

## TATA INSTITUTE RADIOCARBON DATE LIST III

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In this paper are reported  $C^{14}$  dates of archaeological samples from the Neolithic, Harappan and Early Historic sites of India.  $C^{14}$  activity was counted in an Oeschger-Houtermans' gas proportional counter. The counting gas, acetylene, was synthesized using the technique described earlier (Kusumgar and others, 1963). The dates presented here are based on 5568 yr for the half-life of  $C^{14}$ . The conversion to A.D./B.C. scale has been made using A.D. 1950 as the reference year.

All samples were given pretreatment with dil. HCl. Only relatively hard charcoal samples were treated with dil. NaOH.

### GENERAL COMMENT ON DATES

The present date list includes several samples which are important in Indian archaeology. The antiquity of Burzahom Neolithic culture is now found to extend beyond the second millennium B.C. A large number of  $C^{14}$  dates from the well-known Harappan site, Kalibangan, do not suggest any significant time gap between the Sothi and Harappa Cultures. More samples are now being measured to determine the precise time spreads of these cultures. TF-191, together with other previous  $C^{14}$  dates (Agrawal and others, 1964), has led to a time spread of 1000 to 500 B.C. for the P.G. Ware. Available  $C^{14}$  measurements for the famous early historic N.B.P. Ware range from the beginning of the Christian era to ca. 400 B.C. (These time spreads are based on the value of 5730 yr for the half-life of  $C^{14}$ .)

### ACKNOWLEDGMENTS

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### SAMPLE DESCRIPTIONS

#### ARCHAEOLOGIC SAMPLES

**TF-191. Atranjikhhera, India, P.G. Ware deposit**  **$2890 \pm 105$   
940 B.C.**

Charcoal sample from Atranjikhhera ( $27^{\circ} 42' N$  Lat,  $78^{\circ} 44' E$  Long), Dist. Etah, Trench ARJ4-D1, top of SW corner, Layer 6, depth 3.20 m. Subm. by Nurul Hasan, Aligarh Univ., Aligarh. *Comment*: sample belongs to P.G. Ware level.

#### **Burzahom series, Kashmir**

Burzahom ( $34^{\circ} 10' N$  Lat,  $74^{\circ} 52' E$  Long), Dist. Srinagar, is the northernmost excavated site of India. This Neolithic Culture has some Chinese affinities (oral communication, Thapar and Gupta, May, 1964). Site is being

excavated by T. N. Khazanchi (Ghosh, 1960-61, p. 11). Samples subm. by A. Ghosh, Director General of Archaeol. in India, New Delhi-11.

**TF-14. Neolithic Period** **3860 ± 340**  
**1910 B.C.**

Charcoal with mud from Trench SE, Locus A1, depth 2.1 to 3 m. Wet-combustion of sample carried out. Visible rootlets were handpicked. *Comment:* as sample was small it was counted by mixing with anthracite C<sub>2</sub>H<sub>2</sub>.

**TF-127. Neolithic Period** **3935 ± 110**  
**1985 B.C.**

Charcoal from Trench BZH-1/62, North Extension, Locus XIX<sub>x</sub>-XXII<sub>x</sub>, Layer 13, depth 2.9 m. NaOH pretreatment was also given.

**TF-123. Neolithic Period** **4055 ± 110**  
**2105 B.C.**

Charcoal from Trench BZH-3/61, Locus B2 (NE), Layer Pit C, depth 2.8 to 3.4 m. NaOH pretreatment was also given.

**TF-128. Neolithic Period** **4205 ± 115**  
**2255 B.C.**

Charcoal from Trench BZH-1/62, North Extension, Locus XXII<sub>x</sub>-XXIII<sub>x</sub>, Layer 13, depth 3.9 m. NaOH pretreatment was also given.

#### Hetimpur series, Uttar Pradesh

Hetimpur, a pre-iron megalithic site in Dist. Varanasi, is being excavated by Inst. of Archaeol., Allahabad Univ. under direction of G. R. Sharma who subm. the samples. *Comment:* samples belong to early historic period as evidenced by the occurrence of N.B.P. Ware.

**TF-177. N.B.P. Ware Period** **1820 ± 100**  
**A.D. 130**

Charcoal from Trench HPR-I(V), Locus A2, XII-XIII, Pit B sealed by Layer 4, depth 1.2 m, Field No. HPR-I(V)63/2003.

**TF-176. N.B.P. Ware Period** **2000 ± 100**  
**50 B.C.**

Charcoal from Trench HPR-I, Locus A2, IX-XIV, Layer 4, depth .46 m, Field No. HPR-I(V)-63/2002.

**TF-183. Kakoria, India, megalithic habitation** **200 ± 95**  
**A.D. 1750**

Charcoal from Kakoria (25° 3' N Lat, 83° 11' E Long), Dist. Varanasi, Trench KKR-II, Locus SAI, 0-14, Layer 4, depth .76 m, Field No. KKR-II(V) 63/1507. Visible rootlets were handpicked. Sample subm. by G. R. Sharma, Allahabad Univ., Allahabad.

#### Kalibangan series, Rajasthan

Kalibangan (29° 25' N Lat, 74° 05' E Long), Dist. Sri Ganganagar, has become famous for its twin Harappan mounds. The site has yielded remains of Harappa Culture and a pre-Harappan Sothi Culture.\* Excavations are being

\* Sothi Culture, a term gaining currency, was coined by A. Ghosh for this pre-Harappan Culture.

jointly conducted by B. B. Lal and B. K. Thapar (Ghosh, 1960-61, p. 31).  
Samples subm. by A. Ghosh.

**TF-160. Harappa Culture** **4060 ± 100**  
**2110 B.C.**

Charcoal from Trench KLB-1, Locus XC1, Qdt.2, Layer 12, depth 3.65 m,  
Field No. KLB-1, XC1/C/1962-63-10.

**TF-163. Harappa Culture** **3910 ± 100**  
**1960 B.C.**

Charcoal from Trench KLB-1, Locus YE1, Qdt.4, Layer 2R, depth 0.47 m,  
Field No. KLB-1, YE1/C/1962-63-13.

**TF-165. Sothi Culture** **3800 ± 100**  
**1850 B.C.**

Charcoal from Trench KLB-1, Locus XD1, Qdt. 1 and 2, Layer 2R, depth  
2.35 m, Field No. KLB-1, XD1/C/1962-63-15.

**TF-154. Sothi Culture** **3665 ± 110**  
**1715 B.C.**

Charcoal from Trench KLB-1, Locus ZC2, Layer 8, depth 2.7 m, Field  
No. KLB-1, ZC2/C/1962-63-2.

**TF-161. Sothi Culture** **3930 ± 100**  
**1980 B.C.**

Charcoal from Trench KLB-1, Locus YF2, Qdt. 2, Layer 3, depth 1.4 m,  
Field No. KLB-1, YF2/C/1962-63-11.

**TF-157. Sothi Culture** **4120 ± 110**  
**2170 B.C.**

Charcoal from Trench KLB-1, Locus YF2, Qdt. 3, Layer 5, depth 1.2 m,  
Field No. KLB-1, YF2/C/1962-63-7.

**TF-162. Sothi Culture** **3940 ± 100**  
**1990 B.C.**

Charcoal from Trench KLB-1, Locus XE1, Qdt.2, Pit 1 sealed by Layer 3  
cut into natural soil, depth 1.85 m, Field No. KLB-1, XE1/C/1962-63-12.

### **Kausambi series, Uttar Pradesh**

Kausambi (81° 23' N Lat, 25° 20' E Long), now known as Kosam, Dist.  
Allahabad, is located on N bank of Yamuna. Site is being excavated (Sharma,  
1960) by Inst. of Archaeol., Allahabad Univ., under direction of G. R. Sharma,  
who subm. these samples.

**TF-103. Period III** **2295 ± 105**  
**345 B.C.**

Charcoal from Trench KSB-GR, Locus YZ2, 2-3, Pit C sealed by Layer  
18A BK, depth 3 m, Field No. KSB/63/GR-106. Visible rootlets were hand-  
picked. NaOH pretreatment was also given.

**TF-104. Period III** **2150 ± 105**  
**200 B.C.**

Charcoal from Trench KSB/GR, Locus YZ2, 2-3, Layer 22 BK, depth  
2.4 m, Field No. KSB/63/GR-107. Visible rootlets were handpicked.

**TF-105. Period III****2220 ± 110  
270 B.C.**

Charcoal from Trench KSB/GR, Locus YZ2, 1-2. Pit A sealed by Layer 21 BK, depth 2.4 m, Field No. KSB/63/GR-108. Visible rootlets were hand-picked. NaOH pretreatment was also given.

**Lothal series, Gujarat**

Lothal (22° 31' N Lat, 72° 15' E Long), Dist. Ahmedabad, has yielded the most ancient dockyard of the world. Site was excavated by S. R. Rao. Samples subm. by A. Ghosh. *Comment*: TF-133, TF-135 and TF-136 (charcoal samples mixed with soil) were wet-combusted; contamination by younger carbon is not unlikely in these samples.

**TF-133. Harappa Culture****3740 ± 110  
1790 B.C.**

Charcoal from Trench SRG2, Locus AX33, Layer 6, depth 1.35 m, Field No. 75. Visible rootlets were hand-picked. *Comment*: sample belongs to a disturbed level of Phase II, Period A.

**TF-135. Harappa Culture****3405 ± 125  
1455 B.C.**

Charcoal from Trench SRG2, Locus AX33, Layer 9, depth 2.5 m, Field No. 77. Visible rootlets were hand-picked. *Comment*: sample belongs to water-logged deposits of Phase II, Period A.

**TF-136. Harappa Culture****3915 ± 130  
1965 B.C.**

Charcoal from Trench SRG2, Locus AX33, Layer 10, depth 3.0 m, Field No. 78. Visible rootlets were hand-picked. *Comment*: sample belongs to Phase I, Period A.

**Rojdi series, Gujarat**

Rojdi (21° 51' N Lat, 70° 54' E Long), is Harappan site on Bhadar River in Dist. Rajkot. Site was excavated by late P. P. Pandya and later taken over by J. M. Nanavati, Dept. of Archaeol., Gujarat, Rajkot, who subm. the samples.

**TF-200. Harappa Culture****3810 ± 110  
1860 B.C.**

Charcoal from Trench B, Locus VII-IX, Layer 3, depth .65 m, Field No. Mound I/Tr.B/5. NaOH pretreatment was also given. *Comment*: sample belongs to Phase B of Period I.

**TF-199. Harappa Culture****3590 ± 100  
1640 B.C.**

Charcoal from Trench C, Pit 2 sealed by Layer 4, depth 1.75 m, Field No. Mound III/Tr.C/4. Visible rootlets were hand-picked. NaOH pretreatment was also given. *Comment*: sample belongs to Phase B of Period I.

**Utnur series, Mysore**

Utnur (16° N Lat, 77° 38' E Long), Dist. Mehboobnagar is a Neolithic

ash-mound site. Excavated (Allchin, 1961) by F. R. Allchin, Cambridge Univ., Cambridge, who subm. the samples.

**TF-168. Neolithic Culture** **3875 ± 110**  
**1925 B.C.**

Charcoal from Site I, Square D, Layer 5, depth .75 m. Visible rootlets were handpicked. *Comment*: sample belongs to Period IIIA.

**TF-167. Neolithic Culture** **3890 ± 110**  
**1940 B.C.**

Charcoal from Site I, Square E, Layer 7, depth 1.4 m. Visible rootlets were handpicked. *Comment*: sample belongs to Period IIA and is little younger archaeologically than levels dated by BM-54, 4120 ± 150 (Barker and Mackey, 1960).

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