

PHYSICAL RESEARCH LABORATORY RADIOCARBON ¹⁴C DATES: CS-I

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ABSTRACT

Presented below are the ¹⁴C dates measured at the Radiocarbon Laboratory of the Physical Research Laboratory, Ahmedabad. Samples were converted into methane and measured in gas proportional counters as detailed earlier (Agrawal *et al.*¹; Agrawal *et al.*²). Ninety-five per cent activity of NBS oxalic acid was used as modern standard.

All the samples were given HCl pretreatment. Except for PRL-107 and PRL-108, all the archaeological samples were given NaOH treatment also. Rootlets, wherever present, were hand-picked.

The dates in years B.P. are given for each sample based on the half-life values of 5568 ± 30 years and 5730 ± 40 years, the latter within parenthesis. The dates are not calibrated for ¹⁴C/¹²C variations. To convert the dates into AD/BC scale, 1950 AD should be used as reference year.

A number of ¹⁴C dates (PRL-81, -83, -67, -68) now confirm that the Painted Grey Ware culture extended upto the 3rd century BC. Some of the dates from Barkhera (PRL-113), Bateshwar (PRL-200), Bhimbetka (PRL-17) and Koldihawa (PRL-100, 101) are older than normally expected, probably indicative of some hitherto unknown basal cultures in these regions. ¹⁴C dates on *in situ* Megalithic material do not seem to go beyond 200 BC (PRL-134, -135).

¹⁴C DATES WITH SAMPLE DESCRIPTIONS

Aligrama, Pakistan

PRL-186, Swat Protohistoric V period, 3070 ± 230
(3150 ± 240)

Charcoal from Aligrama (Lat. 34° 49' N., Long. 72° 19' E.), District Swat, Trench E, Layer 5b, depth 3.4 m. Samples submitted by Dr. G. Stacul, Trieste University, Italy.

Allahpur, Uttar Pradesh, India

Allahpur, District Meerut, was excavated by K. N. Dikshit and samples were submitted from Painted Grey Ware (PGW) and Northern Black Polished Ware (NBP) deposits by the Director-General, Archaeological Survey of India (DGA), New Delhi.

PRL-81, PGW deposits, 2270 ± 90
(2335 ± 95)

Charcoal from Trench Al, Qd. 1, Layer 11, depth 2.3 m, Field No. ALP/2/70-71.

PRL-83, PGW-NBP overlap, 2160 ± 105
(2225 ± 110)

Charcoal from Trench Al, Qd. 4, Layer 5, depth 1.1 m, Field No. ALP/4/70-71.

Amaravati, Andhra Pradesh, India

Amaravati (Lat. 16° 34' N., Long. 80° 17' E.), a Buddhist site excavated by I. K. Sarma and samples submitted by DGA, New Delhi.

PRL-157, NBP deposit (?), 1700 ± 100
(1750 ± 100)

Charcoal from Trench YA-1/3, Layer 10A, depth 4.2 m.

PRL-158, NBP deposits (?), 1880 ± 100
(1930 ± 110)

Charcoal from Trench YA 3/4, Layer 12, depth 3.75 m.

PRL-160, Stupa complex, 1900 ± 100
(1960 ± 110)

Charcoal from Trench YA-3/2, Layer 10, depth 3.6 m.

PRL-162, Early Stupa phase, 1950 ± 130
(2000 ± 130)

Charcoal from Trench YA-1/2, Layer 11, depth 4.1 m.

PRL-165, Early Stupa phase, 1820 ± 130
(1870 ± 140)

Charcoal from Trench YA-3/3, Layer 10, depth 4.2 m.

Ambamata, Gujarat, India

Ancient copper working near Ambamata (Lat. 24° 20' N., Long. 72° 51' E.), District Banaskantha, samples collected and submitted by N. C. Shekar, Mineral Exploration Corporation Ltd., Ambaji.

PRL-53, Old Copper Working, 2050 ± 200
(2110 ± 200)

Timber from ancient mine, depth 70 m, Field No. Ac-6.

PRL-66, Old Copper Working, 825 ± 100
(850 ± 100)

Timber from bore-hole No. 100 at 62 m depth, Field No. Ac 2.

Barkhera, Madhya Pradesh, India

Barkhera (Lat. 22° 9' N., Long. 77° 7' E.), District Raisen, excavated by K. D. Bajpai, Saugar University, Saugar, who submitted the samples.

PRL-111, Chalcolithic culture, 3170 ± 105
(3265 ± 110)

Charcoal from Layer II and III, depth 0.1 to 0.2 m, Field No. C-26.

PRL-113, Chalcolithic culture, 7250 ± 135
(7460 ± 140)

Seeds from Layers II and III, depth 0.1 to 0.2 m, Field No. C-26. *Comment*: Obviously these are older, perhaps wild seeds and have no relevance to Chalcolithic levels.

Bateshwar, Uttar Pradesh, India

Bateshwar, District Agra, was excavated by J. S. Nigam. Samples submitted by DGA.

PRL-197, Sunga levels, 2410 ± 100
(2480 ± 110)

Charcoal from Trench BTR1, A1, Qd. 1, Layer 14, depth 4.7 m, Field No. BTR 1/3.

PRL-198, Black and Red Ware (BRW) and
PGW levels, 2490 ± 90
(2570 ± 90)

Charcoal from Trench BTR1, A2, Qd. 3, Layer 19, depth 6.65 m, Field No. BTR 1/5.

PRL-199, Mauryan levels, 590 ± 130
(610 ± 130)

Charcoal from Trench BTR2, A2, Qd. 4, Layer 7A, depth 3 m, Field No. BTR 2/6.

PRL-200, Transitional phase, 5130 ± 240
(5280 ± 240)

Charcoal from Trench BTR2, Aw, Qd. 4, Layer 8, depth 3.15 m, Field No. BTR 2/7.

PRL-201, Sunga levels, 2520 ± 160
(2590 ± 160)

Charcoal from Trench BTR1, A2, Qd. 1, Layer 11, depth 4.2 m, Field No. BTR 1/2.

Bharatpur, West Bengal, India

Bharatpur (Lat. $23^\circ 24'$ N., Long. $87^\circ 27'$ E.), a chalcolithic site in District Burdwan, samples submitted by DGA.

PRL-15, Chalcolithic culture, 3290 ± 135
(3385 ± 140)

Charcoal from Trench G5-H5, Layer 5, depth 1 m.

PRL-187, Chalcolithic culture, 3040 ± 150
(3130 ± 150)

Charcoal from Trench BRP-1/74-F 3, Qd. 3, Layer 6, depth 1.95 m.

PRL-188A, Chalcolithic culture, 2770 ± 140
(2850 ± 150)

Charcoal from Trench BRP-1/74-B3, Qd. 1, Layer sealed by 9, depth 2.4 m.

Bhimbetka, Madhya Pradesh, India

Bhimbetka (Lat. $22^\circ 57'$ N., Long. $77^\circ 37'$ E.), District Raisen, the site was excavated by V. S. Wakankar, Vikram University, Ujjain, who submitted the samples.

PRL-17, Pit deposit, 7570 ± 210
(7790 ± 220)

Charcoal from Pit No. 3, depth 0.6 m.

PRL-18, Pit deposit, 2650 ± 125
(2725 ± 130)

Charcoal from Pit No. 11, depth 2.76 m.

PRL-49, Burial No. 1, Modern

Charcoal from lower part of skeleton, Trench III F-16, Field No. 5.

PRL-50, Burial No. 3, 5855 ± 110
(6025 ± 110)

Charcoal from Pit, Trench III F-13, depth 0.03 to 0.1 m, Field No. 6.

PRL-51, Burial No. 2, 2045 ± 110
(2105 ± 115)

Charcoal from Pit, Trench III F-13, Field No. 7.

Henagahapugala, Ceylon

PRL-108, Coastal deposit, 2960 ± 160
(3050 ± 160)

Shells indirectly associated with Mesolithic artifacts from raised beach lagoon near Henagahapugala (Lat. $6^\circ 4' 55''$ N., Long. $80^\circ 55' 50''$ E.), District Hambantota, Trench G2, Layer II, depth 0.8 m, submitted by the Director, Department of Archaeology, Ceylon.

Inamgaon, Maharashtra, India

Inamgaon (Lat. $18^\circ 25'$ N., Long. $74^\circ 32'$ E.). District Poona, a Chalcolithic site giving a sequence from Malwa to Late Jorwe cultures, samples submitted by the Director, Deccan College, Poona.

PRL-57, Chalcolithic culture, 3050 ± 105
(3140 ± 110)

Charcoal from Locus INM-I, Trench D8, Layer 3, depth 0.75 m, Field No. INM-I/884.

PRL-59, Chalcolithic culture, 3205 ± 110
(3300 ± 110)

Charcoal from Locus INM-I, Trench H8, Layer 16, depth 4.2 m, Field No. INM-I/1328.

PRL-76, Chalcolithic culture, 3215 ± 110
(3305 ± 110)

Charcoal from Trench G8, Layer 7, depth 0.75 m, Field No. 1094.

PRL-77, Chalcolithic culture, 3305 ± 110
(3400 ± 115)

Charcoal from Trench H8, Layer 15, 3.2 m, Field No. 1324.

PRL-78, Chalcolithic culture, 2740 ± 115
(2820 ± 115)

Charcoal from Trench H9-19, House No. 38, sealed by Layer 7, depth 0.75 m, Field No. 1197.

PRL-93, Chalcolithic culture, 3020 ± 105
(3110 ± 105)

Charcoal from Trench D7, House No. 36, Layer 4, Field No. 972.

PRL-94, Chalcolithic culture, 3015 ± 115
 (3105 ± 120)

Charcoal from Trench D8, Layer 4, Field No. 926.

PRL-133, Chalcolithic culture, 3225 ± 105
 (3320 ± 110)

Charcoal from Locus INM-II, Layer 3, depth 0.3 m,
 Field No. INM-II/1330.

Kanchipuram, Tamil Nadu, India

PRL-22, Early historic deposits, 2360 ± 120
 (2430 ± 130)

Charcoal from Kanchipuram, (Lat. 12° 50' N., Long. 79° 42' E.), District Chingelput, Trench 0-II', Layer 18, depth 6.16 m, Field No. KCM-1, samples submitted by T. V. Mahalingam, Madras University, Madras.

Khalaua, Uttar Pradesh, India

Khalaua (Lat. 27° 6' N., Long. 77° 52' E.), District Agra, samples submitted by DGA, from PGW and Black and Red Ware (BRW) phase of Early Iron Age.

PRL-67, PGW and BRW deposits, 2450 ± 155
 (2520 ± 160)

Charcoal, Locus KHL-I, II and IV, Layer 7, depth 2.15 m, Field No. Khalaua-T2/66.

PRL-68, PGW and BRW deposits, 2370 ± 170
 (2435 ± 170)

Charcoal, Locus KHL-I, II and IV, Layer 8, depth 2.35 to 2.48 m, Field No. Khalaua-T3/66.

Khangkhui, Manipur, India

PRL-142, Cave deposits, Modern

Charcoal from Khangkhui (Lat. 25° 4' N., Long. 94° 25' E.), District Manipur East, Trench 1, Layer 1, depth 0.2 m, Field No. KHK/C1, submitted by O. K. Singh, D.M. College, Imphal. *Comment*: date probably represents later disturbances.

Koldihawa, Uttar Pradesh, India

Koldihawa (Lat. 24° 54' 30" N., Long. 82° 2' 30" E.), District Allahabad, a Neolithic-Chalcolithic site excavated by G. R. Sharma, Allahabad University, Allahabad, who submitted the samples.

PRL 56, Chalcolithic culture (?), 820 ± 100
 (840 ± 105)

Charcoal from Locus KDW-1, A1 (a), Reference Pit (c) sealed by Layer 1, depth 0.96 m, Field No. AU/ALD/KDW/(DGT)/72/9.

PRL 98, Chalcolithic culture (?), 1990 ± 150
 (2050 ± 160)

Charcoal from Locus KDW 1, A1 (b), III-VII, Layer 2, depth 0.23 m, Field No. AU/ALD/KDW/(DGT) 72/11.

PRL-99, Chalcolithic culture, 2900 ± 150
 (2990 ± 160)

Charcoal from Locus KDW-1, A1 (a), 0-III, Layer 4, depth 0.60 m, Field No. AU/ALD/KDW/(DGT)/72/12

PRL-100, Chalcolithic culture (?), 7180 ± 230
 (7390 ± 240)

Charcoal from Locus KDW-1, A1 (a), 0-III, Layer 5, depth 0.8 m, Field No. AU/ALD/KDW/(DGT) 72/13.

PRL-101, Chalcolithic culture (?), 6295 ± 180
 (6480 ± 185)

Charcoal from Locus KDW-1, A1 (a), 0 to III, Layer 6, depth 1.1 m, Field No. AU/ALD/KDW/(DGT)/72/14.

PRL-102, Chalcolithic culture, 2380 ± 105
 (2450 ± 105)

Charcoal from Locus KDW-1, A1(b), Reference pit B sealed by Layer 1, depth 0.42 m, Field No. AU/ALD/KDW/(DGT)/72/6.

Pallavamedu, Tamil Nadu, India

PRL-46, Early historic deposit (?), 17480 ± 500
 (17990 ± 500)

Charcoal from Pallavamedu (Lat. 12° 50' N., Long. 79° 7' E.), District Chingelput, Locus IV-V-IV'-V', Layer 5, depth 4 m, Field No. PVM-1, sample submitted by the Director, Department of Archaeology, Madras. *Comment*: Sample probably mixed with lignite at site and has no relevance to cultural levels.

Patirajawela, Ceylon

PRL-107, Coastal deposit, 4500 ± 170
 (4630 ± 180)

Shells associated with Mesolithic artifacts from Patirajawela (Lat. 6° 10' N., Long. 81° 13' E.), District Hambantota, Locus D5, Layer II, depth 0.4 m, samples submitted by the Director, Archaeology, Ceylon.

Prabhas Patan, Gujarat, India

Prabhas Patan (Lat. 20° 53' N., Long. 70° 24' E.), District Junagadh, samples submitted by the Director, Deccan College, Poona.

PRL-19, Chalcolithic culture, 3095 ± 160
 (3185 ± 165)

Charcoal from Locus PP 1, Trench B6, Layer 9, depth 2.95 m,

PRL 20, Chalcolithic culture, 3340 ± 105
 (3435 ± 110)

Charcoal from Locus PP 1, Trench C6, Layer 7, depth 2.12 m.

PRL 90, Flood deposit, 4235 ± 110
 (4360 ± 115)

Charcoal from a flood deposit, Locus D6, Layer 16, depth 6.5 m, Field No. 506.

PRL-91, Chalcolithic culture, 3855 ± 165
(3970 ± 170)

Charcoal from House No 9, Locus C4, Layer 10, depth 3.3 m, Field No. 421.

PRL-92, Chalcolithic culture, 3825 ± 95
(3940 ± 100)

Charcoal from Trench D6-7, Layer 14, depth 4.85 m, Field No. 495.

Purana Qila, Delhi, India

PRL-97, Early historic deposit, 2000 ± 140
(2055 ± 145)

Charcoal from Purana Qila, Delhi, Locus PQL-N6, Qd. 2, Layer 48, depth 10.35 m, sample submitted by DGA.

Sanghao, Pakistan

PRL-190, Cave deposits, 210 ± 140
(210 ± 140)

Charcoal from Sanghao cave (Lat. $34^{\circ} 28' \text{ N.}$, Long. $72^{\circ} 12' \text{ E.}$), Trench 1963, East Section, Layer 9, depth 3.6 m, submitted by Mohammad Salim, Institute of Archaeology, London. *Comment*: The sample perhaps represents only a recent shepherd's fire.

Sohgaura, Uttar Pradesh, India

Sohgaura (Lat. $26^{\circ} 23' \text{ N.}$, Long. $83^{\circ} 30' \text{ E.}$), District Gorakhpur, samples submitted by S. N. Chaturvedi, Gorakhpur University, Gorakhpur.

PRL-178, BRW deposits, 3190 ± 110
(3280 ± 110)

Charcoal from Trench ZB2, Layer 12, depth 3.15 m, sender's sample 2.

PRL-179, BRW deposits, 3090 ± 130
(3180 ± 130)

Charcoal from Trench ZB2, Layer 11, depth 3.02 m, sender's sample 3.

PRL-182, NBP deposits, 2130 ± 90
(2190 ± 90)

Charcoal Trench ZB2, Layer 9, depth 1.85 m, sender's sample 6 *a* and *b*.

PRL-183, NBP deposit, 2470 ± 110
(2540 ± 110)

Charcoal from Trench ZB2, Layer 7, depth 1.4 m, sender's sample No. 8 *a*.

Surkotada, Gujarat, India

PRL-85, Harappan culture, 4140 ± 130
(4265 ± 135)

Charcoal from Surkotada (Lat. $23^{\circ} 37' \text{ N.}$, Long. $70^{\circ} 50' \text{ E.}$), District Kutch, Locus ZF1, Qd. 2, Layers 13 and 14, depth 4.85 m, Field No. 21, excavated by J. P. Joshi and submitted by DGA.

Takiaper, Uttar Pradesh, India

Takiaper, District Varanasi, samples submitted by T. N. Roy, Banaras Hindu University, Varanasi.

PRL-184, NBP deposits, 2070 ± 100
(2130 ± 110)

Charcoal from burnt layer between deposits of Periods I and II, Layer 4, Field No. TKP-1.

PRL-47, NBP deposits (?), 4600 ± 120
(4730 ± 125)

Charcoal from Locus A0, Layer 5, depth 1.2 m. *Comment*: samples represent an earlier tree stump burnt at site.

Tilpat, Haryana, India

PRL-61, *Adansonia digitata* wood, Modern

Wood pieces from Tilpat (Lat. $28^{\circ} 30' \text{ N.}$, Long. $77^{\circ} 20' \text{ E.}$), District Gurgaon, collected by K. M. Vaid and submitted by Vishnu Mittre, Birbal Sahni Institute of Palaeobotany, Lucknow. *Comment*: dated to validate reputed antiquity of wood.

Togarapalli, Tamil Nadu, India

Togarapalli (Lat. $12^{\circ} 25' \text{ N.}$, Long. $78^{\circ} 22' \text{ E.}$), District Dharmapuri, site excavated by B. Narasimhatah, samples submitted by M. K. Dhavalikar, Deccan College, Poona.

PRL-134, Megalithic culture, 2180 ± 100
(2240 ± 110)

Charcoal from Locus TGP-3, Layer 5, depth 1.05 m, Field No. TGP-3.

PRL-135, Megalithic culture, 2150 ± 110
(2210 ± 110)

Charcoal from Locus TGP-3, Layer 5, depth 1.15 m, Field No. TGP-3.

1. Agrawal, D. P., Kusumgar, Sheela and Lal, D., *Curr. Sci.*, 1965, **34** (13), 394.
2. —, Gupta, S. K. and Kusumgar Sheela, *Radiocarbon*, 1971, **13** (2), 442.