

QUEENS COLLEGE RADIOCARBON MEASUREMENTS I

R PARDI

Radiocarbon Laboratory, Queens College, City University of New York,
Flushing, New York 11367

INTRODUCTION

The radiocarbon dating laboratory of Queens College, CUNY, was established with the joint support of the Research Foundation of the City University of New York and the departments of Anthropology, Biology, Chemistry, and Earth and Environmental Sciences of Queens College. The laboratory has been operational since June, 1975 and is located in the basement of a two-story concrete and brick building.

A liquid scintillation counter, Picker Liquimat Model 650-220, is employed, adjusted for ^{14}C dating use. Seven vials (5 samples, a sealed background and standard) are cycled at 40 minute intervals for one week or more.

Benzene synthesis from sample CO_2 follows that described by Tamers (1965) and Noakes *et al* (1967). Dry-packed lithium shot is used without prior scrubbing. The vanadia-alumina catalyst (Harshaw Chemicals V-0701 T 1/8) is initially activated as in Coleman *et al* (1972) prior to use and reactivated as in Polach *et al* (1972) between samples.

Counting vials are quartz similar in design to those of Polach (1969) but have a polyethylene cap with Teflon^R seal rather than ground glass. Relative backgrounds between vials are found to be a linear function of weight, after correction for counting efficiency. Backgrounds range between ca 5.2 and 6.4cpm in the ^{14}C channel. All background activity above ca 1.7cpm can be accounted for by ppm concentrations of potassium in the quartz. Two sealed vials are provided for permanent background and NBS oxalic acid. Cocktail recipe consists of 4cc sample and 1cc of benzene-phosphor with resulting concentrations of 0.5% PPO and 0.02% POPOP.

Count rate for 0.95 NBS oxalic acid is $8.595 \pm .045$ cpm/gC. Pre-treatment procedures follow closely those recommended in Olson (1963).

All results are based on the conventional half-life for ^{14}C , *ie*, 5568 ± 30 years. Results are reported in years before 1950. Errors are 1σ , based on the combined statistical counting error of the sample, background and standard. $^{13}\text{C}/^{12}\text{C}$ measurements and corrections have not been made for these samples.

ACKNOWLEDGMENTS

Don Haarman, Judy Berry, and Linda Kaplan assisted in sample preparations. The support and encouragement of David H Speidel and Walter S Newman are especially appreciated. Special thanks to the late Slainte Mhaith Agat for technical advice and assistance in setting up the lab.

SAMPLE DESCRIPTIONS

I. GEOLOGIC SAMPLES

1) **5985 $\pm$ 125****4035 BC**2) **5920 $\pm$ 115****3970 BC****QC-100. Bannerman Island**

Shells (*Crassostrea virginica*) in small midden, depth .31 to .62m, Hudson Highlands Gorge, 98km upstream from Narrows in New York City (41° 27' 28" N, 73° 58' 55" W). Coll and subm by W S Newman, Dept Earth and Environmental Sci, Queens College, CUNY, Flushing, New York. *Comment* (WSN): split of identical sample previously dated, RL-177: 6150 $\pm$ 120. Charcoal from hearth apparently below shell stratum, M-287: 4480 $\pm$ 300 (Newman, 1974).

Niagara Falls area series

Snail and clam shell from Niagara Falls area. Coll and subm by P Calkin, Dept Geol Sci, SUNY, Buffalo, Amherst, New York.

1) **1220 $\pm$ 75****AD 730**2) **1240 $\pm$ 160****AD 710****QC-116. Lake Tonawanda Sand**

Snail and clam fragments (unioids) from Laun I. (43° 05' N, 79° 03' W), depth 2.5m beneath surface, alt 175m. *Comment* (PC): from very fine to fine grained sand of Lake Tonawanda overlying red clay of Glacial Lake Warren or later glacial lake. Previous date, BGS-273: 3780 $\pm$ 90. Neither date conforms to expected age, >10,000.

9915 $\pm$ 165**QC-117. Whirlpool, Niagara River gravel****7965 BC**

Snail shells (*Goniabasis* sp) from Goat Island site (43° 05' N, 79° 04' W), surface, from slump scar just outside railing facing Thompson Point, Ontario, at lower end of Whirlpool. *Comment* (PC): from old Niagara R gravels at Whirlpool Park, Niagara Falls, New York. Previous date, BGS-274: 9770 $\pm$ 150. Brock date on *unioid* without acid leaching.

9115 $\pm$ 215**QC-118. Goat Island, Niagara River gravel****7165 BC**

Clam-shell fragments (mostly unioid) from Goat Island site, from surface, alt 168m. *Comment* (PC): same as QC-117, gives maximum age for retreat of Falls to Goat I. Previous date, BGS-275: 9080 $\pm$ 130.

QC-121. East Hampton-Hither Hills Tombolo $\delta^{14}\text{C} = +45 \pm 20\%$

Shell (*Strombus pugilis alatus*). Coll and subm by W S Newman. Surface colln from 1km NE of Beach Hampton (49° 59' 5" N, 72° 5' 30" W). *Comment* (WSN): presently, this species not found N of North Carolina. Date suggests that sample was discarded from a private colln.

II. ARCHAEOLOGIC SAMPLES

Dogan Point series

Shells and charcoal from Dogan Point, Montrose Point, New York, Haverstraw quad (41° 14' 10" N, 73° 56' 50" W). Coll and subm by L A Brennan, Briarcliff Coll, Briarcliff Manor, New York.

General Comment (LAB): most shells are Middle Archaic, with some Late Archaic and transitional. Traces of ceramic cultures are present. There is no horizontal stratification and middens are generally weathered and mixed. Site elev 3m.

1) 5010 ± 100

3060 BC

2) 4765 ± 115

3815 BC

QC-101. Dogan Point 1

Shells (*Ostrea*), depth 103cm. *Comment* (LAB): from basal layer of complex midden ca .4h. Previous date from overlying shell horizon, L-1038E: 5650 ± 200. Shells from 4.5m away, GX-1918: 5155 ± 135, and L-1381: 6950 ± 100.

2500 ± 100

550 BC

QC-103. Dogan Point 3

Shells (*Ostrea*), from surface. *Comment* (LAB): surface disturbed by weather and traffic (wagon, logging). Small shell size.

310 ± 65

AD 1640

QC-104. Dogan Point 4

Charcoal from hearth, depth 36 to 53cm. Date indicates mixture of later (colonial?) charcoal with older shells.

1) 4560 ± 80

2610 BC

2) 4475 ± 100

2525 BC

QC-105. Dogan Point 5

Shell (*Ostrea*), from surface. *Comment* (LAB): in contact with Otter Creek type point, previously dated, GX-2324: 5095 ± 150, GX-1919: 5075 ± 160, GX-1918: 5155 ± 135. Does not appear to date Otter Creek point, but some later shell heap.

Piping Rock series

Shells from middens along Hudson R, Haverstraw quad (41° 10' 40" N, 73° 52' 30" W). Coll and subm by L A Brennan. *Comment* (LAB): middens are collns of some integrity, randomly found in this area. Site elev, 12m.

4560 ± 105

2610 BC

QC-106. Piping Rock 6

Shell (*Ostrea*), depth 5cm. *Comment* (LAB): previous date of same heap, GX-3371: 3750 ± 150. Stratum below, of unusually large shell, was dated, GX-2999: 4730 ± 140.

QC-107. Piping Rock 7**3765 ± 125****1815 BC**

Shells (*Ostrea* sp), from surface. *Comment* (LAB): date indicates shells are not assoc with Middle Woodland Fox Creek-Cary material of AD 450 to 600. Shells adjacent to heap dated, GX-3371: 3750 ± 150.

QC-108. Piping Rock 8**5175 ± 125****3225 BC**

Shells (*Ostrea* sp), from discrete midden heap. *Comment* (LAB): long, narrow shape of shell may denote period of quick silting, with no rise in sea level. Previous date from similar heap, GX-3238: 5135 ± 155.

QC-109. Pear Tree 9**4750 ± 140****2800 BC**

Shells (*Ostrea* sp), Pear Tree loc, depth 90cm in old beach sand. *Comment* (LAB): apparent stray from midden containing QC-108.

QC-110. Cedar Loc 10**1) 5110 ± 100****3160 BC****2) 4955 ± 110****3005 BC**

Shell (*Ostrea* sp), Cedar loc, depth 76cm. *Comment* (LAB): from thin lens in beach sand. Same situation as QC-109.

QC-113. Pear Tree 13**4735 ± 115****2785 BC**

Shells (*Ostrea* sp), depth 66cm. *Comment* (LAB): shell from similar level ca 4.5m away dated, GX-3238: 5135 ± 155. Dates small Beckman or Hudsonbrook point.

Tinsley site series, New Mexico

Wood and charcoal from Feature A, large circular structure, from posts along S wall, Las Vegas quad (35° 31' 14" N, 105° 13' 0" W), depth 35 to 40cm. Coll and subm by R Mishler, New Mexico Highlands Univ, Las Vegas, New Mexico.

General Comment (RM): age estimate based on architectural analysis ca AD 1100.

QC-119. TN-A-35-H-6**1) 970 ± 75****AD 980****2) 890 ± 80****AD 1060**

Charcoal, preserved with paraffin immediately after colln. Sample given only normal HCl, NaOH pretreatment.

1) **1020 $\pm$ 70****AD 930**2) **1035 $\pm$ 70****AD 915****QC-120. TN-A-154-H-1**

Charred wood. Paraffin preservative extracted from sample using petroleum ether with ca 30min boiling followed by normal HCl, NaOH pretreatment. Dates on same material without ether extraction: 1) 1885 $\pm$ 100, 2) 1950 $\pm$ 100.

1670 $\pm$ 95**QC-128/9. Minisink site****AD 280**

Charcoal from Minisink site, Sqs 8 & 13, Levels 10 & 11, Minisink Hills, Pennsylvania (40° 59' 34" N, 75° 07' 59" W), depth 1.7 to 1.8m. Coll by E McDowell; subm by C McNett, Upper Delaware Early Man project, American Univ, Washington DC. *Comment* (CMcN): from shallow pits in Early Archaic zone. Far too young, and indicates that sample occurred at base of intrusive (Woodland) pit, top portion of which was unrecognizable. Exactly matches a date, W-3135: 1640 $\pm$ 200, from a similar situation in Sq 7, Level 8. This zone should have dated no younger than 5500 BC.

REFERENCES

- Coleman, D D, Liu, C L, Dickerson, D R, and Frost, R R, 1972, Improvement in trimerization of acetylene to benzene for radiocarbon dating with commercially available vanadium oxide catalyst: 8th internatl conf on radiocarbon dating, Proc, Lower Hutt, New Zealand, v 1, p 158-170.
- Newman, W S, 1974, A comment on Snow's 'Rising Sea Level and Prehistoric Cultural Ecology in Northern New England': *Am Antiquity*, v 39, p 135-136.
- Noakes, J E, Kim, S M, and Akers, L K, 1967, Recent improvements in benzene chemistry for radiocarbon dating: *Geochim et Cosmochim Acta*, v 13, p 1094-1096.
- Olson, E A, 1963, The problem of sample contamination in radiocarbon dating: PhD thesis, Columbia Univ, New York, 320 p.
- Polach, H A, 1969, Optimisation of liquid scintillation radiocarbon age determinations and reporting of ages: *Atomic Energy in Australia*, v 12, p 21-28.
- Polach, H A, Gower, J, and Fraser, I, 1972, Synthesis of high purity benzene for radiocarbon dating: 8th internatl conf on radiocarbon dating, Proc, Lower Hutt, New Zealand, v 1, p 145-147.
- Tamers, M A, 1965, Routine ^{14}C dating using liquid scintillation technique: 6th internatl conf radiocarbon and tritium dating, Proc, Pullman, Washington, p 53-68.