

## RIKEN NATURAL RADIOCARBON MEASUREMENTS II

FUMIO YAMASAKI, TATSUJI HAMADA and  
CHIKAKO FUJIYAMA

Institute of Physical and Chemical Research (RIKEN)  
Komagome, Bunkyo-ku, Tokyo, Japan

The C<sup>14</sup> dates given below are a continuation of the work presented in our first list (RIKEN I), and have been obtained by counting CO<sub>2</sub> at about 2 atm pressure in a 2.7-L stainless steel counter. In this article, results obtained during 1964-65 are described.

Shell samples were treated with 1% HCl to remove the outer 10%. Calcareous deposits on the surface, when observed, were removed by mechanical means.

Dates have been calculated on the basis of the C<sup>14</sup> half-life of 5568 yr, and 95% of NBS oxalic acid as modern standard. No correction was applied even for fresh water shell samples.

### SAMPLE DESCRIPTIONS

#### I. GEOLOGIC SAMPLES

##### Iwo-dake series

##### N-148. Ashiaraidani 1

**2060 ± 120**  
**110 B.C.**

Trunk of wood (*Juniperus rigida*) washed out of the face of an eroded bank of Ashiaraidani valley, Nakao, Kamitakara-mura, Yoshiki-gun, Gifu pref. (36° 15' N Lat, 137° 14' E Long), 3 m above present river bed, between two layers of mud flow from volcano Iwo-dake. Coll. and subm. 1964 by M. Oishi, Natl. Research Center for Disaster Protection.

##### N-149. Ashiaraidani 2

**2460 ± 120**  
**510 B.C.**

Root of wood (*Pinus pentaphylla*) exposed on same site as above, 6 m above present river bed.

*Comment:* dates roughly determine rate of alluviation of valley and are useful in planning sand-control work. They are also consistent with belief (Kato, 1911) that the upper mud flow (60 to 70 m thick on the Nakao plateau above) occurred about 400 yr ago.

##### N-150. Sodegatani

**modern**

Wood (*Juniperus rigida*) exposed in debris of landslide at bank of Sodegatani valley, Nakao, Kamitakara-mura, Yoshiki-gun, Gifu pref. (36° 16' N Lat, 137° 35' E Long). Coll. and subm. 1964 by M. Oishi. *Comment:* dates the landslide which was reported to occur in 1889 (Kato, 1911).

### Echuca series

Charcoal fragments from Echuca area, Victoria, Australia, where a relatively complete geomorphic and stratigraphic sequence has been established (Bowler and Harford, 1963). Coll. and subm. 1965 by J. M. Bowler, Univ. of Melbourne.

**N-152. Echuca 1-B** **6800 ± 150**  
**4850 B.C.**

From a horizon, rich in organic remains, 7 ft below flood plain forming top of stratigraphic section in laminated lacustrine silts overlying a fossil soil, at S bank of Murray River, 11 mi ENE from Echuca (36° 5' S Lat, 144° 56' E Long).

**N-153. Echuca 2** **4200 ± 130**  
**2250 B.C.**

From exposure on S bank of Goulburn River 5½ mi E of Echuca (36° 6' S Lat, 144° 51' E Long). Material found in a single layer, 3 ft deep, in channel deposits of Kanyapella prior stream, which are set into older lake sediments represented by sample 1-B.

**N-155. Port Phillip Bay 1** **5990 ± 160**  
**4040 B.C.**

Marine pelecypod shell (*Anadara trapezia*) from core in water 47 ft deep through Recent sediments of Port Philip Bay, 2 mi SW of Sandringham Harbour, Australia (37° 58' S Lat, 144° 58' E Long). Sediments overlie a fossil soil and are believed to be considerably younger than first postglacial transgression. Sample from 74 cm below top of core, and 3 cm above fossil soil. Coll. and subm. 1965 by J. M. Bowler.

### Akashi Channel series

Material from boring at Akashi channel. Coll. by T. Yoshinaka; subm. 1965 by K. Kojima, Public Work Research Inst., Ministry of Construction.

**N-162. Akashi Boring No. 8** **10,800 ± 230**  
**8850 B.C.**

Charcoal fragments in dark-brown clay from 14 m below top of core, Boring No. 8, depth in sea 30 m, off Iwaya, Awaji-cho, Tsuna-gun, Hyogo pref. (34° 36' N Lat, 135° 1' E Long).

**N-163. Akashi Boring No. 11** **>36,800**

Shell fragments in coarse bluish gray sand from 10 m below top of core, Boring No. 11, depth in sea 30 m, off Tarumi, Kobe City, Hyogo pref. (34° 37' N Lat, 135° 3' E Long).

*Comment* (K.K.): dates serve to distinguish between Pleistocene Akashi formation and alluvial sediments filling up a submarine valley. Akashi bed is thought to be suitable to support a bridge across Akashi channel.

**Daisen series**

Wood and charcoal found at various sites around volcano Mt. Daisen. Coll. and subm. 1963-64 by T. Kimachi, Yonago Kita High School.

**N-107. Sukezawa** **>36,800**

Charcoal from Sukezawa, Kobu-cho, Hino-gun, Tottori pref., S side of Mt. Daisen (35° 17' N Lat, 133° 33' E Long), coll. from charcoal layer 0.5 m thick, 8 m below ground surface, overlain by granite-and-andesite gravel layer and underlain by granitic clay.

**18,500 ± 400**  
**16,550 B.C.**

**N-138. Kyu Nawa**

Wood from Kyu Nawa, Nawa-machi, Saihaku-gun, Tottori pref., N side of Mt. Daisen (35° 29' N Lat, 133° 31' E Long), coll. from clay layer ca. 6 m below ground surface, overlain by mud flow and underlain by pumice.

**18,000 ± 400**  
**16,050 B.C.**

**N-139. Fukuo**

Wood from Fukuo, Daisen-cho, Saihaku-gun, Tottori pref., NW side of Mt. Daisen (35° 30' N Lat, 133° 28' E Long), coll. from bottom of mud flow 10 m below ground surface, overlain by lacustrine silt and underlain by clay.

*Comment* (T.K.): dates of N-138 and N-139 are unreasonably younger than dates of samples (GaK-225, Gakushuin II, and N-95, RIKEN I) found in gravel layers which are supposed to be stratigraphically higher.

**Hanaizumi series**

Mammal-bearing Hanaizumi formation was excavated 1958, 1959 and 1960 under leadership of I. Hayasaka, head of research party, at Kanamori, Hanaizumi-machi, Nishi-iwai-gun, Iwate pref. (38° 50' N Lat, 141° 10' E Long). Formation ca. 4 m thick, yielded abundant mammalian fossils including *Megaceros*, *Leptobison* and *Loxodonta*, mainly from base of its upper part, ca. 3 m thick, where silt, clay, and sand beds were intercalated by four plant beds, numbered 1st to 4th in descending order (Ueda, Iwai and Ozaki, 1962). These plant beds contained much driftwood and also cones and seeds of *Tsuga*, *Thuja*, *Larix*, *Picea*, *Pinus*, *Menyanthes*, etc. (Matsumoto *et al.*, 1959). Samples, all of *Picea maximowiczii* Regel (id. by S. Watari and F. Yamauchi), were coll. from SE section of excavation area in 1958. Coll. 1958 and subm. by N. Watanabe, Univ. of Tokyo.

**N-132. Wood from 1st plant bed**

**11,900 ± 200**  
**9950 B.C.**

**N-133. Wood from 2nd plant bed**

**23,100 ± 700**  
**21,150 B.C.**

<b>N-141. Wood from 3rd plant bed</b>	<b>29,300 ± 1300</b> <b>27,350 B.C.</b>
<b>N-142. Wood from 4th plant bed</b>	<b>&gt;36,800</b>
<b>N-143. Wood from layer under 4th plant bed</b>	<b>&gt;36,800</b>

*Comment:* other measurements on Hanaizumi formation: Y-594 (Yale V); St-476, 531, 533, 534, 534A and 534B (Stockholm IV). Dates, as expected, are of glacial age (Kanto Loam Research Group, 1961).

## II. ARCHAEOLOGIC SAMPLES

## A. Japan

<b>N-37. Takayagawa canoe</b>	<b>3070 ± 120</b> <b>1120 B.C.</b>
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Part of dug-out canoe of Late Jomon period from Takayagawa River at Yatsudai, Yokoshiba-machi, Sanbu-gun, Chiba pref. (35° 41' N Lat, 140° 28' E Long), unearthed Dec. 1953 by J. Shimizu, Keio Univ. Pottery was of Kasori B type. Subm. by J. Shimizu through N. Watanabe, Univ. of Tokyo.

<b>N-38. Kamo canoe</b>	<b>5290 ± 140</b> <b>3340 B.C.</b>
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Fragment of dug-out canoe of Early Jomon period from peat formation at Kamo, Toyota-mura, Awa-gun, Chiba pref. (35° 1' N Lat, 139° 50' E Long), unearthed Dec. 1948 by R. Fujita and N. Matsumoto of Keio Univ. (Matsumoto, *et al.*, 1952). Pottery was of Moroiso A type. Subm. by J. Shimizu through N. Watanabe. *Comment:* another wood material from same peat layer yielded 5100 ± 400 (M-240, Michigan I). Dates of shell samples associated with same type of pottery were given 4730 ± 90, 4760 ± 90 (GaK-379a and GaK-379b, Gakushuin IV).

<b>N-103. Onedaira 1</b>	<b>4340 ± 130</b> <b>2390 B.C.</b>
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<b>N-104. Onedaira 2</b>	<b>4180 ± 190</b> <b>2230 B.C.</b>
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Charcoal from fireplace of Dwelling Pit 2 of Middle Jomon period at Nakaguchi, Tsugu-mura, Kita-shitara-gun, Aichi pref. (35° 10' N Lat, 137° 38' E Long), excavated July 1952 by I. Natsume. N-103 and N-104 were from same fireplace. Pottery type was comparable to Kasori E in Kanto district. Coll. 1952 and subm. by I. Natsume through N. Watanabe.

<b>N-106. Marune</b>	<b>870 ± 100</b> <b>A.D. 1080</b>
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Charcoal from passage-way to stone coffin chamber of burial mound at Marune, Higashi-nagura, Shitara-machi, Kita-shitara-gun, Aichi pref. (35° 9' N Lat, 137° 32' E Long). Burial mound, round in plan, was of later Kofun type. Coll. 1939 by H. Sawada; subm. by I. Natsume through N. Watanabe.

- 1950 ± 130**  
**A.D. 0**
- N-108. Nishimukai**  
Charcoal from dwelling pit of Late Yayoi period at Nishimukai, Naka-shitara, Toei-machi, Kita-shitara-gun, Aichi pref. (35° 5' N Lat, 137° 41' E Long), excavated Feb. 1954 by M. Okada. Coll. 1954 by M. Okada; subm. by I. Natsume through N. Watanabe.

- 1480 ± 130**  
**A.D. 470**
- N-109. Nishino**  
Charcoal from ceramic kiln of Early Kofun period at Nishino, Sakai city, Osaka pref. (34° 31' N Lat, 135° 33' E Long). Material from N one of two kilns excavated May 1963 by M. Suenaga and K. Mori, Kansai Univ. Coll. 1963 and subm. by N. Watanabe.

- 2820 ± 130**  
**870 B.C.**
- N-110. Yahatazaki**  
Walnuts from peat formation at Yahatazaki, Onoe-machi, Minamitsugaru-gun, Aomori pref. (40° 37' N Lat, 140° 32' E Long), excavated Nov. 1962 by T. Esaka, Keio Univ. *et al.* Pottery was of Obora B type of Latest Jomon period. Coll. 1962 and subm. by N. Watanabe.

- 3680 ± 130**  
**1730 B.C.**
- N-114. Oyu**  
Charcoal fragments from base of black soil layer between two volcanic ash layers at central part of double concentric circles, ca. 40 m and 10 m in diam, consisting of many small stone structures, at Nonakado site Oyu-machi, Kazuno-gun, Akita pref. (40° 16' N Lat, 140° 48' E Long). Upper part of black soil layer contained Late Jomon potsherds, which were thought to be contemporary to stone constructions. Excavation by Comm. for the Protection of Cultural Properties (1953) July 1951. Coll. 1951 and subm. by N. Watanabe.

- 1430 ± 120**  
**A.D. 520**
- N-115. Hizamori**  
Charcoal from dwelling pit at Hizamori, Shichinoe-machi, Kamikita-gun, Aomori pref. (40° 43' N Lat, 141° 10' E Long), excavated Aug. 1954 by K. Narita. Haji pottery and corroded iron objects were found. Coll. 1954 and subm. by N. Watanabe.

### **Shinpukuji series**

Peat formation at Shinpukuji, Iwatsuki city, Saitama pref. (35° 56' N Lat, 139° 43' E Long), was excavated Aug. 1940 by K. Hasebe, Univ. of Tokyo. Wooden artifacts and pottery of Latest Jomon period were found. Coll. 1940 and subm. by N. Watanabe.

- 2990 ± 130**  
**1040 B.C.**
- N-116. Walnuts**  
Associated with Angyo III type of pottery.

**N-117-1. Wood** **3020 ± 130**  
**1070 B.C.**

**N-117-2. Wood** **2940 ± 130**  
**990 B.C.**

From same peat layer which yielded N-116. In prepared samples, no visible rootlets remained in N-117-1, some remained in N-117-2.

### Kurihara series

Eighteen dwelling pits of Yayoi and Kofun periods were excavated Dec. 1955 by S. Nakagawa, St. Paul's Univ. (1957) at Kurihara, Kami-itabashi, Itabashi-ku, Tokyo (35° 45' N Lat, 139° 41' E Long). Coll. 1955 and subm. by N. Watanabe.

**N-121. Charcoal from House H-2** **1600 ± 120**  
**A.D. 350**  
Associated with Haji pottery of Late Kofun period.

**N-122. Charcoal from House H-6** **2180 ± 130**  
**230 B.C.**  
Associated with Haji pottery of Kofun period. *Comment* (N.W.): too old compared to N-123 of Yayoi period.

**N-123. Charcoal from House Y-3** **1830 ± 130**  
**A.D. 120**  
Associated with Yayoicho type pottery of Late Yayoi period.

**N-124. Abiko** **1940 ± 120**  
**A.D. 10**  
Charred timber of dwelling pit of Early Kofun period at Abiko-machi, Higashi-katsushika-gun, Chiba pref. (35° 52' N Lat, 140° 2' E Long). Material from House 4 excavated Jan. 1959 by S. Yoshida, Univ. of Tokyo (Yoshida and Tamura, 1961). Pottery was of Goryo type. Coll. 1959 and subm. by N. Watanabe. *Comment*: charcoal associated with same type of pottery at Goryo yielded 1890 ± 120 (N-68, RIKEN I).

**N-125. Kameyama** **1860 ± 120**  
**A.D. 90**  
Charred timber of dwelling pit of Late Yayoi period at Kameyama, Oji-machi, Kita-ku, Tokyo (35° 45' N Lat, 139° 44' E Long). Material from House 17B unearched 1956 by S. Wajima, Yokohama Municipal Univ. Coll. 1956 and subm. by N. Watanabe.

**N-126. Santonodai** **2260 ± 120**  
**310 B.C.**  
Charcoal from dwelling pit of Late Yayoi period at Santonodai, Okamura-cho, Isogo-ku, Yokohama city, Kanagawa pref. (35° 25' N Lat, 139° 37' E Long). Material from House 3 excavated 1959 by S. Wajima. Pottery was of Kugahara type. Coll. 1958 and subm. by N. Watanabe.

**1340 ± 100****N-127. Okuda****A.D. 610**

Charcoal from Ceramic Kiln 3 at Okuda, Higashi-hosoya-machi, Toyohashi city, Aichi pref. (34° 41' N Lat, 137° 29' E Long), excavated Oct. 1957 by H. Hisanaga. Associated with Latest Sue pottery. Coll. 1957 and subm. by N. Watanabe.

**3250 ± 140****N-128. Seibuen****1300 B.C.**

Charcoal from dwelling pit of Late Jomon period at Seibuen park, Yamaguchi, Tokorozawa city, Saitama pref. (35° 46' N Lat, 139° 26' E Long), excavated Oct. 1958 by I. Kono and T. Otani. Pottery was of Horinouchi type. Coll. 1958 and subm. by N. Watanabe.

**1390 ± 110****N-129. Kamegado****A.D. 560**

Charcoal from ceramic kiln at Kamegado, Narumi-machi, Aichi-gun, Aichi pref. (35° 6' N Lat, 137° 1' E Long). Excavation Oct. 1959 by H. Hisanaga. Associated with oldest type glazed pottery of Heian era. Coll. 1959 and subm. by N. Watanabe.

**Kosai series**

Samples from two ceramic kilns excavated 1958 by H. Hisanaga and party of Shizuoka Univ. at Kibi, Kosai-machi, Hamana-gun, Shizuoka pref. Associated pottery was of types from Late Kofun period to Nara era. Coll. 1958 by excavation party; subm. by N. Watanabe.

**1420 ± 110****N-130. Osawa****A.D. 530**

Charcoal from Kiln 3 at Osawa (34° 42' N Lat, 137° 32' E Long).

**1380 ± 110****N-131. Kawajiri****A.D. 570**

Charcoal from Kiln 1 at Kawajiri (34° 43' N Lat, 137° 32' E Long).

**3340 ± 120****N-144. Hanaizumi****1390 B.C.**

Wood, *Acer* cf. *palmatum* Koidzumi (id. by S. Watari and F. Yamauchi), from Kanamori formation at Kanamori, Hanaizumi-machi, Nishi-iwai-gun, Iwate pref. (38° 50' N Lat, 140° 10' E Long). Formation overlies fossil-bearing Hanaizumi formation from which Hanaizumi series in Geologic Samples were obtained. At collection site, ca. 200 m S of that of geologic samples, the formation, 20 to 50 cm thick, contained later Middle and early Late Jomon pottery (Matsumoto, *et al.*, 1964). Excavation Oct. 1962 by same research party that excavated Hanaizumi formation in 1958, 1959 and 1960. Coll. 1962 and subm. by N. Watanabe.

**N-145. Bodaino** **1140 ± 110**  
**A.D. 810**

Charred timber on floor of Dwelling Pit 9 at Bodaino, Karibu-mura, Kazuno-gun, Akita pref. (40° 15' N Lat, 140° 49' E Long). Associated with Haji pottery resembling Onitaka type in Kanto district, Nara or Asuka era in age. Excavation July 1951 by Comm. for the Protection of Cultural Properties (1953). Coll. 1951 and subm. by N. Watanabe.

### Fugoppe series

Shell mound in Fugoppe cave, Yoichi-machi, Yoichi-gun, Hokkaido (43° 12' N Lat, 140° 50' E Long), was excavated 1953 by T. Natori, head of excavation party of the cave. Pottery was of Kohoku C type. Coll. 1953 and subm. by T. Natori through N. Watanabe.

**N-146. Charcoal** **1870 ± 100**  
**A.D. 80**

**N-147. Charred walnuts** **1950 ± 120**  
**A.D. 0**

**N-50-2. Charred walnuts** **1920 ± 130**  
**A.D. 30**

Charcoal from middle layer; charred walnuts from lower layer. N-147 and N-50-2 were from same source.

### Nishishiga series

Material from bottom layer of shell mound at Nishishiga, Kita-ku, Nagoya city, Aichi pref. (35° 12' N Lat, 136° 55' E Long). Excavation Aug. 1947 by S. Yamanouchi, Univ. of Tokyo. Pottery was of Ongagawa type of Early Yayoi period. Coll. 1947 and subm. by N. Watanabe.

**N-120. Charcoal** **2520 ± 140**  
**570 B.C.**

**N-161-1. Marine pelecypod shell (*Ostrea* sp.)** **2220 ± 120**  
**270 B.C.**

**N-161-2. Marine pelecypod shell (*Meretrix* sp.)** **2440 ± 130**  
**490 B.C.**

**N-164. Takikubo** **1620 ± 120**  
**A.D. 330**

Charcoal from dwelling pit at Takikubo, Kokubunji-machi, Kitatama-gun, Tokyo (35° 42' N Lat, 139° 28' E Long), excavated 1948 by I. Kono, Musashino Mus. Roof tiles of Musashi Kokubunji temple were used to construct furnace of the house. Documentary date of construction of Musashi Kokubunji temple is sometime after A.D. 741. Coll. 1948 by I. Kono; subm. by N. Watanabe.

**1070 ± 120****N-165. Tengudai****A.D. 880**

Charred timber of dwelling pit at Tengudai, Wada, Tama-mura, Minami-tama-gun, Tokyo (35° 38' N Lat, 139° 26' E Long), excavated Dec. 1955 by F. Miki, Tokyo Nat. Mus. Associated with later Haji pottery. Coll. 1955 and subm. by N. Watanabe.

**Araumi Shell Mound series**

Fresh water and marine pelecypod shells from Araumi shell mound, Narita city, Chiba pref. (35° 50' N Lat, 140° 20' E Long). Shell layer, containing mainly *corbicula japonica*, was on black soil 20 to 40 cm thick overlying loam. Associated pottery is comparable to Obora A and A' type Latest Jomon period (Nishimura, 1960b, 1961). Coll. and subm. by M. Nishimura, Waseda Univ.

**2260 ± 130****N-166-1. Fresh water shell (*Corbicula japonica*) 310 B.C.****2290 ± 120****N-166-2. Marine shell (*Meretrix lusoria*) 340 B.C.****2780 ± 110****N-166-3. Marine shell (*Mya japonica*) 830 B.C.****4540 ± 140****N-167. Saburosaku****2590 B.C.**

Marine pelecypod shell (*Meretrix lusoria*) from Saburosaku shell mound, Sawara city, Katori-gun, Chiba pref. (35° 52' N Lat, 140° 31' E Long). Material found 1 m below surface together with Middle Jomon pottery of Atamadai and Kasori E type (Nishimura, 1960a). Coll. and subm. 1965 by M. Nishimura. *Comment:* charcoal samples associated with same or comparable pottery type yielded 4340 ± 130, 4180 ± 190 (N-103, N-104, this list) and 4570 ± 150 (UCLA-279, UCLA III).

**Nishinojo Shell Mound series**

Material from ancient dwelling site at Nishinojo, Namiki, Kozaki-machi, Katori-gun, Chiba pref. (35° 53' N Lat, 140° 23' E Long). Dwelling pit dug in loam and accompanied by Earliest Jomon pottery of Igusa type. At S side of pit, shell layer, 50 to 79 cm thick and containing pottery of Natsushima type, was found in dark soil, 20 to 50 cm above loam (Nishimura *et al.*, 1955; Nishimura, 1965). Coll. and subm. 1965 by M. Nishimura.

**8150 ± 180****N-168. Shell 6200 B.C.**

Fresh water shell (*Corbicula japonica*) from shell layer.

**N-170. Charcoal****8240 ± 190****6290 B.C.**

Baked soil containing powdered charcoal found on floor of pit. Floor is ca. 1.2 m below present ground surface.

*General Comment:* shell and charcoal associated with pottery of Natsushima type was dated and yielded  $9450 \pm 400$ ,  $9240 \pm 500$  (M-769, M-770, Michigan V).

**Tokisaki Shell Mound series**

Fresh water and marine pelecypod shell from B trench of Tokisaki shell mound, Sawara city, Chiba pref. ( $35^{\circ} 53' N$  Lat,  $140^{\circ} 25' E$  Long). Shell layer, 40 to 90 cm thick, is underlain by loam, mixed with ash and accompanied by Earliest Jomon pottery of Hanawadai II type (Nishimura, 1958a; Nishimura and Kaneko, 1960). Coll. and subm. 1965 by M. Nishimura.

**N-174-1. Fresh water shell (*Corbicula japonica*)****9190 ± 200****7240 B.C.****N-174-2. Marine shell (*Meretrix lusoria*)****8740 ± 190****6790 B.C.****N-175. Okitsu****4880 ± 130****2930 B.C.**

Marine pelecypod shell (*Meretrix lusoria*) from Okitsu shell mound, Miho-mura, Inashiki-gun, Chiba pref. ( $35^{\circ} 59' N$  Lat,  $140^{\circ} 18' E$  Long). Shell layer, 40 to 60 cm thick, is 30 to 60 cm below ground surface and accompanied by later Early Jomon pottery of Okitsu type (Nishimura, 1957a). Coll. and subm. 1965 by M. Nishimura.

**N-176. Mukoyama****4520 ± 130****2570 B.C.**

Fresh water pelecypod shell (*Corbicula japonica*) from Mukoyama shell mound, Toride-machi, Kita-soma-gun, Ibaragi pref. ( $35^{\circ} 56' N$  Lat,  $140^{\circ} 1' E$  Long). Shell layer, containing mainly fresh water shell, 60 to 90 cm thick, is 20 to 30 cm below ground surface and accompanied by later Early Jomon pottery of Ukishima III type (Nishimura, 1958b). Coll. and subm. 1965 by M. Nishimura.

**Kaigakubo Shell Mound series**

Marine pelecypod and gastropod shell from Kaigakubo shell mound, Ukishima, Sakuragawa-mura, Inashiki-gun, Ibaragi pref. ( $35^{\circ} 59' N$  Lat,  $140^{\circ} 24' E$  Long). Shell layer, 40 to 80 cm thick, is found at NE slope of Ukishima hill, 30 to 50 cm below ground surface, and accompanied by later Early Jomon pottery of Ukishima type (Nishimura, 1956). Coll. and subm. 1965 by M. Nishimura.

**N-177-1. Marine shell (*Meretrix lusoria*)** **4920 ± 130**  
**2970 B.C.**

**N-177-2. Marine shell (*Meretrix lusoria*)** **4900 ± 130**  
**2950 B.C.**

Both samples are from same source.

**N-178. Uebo** **5340 ± 150**  
**3390 B.C.**

Marine pelecypod shell (*Meretrix lusoria*) from Uebo shell mound, Kozaki-machi, Katori-gun, Chiba pref. (35° 52' N Lat, 140° 23' E Long). Shell layer, 70 to 80 cm thick, is on black soil 20 to 40 cm thick overlying loam and accompanied by Early Jomon pottery of Uebo type (Nishimura, 1955, 1957c). Coll. and subm. 1965 by M. Nishimura. *Comment:* site is 2 km S of Nishinojo (N-168 and N-170) and 3 km W of Tokisaki (N-174-1 and N-174-2). Presence of marine molluscs, when compared with predominance of fresh water molluscs in the latter two shell mounds, suggests transgression at that time.

#### Nado Shell Mound series

Fresh water and marine pelecypod shell from Nado shell mound, Taiei-machi, Katori-gun, Chiba pref. (35° 51' N Lat, 140° 24' E Long). Shell layer, 30 to 70 cm thick, is on dark soil 20 to 30 cm thick overlying loam and accompanied by Late Jomon pottery of Angyo II and IIIa type (Nishimura, 1957b). Coll. and subm. 1965 by M. Nishimura.

**N-179-1. Fresh water shell (*Corbicula japonica*)** **3130 ± 130**  
**1180 B.C.**

**N-179-2. Marine shell (*Meretrix lusoria*)** **3050 ± 130**  
**1100 B.C.**

*General Comment:* charcoal associated with same type of pottery yielded 3000 ± 120 (N-94, Riken I).

**N-183. Ikazuchi** **4280 ± 130**  
**2330 B.C.**

Marine gastropod shell (*Rapana thomasi*) from Ikazuchi shell mound. Shirai, Omigawa-machi, Katori-gun, Chiba pref. (35° 49' N Lat, 140° 33' E Long). Shell layer, 2 to 3 m thick, contains early Middle Jomon pottery of Shimo-ono and Goryogadai type (Nishimura, 1952; Nishimura and Kaneko, 1954). Coll. and subm. by M. Nishimura.

#### Lake Nojiri series

Flake of wood and twig including a cone of *Picea* sp. from Sugikubo remains, NW side of lake Nojiri, Shinano-machi, Kami-minachi-gun, Nagano pref. (36° 50' N Lat, 138° 13' E Long), imbedded in lacustrine sediments, called Rokugatsu bed lying parallel to top of loam bed comparable to Tachikawa loam in Kanto district. The bed, associated with non-ceramic culture, was intercalated by three plant beds from which

samples were collected (Kamei, 1963). Coll. and subm. 1964 by T. Kobayashi, Kokugakuin Univ.

<b>N-134. 25 cm below surface</b>	<b>18,300 ± 400</b> <b>16,350 B.C.</b>
<b>N-135. 35 cm below surface</b>	<b>30,700 ± 1800</b> <b>28,750 B.C.</b>
<b>N-136. 50 cm below surface</b>	<b>35,200 ± 3000</b> <b>33,250 B.C.</b>

*General Comment* (T.K.): dates will serve to determine absolute age of non-ceramic culture in Japan. They also should be compared with dates of wood samples from neighboring Tachigahana remain which is associated with *Megaceros* and *Elephas namadicus naumanni* (GaK-267, 268 and 269, Gakushuin III).

<b>N-74-a. Toro 4</b>	<b>2010 ± 120</b> <b>60 B.C.</b>
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Worked wooden plate for unknown use from dwelling site at Toro, Shizuoka city, Shizuoka pref. (34° 57' N Lat, 138° 25' E Long), excavated during 1945 to 1950. Sample was found 1 to 2 m below ground surface, in alluvial sand and clay at ancient bed of Abe River and associated with Yayoi pottery. Coll. by K. Mochizuki; subm. 1962 by O. Yamada. Date should be compared with those in the previous report (N-70, 71 and 73, RIKEN I).

<b>N-140. Fushun</b>	<b>150 ± 90</b> <b>A.D. 1800</b>
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Worm-eaten wooden statue of peculiar expression from suburb of Fushun, Manchuria (37° N Lat, 124° E Long). Subm. 1964 by K. Toishi, Tokyo Cultural Properties Research Inst. *Comment* (K.T.): statue was supposed to be an ancient shamanistic idol, but date is too young.

#### B. Andes

##### Kotosh series

A mound of Kotosh (9° 56' S Lat, 76° 17' W Long), ca. 5 km from Huanuco city, central Peru, was excavated in 1960 and 1963 by Seiichi Izumi, head of Tokyo Univ. Scientific Expedition to the Andes. Mound accumulations were divided into 8 phases from surface downward as follows: Kotosh Higueras, Kotosh San Blas, Kotosh Sajarapatac, Kotosh Chavín, Kotosh Kotosh, Kotosh Wairajirca, Templo de los Nichitos (Construction I), and Templo de las Manos Cruzadas (Construction J) phases. All phases except Kotosh Higueras phase are thought to belong to Formative period of New World prehistory (Izumi and Sono, 1963). Coll. 1960 by the Expedition party; subm. by S. Izumi.

<b>N-62. Kotosh Higueras (BC-24)</b>	<b>1880 ± 200</b> <b>A.D. 70</b>
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Charcoal from floor of a house, KTD-4, UR-11b.

	<b>1350 ± 140</b>
<b>N-111. Kotosh Sajara-patac phase</b>	<b>A.D. 600</b>
Charcoal from lower floor of a house, KTB-2.	
	<b>1690 ± 130</b>
<b>N-63-2. Kotosh Sajara-patac phase (BC-26)</b>	<b>A.D. 260</b>
Charcoal from KTD7B-3.	
	<b>2820 ± 120</b>
<b>N-65-2. Kotosh Chavín phase (BC-27)</b>	<b>870 B.C.</b>
Charcoal from KTC3-2.	
	<b>2870 ± 230</b>
<b>N-66-a. Kotosh Kotosh phase (BC-28)</b>	<b>920 B.C.</b>
Charcoal from KTC3-4.	
	<b>2840 ± 170</b>
<b>N-67-2. Kotosh Kotosh phase (BC-29)</b>	<b>890 B.C.</b>
Charcoal from KTD3A-8.	
	<b>3100 ± 130</b>
<b>N-69-2. Between Kotosh Wairajirca and Construction I phases (BC-31)</b>	<b>1150 B.C.</b>

#### **Tumbes series**

Several members of Tokyo Univ. Scientific Expedition to the Andes made excavations at Pechiche and Garbanzal ca. 10 km S of Tumbes city (3° 40' S Lat, 80° 30' W Long), northern Peru. Upper strata at Pechiche are considered to be contemporaneous with Garbanzal, belonging to Garbanzal culture, and the lower belong to Pechiche culture of Formative period of Central Andes and Ecuador (Izumi and Terada, in press). Coll. 1960 by N. Watanabe, K. Terada, *et al.*; subm. by S. Izumi.

	<b>810 ± 150</b>
<b>N-72. Pechiche (BC-36)</b>	<b>A.D. 1140</b>
Charcoal from central hearth of floor at Trench C.	
	<b>785 ± 120</b>
<b>N-75. Pechiche (BC-37)</b>	<b>A.D. 1165</b>
Charcoal from upper strata at Pechiche, Trench C.	
	<b>2260 ± 130</b>
<b>N-80. Pechiche (BC-38)</b>	<b>310 B.C.</b>
Charcoal from lowest layer at Pechiche, Trench C.	
	<b>860 ± 110</b>
<b>N-82. Pechiche (BC-39)</b>	<b>A.D. 1090</b>
Same material as BC-36.	
	<b>910 ± 120</b>
<b>N-83. Pechiche (BC-40)</b>	<b>A.D. 1040</b>
Same material as BC-37.	

- N-84. Garbanzal (BC-41)** **7510 ± 260**  
**5560 B.C.**  
Charcoal from a cemetery along Tumbes River, Garbanzal Site I. Accompanying pottery was of Garbanzal type.
- N-85. Garbanzal (BC-42)** **3680 ± 130**  
**1730 B.C.**  
Charcoal from Garbanzal II-C2. Accompanied with pottery fragments of the San Juan Coarse Incised type.
- N-86. Ancón preceramic (BC-43)** **3810 ± 150**  
**1860 B.C.**  
Plant fiber mixed with sand. Site is located ca. 40 km N of Lima, on central coast of Peru (11° 50' S Lat, 77° 10' W Long). Coll. by Museo Nacional de Antropología y Arqueología de Lima; subm. by S. Izumi.
- N-87. Paracas (BC-44)** **3660 ± 170**  
**1710 B.C.**  
Charcoal from Paracas, S coast of Peru (13° 50' S Lat, 76° 20' W Long). Coll. by the above Museo; subm. by S. Izumi.
- N-88. Chavín de Huántar (BC-45)** **550 ± 110**  
**A.D. 1400**  
Wood remain from Chavín de Huántar, N highland of Peru (9° 40' S Lat, 77° 10' W Long). Subm. by S. Izumi.

### Chanapata series

Chanapata site, located near Cusco, S highland of Peru (13° 30' S Lat, 72° W Long), was excavated in 1960 by Manuel Chávez Ballón and two members of Tokyo Univ. Scientific Expedition to the Andes. Coll. by M. Chávez Ballón and N. Watanabe; subm. by S. Izumi.

- N-89. Chanapata (BC-46)** **2520 ± 150**  
**570 B.C.**  
Charcoal from an ash layer.
- N-90. Chanapata (BC-47)** **2360 ± 760**  
**410 B.C.**  
Charcoal from lowest layer. *Comment:* large error is due to shortage of material.

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| Gakushuin IV  | Kigoshi and Kobayashi, 1965         |
| Michigan I    | Crane, 1956                         |
| Michigan V    | Crane and Griffin, 1960             |
| RIKEN I       | Yamasaki, Hamada and Fujiyama, 1964 |
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