

UCR RADIOCARBON DATES III

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This list reports a portion of the analysis completed on archaeological and paleo-environmental samples measured in the UCR laboratory between August 1974 and August 1976. Results of measurements made during that period on sample suites which are not as yet completed or lack review by submitters will be reported in a subsequent date list.

A second CO₂ proportional counting system, designed to accommodate samples containing as little as 250mg of carbon has been installed. The volume of the detector is 500ml attached to a filling system which maximizes the percentage of sample gas introduced into the effective volume of the detector. Techniques of sample preparation are as reported previously (R, 1975, v 17, p 396-408). Ages continue to be expressed with respect to 0.95 NBS oxalic acid based on the 5568 half-life. Results are reported in years before AD 1950. One-sigma counting errors include standard deviation of count rate of sample, contemporary standard, and background. Routine measurement of $\delta^{13}\text{C}$ values on samples is now being undertaken. Reporting of these measurements will begin with UCR IV. The measured $\delta^{13}\text{C}$ value of the NBS oxalic acid standard is -19.7 per mil relative to PDB.

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I. ARCHAEOLOGIC SAMPLES

A. *United States*

California

Central California Archaeologic Chronology series

The Cultural Resources Sec, California State Dept Parks and Recreation has supported radiocarbon studies of archaeol materials from a number of N and central California sites. Determinations listed here are a continuation of those reported in UCR II (R, 1975, v 17, p 400-402). Samples subm by F A Riddell, Dept Parks and Recreation, California. Comments by J A Bennyhoff, California State Coll, Sonoma.

UCR-169. CA-Sac-65

530 $\pm$ 160

Human bone collagen from Burial 3, 60 to 70cm depth, from intrusive pit into sterile subsoil from Site CA-Sac-65 (120° 30' N, 38° 19' W) Sacramento Co. Assoc with 2 non-diagnostic charmstones. Coll 1974 by P Schulz. *Comment* (JAB): phasing uncertain but date should represent Late Phase 1 of Late Horizon.

UCR-183. Oroville, Structure 18 240 ± 150

Charred bark (*Pinus* sp?) from floor of Structure 18, 90cm from surface from Site CA-But-S84 (39° 34' N, 122° 27' W) near Oroville, N Sierra Foothills. Clam disk beads and desert side-notched points found in fill above floor. Coll 1974 by E Ritter. *Comment* (JAB): date acceptable for terminal component, Oroville Complex (Olsen and Riddell, 1963) representing Late Phase 2 of Late Horizon.

UCR-184. Oroville, Burial 117 950 ± 150

Human bone collagen, 120cm depth on bedrock, from Site CA-But-S84. Assoc with variant of Gunther barbed arrow point, assigned to Late Bidwell Complex which is probably contemporaneous with Early Phase 1 of Late Horizon (AD 900 to 1100, Scheme B). Coll 1967 by E Ritter. *Comment* (JAB): date acceptable at present.

UCR-192. Franklin, Burial 8 1090 ± 150

Human bone collagen, 90 to 108cm depth, from Site CA-Sac-145 (38° 20' N, 121° 27' W) near Franklin in lower Sacramento Valley. No artifact assoc. Coll 1971 by W E Pritchard. *Comment* (JAB): date acceptable for Middle/Late Horizon (AD 700 to 1100, Scheme A). Date series from site is discordant by depth.

UCR-193. Franklin, Burial 4 2020 ± 150

Human bone collagen, 80 to 90cm depth from Site CA-Sac-145. No artifact assoc. Coll 1971 by W E Pritchard. *Comment* (JAB): burial should represent Middle/Late Horizon Transition phase, so date supports Scheme A (100 BC to AD 300). Date must be rejected as too old if Scheme B (AD 700 to 900) is correct. Dates from site discordant by depth.

UCR-194. CA-Sac-34, Burial 23 2000 ± 150

Human bone collagen, 117cm depth in intrusive pit into sterile soil from Site CA-Sac-34 (38° 34' N, 121° 28' W) in lower Sacramento Valley. Coll 1959 by W H Olsen and L A Payen. *Comment* (JAB): date acceptable for oldest component (Olsen, 1961, p 38) representing Early phase of Middle Horizon (200 BC to AD 100, Scheme B).

UCR-195. Verona, Burial 42 940 ± 150

Canid bone collagen assoc with Burial 42 from Site CA-Yol-13 (38° 47' N, 120° 37' W) near Verona in Sacramento Valley. Coll 1957 by W H Olsen and L A Payen. *Comment* (JAB): older range of date acceptable for Middle/Late Horizon Transition phase (AD 700 to 900, Scheme B).

UCR-196. Verona, Burial 28 1010 ± 150

Human bone collagen, 61cm depth in midden at Site CA-Yol-13. Dorsally extended child with *Olivella* split, punched beads. Coll 1957 by F A Riddell and D F McGeein. *Comment* (JAB): assoc diagnostic of Middle/Late Horizon Transition phase (AD 700 to 900, Scheme B). Older range of date acceptable.

UCR-197. Verona, Burial 63 1280 $\pm$ 150

Human bone collagen, 104cm depth in midden at Site CA-Yol-13. Flexed burial with *Olivella* center-perforated thin rectangles. Coll 1958 by W H Olsen and L A Payen. *Comment* (JAB): younger range of date acceptable for Middle/Late Horizon Transition phase (AD 700 to 900, Scheme B).

UCR-198. Hood, Burial 18 900 $\pm$ 150

Human bone collagen, 46cm depth in midden at Site CA-Sac-21 (38° 30' N, 121° 31' W) near Hood, lower Sacramento Valley. Assoc include *Olivella* center-perforated thin rectangles, scored abalone ornaments diagnostic of Early Phase 1, and stemmed arrow points diagnostic of Middle Phase 1 of Late Horizon. Coll 1939 by F Fenenga (Lillard, Heizer, and Fenenga, 1939, p 57-59). *Comment* (JAB): mean date acceptable for transition between Early and Middle Phase 1 of Late Horizon.

UCR-199. Hood, Burial 17 980 $\pm$ 150

Human bone collagen, 64cm depth in midden at Site CA-Sac-21. Assoc with center-perforated thin rectangles; deeper than Burial 18 (UCR-198). Coll 1939 by F Fenenga. *Comment* (JAB): mean date acceptable for Early Phase 1 of Late Horizon.

UCR-214. Carquinez Strait, Burial 12 570 $\pm$ 130

Charcoal, 198cm depth at Site CA-Sol-236 (38° 04' N, 122° 12' W) Shore of Carquinez Strait, E San Francisco Bay. Assoc with *Olivella* thin rectangles (both center- and end-perforated), abalone triangular girdle ornaments, and incised metapodials, all diagnostic of Middle Phase 1 of Late Horizon. Coll 1912 by L Loud. *Comment* (JAB): older range of date acceptable for Middle Phase 1 (AD 1100 to 1300, Scheme B). Charcoal from same bottle gave previous values of 950 $\pm$ 50 BP (UCLA-1909) and 1080 $\pm$ 200 BP (M-886: R, 1960, v 2, p 43) which support Scheme A dating of Middle Phase 1 between AD 700 to 1100. Presumably wood of different ages was used in this single fire which yielded mean dates 500 yr apart.

UCR-224. CA-Sac-99L 1050 $\pm$ 150

Bone collagen from miscellaneous faunal remains, 60 to 70cm depth from Site CA-Sac-99L (38° 36' N, 121° 19' W) E Sacramento Valley. Basal component, 15 to 30cm above subsoil. Higher levels in unit yielded *Olivella* square saddle and saucer beads. Coll 1973 by J A Bennyhoff. *Comment* (JAB): expected age for Intermediate phase of Middle Horizon by Scheme B is AD 100 to 300; date rejected as too young.

UCR-226. CA-Sac-151 510 $\pm$ 150

Human bone collagen from Burial 19, 89cm depth in midden at Site CA-Sac-151 (38° 18' N, 121° 22' W) near Galt in lower Sacramento Valley. Assoc with abalone ornaments and obsidian point (Napa 3.2 μ) indicative of Late phase of Middle Horizon (AD 300 to 500, Scheme B). Coll 1939 by F Fenenga. *Comment* (JAB): date rejected as too young on basis of assoc and obsidian hydration values.

UCR-215. CA-SJo-142, Cremation 3 1740 ± 150

Human bone collagen, 76cm depth at Site CA-SJo-142 (38° 15' N, 121° 27' W) San Joaquin Delta. Assoc with *Olivella* beveled and oval saddle beads diagnostic of Early/Middle Horizon Transition phase, dated by eight other samples between 500 to 200 bc, Scheme B. Coll 1938 by R F Heizer (Lillard, Heizer, and Fenenga, 1939, p 37-38). *Comment* (JAB): date rejected as too young; should approx same age as UCR-216, below.

UCR-216. CA-SJo-142, Burial 30 2180 ± 150

Human bone collagen, 51cm depth from Site CA-SJo-142. Assoc with *Olivella* oval saddle beads diagnostic of Early/Middle Horizon Transition phase (500 to 200 bc, Scheme B). Coll 1938 by R F Heizer. *Comment* (JAB): mean date accepted for end of phase.

UCR-218. CA-Sac-60, Burial 38-11 1550 ± 150

Human bone collagen, 122cm depth in midden at Site CA-Sac-60 (38° 22' N, 122° 31' W) in lower Sacramento Valley. Assoc with obsidian drill (Bodie Hills 3.8 μ) and point fragment (Bodie Hills 4.1 μ) at depth representing Intermediate phase of Middle Horizon (AD 100 to 300, Scheme B). Coll 1938 by F Fenenga. *Comment* (JAB): older range of date is acceptable.

UCR-219. CA-Sac-60, Burial 38-21 1200 ± 150

Human bone collagen, 163cm depth in midden from Site CA-Sac-60. Assoc with slate pendants, rib sudatores, and spatulae diagnostic of Intermediate phase of Middle Horizon (AD 100 to 300, Scheme B). Coll 1938 by F Fenenga. *Comment* (JAB): date rejected as too young; discordant by depth with UCR-218.

UCR-217. CA-Sac-43, Burial 12 1320 ± 150

Human bone collagen, 76cm depth in midden deposit at Site CA-Sac-43 (38° 28' N, 121° 31' W) lower Sacramento Valley. Assoc with obsidian point (Mt Hicks 3.5 μ) at depth representing Terminal phase of Middle Horizon (AD 500 to 700, Scheme B). Coll 1939 by F Fenenga. *Comment* (JAB): mean date acceptable.

UCR-227. CA-Sac-43, Burial 14 1080 ± 150

Human bone collagen, 107cm depth in midden at Site CA-Sac-43. Assoc with *Olivella* full and square saddle beads and square abalone ornament diagnostic of Late phase of Middle Horizon (AD 300 to 500, Scheme B). Coll 1939 by F Fenenga. *Comment* (JAB): date rejected as too young; discordant by depth with UCR-217, -220, -221, -222, -229, -230.

UCR-221. CA-Sac-43, Burial 34 1900 ± 150

Human bone collagen, 48cm depth in midden at Site CA-Sac-43. Assoc with *Olivella* square saddle and small saucer beads diagnostic of Terminal phase of Middle Horizon (AD 500 to 700, Scheme B). Coll 1939 by F Fenenga. *Comment* (JAB): date rejected as too old; discordant by depth with 7 other Sac-43 dates. Date would support Scheme A (400 bc to AD 1).

UCR-228. CA-Sac-43, Burial 36 980 ± 150

Human bone collagen, 91cm depth in midden at Site CA-Sac-43. Assoc with abalone ornaments and *Olivella* full saddle and small saucer beads indicative of transition from Late to Terminal phase of Middle Horizon (ca AD 500, Scheme B). Coll 1939 by F Fenenga. *Comment* (JAB): date rejected as too young; discordant by depth with UCR-217, -221, -222.

UCR-229. CA-Sac-43, Burial 48 1360 ± 150

Human bone collagen, 97cm depth in midden from Site CA-Sac-43. Assoc with obsidian point (Napa 3.4μ) and *Olivella* full saddle and square saddle beads diagnostic of Late phase of Middle Horizon (AD 300 to 500, Scheme B). Coll 1939 by F Fenenga. *Comment* (JAB): older range of date acceptable.

UCR-230. CA-Sac-43, Burial 50 1140 ± 150

Human bone collagen, 91cm depth in midden from Site CA-Sac-43. Assoc with obsidian point (Napa 2.5μ), many bone tools, and *Olivella* full saddle, square saddle, and small saucer beads indicative of transition from Late to Terminal phase of Middle Horizon (ca AD 500, Scheme B). Coll 1939 by F Fenenga. *Comment* (JAB): date rejected as too young; discordant by depth with UCR-217, -221, -222.

UCR-220. CA-Sac-43, Burial 69 780 ± 130

Human bone collagen, 64cm depth in midden at Site CA-Sac-43. Individual killed by obsidian point (Napa 3.4μ) through manubrium; depth represents Terminal phase of Middle Horizon (AD 500 to 700, Scheme B). Coll 1939 by F Fenenga. *Comment* (JAB): date rejected as too young on basis of depth, assoc, and obsidian hydration value.

UCR-222. CA-Sac-43, Burial 25 1170 ± 150

Human bone collagen, 84cm depth in midden from Site CA-Sac-43. Assoc with obsidian point (Napa 3.2μ), basalt point, and abalone ornament diagnostic of Terminal phase of Middle Horizon (AD 500 to 700, Scheme B). Coll 1939 by F Fenenga. *Comment* (JAB): older range of date acceptable.

General Comment (JAB): review of some 150 radiocarbon dates from central California suggests that the current chronology (Scheme A: Middle Horizon falls between 1000 BC to AD 300) should be shortened (Scheme B: Middle Horizon falls between 500 BC to AD 900). Many dates, particularly from bone collagen, do not agree with either dating scheme. The 8 collagen dates reported from CA-Sac-43 are chaotic in terms of depth, assoc, and obsidian hydration values; a series of 6 collagen dates from CA-Sac-145 (2 herein) is similarly discordant, while UCR-226 and -219 are impossibly late.

Vandenberg Air Force Base Project series

Testing and evaluation of archaeol sites within 33.7km sq area of Vandenberg Air Force Base, Santa Barbara Co, was conducted by Univ California, Santa Barbara and supported by U S Dept Interior, Natl Park

Service. Charcoal and marine samples were subm from 12 sites that demonstrate considerable depth, complexity, seasonal and/or specialized activities, and temporal uniqueness (Spanne and Glassow, 1975). Samples coll 1974 and subm by M Glassow and P Martz.

UCR-254. SBa 210, 180 to 200cm 2240 ± 150

Haliotis cracherodii and *Haliotis rufescens* from base of observed stratigraphic level in Unit 8 (34° 35' N, 120° 35' W). *Comment* (PM): indicates occupation during Hunting Transitional sequence (Greenwood, 1972; Rogers 1929).

UCR-255. SBa 210, 340 to 360cm 9050 ± 370

Mytilus californianus assoc with Feature 13, rocks and sea mammal bone from Unit 8. *Comment* (PM): date is anomalous as it appeared stratigraphically above a more recent date. Rodent disturbance may have caused mixing resulting in misassoc of sample. Additional *Mytilus californianus* sample was coll from column sample for this depth (UCR-299, this list) which produced date correlating with stratigraphy and artifact assemblage, placing occupation somewhat earlier within Hunting-Transitional sequence.

UCR-257. SBa 530 7830 ± 350

Mytilus californianus coll from base of site deposit at 100 to 120cm (34° 36' N, 120° 38' W). *Comment* (PM): site is buried beneath stabilized sand dune on sea cliff. Date indicates occupation during Millingstone sequence (Wallace, 1955).

UCR-258. SBa 551, 80 to 100cm 2200 ± 150

Haliotis cracherodii coll from Unit 5 (34° 36' N, 120° 38' W). *Comment* (PM): indicates occupation during Hunting-Transitional sequence. Charcoal sample (UCR-259, 690 ± 150 BP) was also subm from this depth and gave more recent date. As shell was carefully treated to remove calcium carbonate contamination and upwelling is not considered a problem along this coastline, charcoal date is suspect. Site was subject to extensive rodent activity and charcoal may have filtered down from above.

UCR-259. SBa 551, 80 to 100cm 690 ± 150

Charcoal taken from sea-mammal bone concentration in Unit 5. *Comment* (PM): date appears too recent for depth and assoc artifact assemblage as observed in sites throughout area (Martz, ms).

UCR-260. SBa 552, 140 to 160cm 3630 ± 200

Charcoal coll from concentration in Unit 1 (34° 53' N, 120° 35' W). *Comment* (PM): indicates occupation during Hunting-transitional sequence.

UCR-261. SBa 552, 160 to 180cm 6910 ± 280

Mytilus californianus coll from Unit 1 above compacted surface (floor). *Comment* (PM): indicates occupation near beginning of Hunting-Transitional sequence.

UCR-262. SBa 552, 260cm 7580 ± 300

Charcoal assoc with Feature 4, metate and mano concentration. *Comment* (PM): illustrates stratigraphy of site with occupation near end of Millingstone sequence.

UCR-263. SBa 552, 520cm 7990 ± 300

Mytilus californianus coll from base of deposit. *Comment* (PM): date indicates occupation well within Millingstone cultural sequence.

UCR-264. SBa 662 2720 ± 200

Haliotis cracherodii from compacted surface in Unit 5, 80 to 100cm (34° 35' N, 120° 38' W). *Comment* (PM): indicates occupation during Hunting-Transitional sequence.

UCR-265. SBa 670 490 ± 150

Charcoal coll immediately above base of deposit (34° 36' N, 120° 37' W). *Comment* (PM): date places occupation within Phase I of Chumash sequence (Gibson, ms).

UCR-266. SBa 690 500 ± 150

Charcoal assoc with Feature 1, concentration of fire-cracked rock at base of deposit (60cm) (34° 41' N, 120° 35' W). *Comment* (PM): date places occupation within Phase I of Chumash sequence.

UCR-267. SBa 712 7300 ± 350

Mytilus californianus coll from base of deposit at 100cm (34° 33' W, 120° 37' W). *Comment* (PM): date indicates occupation during Millingstone sequence.

UCR-268. SBa 931 7970 ± 350

Mytilus californianus coll from base of deposit at 160cm (34° 41' N, 120° 35' W). *Comment* (PM): indicates occupation during Millingstone sequence.

UCR-269. SBa 1010 2240 ± 160

Mytilus californianus coll from base of deposit at 182 to 243cm (34° 46' N, 120° 29' W). *Comment* (PM): indicates occupation at this depth during Hunting-Transitional sequence.

UCR-270. SBa 1118 480 ± 150

Mytilus californianus coll from base of deposit at 60cm (34° 33' N, 120° 37' W). *Comment* (PM): places occupation within Phase I of Chumash sequence.

UCR-271. SBa 663 860 ± 150

Mytilus californianus coll from base of deposit at 120cm (34° 35' N, 120° 37' W). *Comment* (PM): places occupation within Phase I of Chumash sequence.

UCR-298. SBa 210**4320 ± 200**

Mytilus californianus coll from Unit 8 column sample at base of deposit at 520 to 540cm (34° 33' N, 120° 35' W). *Comment* (PM): dated to verify UCR-299.

UCR-299. SBa 210**3530 ± 200**

Mytilus californianus coll from Unit 8 column sample at 340 to 360cm. *Comment* (PM): date fits stratigraphic sequence and shows UCR-255 is anomalous date, probably due to misassoc of sample caused by rodent disturbance.

General Comment (PM): this series of dates from several diversified sites, and especially those from two large coastal villages (SBa 210 and SBa 552) which have considerable depth (>5m) and heavy cultural density, provide exceptional opportunity for further understanding of cultural processes.

Because many of the artifacts found in these sites such as manos do not change through time and could represent seasonal activities rather than chronology, California coastal middens probably were quite homogeneous through time with no significant change in cultural residues until Late Horizon (post 1500 BP) when there is greater diversity and variation in beads and other artifact types (Meighan, 1959).

At least three cultural sequences can be distinguished from radiocarbon dates and assoc artifact assemblages from Vandenberg series. Millingstone cultural sequence demonstrates emphasis upon seed processing. A large proportion of manos and metates and rare hunting implements are assoc with radiocarbon dates at ca 7000 to 9000 BP. Hunting or Intermediate period is distinguished by absence of hook and line fishing, and artistic elaboration, less emphasis upon seed collecting, and improved hunting methods involving better implements and greater variety of fauna. Time span at Vandenberg appears to be ca 2500 to 7000 BP. Chumash cultural sequence is primarily distinguished by artifacts relating to hook and line fishing and many bead varieties, which are found in assoc with post AD 500 dates (Martz, 1975).

Newport Bay series

Samples coll during excavations by Chapman Coll and Cypress Coll at Ca-Ora-119, Orange Co (33° 39' N, 117° 51' W). Material inventory indicates two components (Late Prehistoric Horizon and Intermediate Horizon) and some evidence for third component (Milling Stone Horizon). Samples coll 1975 and subm by H C Koerper, Dept Anthropol, Univ California, Riverside.

UCR-316. Burial 1, 53 to 80cm**390 ± 140**

Human bone collagen (left femur) from Burial 1, intrusive burial, at Site Ca-Ora-119, adjacent to Univ California, Irvine. *Comment* (HCK): sample should date late component at site attributed to Late Prehistoric Horizon.

UCR-310. 0 to 20cm**1670 ± 160**

Marine shell (*Chione californiensis*) from W sidewall, Pit 0-15.

UCR-311. 20 to 40cm 1560 ± 150

Marine shell (*Chione californiensis*) from W sidewall, Pit 0-15.

UCR-308. 40 to 60cm 2070 ± 150

Marine shell (*Chione californiensis*) from W sidewall, Pit 0-15.

UCR-309. 60 to 80cm 1870 ± 160

Marine shell (*Chione californiensis*) from W sidewall, Pit 0-15.

UCR-307. 80cm 5750 ± 170

Marine shell (*Chione californiensis*) from Pit I, 80cm. *Comment* (HCK): sample should date either terminal Milling Stone Assemblages Horizon component or early Intermediate Cultures Horizon component.

UCR-277. Huntington Beach 4340 ± 200

Marine shell carbonate at 30 to 50cm level at CA-Ora-82 (34° 40' W, 118° 0' W) Huntington Beach, Orange Co. Coll 1974 and subm by L Savio, Pacific Coast Archaeol Soc.

Casa Diablo series

The Archaeological Research Unit, Dept Anthropol, Univ California, Riverside, conducted archaeol investigations during 1974 to mitigate impact of construction of power transmission line by Southern California Edison Co along 44km corridor in Inyo and Mono Cos in SE California. Radiocarbon and obsidian hydration samples were obtained to clarify chronologic questions. Samples subm 1974 by R Cowan, Archaeol Res Unit, Univ California, Riverside.

UCR-245. Rutabaga Hill 280 ± 150

Charcoal from 25 to 35cm level at Site 14, Rutabaga Hill (37° 40' N, 118° 35' E). Coll 1974 by R Cowan.

UCR-246. Rutabaga Hill <150

Charcoal from 40 to 50cm level at Site 14. Coll 1974 by R Cowan.

UCR-247. Site 13.5 1300 ± 150

Charcoal from rock ring (?) fill from Site 13.5 (37° 40' N, 118° 35' E). Coll 1974 by K Wallof.

UCR-248. Watterson Trough 250 ± 130

Charcoal from 20 to 30cm level from Site 23 (37° 40' N, 118° 35' E). Coll 1974 by K Collins.

*Nevada***UCR-160. Fremont Point 1120 ± 180**

Charcoal from wall or roof material of semi-subteranean pit house, Fremont Point, Moapa Valley, S E Nevada (35° 39' N, 114° 35' W) from 40cm depth in fill of Grid Q-3 assoc with adult burial. Compare with UCR-161 and -162 (R, 1975, v 17, p 403). Coll 1973 by J Retzer and subm by T Soule, Dept Anthropol, Univ California, Riverside.

Arizona

Chevelon series

Four dry cave or rockshelter sites were excavated in Chevelon Canyon, N central Arizona, in order to compare samples of stratified cultural and biological remains from both cultural and noncultural contexts. Samples subm by F Briuer, Dept Anthropol, Univ California, Los Angeles.

UCR-210. Site 561A, 40 to 50cm 2900 ± 300

Assorted vegetation (*Juniperus* sp, *Opuntia* sp, *Artemisia* sp, *Juglans major*, *Nolina* sp, *Yucca* sp, *Pinus edulis*) from Site 561A, Chevelon Canyon (34° 38' N, 110° 42' W) 64 km S of Winslow. Coll 1972 by F Briuer and S de Atley. *Comment* (FB): plant microfossils, pollen, and faunal remains from this noncultural site were compared with plant and animal remains at a nearby cultural site.

UCR-211. O'Haco Rock Shelter <200

Woodrat (*Neotoma* sp) and mouse (*Peromyscus* sp) feces from St 2 containing a high concentration of artifacts and ecofacts in rock shelter (34° 39' N, 110° 43' W) Chevelon Canyon. Coll 1972 by F Briuer.

UCR-231. O'Haco Rock Shelter 4170 ± 200

Charcoal in ash from Unit 9, St 4, one of the lowest strata containing clear evidence of human activities. Coll 1972 by F Briuer.

New York

Smith Farm series

Samples coll during test excavations at Smith Farm, Otego, New York (42° 23' N, 75° 11' W) as part of preliminary study of sites threatened by construction of Interstate 88. Samples coll 1973 by J C Weber and subm by M C Stewart and M L Weide, State Univ New York, Binghamton.

UCR-284. Locus 1, Feature 4 550 ± 160

Charcoal from Sq E8/S8, Level II.

UCR-285. Locus 1, Feature 3 1290 ± 150

Charcoal from Sq E8/S6, Level III.

UCR-286. Locus 1, Feature 12 760 ± 150

Charcoal from Sq E12/S12, Level II. *Comment* (MW): Smith Locus 1 (SUB i-25) was occupied during Middle to Late Woodland times. UCR-284 dates material assoc with Chance Phase ceramics and is consistent with other dates for this phase. UCR-285 and -286 suggest that occupation begun in Middle Woodland period, recurred in Owasco phase of Late Woodland.

UCR-287. Locus 2 2060 ± 160

Charcoal from Sq E68/S65, at 40cm, assoc with flint chips from Level III. *Comment* (MW): single determination from Smith Locus 2 (SUB i-26)

falls into Early Woodland period and is later than expected for Late Archaic-Transitional assignment expected from cultural remains.

UCR-288. Locus 6, Stratum 3 **2010 ± 150**

Charcoal from Sq E234/S41, at 73cm depth, assoc with fire-cracked rock, lithics, and possible Point Peninsula ceramic vessel.

UCR-289. Locus 6, Stratum 4 **2070 ± 160**

Charcoal from Sq E234/S41 at 85 to 88cm depth at base of Point Peninsula level.

UCR-290. Locus 6, Feature 1 **1710 ± 160**

Charcoal from Sq E230-232/S39, at 65 to 70cm depth, assoc with fire-cracked rock. *Comments* (MW): three dates from Smith Locus 6 (SUB i-37) are consistent with Early to Middle Woodland assignment based on assoc with early Point Peninsula pottery. UCR-288 and -289 suggest that dentate-stamped pottery was being made 200 yr earlier in Upper Susquehanna drainage than previously dated at Cottage site, 1810 ± 100 BP (Y-2348).

B. Israel

UCR-276. Quesarya **240 ± 150**

Human bone collagen from burial, 125cm below surface at Quesarya (Caesarea Maritima). Coll 1972 and subm by J H Stirling, Loma Linda Univ, Loma Linda, California.

C. Africa

Mumbwa Caves series

Samples from Mumbwa Caves (14° 59' S, 27° 05' E) Zambia, S central Africa were measured to date lithic assemblages of a major archaeol site known to contain Middle Stone Age—Later Stone Age—Iron Age sequence.

Previous excavations were made in 1930 and 1939 within a deep cave in N portion of dolomitic limestone outcroppings (Dart and del Grande, 1931; Clark, 1942). Recent radiocarbon dates (UCLA-1750B, -1750C, -1750D) on hominid and faunal remains from lowest levels of 1930 excavations indicate that a portion of Middle Stone Age horizon may date to 20,000 to 18,000 BP (Protsch, ms).

Excavations were made in 1973 within bedrock solution cavities in front of a shallow cave in outcrop to S of main cave (Savage, ms in preparation). The following radiocarbon dates were obtained from this excavation. Coll 1973 by D K Savage and subm by G Isaac, Dept Anthropol, Univ California, Berkeley.

UCR-272. Square D **<150**

Charcoal from red-brown earth layer of Sq D, 10 to 40cm below surface, containing potsherds, but few quartz artifacts. Paucity of charcoal necessitated combining samples from entire level. Two runs on sample from level below in same square (LJ-2987 and -3031) also

produced younger than expected dates and suggests some disturbance in this square.

UCR-273. Square G

2250 ± 160

Charcoal from red-brown earth layer of Sq G, 20 to 50cm below surface, containing pottery, iron, and quartz artifacts. *Comments* (DS): sample was obtained primarily from badly disintegrated and scattered hearth at ca 40cm below surface and dates presence of iron at site.

UCR-274. Square I

500 ± 130

Charcoal from top portion of red-gritty layer of Sq I, 156 to 195cm below surface. Paucity of charcoal again necessitated combining wide dispersion of charcoal to date main Later Stone Age occurrence. *Comments* (DS): reason for anomalous date is unknown.

UCR-275. Square M

9000 ± 370

Charcoal from pocket within middle portion of red-gritty layer in Sq M at 149cm below surface. *Comment* (DS): date is further supported by LJ-2988 and -2989 from same level in different square, and dates late Middle Stone Age horizon with some microliths, heavy-duty grinding and baking equipment, and a small hand-axe.

II. PALEOENVIRONMENTAL SAMPLES

A. United States

California

Lucerne Valley series

Stratified midden (GM-5) of wood rat (*Neotoma*) under overhang on S facing granitic outcropping on Negro Butte (34° 29' N, 116° 46' E) Lucerne Valley, alt 1006m, was excavated by trenching to provide series of stratigraphically controlled samples (King, 1976). Series obtained as part of paleoclimatic study of late Pleistocene and Holocene periods in W Mohave Desert of interior S California. Determinations listed here are continuation of those reported in UCR II (R, 1975, v 17, p 405-406). Samples coll 1974 and subm by T Jackson King, Jr and R E Taylor, Dept Anthropol, Univ California, Riverside.

UCR-235. Level F

3650 ± 210

Twigs and stems from upper portion of Level F, 10cm from midden face, 1m E of W face of trench.

UCR-236. Level F

3750 ± 210

Twigs and stems from lower portion of Level F, external central face of midden, ca 10cm below UCR-235, 1m E of W face of trench.

UCR-237. Level D

3690 ± 210

Twigs and stems from Level D, external central face of midden, ca 15cm below UCR-236, 1m E of W face of trench.

UCR-239. Level G 4300 ± 240

Twigs and stems from lower portion of Level G, 20cm W of E face of trench.

UCR-241. Level G 7100 ± 250

Twigs and stems from Level G, 10cm from midden face, ca 50cm W of E face of trench, 20cm above UCR-239.

UCR-187. Level B 11,100 ± 420

Juniper (*Juniperus osteosperma*) seeds from Level B, 10cm below UCR-185.

UCR-186. Level C 8300 ± 780

Juniper (*Juniperus osteosperma*) twigs and seeds from Level C, 50cm from face of midden.

UCR-185. Level C 7820 ± 570

Twigs of various sp directly above juniper-bearing portion of upper layer in Level C.

UCR-249. Level C 7800 ± 350

Juniper (*Juniperus osteosperma*) seeds and twigs from Level C.

UCR-176. Black Butte B-13 <150

Creosote (*Larrea divaricate*) from Black Butte (117° 42' N, 34° 33' W) Los Angeles Co. Compare with UCR-171 to -175 and UCR-177 in UCR II (R, 1975, v 17, p 404-405). Coll 1974 and subm by F Vasek, Dept Biol, Univ California, Riverside.

UCR-190. Yuba, Sacramento Valley 10,600 ± 900

Dispersed carbon in drilled core from 51m depth, 3.2km NE of Live Oak (390° 12' N, 121° 36'). Coll 1974 by E Porter; subm by D Packer, Woodward Clide Consultants, Oakland, California.

UCR-191. Yuba, Sacramento Valley 3860 ± 900

Dispersed carbon in drilled core from 38m depth, 6.4km NE of Live Oak, California. Coll 1974 by T Bruce and P Corbett; subm by D Packer.

*B. Nicaragua***UCR-189. Villa Fontana <150**

Wood above air fall tuff in alluvial fan from Villa Fontana, Managua (12° 12' N, 86° 24' E) assoc with recent (1000 to 25,000 yr) volcanic activity. Coll 1974 by L Hintze; subm by D Packer.

REFERENCES

- Clark, J D, 1942, Further excavations (1939) at the Mumbwa Caves, Northern Rhodesia: Royal Soc South Africa Trans, v 29, pt 3, p 133-201.
 Dart, R A and del Grande, N S, 1931, The ancient iron-smelting cavern at Mumbwa: Royal Soc South Africa Trans, v 19, pt 4, p 379-427.
 Gibson, R O, ms, 1973, On the nature of beads: Cuesta College.
 Greenwood, R, 1972, 9000 years of prehistory at Diablo Canyon, San Luis Obispo County, California: San Luis Obispo Co Archaeol Soc Occ Paper, No. 7.

- King, T J, 1976, Late Pleistocene-early Holocene history of coniferous woodlands in the Lucerne Valley region, Mohave Desert, California: *Great Basin Naturalist*, v 36, p 227-238.
- Lillard, J B, Heizer, R F, and Fenenga, F, 1939, An introduction to the archaeology of Central California: *Sacramento Jr Coll Bull No. 2*, Sacramento.
- Martz, P, ms, 1975, The Vandenberg Air Force Base Project: a correlation of relative dates with radiocarbon dates: *Univ of California, Riverside*.
- Meighan, C W, 1959, California cultures and the concept of an archaic stage: *Am Antiquity*, v 24, p 289-305.
- Olsen, W H, 1961, Archaeological investigations at Sutter's Fort State Historical Monument, 1959: *State of California, Div Beaches and Parks*, Sacramento.
- Olsen, W H and Riddell, F A, 1963, The archaeology of the Western Pacific Railroad relocation: *State of California, Div Beaches and Parks, Archaeol Repr No. 8*, Sacramento.
- Rogers, D B, 1929, Prehistoric man from the Santa Barbara coast: *Santa Barbara Mus Nat Hist*, Santa Barbara, California.
- Spanne, L and Glassow, M, 1975, Air Force Space Transportation System, Vandenberg AFB, Santa Barbara County, California. Testing and evaluation of archaeological sites: *Univ California, Santa Barbara*.
- Protsch, R R, ms, 1973, The dating of upper Pleistocene subSaharan fossil hominids and their place in human evolution: with morphological and archaeological implications: *PhD dissert, Univ California, Los Angeles*.
- Wallace, W, 1955, A suggested chronology for Southern California coastal archaeology: *Southwestern Jour Anthropol*, v 13, p 214-230.