Volume 50, Number 3

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Cover illustration from Chris Lintz’s report on Chalk Hollow, this issue.

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From the Editors’ Digs

This is our second issue of the new journal format for OAS publications. We still are working to standardize the format and provide timely news and interesting articles. Our projected Society Spotlight has yet to materialize simply because we have not had time to get out to visit our first vict…er, interviewees (still hope to see you soon, Loy and John!).

We have added a section of abstracts on articles from other journals and publications that relate to Oklahoma archaeology (keep those great ideas coming, Pete). We hope this will be very useful. If you notice any articles that we missed, please send us the abstract for inclusion in the next journal. You can also help increase this database on Oklahoma articles by regularly submitting abstracts from journals that you receive. At present, we are getting abstracts from American Antiquity, Plains Anthropologist, North American Archeologist, Current Research in the Pleistocene, and a few others.

The past few months since the first journal issue have been very busy. The 50th anniversary meeting of the Society in Norman was a great success. We had a large turnout and many people traveled from other states to meet old friends and discuss previous digs and activities of the Society. We hope many of you were able to attend and enjoy Don’s slide show on past digs and the talks on Jake Bluff and Mississippian Mound Centers. Congratulations to Christina Rich-Splawn and Barry Splawn, 2002 Golden Trowel Award winners.

Plans are underway for the Fall Meeting to be held at the same time as the Plains Conference in Oklahoma City, October 26. Look for the announcement in the fall issue of the Oklahoma Archaeology. The Fall Activity is scheduled for Lake Murray, October 11-14. The Spring Dig was recently completed at the Jake Bluff site in northwest Oklahoma and the OU Field School is currently working at the site. In April, Larry Neal directed Society volunteers in excavations at the Kubik site in northern Oklahoma, and he has provided an article on the results in this issue.

Society thanks go out to three members who provided generous contributions to the Society. Stephen S. Israel of Baltimore, MD, sent a contribution to help defray the costs of the 50th anniversary celebration. His contribution helped pay for a new OAS logo banner. Dr. Israel was a student of Dr. Bell from 1964-1969 and has been a member of the OAS since 1977. Hank Kerr made a contribution to the Society at the 50th Anniversary celebration in Norman. Hank Kerr has been a member since 1990. Ronald Ludwig of Browning, MO, sent a contribution to help pay for Charlette Gifford’s work in compiling a history of the first 50 years of the Society. Ronald Ludwig is a life member of the Society and first joined in 1966.

We are still looking for articles for future issues of the journal. Note that there are some short articles submitted by OAS members in this volume. These short articles make for interesting reading and we could use more. If you have a find or site of interest, send a few paragraphs to us. We will be happy to help you with formatting and comments on content. We also could use longer articles for future issues.

We hope you all have a good summer and we look forward to seeing you at the fall meeting and activity.

Richard Drass
Mary Ann Drass
June 15, 2002

Christina Rich-Splawn and Barry Splawn, 2002 Golden Trowel Award winners.
The Spring Meeting, held at the Sam Noble Oklahoma Museum of Natural History, was a very successful one. It was the meeting marking the 50th anniversary of the founding of the Society. Considerable effort went into the planning for the meeting to encourage those who had been members for many years to attend. And, indeed, we did have one of the largest attendance in recent history; 138 attended, by my count. It was a pleasure to meet and talk with Dr. Bell, the founder of the Society, and his wife and daughter. I am sure that many others were pleased to see him and relive "past OAS" times with him. Let me take this opportunity to thank all of those who contributed to the success of this meeting: THANKS very much for all of your help!

Dr. Robert E. Bell and Mr. Terrell Nowka at the 50th Anniversary celebration.

Photos from the OAS 50th Anniversary and from the 2002 Spring Dig can be viewed on the Society website: www.okarcheology.org. More photos are shown on page 46 of this Journal.

Mrs. Virginia Bell attended the OAS 50th Anniversary celebration.

The spring dig at Jake Bluff, near Ft. Supply, was quite successful. One obvious aspect of this dig was the larger-than-usual number of diggers who attended. We also had a large number of "first diggers" who came out and experienced the weather, the heat, the large amount of sand moved, and, perhaps the most memorable, the road to the dig. This road, more a path fashioned by a brush hog through the Cooper Land Management pasture, was something to experience, that is, if you like having your back and neck adjusted by your friendly neighborhood chiropractor. We jokingly referred to the ride in the morning and evening as our daily massage. Oh well, we survived and had fun in the process. It was certainly a pleasure to see and work with friends from past digs, and I enjoyed meeting those new people who joined us. We did find some lithic artifacts and uncovered the bison-kill bone bed in one location.

A Board of Directors meeting will take place June 29 at 1:30 pm at the Archeological Survey office in Norman.
Welcome to the Society
New Members, 02/16/2002 through 05/15/2002

Sustaining
William & Shirley Ellis, Caddo
Ed Mayfield, OKC
Denise McDonald, Norman

Contributing
Ramona E. Birdsong, OKC
Paul V. Cox, Jr., Norman
Dr. & Mrs. Patrick Day, Clinton
David Frazier, Newcastle
Karen, Anne & Kelli Madorin, Ellis, KS
Angelia L. Tupica, Norman

Active
Barbara J. Bailey, Fairview
Dr. Timothy G. Baugh, El Paso, TX
Billie Jo & Charles Lee Casey, Noble
Charles Cheatham, OKC
Kay Davis, Fairview
Fred G. & Beverly Graumann, Blair
Elaine V. Harton, OKC
Witcher L. Horton, Ponca City
SSGT John W. Kiernan, Sheppard AFB, TX
Phyllis Klein, OKC
Dr. Carolyn G. Pool, OKC
Bruce & Sue Sanderson, OKC
Robert N. Scheller, OKC
V.H. Scott, Sayre
Meredith & Ladona Sheets, Edmond
Gayle Snider, OKC
Jamie Williams, Fairview
Jody Williams, Ardmore

Institutional
Texas Archeological Research Laboratory, Austin

50 Years Ago in the OAS

In the May, 1952 Newsletter, Editor Robert E. Bell noted that the newly formed Society now had nearly 70 members. Dr. Bell invited Society members to visit and help with excavations at the Morris site south of Tahlequah where the Department of Anthropology Field School was to be held in the summer of that year. The Field School camp was located on the Illinois River where Dr. Bell reported the fishing to be excellent.

Dr. Bell encouraged Society members to plan a visit to the Peoria flint quarries a mile east of Peoria, Oklahoma. He reported that there were some 100 quarry pits and that some of them could be seen from the road. The first mention of these pits in the literature was from William H. Holmes, Bulletin 21, Bureau of American Ethnology, Washington, 1894.

Rock Art
Seth Hawkins
Between April 13th and 21st, 2002, volunteers worked at the Kubik site (34KA354) to complete units opened during the 1998 Oklahoma Anthropological Society spring dig (Figure 1). We needed to complete these units to provide a better sample of the Calf Creek horizon occupations and to obtain a better sample of material and stratigraphy below the Calf Creek component. The first evidence of a possible older occupation was found in 1995 in the step profile (Profile B) located in the creek bank 3 m north of unit 0-0. This evidence consisted of several flakes lying essentially flat at the 3.3-3.4 m depth below laser datum. At this location, the flakes were recognized as part of a deposit clearly distinct from the overlying clay. This lower deposit contained quantities of calcium carbonate and shell bits and exhibited a slightly more gritty texture, though the color of this deposit was essentially the same as the zone above the contact. None of the units in the 1995 excavations reached sufficient depth to see if an occupation was represented by these flakes or if they were redeposited.

The 1998 OAS spring dig included clearing and continuing the 1995 test units to deeper depths in an attempt to find proof of a deeper component. Units 0-0 and S2-W8 revealed no flakes after encountering the calcium carbonate. Units 0-E6, S2-E6, and S2-E8 had a few scattered flakes, and Mick Sullivan noted that as he excavated into the calcium carbonate zone in S2-E8 the few flakes found seemed to be a bit higher on the north side of the unit than on the south. To make matters more confused, 0-E6 had several small clusters of flakes packed, mostly on edge, into 6-10 cm wide, linear areas associated with slight variations in the color of the dirt. We identified these as flakes in gopher tunnels similar to those we had identified in higher levels in S6-E6. Neither unit S6-E6 nor S14-E2 revealed flakes in the deeper levels. The northeast backhoe trench beginning at S8-E18 at the terrace edge revealed at least three levels of flake concentrations, and one of these was at the upper part of the calcium carbonate filled material. The flakes above the calcium carbonate were essentially continuous across the trench profile, but the flakes in the calcium carbonate extended only 1m from the west end of the trench and were not present in the remainder of the profile.

After the 1998 work, it still was not at all clear if the debitage recorded in the creek bank profile and in the northeast backhoe trench profile was evidence of an older occupation at the site, or if it was cultural debris redeposited by water from a site upstream. The presence or absence of the deeper material in the units could serve to delineate the distribution of the apparent cultural material horizontally as well as vertically. To further our investigation we determined to complete the unfinished units from the 1998 OAS spring dig. Our first attempt to complete these in was in April of 2000, but at the conclusion of that nine-day effort we still had levels to dig in some of the units. Thus, we scheduled the April 2002 efforts.

The unfinished units of Grid A were completed to sterile, though in some units this depth was only reached in ½ or ¼ of the unit. Most were finished to level 3.4 m below datum, but in one square, S6-E12, we exposed a profile to 5.2 m below laser datum (laser datum was an average of 1m above ground surface). Several of the incomplete units of Grid A (0-W2, S2-W2, 0-E8, and east ½ of S6-E12) were either at, just below, or still above the Calf Creek levels when we began in 2002, and these units provided additional insight into the Calf Creek cultural inventory at the site. Five notching flakes, one late stage preform (Stage IV, nearly ready to notch), one Stage III biface abandoned due to a “stack”, a serrated flake cutting tool, an un-serrated cutting/scraping (?) tool, and numerous flakes and other biface fragments were recovered from the Calf Creek levels. Bison bones (broken long bone and rib pieces) were recovered, and at least one possible feature consisting of indurated dirt was identified. This possible “feature” was designated as Feature 02-14, and was identified at the beginning of the Calf Creek levels (2.3 m below laser datum) in 0-W2 during the 2000 excavations as a very compact or hardened area that extended into S2-W2. Though it was not detectable by differences in soil color either horizontally or vertically, the 2002 excavations determined that it seemed bathtub shaped based on the contrast.
between the texture of the dirt and the cultural content within this area. The possible feature was devoid of flakes or tools until three levels had been chipped out of the hard soil. Broken bifaces, thinning flakes, burned bone and some heat-fractured flakes were found around the outside margins of the indurated dirt. The feature is 2 m long X 1.4 m wide and 30 cm deep. It seemed deeper and wider in 0-W2 than in S2-W2. The profile in the balk between the units demonstrated no soil discolorations that could help explain the anomaly. Two possible explanations for this anomaly are: 1) a fire place without hearth stones or detectable pit; or 2) the “shadow” or footprint of a tree contemporary with the Calf Creek use of the site. If the latter, the footprint would have prevented cultural material from being deposited within its margins. Perhaps further study will clarify the situation.

We also opened one new square just behind Feature 9, a small hearth exposed in the creek bank in October 1998 near the location of the lab tent. A raw radiocarbon date of 4,410±60 B.P. (Beta-130711) was obtained from charcoal extracted from among the stones of this exposed hearth (Table 1). The corrected date is 4380±60 B.P. with a one standard deviation range of 5055-4870 B.P. when calibrated by tree ring correction. Though this date is from about the same depth below datum as the several dates from the Calf Creek component, it is about 1,000 years later and from a part of the site where we have recovered no temporally sensitive cultural items. We opened a 2X2 m unit (designated Grid B, Unit 0-0) behind Feature 9 in a “shot in the dark” attempt to obtain any tools to help us determine the affiliation. In spite of the persistent efforts of Richard, Ruth and Rusty Johnson, Doug and Sidney Hines, and Mick Sullivan, we did not find any diagnostic items. We did learn that the occupation of this area was sparse, and we did find a probable living floor characterized by occasional flakes and scattered burned limestone fragments, apparently associated with the hearth.

The results of our deep probes into the levels below Calf Creek do seem to show that the cultural debris is not an indication of an actual component at the site. The horizontal distribution of the material seems restricted to a northwest to southeast trending band ranging from 6 to 20 m wide east-west and at least 16 m north-south, or basically the northeast corner of the existing older terrace. The 2.5-5 cm long flakes are consistently found in the upper 10 cm of this matrix, and are lying horizontal and at varying angles to the horizontal. Flakes of this size would be easily moved by water, and the consistent size would seem an indication of size grading such as we might find with flowing water with varying amounts of energy. The matrix containing the flakes is silty, reddish brown clay with large amounts of calcium carbonate nodules and some short “strings” of calcium carbonate, fragments of snail shell, complete small snails, complete small clam shells, and fragments of larger, deteriorated clam shell. This clay forms a distinct but wavy contact boundary with the overlaying matrix containing the Calf Creek horizon materials. Combined with the evidence of a water-laid sediment, it seems likely that the flakes are redeposited from somewhere upstream rather than being a cultural deposit.

This year’s work would not have been possible without the much appreciated aid of Richard and Mary Ann Drass, Mick Sullivan, L.M. Sullivan, Betty Flora, Jean Cochrane, Casey Carmichael, Sandy Kulczycki, George and Nina Hanggi, Barry and Christina Splawn, Cynthia Lanham, Trina Fontane, Bill Menzie, Richard and Ruth Johnson and their son Rusty and grandson Gage Berry, Doug Hines and his daughter Sidney, Jeff, Lisa, Ross and Matt Kubik, Barbara Yoder, Lena Nelson, Patsy Johnson, Ed and Shirley McLonahan, Charles Serber, Bill Johnson, Don and Teri Steneck, Bill McNatt, Bob Schilling, and Charles Sanders all of whom contributed part of their valuable time during the course of the nine days to complete the squares. My special appreciation to Dave Morgan and Jim Marti for their invaluable assistance during the entire 10 days!
Figure 1. Kubik Site Excavation Grid.

Table 1. Radiocarbon Dates From The Kubik Site, 1996-2000.

<table>
<thead>
<tr>
<th>Lab Number</th>
<th>Raw Date</th>
<th>Conventional Date</th>
<th>Calibrated Dates (1 sigma-68%)</th>
<th>Material</th>
<th>Provenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>NZA6534</td>
<td>2372+83 BP</td>
<td>2372+83 BP</td>
<td>522-379 BC</td>
<td>Charred Wood *</td>
<td>Level 13, Unit 0-0</td>
</tr>
<tr>
<td>NZA6601</td>
<td>4990+100 BP</td>
<td>4990+100 BP</td>
<td>3942-3662 BC</td>
<td>Scattered Charred Wood</td>
<td>Level 15, Unit 0-0</td>
</tr>
<tr>
<td>NZA6602</td>
<td>5020+120</td>
<td>5020+120</td>
<td>3961-3669 BC</td>
<td>Charred Nut Husk**</td>
<td>Level 16, Unit 0-0</td>
</tr>
<tr>
<td>Beta98146</td>
<td>5050+60 BP</td>
<td>5050+60 BP</td>
<td>3950-3775 BC</td>
<td>Charred Nut Husk**</td>
<td>Level 16, Unit 0-0</td>
</tr>
<tr>
<td>Beta121354</td>
<td>4710+50 BP</td>
<td>4690+50 BP</td>
<td>3520-3365 BC</td>
<td>Charred Wood</td>
<td>Fea. 1.5-98 @4.0m BLD</td>
</tr>
<tr>
<td>Beta130709</td>
<td>3270+60 BP</td>
<td>3200+60 BP</td>
<td>1620-1485 BC</td>
<td>Charred Wood</td>
<td>Fea. 3-98 @ 2.2m BLD</td>
</tr>
<tr>
<td>Beta130710</td>
<td>4520+60 BP</td>
<td>4600+60 BP</td>
<td>3355-3100 BC</td>
<td>Charred Wood</td>
<td>Fea. 1.5-98 @ 4.2m BLD</td>
</tr>
<tr>
<td>Beta130711</td>
<td>4410+60 BP</td>
<td>4380+60 BP</td>
<td>3105-2920 BC</td>
<td>Charred Wood</td>
<td>Fea. 9-98, area B, @ 2.5m BLD</td>
</tr>
<tr>
<td>Beta 142025</td>
<td>4850+40 BP</td>
<td>4850+40 BP</td>
<td>3695-3630 and 3575-3535 BC</td>
<td>Charred Wood?</td>
<td>Fea. 10-00, area B, @ 3.1m BLD</td>
</tr>
<tr>
<td>Beta 142026</td>
<td>5380+30 BP</td>
<td>5380+30 BP</td>
<td>4305 and 4255-4225 BC</td>
<td>Charred wood?</td>
<td>Fea. 11-00, Area A, @2.6m BLD</td>
</tr>
<tr>
<td>Beta 144754</td>
<td>5210+60</td>
<td>5190+60</td>
<td>4040-3960 BC</td>
<td>Charred Material, Wood?</td>
<td>Fea. 12-00, S6E12, Lev. 2.9m BLD</td>
</tr>
</tbody>
</table>

Kay County, Oklahoma

Scale = 20 meters
Book Review

Voices from the Delaware Big House Ceremony.
Edited by ROBERT S. GRUMET. University of
Oklahoma Press, Norman. 2001. xxv + 213 pp., 16
figures, 4 maps, appendix, references cited, index.

With the publication of Voices from the Delaware
Big House Ceremony, the scattered, obscure, and
unpublished accounts of this important religious
ceremony are gathered together in one volume.
Grumet assembles the earliest missionary and
colonial accounts, the pioneering work of
anthropologists and other researchers, and
interviews with and writings by participants in the
Big House ceremony. Thus, almost 300 years of
history is packed into thirteen chapters. This
assemblage allows the reader a glimpse at the
varying perspectives of this group of authors: from
the inherent ethnocentrism and prejudice of
missionaries, to the sympathetic yet academic
descriptions by anthropologists, to the sometimes
highly emotional accounts by participants.

The Big House ceremony was an integral part of
Delaware (Lenape) culture. The event served as a
time of reverence and reflection, a ceremony of
thanksgiving and prayer, and a community
gathering. The ceremony, which usually lasted
twelve nights, takes its name from the structure in
which the nightly ceremonies are performed. But
the Big House ceremony was much more to its
participants than just a building. Terry J. Prewitt’s
introduction, “The Big House Described”, provides
a superb overview of the ceremony. This
introduction chronicles the events of the ceremony
night by night and explains the various offices held
by key participants, from those who recite their
visions to those who ritually sweep the Big House.
As Prewitt uses the Lenape terms for these offices
and other important aspects of the Big House
ceremony, the chapter can become a bit confusing
or complicated for the casual reader. On the other
hand, the diagrams provided are clear and help in
keeping these terms sorted out in the reader’s mind.
More importantly, though, the careful
contextualization of the Big House ceremony within
the Delaware cosmology and history makes this
chapter incredibly helpful.

This introduction sets the stage for the following
chapters quite nicely, particularly in regards to the
history of the Delaware people. The first few
chapters document the earliest accounts of the Big
House ceremony. Most of these accounts are
written by missionaries and other White settlers and
are infuriating in their ethnocentrism and naiveité.
One can only assume the pressure that the Delaware
people must have felt from missionaries and Whites
at that time. For more academic purposes, though,
these early accounts provide a baseline for what we
know of the Big House ceremony. In some cases,
these earliest observations provided the basis for
later anthropologists’ conclusions; e.g., Anthony F.
C. Wallace’s proposition that the origin of the Big
House as practiced in Ontario and Oklahoma can be
traced to the Munsee prophet Beate. At any rate,
these early accounts allow a starting point from
which to consider the Big House ceremony’s
evolution and regional development.

The following chapters of this volume demonstrate
the variation within the Big House ceremony. As
the Delaware people were forced westward, some to
Ontario, some through the Midwest and into Indian
territory, variation was inevitable. In some cases,
the accounts demonstrate not only regional
variation, but variation in terms of the three
Delaware clans (turtle, wolf, and turkey). In the
chapter covering the 19th and early 20th centuries,
Grumet’s introductions become vitally important.
Grumet manages an even-handed treatment of each
account given, even if the integrity, internal
validity, or perspective of the account’s author has
been called into question by others. This even-
handed treatment of each piece emphasizes one of
this volume’s main strengths: its ability to let the
voice of each account’s author come through. Not
every account of the Big House ceremony will
agree, even on seemingly important issues, like how
many nights the ceremony lasted. At times, the
accounts become redundant, as some details are
repeated over and over again. But in quoting large
segments of text, particularly that of native
participants in the ceremony, Grumet not only
empowers the native voice of the Delaware people,
but also gives a more powerful and more thorough
description of the Big House ceremony itself.

Furthermore, the careful reader will see that this
thorough description solves some of the “mysteries”
set up by the earlier accounts, almost in the manner of a detective novel. For example, on the final day of the Big House ceremony a ceremonial prayer call is used as the participants file out of the Big House for the last time. The origin of this “ho, ho, ha, ha” call, unclear and unquestioned in previous accounts, becomes known in some of Frank Speck’s work published in Chapter Nine. Each account chosen by Grumet provides a few more pieces to the puzzle of the Big House ceremony.

The final chapters of the book are perhaps the most emotional. These chapters contain the reminiscences of eastern Oklahoma Delaware people and accounts of the last years of the Big House ceremony as practiced in this part of the state. Particularly painful to read was Nancy Falleaf Sumpter’s recollections. She and her family visited the site of the last Big House in 1930, only to see it defaced by graffiti, ruined by Boy Scouts on camping trips, and disassembled by collectors of Indian artifacts. Ultimately the ceremony was an expression of Delaware identity; as Grumet points out in the preface, “the Big House, by combining moral lessons with expressions of thanksgiving and prayer, is a defining ritual affirmation of a people’s beliefs, concerns, and values” (xii). To witness the end of such an important ceremony could call into question the ability of the community to survive and function as it had before. Fortunately, the Delaware communities have not met the same fate as the Big House near Copan, Oklahoma. Members of four different communities added their voices to this volume, and their commentaries are included in the prefatory material. In fact, Oklahoma is home to two Delaware communities, the only two federally recognized Delaware groups in the United States. Both of these Oklahoma Delaware groups work diligently to preserve their culture and traditions. If one criticism may be raised, it is the inattention provided to latter-day efforts to revitalize the Big House ceremony or to the continued presence of the Big House ceremony in the minds of the Delaware people today. The ceremony itself may not continue, but undoubtedly members of these communities still think in terms of the cosmology represented by the Big House ceremony or draw on the symbolism of the Big House in their artistic traditions.

In general, this book is recommended to anyone with an interest in Delaware history and culture. Though the book largely focuses on the Big House ceremony, which is interesting in and of itself, it also provides the larger picture of Delaware tribal history. The impact of migration, decreasing game populations, increasing disease, forced attendance of boarding schools, and the pressures of the dominant White culture on the Big House ceremony in particular and the Delaware people in general are all evident. For the student, researcher, or anthropologist interested in the Delaware people, this volume will prove invaluable, just for the sheer amount of raw data it contains. For the Delaware people, as for all of us, the voices of the Big House ceremony are that much more accessible. And finally, for all of us, this volume demonstrates the importance of documenting and preserving these types of cultural traditions at every opportunity.

Rhonda S. Fair
Department of Anthropology
Sam Noble Oklahoma Museum of Natural History
University of Oklahoma, Norman, Oklahoma

New Books for Review

If you’d like to review one of the following books, we’ll send it to you (it’s yours to keep) and, in return, you provide a brief review of the book for the Journal.

Thanks,
Editors


Abstracts from the Literature

Abstracts will be a regular feature in Oklahoma Archeology. We will reprint the bibliographic citation and abstract from journal articles and books from various disciplines pertinent to the study of the peoples and past environments of Oklahoma. If you see a publication you believe should be included, please send the cover page and abstract to the Oklahoma Archeology editors.

Boyd, Douglas K.

Abstract: Theories regarding ethnic affiliation of the Protohistoric inhabitants of the Texas Panhandle-Plains have relied heavily on the chronicles of Coronado's 1541-1542 entrada into that region. Of particular concern are the interpretations of where the expedition traveled and the identifications of the native peoples whom the Spaniards called the Querecho and Teya. The prevailing theory identifies Querechos as Apaches and Teyas as Caddoan peoples, linking these groups with the Tierra Blanca and Garza complexes, respectively. These two complexes are reviewed to highlight many interpretive problems with uncritical use of this ethnohistoric model. Ignoring the debate regarding linguistic affiliation, the Querecho-Teya model is extremely useful for testing regional archeological data and interpreting Native American responses to the conflicts created by Spanish colonization.

Czaplewski, Nicholas J., J. Peter Thurmond, and Don G. Wyckoff

Abstract: Vertebrate fossils were collected from a locality near the eastern outcrop margin of the Tertiary Ogallala Formation in Roger Mills County, Oklahoma. The vertebrates included two tortoises: a large Hesperoestudo sp., and a smaller individual that could represent either Gopherus or Hesperoestudo; and several mammals, most of which are ungulates. The mammals are a bone-cracking canid (Borophagus sp.), a peccary (Tayassuidae gen. Indet.), a camel (Camelidae gen. Indet.), and several horses (Cormohipparion occidentale, Hipparion tehonense, and Calippus martini). Collectively, the mammals suggest either Clarendonian or Hemphillian land-mammal age (or both) for the assemblage. This is consistent with other vertebrate faunas from the Ogallala Formation of the southern High Plains.

Dethier, David P.

Abstract: The Lava Creek B ash bed, erupted from Yellowstone caldera ca. 0.64 Ma, provides a datum for measuring long-term fluvial incision west of the Mississippi River. The ash is widely preserved due to its substantial volume, broad initial dispersal, and the aggrading environment into which the ash fell. Drainages incised soon after Lava Creek B deposition, isolating the ash from fluvial erosion and preserving it in fill terraces. Calculated rates of incision since ca. 0.60 Ma range from <2 to ~30 cm k.y.⁻¹. Rates are high in most areas near the Rocky Mountains and downstream along rivers draining mountainous terrain, and are lowest east of the High Plains and along the Snake River. Incision rates along many rivers decrease downstream. Rates of downsutying increased in the late Pleistocene along several major rivers, indicating that climate change altered sediment budgets. Regional and temporal data suggest that fluvial incision reflects increased middle and late Pleistocene runoff from the southern Rocky Mountains, rather than epeirogenic uplift, but regional rock uplift cannot be excluded as a significant factor. (OA Note: According to their Figure 2, The highest Pleistocene fluvial incision rates on the Great Plains were in Oklahoma along the Salt Fork of the Arkansas, North Canadian, and South Canadian rivers.)

Hall, Stephen A.

Abstract: Radiocarbon ages on organic matter from the late Pleistocene Tahoka Formation at White Lake, Bailey County, Texas, provide a new chronology for playa lakes on the southern High Plains. Lacustrine muds at White Lake accumulated at least 20,000-17,000 ¹⁴C yrs B.P. during the last glacial maximum. The basin at White Lake also contained standing water ca 37,000 ¹⁴C yrs B.P. during the late middle Wisconsinan, a period of time that is poorly documented at other regional paleolakes. A thin bed of lacustrine dolomite and abundant phytoplankton at White Lake may indicate a brief phase of lake drying ca 16,500-17,000 ¹⁴C yrs B.P. The timing of the final desiccation of the paleolake is not known, although a ¹⁴C-based sedimentation rate extrapolated to the top of the lacustrine deposits indicates possible drying by ca 14,000 ¹⁴C yrs B.P. The vegetation
on the High Plains during the last glacial maximum and during the late middle Wisconsinan ca 37,000 14C yrs B.P. was a sagebrush grassland, as indicated by pollen analysis. Previous interpretations of a pine-spruce boreal forest on the High Plains were based on pollen assemblages that were weathered and altered by differential preservation. (OA Note: All of the illustrations in this article are in color. There is an outstanding map of the LGM paleolakes of the southern High Plains.)

Hofman, Jack L.

Abstract: A current synopsis of geomorphic evidence from selected Great Plains archaeological sites of Clovis, Folsom, and late Paleoindian ages is provided. Archaeological site occurrences and regional patterns of artifact finds are discussed by time period: pre-11,000, 11,000-10,000, and 10,000-8,000 14C yrs BP, and by (geomorphic) depositional context: stream valleys, gullies, playas, and dunes. It is likely that there was recurrent use of upland playas (e.g. the Clovis-age Miami site), dune fields (e.g. the Folsom-age Waugh site, and the later Paleoindian Plainview site), and gullies (e.g. the Folsom-age Cooper site and later Paleoindian Olsen-Chubbuck and Norton sites). Within the Plains of Texas, Oklahoma, Kansas, eastern Colorado, Nebraska, and South Dakota, there are strong patterns in the distribution of diagnostic Paleoindian artifacts reflecting a combination of prehistoric population patterns, modern recording biases, and regional geomorphic processes. As examples, the documented occurrence of Clovis points diminishes dramatically from south to north in the Plains. This may reflect, in part, prehistoric population density or time-transgressive longevity of this technological tradition, as the oldest dated Clovis component is in the southern Plains. In contrast, the relatively low frequency of Folsom artifacts in western Kansas, compared to adjacent regions, may reflect a distinctive geomorphic history (erosion and/or deep burial) during or following the Pleistocene-Holocene transition.

Vehik, Susan C.

Abstract: Trade is a prominent activity across much of North America during the Late Prehistoric period. On the Southern Plains, two approaches are used commonly to explain trade during this period. In one, trade is part of a system of economic interdependence between egalitarian societies having very distinct subsistence strategies. In the other, trade reflects the incorporation of Plains societies into macroeconomics centered outside the Plains. I argue that these two approaches inadequately account for Plains trade and are too narrowly constructed to account for the wider trade of which the Plains is a part. As an alternative, I propose that trade develops on the Southern Plains and elsewhere as an internally motivated political activity within the context of widespread and increasing conflict accompanied by substantial spatial rearrangements of people.

Minnick, Paul E. and Wayne J. Elisens (editors)

Summary: Exploring the relationship between Native Americans and the natural world, Biodiversity and Native America questions the common view that indigenous peoples had minimal impact in North America. Introducing a variety of perspectives - ethnobotanical, anthropological, archaeological, and biological - the expert contributors show that Native Americans were active managers of natural ecological systems. The book covers groups from the sophisticated agriculturalists of the Mississippi River region to the low-density hunter-gatherers of arid western North America. The approach the authors take allows readers to develop accurate restoration, management, and conservation models through a thorough knowledge of native peoples' ecological history and dynamics.


Blackmar, Jeannette M. Cody Knives in Context: Recognizing Gender, pp. 6-8. Blackmar notes that Cody knives are much more common from surface collected Cody sites than from excavated ones, and that excavation of Cody sites has concentrated on bison kills. She hypothesizes that Cody knives were primarily a woman's tool associated with campsites, "...and did not function as primary bison butchery tools."

Blackmar, Jeannette M., Richard O. Rose, and Jack L. Hofman. 1A2, a West Texas Cody Campsite, pp. 9-11. This is a Paleoindian campsite in a dunefield area on the Southern High Plains in Andrews County, Texas, which has been surface collected since 1981. Two Midland points, one Goshen point, and 12 Archaic points have been collected from the site, but the article concentrates upon the Cody complex component. Eight Firstview points, 161 endscrapers, one sidescraper, three convergent scrapers, twelve limaces, five gravers, and seven bifaces have been collected from "...a limited area of the site that yielded only Cody points...". Most of the
tools are Edwards chert, but twelve are chalcedony, two unidentified cherts, and one obsidian. The endscrapers are small, complete, reworked, and heavily worn, and half are spurred. The site is interpreted as a bison processing area associated with a yet-to-be-identified kill site.

Hatfield, Virginia. Paleoindian Point-Type Representation at the Triple S Ranch Locality, North-Central Texas, pp. 37-38. Paleoindian lithic artifacts have been documented from sites on the Triple S Ranch on Cowhouse Creek, a spring-fed tributary of the Brazos River at the northeast edge of the Edwards Plateau in Hamilton County, Texas. The collection is naturally dominated by Edwards chert. The Paleoindian projectile point collection is 4% Clovis, 43% Plainview/Meserve, 18% Golodrina, 17% early side-notched Wilson, 3% Scottsbluff, and 22% untyped.

Hofman, Jack L., Richard O. Rose, Larry D. Martin, and Daniel S. Amick. Folsom Adornment and Bone Technology, pp. 42-45. A bone bead less than 2 mm in maximum diameter has been recovered from the Shifting Sands site, a Folsom campsite in west-central Texas from which some 6500 lithic artifacts have been surface collected since 1981. It is hypothesized that the bead was “…used in conjunction with numerous similar beads for decorating some garment or object…” . This is the only bead known from a Folsom site, and it is speculated that conventional recovery and sorting techniques have simply missed them in the past.


Blackmar, Jeannette M., Jack L. Hofman, and Ray Kunselman. Cody Obsidian Use in the Southern Plains, pp. 5-8. An obsidian Scottsbluff point is reported from the Flaming site in Washita County, Oklahoma. X-ray florescence analysis of the artifact suggests the obsidian derives from the Wright Creek source in southeastern Idaho.

Gobetz, Katrina E. and Larry D. Martin. An Exceptionally Large Short-Faced Bear (Arctodus simus) from the Late Pleistocene/Early Holocene of Kansas, pp 97-99. A humerus, femur, metatarsal, and two vertebra of short-faced bear have been collected from a Kansas River alluvial deposit on the west side of Kansas City. The bones are some ten percent larger than those of previously known large short-faced bear fossils in Nebraska and Utah, and suggest a living body weight of about 650 kg, or 1450 lbs. Tom Stafford has radiocarbon dated one of the bones at 9630 ± 60 rcy BP.


Abstract: The archeology office of the Kansas State Historical Society investigated portions of eight large Lower Walnut focus sites near Arkansas City, Kansas from 1994 to 1996. The presence of a large quantity of Florence A or Kay County chert on these sites, most in thermally altered form, attests to both the importance of this stone itself and of heat treatment as an integral part of its procurement and reduction into stone tools. Utilizing a lithic technology class conducted as part of the 1994 Kansas Archeology Training Program field school at the Killdeer site (14CO501), concurrent exploratory investigations were made at 14CO5, one of the large aboriginal Florence A quarries. Some of the freshly quarried stone was then used for experimental heat treating. These experiments suggest a feasible heat treatment strategy and document aspects of the physical and chemical changes that this chert undergoes when it is subjected to controlled heat in the 500 to 600° F (ca. 300° C) range for extended periods.

Field Notes
David Engle

I collected a small cache of Florence-A flake scrapers about twelve years ago while looking at what appeared to be a likely prehistoric campsite (CU162). A large site that I collected infrequently, a mile or so downstream along this section of West Barnitz Creek, had yielded a lot of Kay County (Florence-A) chert, and I hoped to discover another such site nearby. On the first visit to the CU162 location I walked in from the road across a deeply mold boarded field towards the creek. As expected, I began to observe flakes and miscellaneous broken rocks as I came within 100 yards or so of the small stream. Then a broken mano and a couple of Washita and Fresno arrowhead fragments were found. Other materials found at the site include one small cordmarked sherd with fossiliferous shell temper and two parallel lines incised on the exterior, 1 Edwards chert flake, 2 Florence-A flakes.
(one heated), and 15 Alibates flakes. As I walked very near a high bank above the creek I saw this cache of large flake lying, mostly exposed, where the plow had rolled them right up to the surface in an area no larger than a square meter. After the initial excitement subsided a bit and upon closer inspection, it looked likely that the six pieces were chipped from a single heat-treated cobble. Each of the large flakes is modified along one or more edges, and they probably were used as scraping tools. Four of them display a white quarry cortex and all are heat-treated to a rich pinkish-red color fading into tan in places. While they vary considerably in shape, they are close in size and weight with the largest measuring approximately 92 x 42 mm and weighing approximately 54 grams down to the smallest at 26 grams and 64 x 39 mm. Based on the artifacts found at the site, it appears that this Florence-A flake scraper cache relates to a Plains Village occupation, probably during the Turkey Creek phase around A.D. 1250-1450. Finding this rare cache of stone scrapers truly made this outing a memorable one. Finally, I want to thank Mary Ann Drass for her gentle prodding to get me to write this up.

Postscript to Field Notes in Vol. 50, No.2.

Mary Ann Drass

At the OAS 50th Anniversary celebration Terrell Nowka had some interesting information about the sandstone steps I reported on from Custer County in the last Field Notes. Terrell reports that these steps are to be found all over the canyon-cut country in western Oklahoma. He remembers many instances of them being cut in the steep faces of the canyons during his childhood. According to Terrell, children who needed a quick way to cross a canyon to school or farmers whose land was divided by canyons took an old, dull axe and chopped the steps since a crossing might be more than a mile away. Thanks for the insight into these features, Terrell.

In Remembrance

A sad note from the Kay County chapter is the passing of Harold Brown on February 27, 2002. Harold was a long-time member of the OAS, and he and wife Betty were very active in the Society for several decades. Betty passed away in 1986. Harold and Betty Brown were the 1975 Golden Trowel Award winners.

Harold was born October 7, 1927 in Newkirk. He served in the Navy during WWII, joined the National Guard upon his return to Ponca City and then was called to active duty in the Army during the Korean War where he was a master sergeant and rifle platoon sergeant.

He is survived by his wife Rita, three daughters, 11 grandchildren and many other family members.
Radiocarbon Dates from the Chalk Hollow Site, A Stratified Archaic-Early Ceramic Period Locale in Randall County, Texas

Christopher Lintz, TRC Environmental

ABSTRACT

The 1972-1973 excavations at Chalk Hollow (41RD51) sampled stratified remains in a 5.5 m tall cut bank along a northern tributary of the Red River. Twenty-five radiocarbon assays date two major "midden units". The upper unit, associated with small corner-notched "Scallorn" points and plain pottery has an age of ca. 936-1580 B.P. (overlapping 2 standard deviation [sd] tree-ring calibration range), and is attributed to the Palo Duro Complex. The lower unit has three chronologically defined occupation zones with ages of ca. 3460-3840 B.P., ca. 2700-3075 B.P., and ca. 2425-2550 B.P. (overlapping tree-ring calibrated, 2 sd intervals) within a general span of 2040 to 3897 B.P. The lower occupations are attributed to the redefined Little Sunday complex of the Late Archaic (Boyd 1997). Although mixed, these lower Chalk Hollow materials and components at similar localities establish the early existence of bison hunter campsites associated with corner-notched dart points, even though the age of bison kill sites with comparable projectiles tend to be more recent (1060-2335 B.P.). Changes in site locations and geomorphic conditions are postulated to underlie the chronometric differences between the kill and campsites.

INTRODUCTION

Excavations sponsored by the Smithsonian Institution during the summers of 1972 and 1973 focused on a deeply stratified open campsite along Chalk Hollow, a northern tributary gorge of Palo Duro Canyon in Randall County, Texas (Figure 1). Archaeologists were drawn to the locality by observations of stratified lithic debris and fire-cracked rock exposed in the upper 4.2 m segment of a 5.5 m tall cut bank. The excavations yielded quantities of artifacts and charcoal suitable for dating. Despite the processing of 25 radiocarbon samples from the site, the individual chronometric results and rates of sedimentation were not discussed in the brief published site report (Wedel 1975:272). This lack of detail was dismissed as an "unfortunate" lack of consistency "between the stratigraphic depth of the find spots for the charcoal and their radiocarbon ages". In most parts of the site, two "midden units" were recognized; the upper one was dated by six samples between ca. A.D. 400 and 850 (uncalibrated), and the lower unit, consisting of a series of occupation zones or layers, dated between ca. 400 to 1650 B.C. (uncalibrated). A late 19th century historic component was also represented by two dugouts and some metal and glass artifacts. The site was considered to be significant in that it represented the best dated and deepest stratified Late Archaic-Early Ceramic occupations excavated in the Texas panhandle and Southern High Plains.

The present paper provides an overview of the investigations at the Chalk Hollow site, presents stratigraphic descriptions and radiocarbon results, examines the rates of deposition, and provides preliminary observations on the distribution of diagnostic projectile points and selected ceramic materials. Complete analysis of Chalk Hollow site assemblage must await full description of the artifacts and study of the spatial patterning of the materials held by the Smithsonian Institution.

SITE SETTING AND INVESTIGATIVE HISTORY

Chalk Hollow is a deeply incised, north/south-oriented intermittent tributary of the Palo Duro Canyon portion of the Red River drainage (Figure 2). The site is located on the Currie Ranch, about 19 km southeast of Amarillo and 20 km east of Canyon, in Randall County, Texas. It is designated 41RD51 in the Texas Archeological Research Laboratory site files, and Site A-883 in the Panhandle-Plains Historical Museum site files.

In 1972, a two-year project "aimed at further illumination of problems of human prehistory and aboriginal ecology in the central Great Plains" was proposed to the Smithsonian Research Foundation for the examination of panhandle (Antelope Creek phase) materials from the Texas High Plains. These remains were believed to be ancestral to the Protohistoric groups in Central Kansas and have some bearing on Central Plains archaeology (Wedel 1971:1; Hughes
Late Archaic and Woodland Sites

- **Camps**
  1. Saunders
  2. Sandy Ridge
  3. Tascosa Creek
  4. Middle Cheyenne
  5. 41Pt-29
  6. 41Mo-5
  7. South Ridge
  8. Lake Creek
  9. Swift Creek
  10. Beaver Dam
  11. 34RM-334
  12. 34GR-12
  13. Canyon Club Cave
  14. Calk Hollow
  15. Deadmans Shelter
  16. Kent Creek
  17. Sam Wahl

- **Bison Kills**
  a. Certain
  b. Strong
  c. Buzzard Roost
  d. Sitter
  e. RO Ranch
  f. Finch
  g. Collier
  h. Twilla
  i. Doc Bell

Figure 1. Location of Late Archaic and Woodland Sites on the Southern Plains.
The proposed project involved primarily a study of aerial photographs to locate Antelope Creek phase architectural sites and examinations of museum collections in Texas and Oklahoma. But a modest amount of excavations were also proposed "to help redress the imbalance into which the national collections have fallen with respect to Great Plains archaeology...[since the museum is] woefully weak on archaeological materials from south of the Arkansas River" (Wedel 1971:4). Although the initial Smithsonian Research Foundation proposal was not funded, other sources provided modest funds to cover minimal travel expenses and salaries for Waldo Wedel and one crew chief. Other labor was contributed by volunteers.

Initial reconnaissance and testing focused on lateral tributaries of the Red River near Palo Duro Canyon, due in part to their proximity to the Panhandle-Plains Historical Museum in Canyon, Texas. Early in the 1972 season, the initial work at the Thomas Draw locality shifted east to the adjacent Chalk Hollow Draw to examine pre-Antelope Creek materials when deeply stratified cultural deposits were discovered. About 188 person-days of labor were spent during the 46 field days of excavations conducted during the two summers at the site.

The archaeological materials in Chalk Hollow occur on the lower canyon slopes approximately 30 m below the canyon rim. Most artifacts occur over a broad expanse, with concentrated surficial materials around two vandalized areas (herein designated Areas A and B), and a substantial portion of the lower 15 m slope on the right side of the meandering gully (herein designated Area C; Figure 3). The standard excavation units were 5 x 5 ft (1.5 x 1.5 m) squares which were excavated in 6-inch (15 cm) levels.

Area A is a relatively level area high on the canyon wall at an elevation of ca. 1027.2 m above mean sea level (amsl) with artifacts scattered over a 12 x 15 m area. A single excavation unit was placed near two small potholes in this part of the site. Area B, also designated in some field notes as "the second bench," was also relatively level with artifacts occurring within an 18 by 15 m area located between 1021.1 and 1022.6 m amsl. Three excavation units were dug adjacent to a disturbance measuring about 6 by 8 m (Figure 3).

Most of the Smithsonian's excavations were conducted in the extensive Area C, which included the deep cut bank with the exposed stratified artifacts (Figure 4). This area had concentrated surface artifacts within a 60 by 50 m area, located between 1019.6 and 1011.9
Since several blocks and test units were placed in this area, and all but one of the 25 radiocarbon dates are from this part of the site, highlights of the excavations in this area are discussed below.

Additional cultural materials were also found on three ridges or dissected terrace remnants on the left bank of the canyon (herein designated Areas D-F). Area D, located furthest to the east, was a "heavily washed remnant of a nice little terrace" which measured about 25 by 30 m, and was briefly tested by a single test unit (Couzzourt 1996). Areas E and F measured 20 by 18 m and 21 by 18 m, respectively; however, neither area was tested. Since the field notes do not discuss these areas or the results from the limited testing, only the radiocarbon dates, temporally diagnostic artifacts, and stratigraphic conditions and materials from Area C are discussed here.

**AREA C EXCAVATIONS**

A formal 5 by 5 ft (1.5 by 1.5 m) grid system was laid out over all of Area C to control the horizontal recovery of artifacts. A primary northwest-southeast (NW-SE) baseline was set up roughly 30° west of north, parallel to, and about 6 to 7.5 m from the cut bank axis. A secondary northeast-southwest (NE-SW) baseline was set up perpendicular to the first with the “0-0” datum point designated at the intersection of the two base lines. All excavation units in Area C were designated according to the grid point at each unit's northwest corner, which also served as the vertical elevation datum for each unit.

During the 1972 field season, excavations were conducted in five areas. These consisted of several units forming an L-shaped trench (units 0-2SW, 0-1SW, 0-0, 1SE-0, 2SE-0), two units along the cut bank (0-3NE, 1SE-3NE), at an isolated unit (6SE-0), and
testing within two historic dugout depressions (Dugout 1: 6SE-3NE, 6SE-7NE; Dugout 2: 12SE-7SW) (Figure 5). The 1973 field season focused on 14 units of a 10+ by 25 ft (3 x 7.6 m) block excavation at Dugout 1 (5SE- through 9SE-, -3NE through -5NE), continued work in units 0-0 and 1SE-0 of the L-Trench and also work in isolated unit 6SE-0. The depth of the excavation units is not readily reconstructible. But based on available profiles and radiocarbon provenience data, some units in the L-Trench were dug between 3 m (0-1SW), and 4.4 m (1SE-0) below surface. The cut bank units (0-3NE, 1SE-3NE) were dug at least 3.7 m deep (and perhaps to a depth of 4.2 m). A profile drawn of the wall of these units included the stream base at 5.5 m. Excavations in the vicinity of Dugout 1 were taken to depths of 3 m and possibly 3.7 m below surface.

Stratigraphic Descriptions

Stratigraphic profiles exist for six portions of Area C among the records at the Smithsonian Institution. These include profiles of two units within the L-Trench (southeast and northeast walls of 0-1SW, and the southeast and northeast walls of 0-1SE), a continuous 3 m profile of the “cut bank” (southwest wall of 0-3NE and 1SE-3NE), and three profiles within Dugout 1 (northwest profile of 8SE-4NE, the northwest wall of 6SE-3, 4 and 5NE, and a profile of the cut bank at Dugout 1 in the vicinity of 5SE-5NE) (Figure 6). None of the profiles use standard Munsell color terminology, and the texture nomenclature is vernacular and occasionally colloquial.

A number of occupation zones were recognized, which, based on their apparent accumulated thicknesses, probably represent midden debris from multiple palimpsest living surfaces. In view of the rapid rate of sediment accumulation as documented by the radiocarbon dates and the number of hearths encountered, it is likely that most represent charcoal and ash enriched detritus from multiple human occupations rather than the naturally darkened A-horizon of a soil profile. During some periods, midden accumulations were apparently interrupted by the deposition of non-cultural colluvium or, where sorted gravel lenses are noted, the upper slope wash was halted by deflation or alluvium.

The profiles of the cut bank and two units within Dugout 1 are detailed, annotated, and provide considerable depth information. One Dugout 1 profile (6SE-3, 4, 5NE profile) only documents strata about 76 cm below the dugout floor and is not very informative. Unfortunately, the profiles from both units in the L-Trench, show strata thicknesses and boundaries, but provide no descriptions of color, nor texture, and the only clue about zone correlation is based on one strata labeled “wash,” which probably correlated to the non-cultural zone between the upper and lower midden units. Despite the presence of detailed profiles from the cut bank only 3 m away, correlations with strata within the L-Trench profile are tenuous and speculative. In most areas, five zones are apparent, each comprising one or more documented strata. The upper four zones are believed to be primarily colluvial and/or midden accumulations, whereas the lowest may be alluvial. The cut bank profile (0/1SE-3NE), the cut-bank at the dugout (vicinity of 5NE-5SE), and profile 8SE-4NE within Dugout 1 are exemplary of the depositional variability within the site (see Figure 6). In the following descriptions, all radiocarbon dates are reported as 2 sd tree-ring calibrated age ranges.

Cut Bank Profile 0/1SE-3NE

The 5.5 m high profile of the cut bank is herein subdivided into five depositional zones above the Trujillo Formation sandstone. This profile is described from bottom to top according to the sequence of deposition. Zone measurements reflect thickness and depths below surface (bs) based on the drawings. The discussion is based mostly on annotations on a field drawing of the 3 m long section of two excavation units; other information is provided from Wedel's (1975) brief report.

Zone 1 (0.66 m thick; 4.82 to 5.48 m bs). This is a zone of densely compacted gravel, which Wedel (1975:271) describes as caliche rubble, stream gravels, and medium sands. The coarse texture and well-developed size sorting of the gravels indicate that this zone was probably deposited under a high-energy environment at some unknown time in the past. It may represent a combination of alluvial and perhaps deflated colluvial materials. No charcoal, darkened sediment layers, or "middens" are associated with this zone. It is culturally sterile.

Zone 2 (1.09 m thick; 3.73 to 4.82 m bs). This zone consists of tan sand with some small caliche pebbles
Figure 5. Plan Map of Area C of the Chalk Hollow Site.
Figure 6. Correlation of Stratigraphic Profiles at Chalk Hollow.
and at least three extensive, discrete, thin, horizontal layers of light gray sediments. Artifacts were scarce and the thin charcoal layers suggest that either natural soil development, natural brush fires, or brief, and stratigraphically discrete occupations are present. Along the northern edge of the profile is a dense series of large caliche cobbles measuring up to 30 cm in diameter, which may have been colluvially derived from exfoliated caprock canyon walls. Although the field notes record no cultural materials from this stratigraphic unit, the 1973 crew chief recalls the infrequent recovery of fractured and battered quartz cobbles, burned rocks and highly suspicious rocks that were believed to be manuports from this zone (Couzzourt 1996). No datable charcoal was recovered. Analysis of the artifacts at the Smithsonian may clarify the nature of these materials. Zone 2 is most predominately a natural stratigraphic unit deposited under relatively low-energy conditions; however, the filling was sufficiently quick to preserve three thin dark lenses, which may or may not be culturally derived.

Zone 3 (1.90 m thick; 1.83 to 3.73 m bs). This zone corresponds to Wedel's (1975:271) "lower midden," which he describes as having "interbedded lenses and more extended layers of fine sandy gray soil that contains charcoal, flint chips, animal bone scrap, fire-blackened cobbles, sandstone milling fragments, occasional hearths, and other debris of human activity." Unlike Zone 2, no large, dense clusters of caliche cobbles are present, except in areas where cultural features are recorded. The profile indicates that this zone consists of four tan sand layers (sometimes with caliche pebbles which are interpreted to be culturally sterile slope wash layers), interfingered with four light gray midden deposits. Thin, discontinuous stringers of caliche pebbles and sand are shown at approximate depths of 3.73, 3.43, 3.35, 2.83, 2.26, and 2.13 m bs and might represent brief intervals of stability or deflation. An 84 cm diameter basin hearth filled with "burned soil" is documented at a depth of 3.50 m bs. Discrete cobbles (perhaps representing boiling stone dumps or thermal rock features), and isolated ground stone implements or some other kind of manuports occur at depths of 3.58 and 1.92 m bs. Two rock clusters about 2.44 m deep consist of larger and greater abundances of rocks than those found in other parts of this zone; charcoal from this general depth yielded a calibrated radiocarbon age of 2107 to 2489 Before Present (B.P.; based on A.D. 1950 standard) (SI-1705). A few pieces of lithic debris and occasional charcoal flecks intermittently occur throughout the zone. Zone 3 clearly represents a series of stratified cultural deposits. A radiocarbon age on a sample from near the base of the zone yielded a calibrated age of 2745-3015 B.P. (SI-1710).

Zone 4 (0.46 m thick; 1.37 to 1.83 m bs). This zone has an undulating upper boundary that probably marks an erosional unconformity. Sediments consist of light tan sand and gravel, which Wedel (1975:271) refers to as a "culturally clean, light-colored sandy stratum." The profile descriptions call this unit a "non-occupation layer, containing little (sparse) cultural materials." Evidence for rodent burrowing is abundant throughout, and one unidentified dart point base (Specimen 73-R) was collected from this zone.

Zone 5 (0 to 1.37 m bs). This zone consists of the upper midden unit, described by Wedel (1975:271) as a "relatively rich deposit much darker in color than the underlying materials, which is often loose and sooty in texture and feel." Wedel further comments that this "upper deposit is apparently uninterrupted by lenses or strata of clean slope wash soils, and suggests no prolonged period of non-occupancy." But the profiles note that the hue of the upper "midden" grades from dark near the surface to lighter with depth, similar to the expected profile of a pedogenic soil A-horizon. Artifacts are very abundant in this upper zone. The relatively extreme thickness of this upper midden unit suggests that the deposition occurred over a prolonged period of time, perhaps during several hundred years. One tree-ring calibrated radiocarbon date from the base of this zone (level 9) at 0-3NE yielded a calibrated age of 1318-1580 B.P. (SI-1704); a radiocarbon date from level 2 of 2SE-0 (the L-Trench) provides a near terminal deposition calibrated age of 936-1262 B.P. (SI-1298).

Dugout 1 Cut Bank Profile (ca. 5NE-5SE)

This cut bank profile apparently is near the north wall of Dugout 1 based on the slope and edge of the dugout wall; however, the diagram is not tied to the grid system. The profile depicts a 3.65 m thick series of sediments overlying the Trujillo sandstone. Notes indicate that beyond the limits of the profile, the bank rises an additional 1 m, and that the upper black midden begins in this higher section. Undoubtedly the historic dugout excavation removed the zone 5, or
upper midden unit. Thus, four of the five zones in the cut bank profile are documented.

Zone 1 (0.60 m thick; 3.65 to 3.05 m bs). The dense, culturally sterile layer of stream gravels is approximately the same thickness as this zone in the upstream cut bank profile, 0/1SE-3NE.

Zone 2 (1.22 m thick; 3.05 to 1.83 cm bs). This zone consists of tan sand interbedded with pebbles and gravel lenses. One thin lens of pebbles occurs at a depth of 2.44 m, and a second lens with pea to cobble-size gravels occurs at 2.00 to 2.25 m bs, but the large cobbles and the thin burned stringers in the upstream cut bank are not present here. For the most part, the zone is culturally sterile, although occasional quartzite cobbles were found that simply did not belong in the natural stratum, and some rocks showed signs of battering and/or burning (Couzzourt 1996). In this spot, zone 2 is thicker than any of the other profiles and is some 13 cm thicker than in the upstream cut bank profile thickness.

Zone 3 (1.59 m thick; 1.83 to 0.24 m bs). The lower midden unit consists of two or three layers of gray sediments, charcoal, and flint separated by tan sand with sparse cultural material. The lowest gray midden layer is about 12 cm thick and occurs at a depth of 1.82 m. The middle midden layer is darkest within a 14 cm band at a depth of 1.46 m. A rock-lined hearth is present near the base of the middle midden layer, and the profile is sufficiently ambiguous to suggest that the middle and lower layers may be continuously connected by a faintly darkened layer. The upper layer measures 1.28 m thick and is separated from the lower layers by some tan sand. The excavation of the historic dugout has nearly penetrated the entire highest midden layer (see Figure 6). This entire lower midden unit is almost the same thickness as Zone 3 present in the 0/1SE-3NE profile.

Zone 4 (0.24+ m thick; 0.0 to 0.24 m bs). A portion of this sterile sandy zone extends to the surface adjacent to the dugout in the profile. Due to the erosion in this area, the thickness of this unit is uncertain.

Zone 5 (not present). The upper midden unit is not present in this profile. Field notes indicate that the profile abruptly rises 1 m a mere 45 cm beyond the edge of the profile, and that the upper black midden begins beyond the margin of the profile.

Dugout 1 Profile 8SE-4NE

The profile of 8SE-4NE beneath Dugout 1, also shows the same five stratigraphic zones (see Figure 6). However, sediments in this area are only about half as thick (ca. 2.90 m) over the Trujillo sandstone as in the upstream profile at 0-3NE. This profile provides little additional information, but it does give insights into the compressed nature of the sediments on some portions of the site.

Zone 1 (0.65 m thick; 2.25 to 2.90 m bs). The dense, culturally sterile layer of stream gravel is approximately the same thickness in the profiles of the dugout cut bank and 0/1SE-3NE. The gravel texture leaves unambiguous correlation between these three units.

Zone 2 (0.73 m thick; 1.52 to 2.25 m bs). This culturally sterile, tan, fine-to-medium sand zone is nearly 30 cm thinner than nearby profiles. Although notes on this zone do not record the caliche cobbles or the three continuous burned layers that were found upstream, there is no doubt that zone 2 represents the same depositional unit. The shallower zone and absence of caliche cobbles may represent a sorting of the colluvial deposits further away from the current gully walls.

Zone 3 (0.76 m thick; 0.76 to 1.52 m bs). The lower midden unit in the dugout area is less than half the thickness as that found in the 0/1SE-3NE profile. The profile shows three "midden or occupation zones" separated by two thin tan sand zones, suggesting that several interfingering lenses or substrata have merged. Three manuport cobbles are associated with the lowermost midden unit.

Zone 4 (0.18 m thick; 0.58 to 0.76 m bs). This sterile sandy zone is also less than half the thickness of that present in the 0-3NE profile. The historically excavated pit from Dugout 1 may have truncated the top of the zone.

Zone 5 (0 - 0.58 m bs). This zone is less than half as thick as that in the upslope area. All of the matrix attributed to Zone 5, the dark upper midden unit, is mixed and redeposited in the fill above the historic dugout floor.
The comparisons between the three profiles indicate that the coarse gravels (zone 1) lying directly on the Trujillo sandstone were uniformly deposited along this portion of the Chalk Hollow tributary. Most other strata tend to be thicker upstream in unit 0/1SE-3NE, than in 5NE-5SE or 8SE-4NE. The culturally sterile sands for zone 2 are thicker in 5NE-5SE, but only two-thirds as thick in 8SE-4NE. The thickness of the lower midden unit of zone 3 slightly decreases downstream in 5NE-5SE, and by more than half in 8SE-4NE, whereas the sterile zone between the upper and lower middens decreases downstream by 52 and 39 percent. The upper midden unit is present in only two profiles and decreases in thickness by about half between 0/1SE-3NE and 8SE-4NE.

**RADIOCARBON DATES AND DEPOSITIONAL CONTEXTS**

The Smithsonian Institution Radiocarbon Laboratory (SI-RL) processed 25 radiocarbon samples of wood charcoal from various units in four site areas. All were composite samples from 15 to 30 cm thick levels or discrete feature contexts. The processing procedure is probably similar to published methods used by the laboratory in 1972:

All samples are counted for at least 2500 minutes, and $X^2$ analyses are made on 100-minute print-outs... Except where noted, all other samples are pretreated with hot 2% NaOH and 2N HCL, CO$_2$ is converted to CH$_4$ in a static bomb reactor with ruthenium metal catalyst using H$_2$ generated from "dead" H$_2$O. Radon is extracted from CH$_4$ by passing it through charcoal at -30°C. (Stuckenrath and Mielke 1973). There is no indication as to whether the reported Chalk Hollow radiocarbon dates are raw results, or have been C13/C12 isotope corrected to derive "normalized results." This difference can be important, since different kinds of plants photosynthesize and animals metabolize carbon by various pathways. The analyzed or estimated C13/C12 ratio of any material provides a slight difference between the archaeological sample and the carbonate PDB standard. For general wood charcoal, the mean C-13 isotope for wood charcoal is -24.0 \%/oo, and this value is now used as the estimate when no C12/C13 measurements were made (Stuiver and Polach 1977). Measured C12/C13 ratio variations from the estimated mean cause variation of about 16 radiocarbon years for each -1.0 \%/oo departure from the generalized isotope mean. The departures are in part due to climatic variations.

In the absence of information about the Smithsonian Institution procedure for reporting raw or estimate normalized dates, a series of studies in the Southern Plains region where C12/C13 data have been measured for wood charcoal was used to determine whether a systematic temporal problem may adversely affect the Chalk Hollow results. The average measured isotope results on wood charcoal range from -25.9 \%/oo for Fort Hood, Texas (n=33; Quigg and Ellis 1994), to -22.7 \%/oo for Conchas Reservoir, New Mexico (n=4; Kramer et al. 1988). The measured isotopes for wood charcoal from projects closer to the panhandle range from an average -25.3 \%/oo for the O.H. Ivie Reservoir, Texas (n=94 samples; Lintz et al. 1993; Treece et al. 1993a, 1993b) to an average -24.1 \%/oo at both Justiceburg Reservoir, Texas (n=37 samples; Boyd et al. 1993), and Carnegie Canyon, Oklahoma (n=10 Lintz and Hall 1983). These values are so close to the estimated mean C12/C13 ratio of -24.0 \%/oo for wood charcoal, that even if the Chalk Hollow radiocarbon results are reported in a raw form, there is apt to be no appreciable change in the overall ages due to the need for isotope corrections.

Table 1 presents the provenience of Chalk Hollow radiocarbon dates by subarea, test unit, level, depth, average elevation, and feature association, SI-RL number, the one standard deviation interval for the raw/normalized uncorrected radiocarbon age before present (B.P. = 1950). The last four columns on Table 1 present the radiocarbon tree-ring calibration at the one (1 sd, ca. 68 percent confidence) and two standard deviation (2 sd, 95 percent confidence) intervals. The tree-ring calibration of the radiocarbon ages to calendrical ages is not a smooth correlation, but contains major trends and short-term “wiggles” called the deVries effect that are caused by fluctuations in the atmospheric carbon reservoir over time. Consequently, the standard deviation interval for any particular date can intersect the calibration curve in one or more places. For the suite of dates from Chalk Hollow, the 1 sd and 2 sd calibration intervals for each date has from one to five possible calibration spans. Each span has a differential calculated probability value that represents the percentage of areas of the radiocarbon date that
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<td>2937 - 2906</td>
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<td></td>
<td>Hearth</td>
<td></td>
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<td>2574 - 2548</td>
<td>0.07</td>
<td>2894 - 2700*</td>
<td>0.71</td>
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<td></td>
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<td>2698 - 2476</td>
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<td>Unit 7SE-3NE</td>
<td>9</td>
<td>48-54</td>
<td>1013.69</td>
<td>--</td>
<td>SI-1715</td>
<td>2810±75</td>
<td>2979 - 2841*</td>
<td>0.81</td>
<td>3110 - 3094</td>
<td>0.01</td>
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<td>2838 - 2796</td>
<td>0.19</td>
<td>3085 - 2759*</td>
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<td>10</td>
<td>54-60</td>
<td>1013.46</td>
<td>--</td>
<td>SI-1716</td>
<td>2635±75</td>
<td>2854 - 2711*</td>
<td>0.90</td>
<td>2923 - 2917</td>
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<td>2576 - 2546</td>
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<td>2883 - 2470*</td>
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<td>Units 6SE-3&amp;4NE</td>
<td>12</td>
<td>66-72</td>
<td>1014.14</td>
<td>Burned</td>
<td>SI-1299</td>
<td>2820±80</td>
<td>3000 - 2841*</td>
<td>0.84</td>
<td>3149 - 3127</td>
<td>0.02</td>
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<td>Caliche</td>
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<td>2837 - 2796</td>
<td>0.16</td>
<td>3117 - 2762*</td>
<td>0.98</td>
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* Tree ring calibration derived from the University of Washington Radiocarbon Calibration Program 1993, version 3.0.3c
Underlined 2 SD values are used in this study.
Elevations in dugout use pre-exavation ground slope.

falls within a tree ring conversion span (Stuiver and Reimer 1993). The calibration span(s) with the highest probability value(s) are used, and those segments with low probability ranges are not. A total of 21 calibration date spans (84%) account for more than 94 percent of the radiocarbon area using the 2 sd values, and another three calibration span (12%) account for 82 to 86 percent of the radiocarbon areas. Only sample SI-1713 uses a moderate degree of confidence in the calibration date span at 71 percent (Table 1).

The 1 sd values for each age are generally regarded as having increased precision (i.e., smaller spans) but less accuracy (68 percent confidence) than the 2 sd values with decreased precision (i.e., larger spans) and increased accuracy (95 percent confidence). Whereas several 1 sd calibrated ages have multiple relatively low probability ranges (cf. SI-1291 [p=.33, .36], SI-1706 [p=.42, .49], SI-1296 [p=.35, .65], SI-1705 [p=.40, .60]) that may yield multiple choices for some calibrated age spans, the 2 sd probability ranges are consistently much higher and less ambiguous. The lowest 2 sd probability range is for SI-1713, with p=.27 and .71. In addition, since the 2 sd values increase the total Chalk Hollow radiocarbon age range by only about 10 percent (318 years over a 3,125 year span), the 2 sd tree-ring calibrations with the higher probability values are used as the tree ring calibration age values throughout this study.
Problems exist in deriving the specific elevations of the radiocarbon samples, since none was recorded during fieldwork. These values were derived by interpreting the elevation of each test unit’s northwest corner datum elevation (interpolated from a 1973 block excavation topographic map [Wedel n.d.]), minus the depth for a point-plotted sample. Where no depths are specified, but the sample is attributed to a specific 15 cm thick level, the depth below surface was interpreted to be the mean depth for the level. Thus, for level 1, the depth is 7.6 cm bs, plus 15.2 cm for each level thereafter (i.e., 7.6, 22.8, 38.1 and 53.3 for levels 2 through 4, etc.). These depths were subtracted from the elevation of the northwest corner datum surface after they were converted to metric from English measurements. For those radiocarbon ages from excavation units inside the depression of Dugout 1, the sample elevations were interpolated back to the original ground surface before the excavation of the dugout. Couzzourt (1996) mentions that a low berm existed around the perimeter of the dugout. But, since the elevations of this berm were not documented and its relationship, if any, to the unit datum is uncertain, the projected ground surface was derived by extending the topographic trends of the surface from outside the dugout to the creek bank. Since interpretations and projections were made, some minor ambiguities may exist for the elevations of the dugout samples.

Radiocarbon Results

One radiocarbon age (SI-1300) came from shallow deposits in Test Unit 3 on the second bench in Area B and provides information on the use of this separate area (see Table 1). The radiocarbon date is the most recent age from the site and suggests use of this area towards the end of, or following development of, the upper midden in Area C. This date does little to assist in understanding the deposition in other areas of the site.

The other 24 radiocarbon dates are from three subareas of Block C. Ten dates come from four units in the L-Trench; seven are from the two adjacent bank profile units; and seven more come from the block excavations around and beneath Dugout 1 (see Table 1).

In general, the calibrated radiocarbon dates from each of the three areas show considerable internal consistency, with the deeper samples generally yielding the older ages. Within the L-Trench area, the upper seven levels of the higher midden generally yield ages (n=4) between 936 and 1523 B.P. (A.D. 427 to 1014) based on the maximum span of calibrated 2 standard deviation intervals). The age of deposits between levels 16 and 28 of the lower midden ranges between 2040 and 3897 B.P. (90 - 1947 B.C.). Two samples (SI-1292 and SI-1293) are reportedly from hearth feature contexts (Figure 7). Three lower ages in the L-Trench area seem to be either about 885 years too young (SI-1294), or 775 to 695 years too old (SI-1290, SI-1293) for their depths, relative to other radiocarbon results. The causes for the three incongruous dates are uncertain, but contextual displacement from “the extraordinary activity of burrowing rodents” as commonly noted in the records (Wedel n.d.), is probably a contributing factor. But SI-1293 is based on charcoal from a hearth context and perhaps represents the burning of old/dead wood or the core portion of a large log. Based on the sequence of dates from the L-Trench, the rates of deposition of the upper midden average about 23.1 cm/century. The interval between the midden formations was deposited at a rate of about 13.8 cm/century, and the lower midden deposition rate using the accepted ages averages about 13.7 cm/century.

Within the two cut bank units, the single sample from the base of the upper midden unit (level 9) yields an age of 1318 to 1580 B.P. (SI-1704), while the six ages from the lower midden unit (levels 17 to 24) range between 2107 and 3117 B.P. (Figure 8). None of these dates is from identified feature contexts. The latter batch shows considerable consistency with only sample SI-1707 occurring beyond the 2 sd range by ca. 440 years older than the age-depth trends for the other dated samples in the lower component. These assay results suggest that in the cut bank area, the deposition rate for the interval between the upper and lower midden formation was about 14.1 cm/century, whereas the lower midden accumulated at an average rate of 16 cm/century.

The seven radiocarbon assays from the block excavation below Dugout 1 are tightly clustered between 2424 and 3117 B.P. (Figure 8), despite their occurrence at relatively shallow depths (levels 7-12). Four of these dates are from hearth feature contexts. Most ages from different levels have considerable overlapping 2 standard deviation intervals that suggest
Figure 7. Comparison of Normal Tree-Ring Adjusted Ages (1 SD Intervals) for the Chalk Hollow Radiocarbon Dates.
Figure 8. Tree-Ring Adjusted Radiocarbon Ages Plotted by Level for each Excavation Block at the Chalk Hollow Site.
some vertical displacement of charcoal from a relatively brief occupation (especially for SI-1711 and SI-1714). If these age assays are ignored, then the lower midden beneath the dugout has a deposition rate of about 17.8 cm/century. If the excavation units were dug parallel to the deposition slope, then, on average, each excavated level would constitute the accumulated sediments from about a century of deposition.

If the 24 calibrated radiocarbon ages from Area C are plotted together by depth below surface for specific excavation units, very little patterning is evident in the age-depth trends (Figure 9). The most evident pattern is that five samples from the upper nine levels (1.37 m) provide ages for the upper midden spanning 936 and 1580 B.P. and that no radiocarbon ages are from the span 1580 to 2040 B.P. The nineteen assays from the lower midden (levels 7 to 28) provide ages between 2040 and 3897 B.P. This seemingly broad range of radiocarbon results from the lower 3.35 m of deposits may underlie Wedel's (1975:272) concern for the unfortunate lack of chronometric consistency. However, the plotting of age by depth below surface assumes that the ancient strata represent depositional zones laid down along a slope approximately parallel to the present ground surface.

If the ages of the radiocarbon calibration ages are plotted as a function of elevation, then considerably more consistency is apparent (Figure 10). No change is evident in the ages of the highest five ages (936 to 1580 B.P.) between 1016.36 and 1017.12 m associated with the upper midden. But considerably more age clustering is apparent in the 19 ages (2040 to 3897 B.P.) that occur at elevations between 1013.39 and 1015.52 m of the lower midden. Some of the age-depth variation in the lower components may relate to assumptions inherent in the procedures used to extrapolate the pre-excavation ground surface elevation in the area of Dugout 1. Nevertheless, the anomalous ages for each area may still be due to the collection of charcoal samples displaced out of their depositional context. The tighter clustering of lower midden ages strongly suggests differential rates of deposition over various parts of the site, with the higher elevations (L-Trench and cut bank areas) receiving more midden deposition and colluvium than around the area of Dugout 1. The data are too imprecise to confidently claim that deposition of the deeper deposits throughout Area C occurred horizontally or uniformly between the three areas. But the chronometric data suggest that a model of differential deposition rate that does not parallel the modern ground surface is best applicable for the Chalk Hollow site deposits.

The radiocarbon assays may also be used to clarify the number and age of dated events at the Chalk Hollow site, by using all tree-ring calibrated ages, irrespective of their context or provenience. This requires an assumption that all of the burned wood occurred as a result of human activities, and no old wood or core wood biases, nor natural range fire wood are present. By plotting the overlap in the 2 sd intervals of tree-ring calibrated dates (Figure 11), three chronometric events are apparent for the lower midden deposits, and one main occupation zone is evident for the upper midden unit. Each chronometric event may represent one or more occupations at the site area, but a combination of possible sample selection error and insufficient time differentiation precludes sufficient assay resolution to temporally recognize the number of dated occupations. The earliest dated event(s), near the base of the lower midden unit, are derived from two samples (SI-1295, SI-1293) and reflect an age of ca. 3460 to 3838 B.P. (maximum overlap of the 2 standard deviation interval). The other 17 assays from the lower midden document a general accumulation spanning 2040 to 3275 B.P. (maximum overlap spans of 2107 to 3117 B.P.), with bimodal overlap ages. Eleven ages have overlapping 2 standard deviation intervals of ca. 2700-3076 B.P. and define a middle chronometric component for the lower midden unit. Seven other assays have a modal overlap in the 2 standard deviation range and tentatively define an upper chronometric event of the lower midden unit, with an age of ca. 2424-2551 B.P. The upper midden unit has five radiocarbon assays with overlapping 2 standard deviation interval ages between 1077 and 1523 B.P.

PRELIMINARY OBSERVATIONS ON ARTIFACT DISTRIBUTIONS

Limited information is available in the records about artifact frequencies and distributions. A brief examination of the compiled ceramic and projectile point data provides insights about the integrity and clarity of occupations at the site. The following analysis focuses on these diagnostic material distributions as based on laboratory and analytical notes (Wedel n.d.). The ceramic data consists of
information culled from catalogue index cards maintained only during the 1972 season, which indicate sherd frequency and provenience, but provide no descriptions or identifications. The projectile point data are derived from a hand-tabulated analytical table and three pages of draft text from a partial manuscript covering both field seasons (Wedel n.d.). The available information does not include stem widths, which would have been useful to confirm the distinctions between arrow and dart points.

A total of 13 prehistoric pottery sherds are listed in the catalog records as being recovered during the 1972 excavations; the quantity of pottery, if any, from the 1973 excavations is unknown. One sherd comes from Area B, and is not relevant to the present discussion. All but two of the remaining sherds are from the L-Trench area; five sherds are from the upper 46 cm (levels 1-3), one sherd each was recovered from levels 5 through 8 (61-122 cm), and one sherd has no recorded depth information (Table 2). All these sherds are attributed to the upper midden. Two sherds were also found in Dugout 1 (6SE-3NE, level 7: 91-107 cm), but their stratigraphic position relative to the floor is uncertain. Although the pottery has not been formally analyzed, Wedel (1975:272) calls it a plain brownware "probably not of local manufacture." The absence of cordmarking indicates that these sherds are not of Plains Woodland derivation but, rather, may be related to the plain brownwares found among Palo Duro complex sites in the canyonlands region (Hughes 1979:43; 1989:26; Hughes and Willey 1978:190; Boyd 1997).

A total of 14 arrow points, 22 dart points, and 6 projectile point preforms were tabulated from both the 1972 and 1973 field seasons at Chalk Hollow (Table 3; Wedel n.d.). The high occurrence of identifiable points and haft descriptions suggests that unidentified fragments were not included. Catalog inventories for the 1972 season alone indicate that 68 projectile point fragments were recovered.

Nearly all of the 36 tabulated projectiles conform to stemmed and/or corner-notched point categories. The smaller arrow points generally measure between 17-30 mm long, by 13-15 mm wide, and 3-4 mm thick, whereas the dart points measure between 37-70+ mm long, 23-39+ mm wide, and 5-10 mm thick. The six preforms are unnotched bifaces which are ovate (n=5) or subtriangular (n=1), and range between 35-58 mm long, 21-32 mm wide, and 6-7 mm thick. All preforms are within the size range of the stemmed dart points.

Eleven arrow points were attributed by Wedel (1975:272) to the corner-notched Scallorn or Scallorn-like type; one is an unnotched "Fresno" point, and two others are unidentifiable fragments, one with a small stem and a small, thin blade portion of a serrated point. Some morphological variability is apparent. Perhaps significantly, occasional arrow point specimens are described as having finely serrated blade edges (Wedel n.d.). Subsequent to Wedel's analysis, the Deadman's arrow point type, a small, barbed, and often serrated form occurring in association with Scallorn points, has been defined as a hallmark of the Palo Duro complex (Hughes and Willey 1978). Published illustrations of four Chalk Hollow arrow points, however, show all to be comparable to the Scallorn rather than Deadman's type (Wedel 1975: Figure 4). Nevertheless, until the Chalk Hollow assemblage is reexamined, it is not possible to discount the presence of Deadman's points from the assemblage. The "Fresno" point, which usually postdates the Scallorn form (Hughes 1989), was found high in the upper midden and either represents an item from a brief Late Prehistoric occupation, or perhaps an arrow point preform. The arrow points are predominately made of Tecovas jasper (n=8), with a few made of Alibates (n=2), chalcedony/opalite (n=2), quartzite (n=1), and unidentified materials (n=1). Tecovas sources occur along the eastern edge of the Caprock Escarpment predominately south of Palo Duro Canyon, although one source is reported to be within 6.5 km from the Chalk Hollow site (Jim Couzzourt 1996; Cameron 1980). Alibates is derived from exposures in the Canadian River valley a short distance to the north. All other lithic material types used to make small arrow points may be regarded as local gravels; no exotic or foreign cherts were recognized for the small points (Holliday and Welty 1981).

Of the 11 arrow points from known contexts, all occur in the upper 107 cm; about three-fourths come from the upper 61 cm (Table 3). Spatially, most (n=8) arrow points are from the L-Trench, including the six Scallorn/Scallorn-like specimens, the Fresno, and the unidentified stem portion. Single examples of Scallorn points are from slump in the gully bank, the cut bank (0-NE3), and from isolated unit SE6-0. Only three arrow points are from the mixed slope wash fill above
Table 2. Prehistoric Ceramic Proveniences from the Chalk Hollow Site (1972 Phase Only).

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<tr>
<th>Pottery Type</th>
<th>Cat. No.</th>
<th>Unit</th>
<th>Level-Depth (in)</th>
<th>Elevation (m)</th>
<th>No. Sherds</th>
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<td>Area B, T-2</td>
<td>1 0-6&quot;</td>
<td>unknown</td>
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<td>CH-213</td>
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<td>5 24-30&quot;</td>
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<td>CH-224</td>
<td>0-2SW</td>
<td>6 30-36&quot;</td>
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<td>8 42-48&quot;</td>
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<td>0-1SW</td>
<td>wall trim</td>
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<td>6SE-3NE</td>
<td>7 36-42&quot;</td>
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<td>2</td>
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<td>2SE-0</td>
<td>1 0-6&quot;</td>
<td>1017.27</td>
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<tr>
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<td>2SE-0</td>
<td>1 0-6&quot;</td>
<td>1017.27</td>
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<td>2 6-12&quot;</td>
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<td>2 6-12&quot;</td>
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<tr>
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<td>CH-179</td>
<td>2SE-0</td>
<td>3 12-18&quot;</td>
<td>1016.97</td>
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Table 3. Projectile Point Types and Proveniences from the Chalk Hollow Site

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<th>Elevation (m)</th>
<th>Material</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
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<tr>
<td>Fresno?</td>
<td>CH-61</td>
<td>0-1SW</td>
<td>3 12-18&quot;</td>
<td>1017.35</td>
<td>Tecovas</td>
<td>23</td>
<td>14</td>
<td>4</td>
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<td>CH-68</td>
<td>0-0</td>
<td>2 6-12&quot;</td>
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<td>Alibates</td>
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<td>15</td>
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<td>3 12-18&quot;</td>
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<td>Tecovas</td>
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<td>3</td>
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<td>Scallorn</td>
<td>CH-149</td>
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<td>4 18-24&quot;</td>
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<td>Tecovas</td>
<td>17</td>
<td>13</td>
<td>--</td>
</tr>
<tr>
<td>Scallorn</td>
<td>73-G</td>
<td>6SE-0</td>
<td>4 18-24&quot;</td>
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<td>Quartzite</td>
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<td>13+</td>
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<tr>
<td>Scallorn</td>
<td>73-O</td>
<td>8SE-4NE</td>
<td>4 17&quot;</td>
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<td>Chalcedony</td>
<td>27</td>
<td>14+</td>
<td>--</td>
</tr>
<tr>
<td>Scallorn</td>
<td>73-I</td>
<td>9SE-3NE</td>
<td>4 24&quot;</td>
<td>1014.22</td>
<td>Unknown</td>
<td>23</td>
<td>13</td>
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</tr>
<tr>
<td>Scallorn</td>
<td>73-xxx</td>
<td>0-3NE</td>
<td>5 24-30&quot;</td>
<td>1016.98</td>
<td>Chalcedony</td>
<td>30</td>
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<td>CH-227</td>
<td>0-1/2SW</td>
<td>4-6 18-36&quot;</td>
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<td>Tecovas</td>
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<td>14</td>
<td>3</td>
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<td>CH-262</td>
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<td>unknown</td>
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<td>Scallorn</td>
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<td>slump</td>
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<td>15</td>
<td>3</td>
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<tr>
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<td>CH-218</td>
<td>0-1SW</td>
<td>7 36-42&quot;</td>
<td>1016.74</td>
<td>Tecovas</td>
<td>23+</td>
<td>15</td>
<td>3</td>
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<tr>
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<td>CH-70</td>
<td>0-0</td>
<td>2 6-12&quot;</td>
<td>1017.47</td>
<td>Tecovas</td>
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<td>17+</td>
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<td>CH-250</td>
<td>6SE-3NE</td>
<td>7 36-42&quot;</td>
<td>1014.91</td>
<td>Alibates</td>
<td>24+</td>
<td>18</td>
<td>3</td>
</tr>
</tbody>
</table>

| **Dart Points** | | | | | | | | |
| Marcos      | CH-306   | 1SE-0     | 15 90"           | 1015.26       | Alibates | 59          | 29+        | 6              |
| Marcos      | 73-M     | 9SE-3NE   | 7 39.3"          | 1013.83       | Tecovas? | 43          | 24         | 6              |
the floor of Dugout 1. Wedel (n.d.) attributes all arrow points to the upper midden. Overall, there is a strong horizontal and vertical association of the prehistoric pottery and the Scallorn arrow points with this upper midden unit.

The 22 dart points were classified "with some uncertainty" (Wedel n.d.) as belonging to a range of large, broad corner-notched forms, including "Marcos" (n=6), "Castroville" (n=4), "Williams" (n=3), "Palmillas" (n=3), "Ensor" (n=2), and "unidentified" (n=4), along with six ovate and subtriangular preforms. The dart points and preforms are mainly made of Tecovas jasper (n=10) and Alibates (n=9), probably from sources south and north of Chalk Hollow canyon, respectively. Four specimens were made of Edwards chert or a "gray chert" which might also be from the Edwards Plateau, south of the Texas panhandle. Minor lithic resources among the dart points and preforms include single

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<table>
<thead>
<tr>
<th>Point Type</th>
<th>Cat. No.</th>
<th>Unit</th>
<th>Level Depth</th>
<th>Elevation</th>
<th>Material</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Thickness (mm)</th>
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<td></td>
<td></td>
<td>(in)</td>
<td>(m)</td>
<td></td>
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<tr>
<td>Marcos</td>
<td>73-W</td>
<td>1SE-3NE</td>
<td>21 121&quot;</td>
<td>1014.35</td>
<td>Potter</td>
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<td>39+</td>
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1 All identifications are based on Wedel (n.d.)
examples of Potter chert, chalcedony or opalite, "striped chert," and two examples of an "unknown chert." Potter chert and chalcedony/opalite may be regarded as High Plains lithic materials that could occur as gravels or bedrock spalls within a short distance of the site (Holliday and Welty 1981; Lintz 1997).

An examination of the materials and point types indicates that both Marcos and Castroville forms were made of Tecovas and Alibates, indicating familiarity with lithic resources north and south of the site. Ensor points were fashioned from the regionally available High Plains lithic resources (Alibates and chalcedony/opalite). Williams points are made of materials also reflecting northern sources (Alibates) and possible nonlocal southern sources from the Edwards Plateau ("gray chert"). But the Palmillas points were made from lithic resource types exposed to the south (Tecovas jasper and Edwards/gray cherts), without evidence of the use of distinctive High Plains materials. These point forms are mostly from the upper occupation zone of the lower midden, and probably comprise a multitude of palimpsest occupations. It is uncertain whether the various tool stone materials represent movements of different groups through the lower panhandle region, or the convergence of several groups at the Chalk Hollow locale.

The spatial distribution of the dart points and preforms shows no horizontal clustering within the site. All dart forms seem to co-occur. Five projectile points came from two units of the L-Trench, six points and one preform came from the two cut bank units, and eight points and three preforms were from specific levels and units around Dugout 1. One other dart point and one preform were also recovered without specific provenience from the Dugout block excavation and an additional point came from the general cut bank area.

The dart points were found from levels 1 to 21 (0-320 cm deep). Analysis of artifacts by depth below surface is uninformative, since the radiocarbon data indicate differential deposition rates in various portions of the site. Based on mere depth below surface, over half of the dart points came from depths comparable to the ceramics and arrow points (Figure 12). Three-fourths of the dart points from the upper 122 cm come from the area of the Dugout 1 where the deposition rates are slower and the upper deposits have been displaced. Only 11 percent of the dart heads from depths of 183 to 320 cm were from the same area.

If the ceramics, arrow, and dart points are replotted by absolute elevations, significant shifts exist between elevations and levels predominately for those artifacts from the Dugout 1 area (Figure 12). But only minor changes in the vertical distribution of artifacts occur in other areas of the site. Most dart points cluster in lower elevations below the arrow points and ceramics.

The upper midden unit contains 10 sherds, 5 “Scallorn” points, 1 "Fresno" preform, 1 unidentified arrow point, 1 Palmillas dart point, and 2 untyped dart points, whereas the lower midden unit contains 4 Marcos points, 2 Castroville points, 2 Palmillas points, and 1 unknown dart point.

Although two pottery sherds and four arrow points occur at elevations below 1016.50 m amsl, all are in the disturbed fill above the dugout floor. Also, 91 percent of the dart points below 1014.40 m are from the dugout area, but only one of eleven dart points above 1014.40 m is from the same area. This dart point in the upper midden may represent a specimen 1) moved into the upper midden zone by rodents or other disturbance factors, 2) an early point form found and reused by later groups, or 3) slight evidence for the simultaneous use of dart and arrow weaponry. These overall distributional patterns further underscore differential deposition rates across the site.

Very little consistency or segregation exists in the association of various dart point forms in the lower midden unit. Marcos, Williams, Castroville, and Ensor co-occur in the same elevations/levels. And many of these are probably associated with the upper occupation zone in the lower midden. Palmillas, a poorly defined and probably a dubious type, and all of the unidentified dart points tend to occur above the named kinds of points. The overlap in the depths and elevations for various point types at the Chalk Hollow site may reflect 1) contemporaneous use of different dart point forms, 2) some mixing of specimens caused by burrowing rodents and other forms of disturbances, 3) some reuse of early dart points by later groups, or 4) systematic vertical distortions due to the geometry of depositional units which vary from the present ground surface.
Only three radiocarbon assays are from the same test units and levels as the diagnostic artifacts. Based on deposition rates and the thickness of the excavated levels, these points should date within a century of
the radiocarbon range if they have not been displaced. One "Castroville" point from the lower midden portion (Level 19) of the cut bank area, 1SE-3NE, is associated with an age of 2762-3117 B.P. (SI-1707). The L-Trench area yielded two dates from the upper midden associated with diagnostic materials. An age range of 1128-1523 B.P. (SI-1297) is from level 7 of 0-1SW and is associated with one Scallorn arrow point and a "corner-notched dart point." And an age range of 936-1262 B.P. (SI-1298) is from 2SE-0, Level 2, which also yielded plain brownware sherds.

Most radiocarbon assays come from below the levels yielding diagnostic materials. Within the L-Trench area, all six radiocarbon dates from the lower midden occur below diagnostic materials. In the cut bank area, 87.7 percent of the radiocarbon dates occur below levels containing 71.4 percent of the diagnostic points. Similarly, in the dugout region, 71.4 percent of the dates are below 75 percent of the dart points and preforms. Unfortunately, even though the suite of radiocarbon dates indicate that multiple chronometrically defined events or occupations exist for the lower midden, at this time, the diagnostic dart points are only associated with the highest portion of the lower midden. The kinds of dart heads associated with the lower and earlier occupation events remain unknown.

COMPARISONS AND CULTURAL AFFILIATIONS

Analysis of the radiocarbon dates and temporally diagnostic materials from the upper midden unit at the Chalk Hollow site has documented at least one main occupational zone that dates 1270-1400 B.P., within a general age of 936 to 1580 B.P. Associated cultural diagnostic materials include Scallorn and Scallorn-like points, occasional dart points (unidentified types), and plain brownware pottery. Wedel (1975:273) attributed the upper midden materials to the Lake Creek complex, a Woodland manifestation identified by Scallorn arrow points and thick cordmarked pottery centered along the Canadian River Valley (Hughes 1962; 1989).

Recent evidence suggests that the small corner-notched arrow points preceded the occurrence of ceramics on the Southern Plains by several hundred years (Quigg et al. 1993; Taylor, 1987). By ca. 1800 B.P. a thick, cordmarked ceramic technology was adopted by these indigenous groups in the upper Texas panhandle (Quigg 1997). In the high and low Plains areas of southeastern Colorado, northeastern New Mexico, the upper Texas panhandle, central and western Oklahoma, and Kansas, comparably thick, conical vessel cordmarked pottery and arrow points along with the large corner-notched dart points have been found as hallmarks of the Woodland tradition cultural influences dating to the same general time period of ca. 2500 to 800 or 1000 B.P. (Johnson 2001; Wedel 1961). Differences in ceramic tempering, tool forms (especially bifaces and dart points), and masonry vs. non-masonry architectural styles suggest that considerable variations in the Woodland manifestations exist. These Woodland manifestations can be traced to developments occurring in the Midwest (Missouri, Illinois) where the pottery appears at least a half millennium earlier than it does on the Plains (Johnson 2001; Wedel 1961).

Numerous sites in the Texas panhandle and adjacent areas have been attributed to the Woodland tradition. Woodland sites with radiocarbon or thermoluminescence dates include Tascosa Creek site (Couzzourt 1985, 1988), Duncan Ranch site 1 (Gustafson 1994), and Block A at the Sandy Ridge site (Quigg et al. 1993). Other near-by dated Woodland sites include the Swift Horse site (Briscoe 1987), Beaver Dam, Area A (Thurmond 1991), and the Sullivan-Carpenter burials (Gettys 1991; Anonymous 1993) in western Oklahoma, and the Carrizo Creek Bridge site (Saunders 1983), and Site 34CI320 (Bartlett 1997) in the western end of the Oklahoma panhandle. Numerous other Woodland tradition sites in the Texas panhandle lacking absolute dates include the type site of Lake Creek, Harrison-Greenbelt, 41MO5, 41PT29, and Night Storm (Boyd 1997:275). The dates confirm that the sites generally were used from about 2000 to 1100 years B.P., even though late dates are yet available for 850 to 1300 B.P. (Boyd 1997). The contextual association of the absolute dates with the diagnostic materials is not always clear, and the frequent excavation strategy involving few or widely dispersed excavation units and poor contextual association of materials precludes recognition of a sufficiently discrete tool assemblages to ascertain whether one or more Woodland complexes are represented. While unquestionably Woodland tradition sites are abundant in the upper Texas panhandle and the arrow points
and dates from the upper midden at Chalk Hollow are contemporaneous with the Woodland tradition, the absence of cordmarked pottery from the site means that the early ceramic culture at Chalk Hollow is not affiliated with the Lake Creek complex of the Woodland tradition.

In contrast, Jack Hughes (1979:43; 1991:26; Hughes and Willey 1978:190) attributes the upper midden materials at Chalk Hollow to the Palo Duro Complex, which was not identified until several years after Wedel's study (Boyd 1995, 1997). These affiliations are based on the plain brownware pottery, the barbed, shouldered arrow points (some with serrations), and favorable chronometric comparison with the reported range of radiocarbon dates from Deadman's Shelter in Mackenzie Reservoir (Hughes and Willey 1978). Other chronometrically dated Palo Duro complex components have since been found at the Sam Wahl, Gobbler Creek Bridge site, South Sage Creek site, Boren Shelter 2, and Cat Hollow sites within Lake Alan Henry (Justiceburg) Reservoir (Boyd et al. 1993), the Kent Creek site (Cruse 1992), and the Canyon Country Club Cave (Hughes n.d.). Other undated sites affiliated with the Palo Duro complex include South Ridge (Etchieson 1979), Blue Clay and County Line sites (Hughes and Willey 1978) and the Maintenance Barn site (Covozount 1982). The calibrated radiocarbon dates from Palo Duro complex sites, including the upper midden at the Chalk Hollow site, range from 850 to 1830 B.P. Boyd (1995:507) attributes this complex as an intrusion of a new hunting/gathering people who were in contact with, if not descended from, Jornada Mogollon groups of southeastern New Mexico into the caprock canyons east of the High Plains. In addition to the plain ware pottery and corner-notched arrow points, several sites have rectangular houses in shallow pits. Boyd indicates some uncertainty in the timing of the Palo Duro complex intrusion and acknowledges that some occupations may have begun during the transitional Archaic (1500 - 2000 B.P.). The preponderance of chronometric evidence places the age of the Palo Duro complex between 1500 and 1000 B.P.

At least three distinct chronometric events are identifiable for the lower midden at Chalk Hollow based on the overlap of the 2σ interval range. These occupations are primarily Late Archaic with ages of ca. 3460-3840 B.P., ca. 2700-3075 B.P., and ca. 2425-2550 B.P. within a span of 2040 to 3897 B.P. Associated dart points from the upper part of the lower midden include broad corner-notched points resembling Marcos, Williams, Castroville, Ellis, and the poorly defined Palmillas types (Suhm and Jelks 1962; Turner and Hester 1993).

Similar large point types have been recovered from a number of other dated sites on the Southern Plains. In the absence of associated pottery and arrow points, these sites are usually attributed to the Archaic period, although as undated sites they may be specialized activity locations used by Woodland tradition groups. Dated Late Archaic campsites and rockshelters on the Southern Plains include Zones 4 and 5 for Canyon City Club Cave (Hughes n.d.), sandy ridge, Block C (Quigg et al., 1993), Deadman’s Shelter, Area 2, stratum D (Hughes and Willey 1978), and the Sanders site (Quigg 1997). Undated Late Archaic campsites include Little Sunday (Hughes 1955) and Bitter Creek site (Hughes and Hood 1976), whereas mesa top Archaic occupations are documented for the L-7 and Z-Bar-L Mesas (Walter 1992). In western Oklahoma, Late Archaic campsites have been reported from the Summers site, 34GR12 (Leonhardy 1966), Beaver Dam, and 34RM334 (Thurmond 1991).

Radiocarbon dates from a few campsite assemblages containing these large corner-notched dart points (specifically Sandy Ridge [Block C], 34GR12, and the lower midden at Chalk Hollow) document the early use of these point forms by at least 3000 to 3800 years ago. Clearly, the large corner-notched dart points were a popular style used over a considerable length of time throughout the Late Archaic period. These dart point forms persisted when the corner-notched arrow points and cordmarked pottery were added independently and sequentially to the indigenous Archaic cultural base by ca. 1800 B.P.

In addition to open and mesa top campsite and rockshelter occupations, a whole series of bison kills with large dart points are known from a series of arroyo nick points along the eastern edge of the Llano Estacado. These dated bison kills in the Texas panhandle include the sites of Twilla, Collier, Bell, Strong, and Mcintyre (Collins 1968; D. Hughes 1977, 1989; Lintz et. al 1989; Tunnell and Hughes 1995; Wilkens 1997). The most notable
dated Late Archaic bison kill site in western Oklahoma is the Certain site (Bement and Buehler 1994). Other undated bison kills include Buzzards Roost, Finch, Hoover, R.O. Ranch, and Sitter (Hughes 1977). Typically these bison kills date from 2335 ± 100 to 1060 ± 135 B.P. (Hughes 1977; Lintz et al. 1989; Wilkens 1997).

The relatively recent ages of these bison kills indicate that they are mostly contemporaneous with the early ceramic period manifestations (Palo Duro and Lake Creek complexes), rather than the age of the traditional pre-ceramic assemblages of the Late Archaic Period. The present chronological data suggests that the bison kills represent the persistence and specialized use of the large projectiles in bison procurement, perhaps by early pottery-using people. Alternatively, these kills represent remains from an enclave of people utilizing only Late Archaic hunting armament and strategies when surrounding people were adopting pottery and lighter weaponry. Until other bison kill sites predating the past two millennia are identified, or a mixture of small and large weaponry is recovered from bison kill sites, the Late Archaic tactics and strategies of bison procurement on the Southern Plains remains unknown.

SUMMARY

The present chronometric and stratigraphic assessment of the Chalk Hollow site reaffirms Wedel’s contention that the upper midden unit contains a relatively discrete assemblage. Although the present characterization of the pottery as plain ware suggests that the materials may be affiliated with the Palo Duro complex, a detailed reanalysis of these materials on file at the Smithsonian Institution would help contribute to the delineation of this poorly known cultural manifestation.

Despite the occurrence of deeply stratified, multiple Late Archaic zones in the lower midden, it is not presently possible to relate specific diagnostic point forms to individual components, nor is it possible to confidently determine whether multiple point forms are related to assemblages from single or multiple groups. Most dart forms are from the highest occupation zone, and only a few points come from the lowest zones of the lower midden unit. Some ambiguous contextual associations of radiocarbon dates and diagnostic points may be due to material translocation by rodent activities. It is impossible to determine in specific cases whether the charcoal or the projectile has been moved out of context. In addition, the excavation tactic of using relatively coarse (15 cm thick) arbitrary horizontal levels, rather than excavations by natural sloping strata or finer units, may have contributed to the analytical and interpretive problems. Until a detailed reanalysis of artifacts from the lower midden unit is undertaken, the magnitude of the provenience problems remains unknown. In light of the excavation procedures and post-occupation disturbance factors discussed above, a thorough analysis of the Chalk Hollow assemblages should be approached cautiously.

The Chalk Hollow site remains an extremely important, deeply stratified locale that is apt to contain a critical record of culture changes through the Late Archaic and Early Ceramic Periods in the Texas panhandle. It has one of the longest chronometric sequences of stratified Late Archaic deposits on the Southern Plains. A full study of the materials for the excavation is worthwhile. Only after such a robust study has been undertaken can the full importance of Chalk Hollow be assessed.

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Wilkens, D.

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Smithsonian Institution, Washington, D.C. Dr. Jim Harwood and the staff of the NAA located and pulled Chalk Hollow records from four separate locations in the archives. All figures of maps and profiles are based on original records on file at the NAA. The artifacts from Chalk Hollow are curated at the Museum Support Center in Suitland, Maryland, and were not examined during this brief visit.

I would also like to thank Doug Boyd and Tim Perttula for their comments, discussions and insights about Southern Plains archaeology, as well as Meeks Etchieson, Eileen Johnson and A. J. Taylor for their interests in this project. Jim Couzzourt, the 1973 crew chief, provided detailed comments on an earlier version of this paper and personal insights about the excavations. LeRoy Johnson helped with the radiocarbon date tree ring calibrations. Carolyn Spock of the Texas Archeological Research Laboratory helped provide the Chalk Hollow site number. None of these individuals should be faulted for any errors of omission or commission; those problems are mine alone.

Nearly 40 people volunteered to assist in the excavations during the 1972 and 1973 field seasons. Several people merit special mention for their sustained efforts on this project. They include paid crew chiefs Ron Corbyn (1972) and Jim Couzzourt (1973) and volunteers Jerry McGlohon, Walter Riddlespurger, Bobbie Speer, Henry Smith, and Ray Thompson for working more than five days. Five people volunteered during portions of both summers; Bill Harrison, Jerry McGlohon, Lynn Slesick, Henry Smith, and Ray Thompson. The results from the Chalk Hollow excavations are largely due to the 126 person-days of volunteer time and efforts donated by these and numerous other individuals in the Texas Panhandle.

Mark Your Calendar

THUNDERBIRD Knap-in September 6-8, 2002 Lake Thunderbird State Park (Thirteen miles east of Norman, Oklahoma on State Highway 9 at the Clear Bay Entrance to the state park.) A "knap-in" is a weekend gathering of flintknappers (persons who chip arrowheads and other stone tools out of rocks). These artisans will be presenting demonstrations of their craft to the general public. Persons wishing to purchase some of these unique stone tool items will also have an opportunity to do so. This special program is sponsored by the Friends of Lake Thunderbird State Park Association, Inc. No registration fee...No vendor fees...Primitive camping is available at the state park for the nominal fee of $8 per night (payable to the state park). For further information, contact: Neil Garrison, (405) 373-0309, e-mail: atlatlgarrison@hotmail.com, Rip Riley, (405) 341-5937, e-mail: rriley3@cox.net, Scott Thompson, (405) 373-4815, e-mail: sat78@yahoo.com.

2002 OAS Fall Survey
Lake Murray State Park
Dave Morgan
The fall activity will be to survey Lake Murray State Park land on October 11 thru 14. This will be the third year to survey at Lake Murray and I think we will be able to finish the survey this year. The park was constructed by the Civilian Conservation Corps (CCC) during the depression. Site identification and recording should be very productive as it was the last two years.

- Camping will be at Duke’s Forrest Camp Ground
- Duke’s Camp Area has restrooms with showers and a dump station
- The camp sites have water and electric hookups
- Camping fees are waived for the surveying members
- OAS Membership required
- Registration form is attached and the fee is $5.00 per person
- We will leave camp each morning at 8:00 AM to survey

Lake Murray State Park is Oklahoma’s first state park. The park land was acquired in 1933. Today, Lake Murray State Park encompasses 12,496 wooded acres, Oklahoma’s largest state park. Lake Murray itself is 5,728 surface acres with 150 miles of shoreline.
Sign up Now!

OAS REGISTRATION FORM (copy, enclose $5:00 per person, and mail to Dave Morgan, 1049 SW 2nd Street, Moore, OK. 73160-2211)

Names...........................................................................................................................................................
Address..............................................................................................................................................................

Circle Dates You Will Attend: ..October.........11..........12........13.........14...............14.................

Directions to Lake Murray State Park

Take I-35 approximately 2 miles south of Ardmore, Oklahoma to exit 29 or Hwy 70 and go east to 77S, turn south on 77S to Dukes Forrest Camp Ground. OAS signs will mark turning place at 77S and Dukes Forrest Camp Ground.

Spring Dig, 2002

Kubik Site Dig, Spring 2002

Spring Dig, 2002

Kubik Site Dig, Spring 2002
Certification Seminars At Spring Dig A Success
Lois E. Albert
Chair, Certification Council

Partly because the OAS has acquired several new members in the last year, the seminars given at the Spring Dig near Fort Supply were well attended. The attendance was as follows: General Excavation Techniques – 15; Archeological Research Design – 13; Specialized Techniques – Soils – 18. Very pleasant weather (except for the cottonwood cotton and a chilly Friday night) helped boost the attendance. The Soils seminar on Sunday, taught by OSU soil scientist Dr. Brian Carter, was held near the dig site, Jake Bluff.

The seminars for the fall have been set. These are Maps and Mapping (S5) on September 21 (no OU football game that day), Archeological Photography (S6) on November 9 (tentative, depending on health of instructor), and Report Writing: Newsletter Article (S12A) on December 7. The General Survey Techniques (S2) seminar will not be offered this year at the OAS Fall Activity because we could not secure a picnic pavilion. Others which may be offered next spring (2003) are Organic Remains: Floral (plants) (S9A), Historical Archeological Methods (S10), and Archeological Sketching (S18).

Seminars will not be offered in October because of the Fall Activity, Plains Conference and the OAS Fall Meeting, or in January because of the board meetings and the possibility of bad weather. If you need a seminar to complete a certificate, please let me know and we will try to schedule it as soon as possible. Do be aware that because of the small pool of Certification Program enrollees and the small number of archeologists in Oklahoma from whom to draw as instructors, some seminars can’t be offered more frequently than every two to four years.

ENROLLMENT FORM FOR CERTIFICATION PROGRAM SEMINARS

___ S5 Maps and Mapping. **Time:** Saturday, September 21, 2002, 9:00 a.m. to ca. 4:00 p.m. **Place:** Oklahoma Archeological Survey Conference Room. **Instructors:** Lois E. Albert, David Morgan, others tba.

___ S6 Archeological Photography. **Time:** Saturday, November 9, 2002, 8:30 a.m. (Tentative). **Place:** Oklahoma Archeological Survey Conference Room. **Instructor:** Jean Sinclair.

___ S12A Report Writing: Newsletter Article. **Time:** Saturday, December 7, 2002, 9:00 a.m. **Place:** Oklahoma Archeological Survey Conference Room. **Instructor:** Richard Drass.

Tentative -- seminars for spring 2003

S 9 – Organic Remains: Floral (Plants)
S10 – Historical Archeological Methods
S18 – Archeological Sketching

Please include $2.00 per seminar as an enrollment fee (make checks payable to OU/Archeological Survey). In seminars with limited enrollment, preference will be given to members who are in the Certification Program. Some seminars may have an additional fee for reading or study materials; this is usually a nominal amount.

Indicate: ___ I am a current OAS member. ___ I am enrolled in the Certification Program.

Name: ____________________________________________________________________
Address: ____________________________________________________________________
City/State/Zip: ________________________________________________________________
Telephone: (____) _______________ (W), (____) _______________ (H)
email address: _______________________________________________

Send this completed form with your payment (check/money order - make check to Oklahoma Archeological Survey) to: ____________________________________________________________________

Oklahoma Archeology, Vol. 50, No. 3
## Oklahoma Anthropological Society Membership Form

**MEMBERSHIP CATEGORY DESIRED:**

<table>
<thead>
<tr>
<th>Membership Category</th>
<th>Fee</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active</td>
<td>$20.00</td>
<td>Receive 4 issues of Oklahoma Archeology, Journal of the Oklahoma Anthropological Society</td>
</tr>
<tr>
<td>Contributing</td>
<td>$30.00</td>
<td>Receive 4 issues of Oklahoma Archeology, Journal of the Oklahoma Anthropological Society and any memoirs occasionally published by the Society at no additional cost</td>
</tr>
<tr>
<td>Sustaining</td>
<td>$40.00</td>
<td>Receive 4 issues of Oklahoma Archeology, Journal of the Oklahoma Anthropological Society and any memoirs occasionally published by the Society at no additional cost</td>
</tr>
<tr>
<td>Associate</td>
<td>$5.00</td>
<td>For one additional member of your immediate family $10.00 for two or more</td>
</tr>
<tr>
<td>Life</td>
<td>$500.00</td>
<td>Provides all benefits of a contributing membership throughout the lifetime of member</td>
</tr>
<tr>
<td>Institutional – Domestic</td>
<td>$30.00</td>
<td></td>
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<tr>
<td>Institutional – Foreign</td>
<td>$35.00</td>
<td></td>
</tr>
<tr>
<td>OAS New Member Handbook</td>
<td>$5.00</td>
<td>(recommended to new members)</td>
</tr>
</tbody>
</table>

Name: ____________________________________________________________

Address: __________________________________________________________

City: __________________________ State: _______ Zip+4 ______________

Email ____________________________ Phone # __________________

Make check payable to: Oklahoma Anthropological Society

Attn: Pete Thurmond

Rt. 1, Box 62B

Cheyenne OK 73628