RADIOCARBON DATES OF SAMPLES FROM N.B.P. WARE AND PRE-N.B.P. WARE LEVELS

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RADIOCARBON "dates" of samples from N.B.P. levels of Ahichchhatra, Atranjikhera and Rajghat and from Rupar are presented here. "Dates" from the protohistoric black-and-red ware levels of Chirand (Bihar), neolithic of Burzahom and P.G. Ware level of Atranjikhera are also included. The experimental procedures used for obtaining radiocarbon dates have been described previously (Kusumgar *et al.*, 1963; Agrawal *et al.*, 1965). Some essential details are, however, summarised below for the sake of completeness.

After subjecting samples to manual cleaning they were digested in 1% HCl to remove carbonates. Sodium hydroxide treatment was given, whenever the samples were hard enough to stand it, to remove any humic acid present. The samples were converted into methane and counted in a gas-proportional counter.

Ninety-five per cent activity of oxalic acid "standard" (National Bureau of Standards) is used for the value of "modern" radiocarbon activity. Two dates have been given for each sample: the first is based on the radiocarbon half-life value 5568 ± 30 years; the second within brackets on 5730 ± 40 years. The latter is now regarded as the best working value (Godwin, 1962). All comparisons should be made on dates based on one or other of the half-life values. For converting the dates to A.D./B.C. scale, 1950 A.D. should be used as reference year (Deevey *et al.*, 1964).

General Comment on Dates

Black-and-red ware of Bihar has been "dated" for the first time. The two "dates" obtained centre around the first quarter of the first millennium B.C. This suggests a broad contemporaneity with the P.G. Ware of Doab. In Atranjikhera there is a distinct pre-P.G. Ware horizon of black-and-red ware of Banasian affinity (Gaur, private communication). The available chronology thus suggests a Banasian epicentre for black-and-red ware, from where it could have spread to Central and Eastern India as well as Doab. The probability of the equation of Banas Culture with Aryans and their subsequent spread (Agrawal, 1965) is supported by this chronology. A large number of radiocarbon dates are now available from N.B.P. ware levels of different sites. These "dates" suggest a bracket of *ca.* 450-50 B.C. Thus we see that the radiocarbon dates too reflect an overlap between the P.G. Ware (maximum spread *ca.* 1000–400 B.C.) in the fifth century B.C. (Agrawal and Lal, 1965).

C^{14} Dates with Sample Descriptions

Ahichchhatra, Uttar Pradesh, India

Ahichchhatra (Lat. 28° 22′ N., Long. 79° 7′ E.), District Bareilly, was the ancient capital of north Panchal. The site has recently been excavated again by Dr. N. R. Banerji, Archæological Survey of India. Samples were submitted by Shri A. Ghosh.

TF-310, N.B.P. Ware Deposits, 2050 ± 90 (2110 ± 95)

Charcoal from High Mound, Locus XI-XII, Pit No. 4, Sealed by Layer 8 A, Depth 2·5 m., Field No. 177.

TF-311. N.B.P. Ware Deposits, 2360 ± 105 (2425 ± 105)

Charcoal from High Mound, Locus IX′-X′, Pit No. 5, Sealed by Layer 14, Depth 3·8 m., Field No. 196. Comment: These deposits also yield P.G. Ware.

Atranjikhera, Uttar Pradesh, India

Atranjikhera (Lat. 27° 42′ N., Long. 78° 44′ E.), District Etah, has a unique position in the archæology of Doab. The site is being excavated by the Aligarh University under the direction of Shri R. C. Gaur, who submitted the samples. The excavations there have thrown considerable light on the protohistory of the area and have established the existence of a distinct pre-P.G. Ware horizon of black-and-red ware deposit. Comment: The samples mentioned below belong to the N.B.P. Ware deposits and one to late P.G. Ware levels.

TF-283, N.B.P. Ware Deposits, 2150 ± 105 (2210 ± 105)

Charcoal from Trench ARJ-4, Locus A1 (NE.), Layer 27, Depth 4·85 m., Field No. ARJ-4/64-1.

TF-284, N.B.P. Ware Deposits, 2180 ± 95 (2245 ± 100)

Charcoal from Trench ARJ-4, Locus A1 (SW), Layer 29, Depth 5 m., Field No. ARJ-4/64-2, NaOH pretreatment was also given,

TF-194, N.B.P. Ware Deposits, 2410 ± 85 (2480 ± 85)

Charcoal from Trench ARJ-4, Locus A1 (NW), Layer 16, Depth 3·1 m.

TF-291, P.G. Ware Deposits, 2415 ± 100 (2485 ± 100)

Charcoal from Trench ARJ-4, Locus D1(SE), Layer 6, Depth 2·50 m., Field No. ARJ-4/64-9. Comment : The sample belongs to the late levels.

Burzahom, Kashmir, India

TF-129, Neolithic Culture, 3670 ± 90 (3775 ± 100)

Charcoal from Burzahom (Lat. 34° 10′ N., Long. 74° 54′ 30″ E.), District Srinagar, Trench BZH-1, Locus XIX-XXII, Layer 13, Depth 2·9 m., Field No. BZH-1/62. Sample submitted by Shri A. Ghosh. Comment : Several samples have been measured from this site. The available C^{14} dates suggest a spread of *ca.* 2300-1500 B.C. for this northern neolithic culture.

Chirand, Bihar, India

Chirand (Lat. 25° 45′ N., Long. 84° 45′ E.), District Saran, is a well-known protohistoric site of Eastern India. The site is being excavated by Dr. B. S. Verma under the general direction of Dr. B. P. Sinha, Director, Department of Archæology, Bihar State, who submitted the samples. Comment : The radiocarbon dates show that this eastern black-and-red ware is considerably later than the Banas black-and-red ware. In view of the vast distance between the two, there is still a possibility of the former having been derived from the latter.

TF-336, Black-and-red Ware Deposits, 2640 ±95 (2715 ± 100)

Charcoal from Trench CRD-VIIB, Layer 14, Depth 8·5 m. Comment : The sample belongs to Period IB.

TF-334, Black-and-red Ware Deposits, 2715 ± 120 (2795 ± 125)

Charcoal from Trench CRD-VIIB, Layer 18, Depth 12·5 m. Comment : The sample belongs to Period IA.

Dharnikota, Andhra Pradesh, India

TF-246, Early Historic Period, 2355 ± 95 (2425 ± 100)

Charcoal from Dharnikota (Lat. 16° 34′ 45″ N., Long. 80° 24′ 21″ E.), District Guntur, Trench DKT-1, Locus XXXVI-XLII, Layer 11, Depth 6·55 m. Sample submitted by Shri A. Ghosh.

Kakoria, Uttar Pradesh, India

TF-179, Megalithic Habitation Area, 195 ± 90 (200 ± 95)

Charcoal from Kakoria (Lat. 25° 3′ N., Long. 83° 11′ E.), District Varanasi, Trench KKR-I-A, Locus 0-III, Pit E sealed by Layer 1, Depth 0·7 m., Field No. KKR-1(V)-63/1502. NaOH pretreatment was given. Sample submitted by Prof. G. R. Sharma.

Rajghat, Uttar Pradesh, India

Rajghat (Lat. 25° 18′ N., Long. 83° 1′ E.), District Varanasi, is a well-known site on the banks of River Ganga. The site was excavated by the College of Indology, Banaras Hindu University, under the direction of Shri A. K. Narain who submitted the samples.

TF-293, N.B.P. Ware Deposits, 2370 ± 105 (2440 ± 110)

Charcoal from Trench RGT-XI, Locus XI-XII, Layer 11, Depth 9·45 m., Field No. RGT-XI/1963-64-S. No. 2. Comment : The sample belongs to early phase of N.B.P. Ware.

TF-292, Black Slipped Ware Deposits, 2350 ± 95 (2420 ± 100)

Charcoal from Trench RGT-Cutting B, Locus 0-II′, Layer 6, Depth 5·9 m., Field No. RGT-Cut, B/1963-64-S. No. 5. Comment : In the preceding layer there is evidence of flood.

Rupar, Panjab, India

TF-213, N.B.P. Ware Deposits, 2275 ± 100 (2340 ± 105)

Charred wood from Rupar (Lat. 30° 58′ N., Long. 76° 32′ E.), District Ambala, Trench RPR-1, Locus 0-VIII, Layer 26, Depth not given, Field No. RPRI-1710. Sample submitted by Shri A. Ghosh.

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