against the application of the ethnographic record, as described through oral tradition, beyond the past few centuries prior to contact. Gould himself cites conflicting views on the origins of the subterranean plank house structure he excavated at Point St. George to argue that the ethnographic record in Tolowa territory extends only as far back as genealogical memory (Gould 1990:74–79). Gould recounts an exchange between Amelia Brown and Lydie George (Fig. 1) in which Ms. George insisted that the house, which was not known to her, must have belonged to Coyote, dating to the time when "animals were people and people were animals," while Ms. Brown entertained the idea that the house may have belonged to a human ancestor long since forgotten. In addition, none of Gould's consultants could explain the dart points found in the lower and earlier Point St. George I component at the site. In contrast, the Tolowa consultants recognized excavated features and archaeological materials associated with the later (Point St. George II) site component. Thus, Gould reasoned, while oral histories could be used to better understand the site's late (Point St. George II) component, it was less relevant with regard to the older (Point St. George I) component (Gould 1990:74–79).

Elsewhere, we have both argued that the ethnographic record is biased as it relates to subsistence (Tushingham and Bencze 2013; Whitaker 2012). Whitaker (2012) found that despite an emphasis in the ethnography on pinnipeds and salmon as the primary focus of Yurok coastal hunting, waterfowl (notably coots and grebes) and non-salmonid fish were the focus of subsistence activities at the Late Period Yurok coastal village of Tshapek (CA-HUM-129) at Stone Lagoon. Rather than arguing for a wholesale rejection of the ethnographic record, Whitaker simply identified an inconsistency between the coastal archaeological record and the interior-focused ethnographic record. Similarly, Tushingham and Bencze (2013) confirmed the presence of all the major staples in prehistoric deposits at CA-DNO-11 and CA-DNO-13 that were used ethnographically by the Tolowa interviewed by Gould (1966), but found a similar dearth of evidence for salmon fishing and acorn consumption, a finding that is inconsistent with the notion that these two mass-harvested and stored foods were primary staples for coastal villagers. Importantly, both studies demonstrate the potential for variation in subsistence practices across the region.

Similar differences between the prehistoric and ethnographic records are observed by Hughes (1978), who notes that ethnographically, the most prestigious

wealth items in northwestern California and southwest Oregon—large obsidian blades—were passed from father to son and rarely buried with individual owners (Kroeber 1905:691; 1925:39; Rust 1905:688), yet such blades have been recovered with prehistoric burials (e.g., Cressman 1933a, 1933b; Hughes 1978, 1990; Loud 1918). Hughes (1978:63) suggests that these differences may be attributed to the consolidation of social boundaries in the region, "resulting in restriction or attenuation of the flow of material through existing exchange networks. If this had been so, the cost of these items would have encouraged hoarding." This disjuncture may also be associated with the cataclysmic upheaval and population declines characteristic of the historic period. In other words, after populations dwindled and exchange networks were disrupted, the blades may have been simply too precious to bury with their owners (in this vein see Hughes 1994:112 for a discussion of using ethnographic parallels to reconstruct prehistoric obsidian access mechanisms). These examples demonstrate the potential shortcomings of the ethnographic record, both as recorded by Gould (1966) and by Kroeber and his students (e.g., Driver 1939; Drucker 1950; Kroeber 1925).

Erlandson and Moss (1997) and Erlandson and Bartoy (1996) recommend that if the ethnographic record is biased by protohistoric epidemics, then it may be more suitable to test archaeological hypotheses with ethnographic data, rather than the reverse, as is typically done by California archaeologists. While we agree with this as a general guiding principal, we do not follow that analytical tactic here. This is because the hypothesis that we test here—that distinct workshop and habitation areas are archaeologically visible at the Point St. George site—is a hypothesis that initially was ethnographically derived and archaeologically supported. We simply seek to quantitatively corroborate the qualitative conclusions reached by Gould (1966).

TOLOWA ETHNOGRAPHY AND VILLAGE USE

Athabascan-speaking people in southwestern Oregon and northwestern California shared a common language and culture (Drucker 1937:222), with ethnographic territories that ranged from the Umpqua River in Oregon south to Wilson Creek in California. The Tolowa were the southernmost group of these "Oregon Athabascan" speakers, who occupied roughly 640 square miles of land along the coast, from basically the California-Oregon border south to Wilson Creek, including the entire Smith River watershed (Fig. 2). Oregon Athabascans spoke a language similar to the "California Athabascans," a group that included the Hupa, Mattole, and Sinkyone.

Tolowa territory encompassed four ecological zones: (1) the coastal strip with offshore rocks and adjacent beaches; (2) lakes Earl, Talawa, and the mouth of the Smith River estuaries; (3) the Smith River (which flows through the Redwood Belt and Oak-Woodland ecosystems); and (4) the mountainous interior uplands.

The coastal zone was a primary focus of activities, as it provided an abundant year-round supply of shellfish, sea mammals, marine fish, shorebirds, and edible seaweed. Major Tolowa villages were situated along the coast, and served as the principal socio-political units. Villages were occupied by the entire population for a majority of the year, though people would disperse to hunt, fish, and gather in temporary camps or other locations according to seasonal resource availability. Major villages tended to be strategically located near prime foraging locations such as estuaries, river mouths, and protected coastal areas such as lagoons. Permanent settlements were typically lived in for centuries, were located above flood zones, and included clusters of plank house dwellings, with house frontages facing rivers or oceans.

Villages were occupied by the entire population for nine to ten months of the year (during winter, spring, and part of summer), but villagers would disperse at other times of the year. People lived in permanent redwood-plank houses while in the major villages. These substantial structures were made of upright planks built over a shallow semi-subterranean house pit, with a hearth built into the center. Smooth stones or patios were often placed in front of the entrance, and can signal the presence of an ancient house in the archaeological record (Milburn et al. 1979; Tushingham 2005; 2009). The size, placement, and quality of the house generally depended on the wealth of the individual (Gould 1978).

Activity Areas within the Village

Tolowa elders explained to Gould that their ancestral villages were separated into several discrete areas: the residential area (where people lived), the workshop area (general discard/ work/ butchery areas), and the

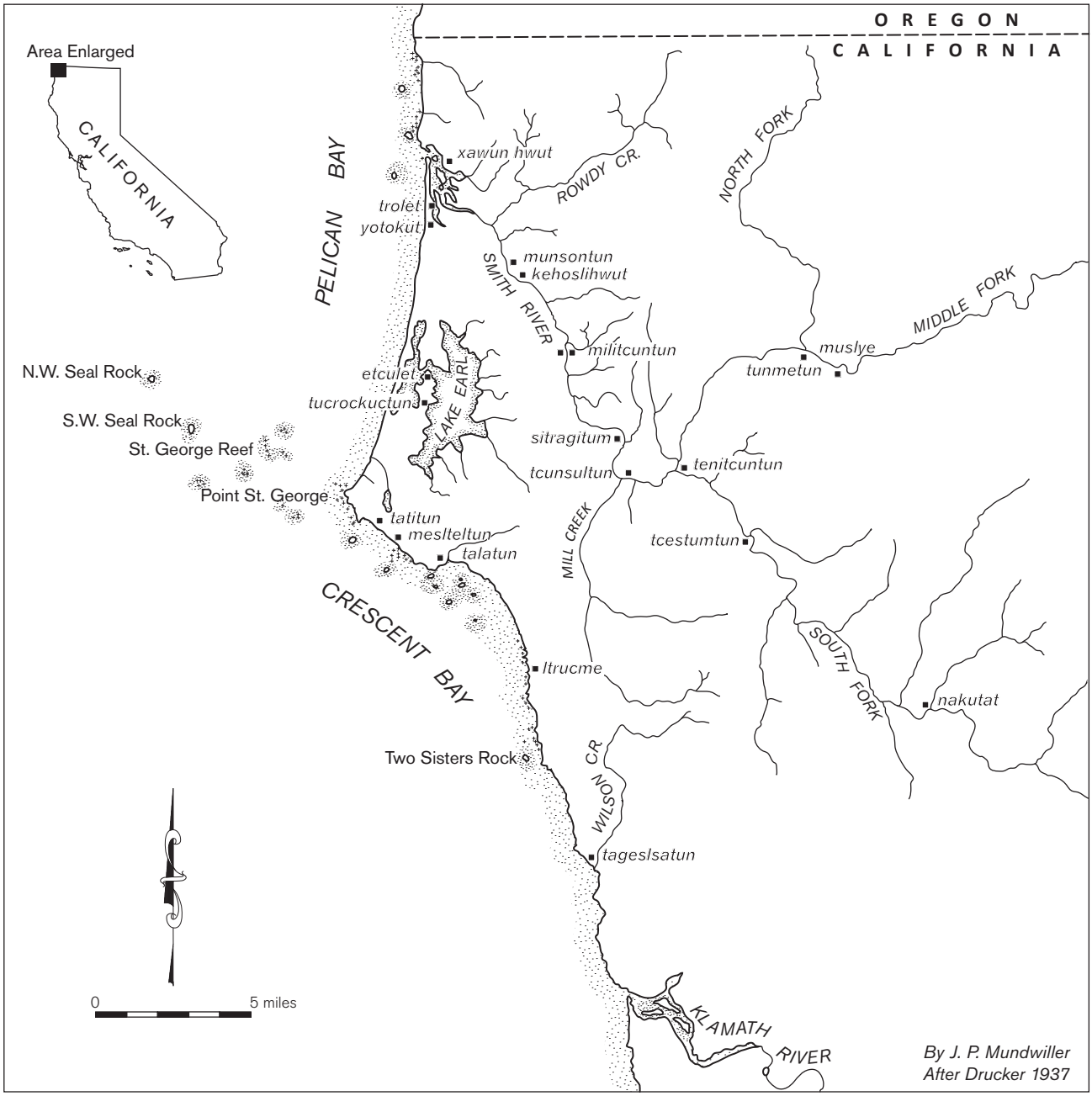

Figure 2. Southern Tolowa traditional territory with village locations recorded by Drucker (1937).

cemetery. Based on information from his consultants, Gould associated each of these areas with distinct activities and developed predictions regarding the types of archaeological residues to be expected in each (Table 1). The workshop area was thought to be most closely associated with an initial preparation of flaked stone, bone, and antler tools, and the manufacture of ground stone tools (i.e., pestles) and net sinkers (Gould 1966). In terms of food preparation and consumption, the workshop is where most "messy" activities occurred (i.e., the butchery of large mammals such as sea lions, and the initial cleaning of fish).

All food was consumed within the habitation area, fish were dried and smoked, and the final stages of manufacture for composite (e.g., fishing nets, harpoons, bows and arrows) and formal (e.g., knives, drills) tools was carried out. The most ubiquitous activity at coastal sites—the cracking or extraction of shellfish—occurred in both

Table 1

VILLAGE AREAS AND ASSOCIATED ACTIVITIES AS MODELED BY GOULD (1966)

	Workshop Area	Habitation Area
Food Preparation and Consumption		
Acorn pounding/preparation	X	X
Cracking open of shellfish for consumption	X	X
Heavy butchering of large mammals (mostly sea lion)	X	–
Consumption of most game	–	X
Initial cleaning of fish (principally removal of head/backbone of larger fish)	X	–
Drying/smoking and consumption of fish	–	X
Tool Preparation		
Basic preparation of stone tools	X	–
Fine finishing of stone tools	–	X
Manufacture of ground stone tools (pestles, large net sinkers)	X	–
Assembly of complicated tools (e.g., fishing nets and lines, harpoons, bows and arrows)	–	X

Notes: Data from Gould 1966:17–18

workshop and habitation areas, as did acorn pounding and preparation. Also notable from an archaeological perspective is the fact that Tolowa houses were essentially very large storage facilities with myriad food items stored year round, including surf fish, salmon, acorns, small seeds, berries, deer, and elk (Drucker 1937; Gould 1966).

Archaeological Expectations

There are several testable archaeological expectations that can be derived from the dichotomy between the workshop area (initial food processing and tool manufacture) and the habitation area (food consumption and tool finishing and storage). Perhaps the most important is that the two assemblages should be noticeably different in terms of the types of tools and fauna recovered from each area. Compared to the workshop, the habitation area would be expected to contain more finished tools (e.g., projectile points, drills, harpoons, net weights), many of which would have been stored in or near houses, but fewer expedient tools or evidence of initial stages of tool manufacture (e.g., early stage bifaces, cores, debitage).

Faunal remains are expected to be found in greater densities in the workshop area, where initial butchering is thought to have occurred, but may also be found in the habitation area if associated with portions of animals that may have been stored or the bones of animals that were stored whole (e.g., smelt). In particular, sea lion bones are expected mainly in the workshop area.

ARCHAEOLOGICAL DATA COLLECTION FROM POINT ST. GEORGE

Data to test the validity of the ethnographically described activity areas in Tolowa villages are derived from two excavations at the Point St. George site. The first involved Gould's original work referenced above, which entailed a large sample of both the habitation and workshop areas (Gould 1966). The second involved the more recent excavations we conducted within the workshop area (Whitaker and Tushingham 2011). We describe the methods and findings of each set of excavations as well as the previously unreported information on provenience for Gould's data that we tabulated as part of our recent study. Artifacts were linked to either the habitation or workshop area according to their provenience (e.g., Trenches 1 through 4), which was recorded in Gould's catalog (Gould n.d.). Artifacts that were surface collected or not assigned to a specific provenience were not included in the analysis.

Gould's 1964 Excavations at CA-DNO-11

Gould's methodology within both the habitation and workshop areas consisted of excavating five-foot-square areas along trenches that cross-cut several dunes at the site. All matrix was "shovel-cast" into back-dirt piles, and artifacts and bone elements were collected. Artifacts were catalogued by provenience, but Gould did not separate the Late Period assemblage by activity area in his monograph (Gould 1966). Using the original catalogues from the excavation, we tabulated the findings by component and locus (Whitaker and Tushingham 2011). Although two component assemblages were identified by Gould within the workshop area—one dating to the Mendocino Pattern (3,000–1,500 cal B.P.) and one to the Late Period (1,500–150 cal B.P.)—we focus only on the Late Period assemblage (Table 2), which (unlike the earlier component) Gould argued was culturally representative of the ethnographic Tolowa.

Gould's excavations within the habitation area, located on a bluff about 265 meters south of the workshop area, were largely guided by local Native consultants and

Table 2

ARTIFACTS RECOVERED FROM CA-DNO-11 BY ETHNOGRAPHIC ACTIVITY AREA (1966)

	Gould 1966		Whitaker and Tushingham 2011	Grand
	Habitation	Workshop	Workshop	Total
Flaked Stone Tools				
Projectile Points	10	13	–	**23**
Stone Harpoon Tips	10	4	1	**15**
Bifaces	7	3	1	**11**
Drills	4	–	–	**4**
Cores	–	–	4	**4**
Core Tools	–	–	4	**4**
Flake Tools	–	6	3	**9**
Ground Stone Tools				
Bowl Mortar	–	–	1	**1**
Pestles	6	14	1	**21**
Misc. Ground Stone	3	16	–	**19**
Ground Slate	–	3	–	**3**
Net Sinkers	21	5	–	**26**
Adze Handles	1	2	–	**3**
Modified Stone Artifacts				
Steatite Pipe Fragments	–	2	–	**2**
Hematite Artifacts	–	1	–	**1**
Hematite Fragments	–	1	1	**2**
Modified Bone Artifacts				
Bone Wedges	8	35	–	**43**
Simple Harpoons	5	–	–	**5**
Gorge Hooks	1	1	–	**2**
Awls/Pins	3	9	3	**15**
Decorated Bone	–	3	–	**3**
Miscellaneous Bone Tools	1	3	4	**8**
Curved Fishhooks	–	3	–	**3**
Modified Shell Artifacts				
Dentalium	–	1	–	**1**
Clam Disk Beads	–	1	–	**1**
TOTAL	**80**	**126**	**23**	**229**

Notes: Data from Gould (1966) and his hand-written catalogue.

included the excavation of a single exposure (Trench 2), which exposed the remains of a redwood plank house with a prepared blue clay floor, and unearthed 31 flaked stone, ground stone, and bone tools (Table 2). No radiocarbon dates were obtained by Gould in the habitation area, but this portion of the site is assumed to reflect Late Period occupations based on temporally diagnostic artifacts.

Late Period deposits from the three excavation trenches (1, 3, and 4) within the workshop area included flaked and ground stone tools, stone harpoon tips, ground slate, net sinkers, adze handles, steatite pipe fragments, bone tools used for fishing, and decorated bone ornaments and shell beads. Bone tools included awls/pins, gorges, curved fishhooks, and bone wedges. Gould concluded that there was evidence in the Late Period workshop area for a variety of tasks, such as flaked-stone tool production, working antler and bone, cleaning fish, heavy-duty butchering, and hematite processing.

2010 Excavations

Three control units totaling 2.6 cubic meters were excavated within the workshop area in 2010. All matrix was screened through either 1/8- or 1/4-inch wire mesh screens. A 20 x 20-centimeter column sample was taken from one unit in ten-centimeter increments from 0 to 70 centimeters below surface to collect plant macrofossils, fish bone, and other midden microconstituents. The artifact assemblage recovered from these excavation units included 23 lithic or modified bone tools, 171 pieces of lithic debitage, 1,041 mammal and bird bones, 3,004 fish bones, and 1,219 grams of shellfish.

Four Accelerator Mass Spectrometry dates were obtained on mussel (*Mytilus californianus*) shell and burnt nutshell. Calibrated median probability ages of the four samples ranged from 1,200–650 cal B.P., all within the Late Period and contemporaneous with the predicted period of occupation in the habitation area (Table 3; Whitaker and Tushingham 2011).

Quantification of Differences Between Workshop and Habitation Areas

Gould concluded that the ethnographically predicted patterns were borne out by the results of his excavations, with evidence for all of the activities that had been predicted to have occurred within the workshop and with evidence for some of the predicted activities in the habitation area. However, nowhere in his monograph did he tabulate the assemblages for the two areas or attempt to statistically confirm or refute the idea that there were two distinct activity areas. Instead, he relied mainly on ethnographic information and the presence of the house floor to conclude that the loci represented unique activity areas. We combined the artifacts from

Table 3

RADIOCARBON DATES FROM CA-DNO-11

Sample ID	Provenience	Material	^{14}C Years B.P.	2-Sigma Range	Calibrated Median
I-04006[a]	Trench 3	Charcoal	2,260 ± 210	2,772–1,811 cal B.P.	2,280 cal B.P.
NOSAMS-86017[b]	CU 1 Level 4	*Mytilus californianus*	1,900 ± 25	1,295–945 cal B.P.	1,137 cal B.P.
NOSAMS-86018[b]	CU 1 Level 6	*Mytilus californianus*	1,980 ± 25	1,386–1,011 cal B.P.	1,214 cal B.P.
NOSAMS-86019[b]	CU 3 Feature 2	*Protothaca staminea*	1,410 ± 25	827–507 cal B.P.	658 cal B.P.
NOSAMS-86020[b]	CU 3 Feature 2	Bay nutshell	675 ± 25	675–562 cal B.P.	651 cal B.P.

Note: Dates on shell were calibrated using Calib 6.0 calibration software and were corrected for the marine reservoir effect using a Delta R correction of 316 ± 85 based on an averaged correction rate for northern California and southern Oregon (calib.qub.ac.uk/marine; see Tushingham 2009). a-Gould 1972; b-Whitaker and Tushingham 2011.

Gould's original excavations and our current excavations for our analysis. The resulting table (Table 2) includes both Gould's and the current study's artifacts from the workshop area and Gould's assemblage from the habitation area. Cores, core tools, and debitage were not systematically collected by Gould, and therefore offer a poor comparative assemblage; we therefore do not include them in the current analysis, though cores are included in Table 2.

We employed chi-square tests[1] and a consideration of adjusted standard residuals (Agresti 1996) to distinguish the extent to which the contents of individual assemblages are the same or different (e.g., Bettinger 1989). Chi-square values and adjusted residuals were calculated from contingency tables composed of 22 rows (artifact categories) and two columns (individual assemblages). Chi-square tests applied to these tables assess the probability of associations observed between variables. In this case, we are concerned with the independence of the data sets—whether the two assemblages differ in their contents.

The residuals in the chi-square test represent the difference between the observed and expected frequencies for each cell in the contingency tabulation. They are adjusted to a mean of zero and standard deviation of one. In the current analysis, consideration of adjusted residuals allows for the identification of those parts of a particular assemblage that are significantly different than expected in a random distribution. In other words, adjusted residuals can indicate if a particular artifact is over- or under-represented in an assemblage relative to all other assemblages under consideration. We follow the method employed by Bettinger (1989:312–313) to calculate standardized adjusted residuals.

With a significance level equal to 0.05, residuals greater than 1.96 or less than –1.96 are significant, meaning a particular class of artifact is either over-represented (>1.96) or under-represented (<–1.96) in a sample. Residuals falling between these values are considered to contribute equally to both assemblages. Data must meet the same requirements as the chi-square statistical test, namely that no more than 20% of cells must have fewer than five items. Unfortunately, even with the combination of artifact types, this is not possible. As a result, the statistical analysis is more prone to error. Regardless, the results demonstrate significant differences between the two assemblages.

The chi-squared and standardized adjusted residual values for the two assemblages are shown in Table 4. The chi-square analysis shows that there is an extremely significant statistical difference between the two assemblages (X^2=71.16, degrees of freedom=21, p-value <0.0001), with only a 0.00005% probability that the two assemblages represent a random sample from the same general population. In other words, the assemblages are unique. The standardized adjusted residuals elucidate the artifact classes which drive these differences. Seven artifact types are over-represented in one of the two assemblages: net sinkers, drills, harpoons, and harpoon tips are statistically more common in the habitation area, while flake tools, bone wedges, and miscellaneous ground stone (mainly mortars) are more common in the workshop area.

Dietary Data

Since faunal data constitute the most widely available type of data at coastal sites, an analysis of both vertebrate and invertebrate fauna from the two areas is important

Table 4

CHI-SQUARED AND STANDARDIZED ADJUSTED RESIDUAL ANALYSIS OF LATE PERIOD ASSEMBLAGES BY ACTIVITY AREA

	Habitation	Workshop	Total	Chi Square		Standardized Adjusted Residuals	
Flaked Stone Tools							
Projectile Points	10	13	23	0.27	0.16	0.70	-0.70
Stone Harpoon Tips	10	5	15	3.61	2.11	**2.48**	**-2.48**
Bifaces	7	4	11	2.14	1.25	1.89	-1.89
Drills	4	–	4	4.32	2.53	**2.64**	**-2.64**
Flake Tools	–	7	7	2.58	1.51	**-2.06**	**2.06**
Ground Stone Tools							
Pestles	6	15	21	0.39	0.23	-0.83	0.83
Misc. Ground Stone	3	17	20	2.59	1.51	**-2.13**	**2.13**
Ground Slate	–	3	3	1.11	0.65	-1.33	1.33
Net Sinkers	21	6	27	12.26	7.16	**4.71**	**-4.71**
Adze Handles	1	2	3	0.01	0.01	-0.13	0.13
Modified Stone Artifacts							
Steatite Pipe Fragments	–	2	2	0.74	0.43	-1.09	1.09
Hematite Artifacts	–	1	1	0.37	0.22	-0.77	0.77
Hematite Fragments	–	1	1	0.37	0.22	-0.77	0.77
Modified Bone Artifacts							
Bone Wedges	8	35	43	3.89	2.27	**-2.77**	**2.77**
Simple Harpoons	5	–	5	5.41	3.16	**2.96**	**-2.96**
Gorge Hooks	1	1	2	0.09	0.05	0.39	-0.39
Awls/Pins	3	12	15	1.16	0.68	-1.40	1.40
Decorated Bone	–	3	3	1.11	0.65	-1.33	1.33
Miscellaneous Bone Tools	1	5	6	0.66	0.39	-1.04	1.04
Curved Fishhooks	–	3	3	1.11	0.65	-1.33	1.33
Modified Shell Artifacts							
Dentalium	–	1	1	0.37	0.22	-0.77	0.77
Clam Disk Beads	–	1	1	0.37	0.22	-0.77	0.77
TOTAL	**80**	**137**	**217**	**–**	**–**	**–**	**–**

Note: Shaded cells are significant to 0.05 level; data are from Gould's catalogue (Gould n.d.) and the current excavations.

for understanding the overall use-area patterning at the site. According to Gould's model, most "messy" activities, including the heavy butchery of animals, was conducted in the workshop area. While most food was consumed in the habitation area, most food refuse was transported and discarded at the workshop. Therefore, we expect fewer faunal remains, especially those from large mammals, in the residential area.

In a recent study, Tushingham and Bencze (2013) gathered previously unavailable quantitative faunal data from Gould's excavations at Point St. George, including data tabulated from original catalogues prepared in analyses of bird and mammal (Ziegler 1964) and fish (Follett 1965) bone. Using the data compiled by Tushingham and Bencze (2013), we separated data between residential and workshop contexts.

Contrary to expectations, we found relatively few differences in the faunal remains identified from these areas (Table 5; Fig. 3). Although there is variation in the frequency of some taxa, the overall number of identified specimens (NISP) in both areas was very similar (residential area NISP = 1,037; workshop area

Table 5

SUMMARY OF BIRD AND MAMMAL BONE FROM GOULD'S 1964 EXCAVATIONS AT CA-DNO-11 (FROM ZIEGLER 1964)

Taxon	Common Name	Residential Area			Workshop	Grand Total
		House	House Area	Midden		
Aves						
Corvus brachyrhynchos	American crow	–	–	–	1	1
Phalacrocorax sp.	Cormorant	–	–	2	7	9
Alcidae (large)	Murres, auklets, guillemots	–	–	1	–	1
Rallidae (large) (*Fulica americana*, *Rallus* sp., *Gallinula chloropus*)	Coot, rail, gallinule/moorhen	–	–	2	–	2
Laridae or Scolopacidae	Gull or large shorebird	–	2	2	2	6
Anatinae	Duck	–	1	4	5	10
Anserinae	Goose	–	–	–	11	11
Aves (small)	Small Bird+	1	4	–	1	6
Aves (medium)	Medium bird+		1	–	–	1
Aves (large)	Large bird+	–	3	1	4	8
Aves (very large)	Very large bird+	–	–	1	–	1
Mammalia						
Lagomorpha (*Lepus* sp. or *Sylvilagus* sp.)	Jack rabbit or cottontail	–	1	–	–	1
Thomomys bottae	Pocket gopher	1	5	1	17	24*
Procyon lotor	Raccoon	–	–	1	2	3
Microtus sp.	Voles	–	1	–	–	1*
Cervus elaphus	Elk/wapiti	1	2	3	31	37
Odocoileus sp. (*O. hemionus* or *O. virginianus*)	Deer (mule or white tail)	–	1	1	4	6
Artiodactyl (medium)	Deer, pronghorn, sheep	–	–	1	1	2
Canis latrans	Coyote	–	1	–	–	1
Ursus americanus	Black bear	–	–	–	1	1
Callorhinus ursinus	Northern Fur Seal	–	–	–	1	1
Eumetopias jubatus	Stellar sea lion	1	44	120	113	278
Zalophus californianus	California Sea Lion	–	–	4	3	7
Phoca vitulina	Harbor seal	–	1	1	4	5
Pinniped	Sea lion, fur seal or seal	2	112	358	404	876
Enhydra lutris	Sea Otter	–	–	4	30	34
Cetacean (small)	Porpoise or dolphin	–	–	–	3	3
Cetacean (large)	Whale	–	–	–	2	2
Mammalia (small)	Small mammal++	–	–	–	2	2
Mammalia (medium)	Medium mammal++	–	–	4	4	8
Mammalia (large)	Large mammal++	11	96	234	422	763
TOTAL NISP		**17**	**275**	**745**	**1,074**	**2,111**

+**Bird size classes:** Very large ="pelican and albatross size"; Large ="hawk-cormorant etc. size"; Medium ="crow and small duck size"; Small ="up through robin and jay sized"

++**Mammal size classes:** Large="pinniped/deer size and up"; Medium = "large skunk to wolf and sea otter size"

*likely intrusive according to Ziegler

NISP=1,074). Pinniped and bird bones are nearly evenly distributed between the workshop and habitation areas, with 31 of the 56 total bird bones (55.4%) and 555 of the 1,201 identified pinniped bones (46.2%) associated with the workshop area. However, large terrestrial mammals and fish are proportionately more frequent in the workshop area, with 36 of the 46 artiodactyls (78.3%) and 153 of the 177 fish bones (86.4%) recovered from this area.

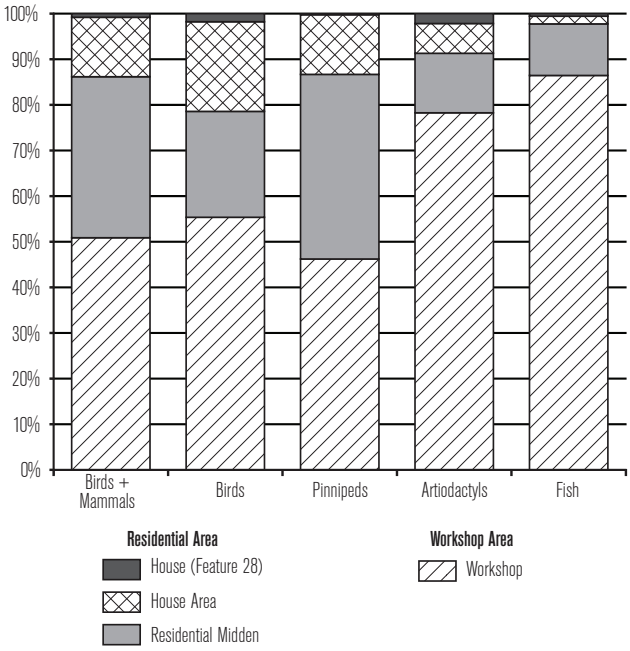

Figure 3. Relative recovery of faunal remains from workshop and three contexts within the habitation area (note: birds + mammals are indeterminate bird or mammal bone fragments).

In terms of faunal remains, the residential midden area is in fact very similar to the workshop, although there are fewer fish and artiodactyl bones there overall. Because there was far more bone, particularly from marine mammals, than expected in the residential area, we decided to take a closer look at where the remains were found within this area. As Gould's map demonstrates (Fig. 4), the residential area contained a discrete midden area set apart from the site's excavated semi-subterranean house. We therefore divided faunal remains by unit provenience into three discrete groups: (1) within house, (2) the (outside) house area, and (3) the residential area midden.

Separated in this way, it is apparent that very few faunal remains were found within the house, slightly more were found in units adjacent to the house, and the most faunal remains in the residential area were associated with units excavated away from the house (i.e., in the discrete midden area; Fig. 3). This indicates that the presence of a localized, house-based kitchen midden may be muddying the record between the two larger activity areas. If partially processed or butchered food was brought to the residential area for storage (as described ethnographically), it may be too difficult to distinguish between the two areas based on faunal remains, at least at our current level of archaeological resolution.

SUMMARY OF DIFFERENCES BETWEEN ACTIVITY AREAS

Based on these data, we can re-evaluate Gould's original conclusions. We agree, with a great deal of certainty, that the northern and southern loci of the site are discrete activity areas represented in the distinct artifact assemblages recovered. Furthermore, the notion that tools were manufactured in the northern locus but stored within the houses of the southern (habitation) area is confirmed by the assemblages. Most notably, nets and harpoons, both technologies requiring a great deal of investment and ethnographically described as being stored within houses, were recovered in greater abundance in the habitation area. Gould (1966) believed that the net sinkers found in the habitation area were most likely associated with nets, whereas those found in the workshop area were individual implements not yet attached to netting. For example, 13 of the 21 net sinkers found in the habitation area were found in close association; Gould (1966:73) hypothesized that they likely represented net weights that were once attached to a "single large net….(the net would have decomposed, leaving the sinkers concentrated as we found them)." In contrast, more expedient and generalized tools were found in the northern locus. Flake tools are expediently produced implements used for a variety of animal processing and net/basket-making tasks. Similarly, bone wedges are associated with wood-working, an activity expected to occur in the workshop area. Two of the seven significant artifact class differences go against the general interpretation. Drills were recovered exclusively from the habitation area and miscellaneous ground stone tools (mainly mortars or milling slabs) were mainly recovered from the workshop area when they would be expected within habitation areas equally if not more frequently. The presence of drills in the habitation area is perhaps best explained by the nature of their use. Drills are typically associated with puncturing materials (e.g., wood, bone, and hide) which is more delicate or intricate work that fits Gould's description of the habitation area as being the location where the finer

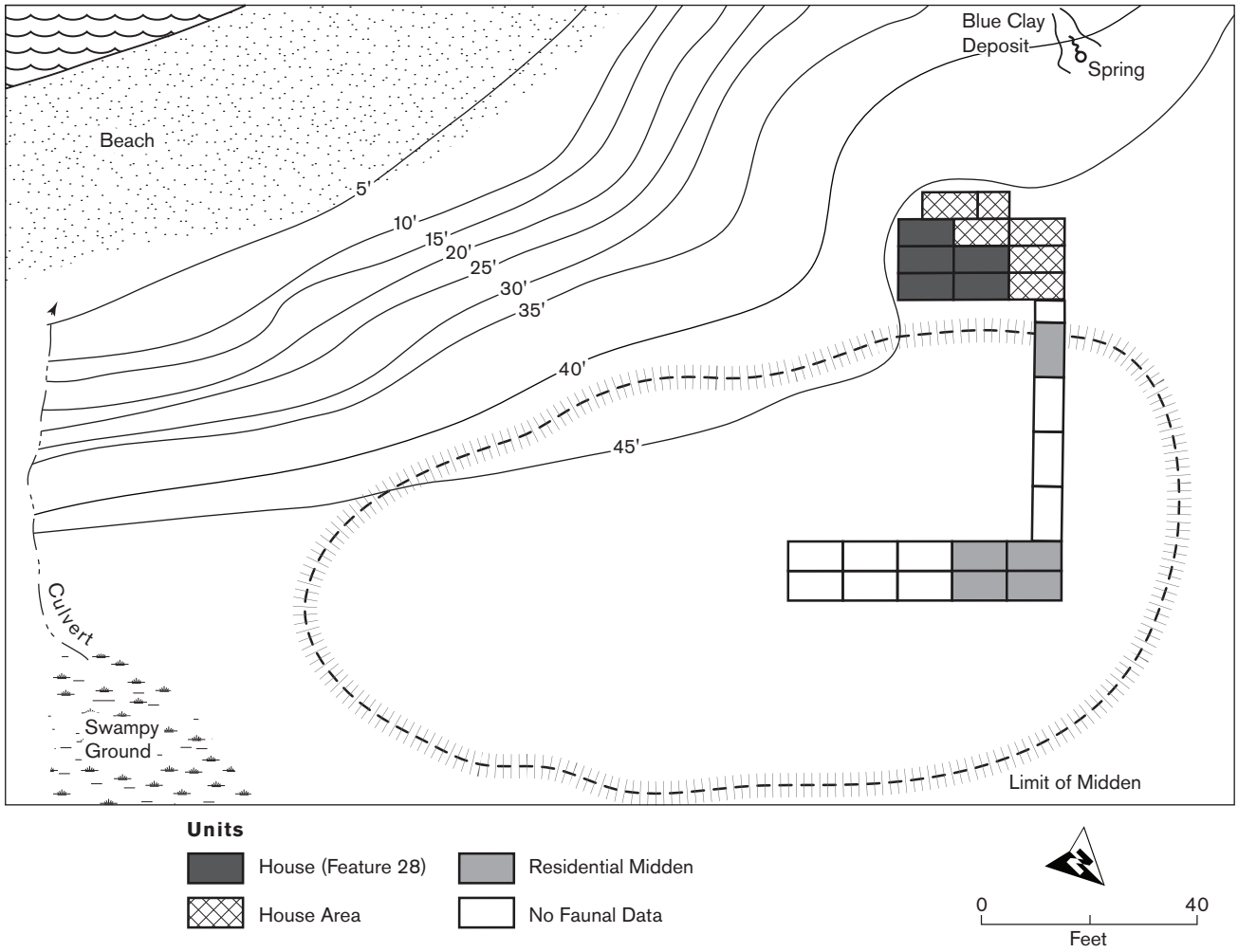

Figure 4. Location and context of excavation units with identified fauna from within the habitation area.

finishing of tools and the assembly of complicated tools took place.

Despite some anomalous findings, the quantitative data substantiate the qualitative interpretation made by Gould—the northern locus was used for a greater variety of tasks, including carcass processing, seed processing, wood-working, and tool manufacture. In contrast, completed tools, particularly composite ones, were stored within houses in the southern locus.

Despite expectations, we found surprisingly few differences in the faunal remains found in the residential and workshop areas from Gould's excavations. Assuming the workshop and residential areas are contemporaneous with one another, it appears that certain types of animals (elk, deer, and fish), were more often processed and/or discarded in the workshop. Otherwise, faunal remains found in the residential area are very similar to those found in the workshop area, although most are found within a discrete midden area set apart from the houses.

DISCUSSION

The archaeological record corroborates, both qualitatively and quantitatively, the ethnographically described differences between loci at the Point St. George site. Although this is just one example, the knowledge possessed by Richard Gould's consultants provides a concrete demonstration of the lasting imprint of oral tradition even into the twentieth century. Gould's consultants could identify the location of the residential area at a site which appears to have been abandoned over 300 years earlier, and despite the dramatic impacts

on the population and culture of the Tolowa that had occurred between 1850 and 1960 (Madley 2012; Thorton 1984, 1986; Tushingham 2005).

Interestingly, the accuracy with which activity areas were identified stands in contrast to other recent studies that find a mismatch between the archaeological and ethnographic records (Tushingham and Bencze 2013; Whitaker 2012). As noted above, Whitaker found that the ethnographic record de-emphasized waterfowl and small mammals in relationship to the pinnipeds and salmon that are described ethnographically as staples. Similarly, in a study of micro-constituent samples from nearby DNO-13 at southern Point St. George, Tushingham and Bencze (2013) found key qualitative aspects of hunter-gatherer organization and patterns of resource procurement consistent between Gould's description of the Late Period and ethnographic Tolowa (e.g., intensive use of low-ranked resources, low mobility, mass harvest and bulk storage of food, and the logistical procurement of resources by task-oriented groups), but discerned variability in certain aspects of the diet. Small intertidal fish and artiodactyls may have been more important in the past than is portrayed in ethnographic models, while key ethnographically-described staples from interior zones (salmon and acorns) were found in lower numbers than expected. They posit that access to interior resources may have been more constrained for coastal villagers in the pre-contact period, when populations were much denser. These discrepancies, however, likely stem from an over-emphasis on the higher quality (and likely higher-ranked) foods eaten by prehistoric inhabitants of the California coast, and therefore consultants may have emphasized the foods that they continued to consume even after they were forced into historic-era Euro-American cash economies. In both cases, we have argued that the ethnographic baby should not be thrown out with the bathwater, but instead, that a careful application of ethnographic and ethnohistoric data should be used in conjunction with the archaeological record.

The ethnographic record appears to be most robust in describing the overall structure of village sites rather than the specifics of the subsistence economy. In fact, the point made by Gould's consultants is possibly not so much one about unique Tolowa traits, but instead reflects what the Tolowa saw as a human universal: "They didn't live in their garbage any more than you would!" (Gould 1966). In this sense, the remarkable part of the interaction between Gould and his consultants was the consultants' ability to identify the location of the house despite the several hundred years that had elapsed since it had been occupied. If, as Gould hypothesized, the village was abandoned around A.D. 1700 (when it was hit with a pandemic), it may not be surprising that the location of the residential area was passed down to the descendants of those that lived in the house at DNO-11. This might have been simply something that was noted in passing when villagers from nearby DNO-13 moved past DNO-11 on their way to the sandy dunes north of the point, or it may have been more broadly engraved in oral tradition through formal storytelling.

A pattern emerges from the small sample of comparisons between the ethnographic and archaeological records described here, and from other recent papers from northwestern California (Tushingham and Bencze 2013; Whitaker 2012). Details concerning subsistence and settlement appear to be less accurate than more basic topics such as village organization. This might be due to differential effects of Euro-American culture on Native Californians. Certain foods that were important not only for subsistence, but also for cultural and spiritual practices—such as salmon, surf fish, acorns, and sea lions—would have continued to be pursued despite the presence of Euro-American dry goods and livestock. Imported food items and new technologies involving subsistence (i.e., firearms), however, are likely to have replaced lower-ranked, but staple foods (cf. Winterhalder 1981). Thus, when ethnographers recorded details about subsistence and settlement patterns, the remaining traditional practices emphasized the previously less abundant, but culturally important, practices. In contrast, it is apparent that the arrival of Euro-Americans did little to affect certain aspects of hunter-gatherer organization, including the use of semi-subterranean houses (Tushingham 2005). Details such as these, therefore, would have been more likely to survive European pandemics, genocidal violence, reservation roundups, and acculturational attempts in the early half of the twentieth century (Tushingham 2005). In a broader sense, these findings demonstrate the fidelity of the transmission of non-economic cultural practices as late as the middle of the twentieth century. Put another way, there are certain structural details that seem to persist

while the subsistence economy is necessarily flexible. It follows that the specifics of many other cultural practices, including dances, songs, stories, and political systems, are likely to be just as accurate as the details about village structure demonstrated here.

Therefore, perhaps rather than either taking ethnography at face value, or testing archaeological data against ethnographic evidence, we should take greater steps to justify the types of ethnographic data we use or factor in the ways in which impacts between contact and the recording of the ethnographic information may have shaped traditional culture and therefore the information provided by consultants.

NOTES

[1]The chi-square statistic is calculated by finding the difference between each observed and theoretical frequency for each possible outcome, squaring them, dividing each by the theoretical frequency, and taking the sum of the results. Residuals represent the difference between the observed and expected frequencies for each cell in the contingency tabulation. To standardize these residuals they are adjusted to a mean of zero and a standard deviation of one. They are standardized through a series of steps.

Individual row-column residuals are standardized:

$$e_{ij} = (n_{ij} - E_{ij})/\sqrt{E_{ij}},$$

where e_{ij} is the standardized residual for the jth artifact in the ith assemblage.

These standardized residuals are then adjusted according to their estimated variance:

$$d_{ij} = e_{ij}/\sqrt{v_{ij}},$$

where:

d_{ij} is the adjusted residual for the ith artifact category in the jth assemblage

v_{ij} is the estimated variance of that standardized residual (e_{ij}), calculated as:

$$v_{ij} = (1 - n_{i\cdot}/N)(1 - n_{\cdot j}/N),$$

where:

$n_{i\cdot}$ is the sum of the ith variable over all rows

$n_{\cdot j}$ is the sum of the jth variable over all columns.

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