

# New C-14 Dates from China

NOTES AND COMMENTARY

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IN A recent issue of *Kao-ku* (no. 5, 1974), there appeared a list of fifty-four radiocarbon datings released by the Institute of Archaeology, Academia Sinica, Peking. The descriptions of individual samples ("Report on Carbon-14 Dates") were prefaced by a technical article on the method of carbon dating ("The Question of Reliability in Carbon-14 Dating"), which included discussion on the problematical half-life of the C-14 isotope and on the proposed dendrochronological calibrations. All age determinations were given using half-life calculations of both 5730 and 5570, in years before present (1950) and in years B.C. or A.D. In the translation below, the age of each sample is listed first on the basis of a half-life of 5730, followed (in parentheses) by a calculation using 5570, in calendar time B.C. or A.D. For further ease of reference, the order of samples has been rearranged numerically (the original presentation was generally by area). There are, however, several pairs of dates from the same site which become separated in such an arrangement: ZK-28 and ZK-142, ZK-165 and ZK-172, ZK-212 and ZK-257. Finally, the translation includes material of the sample, name of site, county and province, cultural associations, and references mentioned (if any). Omitted are names of excavating and submitting agencies, dates of site investigations, grid location of site, field code notations, technical notes on the analysis of the samples, and samples less than 300 years old or nonarchaeological samples. The nonarchaeological samples are geological specimens; two are from tree trunks or branches, two are from decayed wood, and one is carbonaceous material in clay. In the commentary which follows, C-14 dates "previously published" refer to those released in 1972 (*Kao-ku*, no. 1 and no. 5).

ZK-27

925 (845) B.C.  $\pm$  90, from fragments of a wooden boat uncovered at Yen-cheng, Wu-tsin county, Kiangsu province. *WW*, 1958, no. 11.

ZK-28

1195 (1105) B.C.  $\pm$  105, on a charcoal sample from Peh-yin-yang-ying, Nanking region, Kiangsu province. Material is of Hu-shu culture. *KKHP*, 1958, no. 1.

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## ZK-39

8920 (8615) B.C.  $\pm$  240, from a shell unearthed at Hsien-jen-tung, Wan-nien, Kiangsi province. The site is located in a limestone cave, below a level of recent disturbance. The shell is part of the reddish-gray sticky soil deposit belonging to the upper level in the cave, which is clearly different from the lower level. The first estimate was that it belonged to the Late Neolithic. *KKHP*, 1963, no. 1.

## ZK-67-0

375 (310) B.C.  $\pm$  85, on a human bone from Hou-ma-chiao-ts'un, Shensi province. Bone is from the skeleton in a Warring States tomb.

## ZK-85

255 (305) A.D.  $\pm$  85, on charcoal from Tung-k'ang, Ning-an county, Heilungkiang province. Sample is from inside a pottery urn, in association with polishing stones, pottery p'an-basins, etc.

## ZK-88

1035 (950) B.C.  $\pm$  120, on birch bark from Ying-ko-ling, Ning-an county, Heilungkiang province. *KK* 1957.

## ZK-89

1075 (990) B.C.  $\pm$  90, on charcoal from Ying-ko-ling, Ning-an county, Heilungkiang province.

## ZK-90

3835 (3675) B.C.  $\pm$  105, on a charcoal sample from Szu-hu, Ta-tun-tzu, Pi county, Kiangsu province. Sample is associated with the lower level at the site, which belongs to the Ching-lien-kang culture. *KKHP*, 1964, no. 2.

## ZK-98

1140 (1055) B.C.  $\pm$  90, on a shell sample from the Tan-shih-shan shellmound in Fukien province. The sample is from the third cultural layer.

## ZK-103

2085 (1970) B.C.  $\pm$  90, on a shell sample from the shellmound near Hou-shan-kang, Tseng-ch'eng, Kwangtung province. The site is on a low mound consisting mostly of shell deposit. *KK*, 1961, no. 12.

## ZK-124

2195 (2080) B.C.  $\pm$  100, on a charcoal sample from Ch'u-chia-ling, Hupei province. Sample is

from the later phase of the first cultural level. See generally "Chu-chia-ling culture."

## ZK-125

2245 (2130) B.C.  $\pm$  60, on a wood sample from Ch'u-chia-ling, Hupei province. From the later phase of the second cultural level.

## ZK-133

1960 (1850) B.C.  $\pm$  90, on a charcoal from Hou-kang, An-yang, Honan province. From an ash pit associated with Lungshan cultural remains. *KK*, 1972, no. 3.

## ZK-134

3730 (3570) B.C.  $\pm$  105 on charcoal from Hou-kang, An-yang, Honan province. Sample is from the Yangshao cultural level.

## ZK-142

1540 (1440) B.C.  $\pm$  90, on a charcoal sample from Peh-yin-yang-ying, Nanking, Kiangsu province. Material in association belongs to Hu-shu culture, early period. *KKHP*, 1958, no. 1.

## ZK-162

855 (755) B.C.  $\pm$  90, on charcoal from Yeh-tien, Tsou county, Shantung province. Sample is from a kiln, which was disturbed by an ash pit dated to the Chou dynasty. *WW*, 1972, no. 2.

## ZK-165

145 (85) B.C.  $\pm$  80, from a charcoal sample next to the coffin, from tomb no. 1, Ma-wang-tui, Chang-sha, Hunan province. Tomb is of the Han dynasty period.

## ZK-169

2240 (2125) B.C.  $\pm$  95, on a charcoal sample from Li-chia-ts'un, Hsi-hsiang county, Shensi province. Charcoal found in the third cultural layer. *KK*, 1961, no. 7 and 1962, no. 6.

## ZK-172

165 (105) B.C.  $\pm$  80, on a prune shell found in the food offering in tomb no. 1, Chang-sha, Hunan province.

## ZK-176

2015 (1905) B.C.  $\pm$  90, on charcoal from Chih-chu-shan, Ch'in-feng, Liaoning province. In association are remains of the Hsia-chia-tien culture, early phase.



## ZK-185

3075 (2935) B.C.  $\pm$  100, charcoal from Ta-ho-ts'un, Cheng-chou, Honan province. Artifacts in association belong to the Yangshao culture.

## ZK-188

2785 (2650) B.C.  $\pm$  110, on birch bark from Fu-hou-kou-men, Liaoning province.

## ZK-195

360 (405) A.D.  $\pm$  85, on charcoal from Su-fu county, Sinkiang province.

## ZK-200

2100 (1985) B.C.  $\pm$  95, on a shell knife fragment from Shang-p'an-wang, Tz'u county, Hopei province. Knife is of Lungshan culture type.

## ZK-204

1010 (925) B.C.  $\pm$  90, on a wood sample from the Shanghai region, in association with early stamped geometric pottery.

## ZK-212

1620 (1520) B.C.  $\pm$  95, on a shell fragment from Erh-li-tou, Loyang, Honan province. Early phase of occupation at the site. *KK*, 1965, no. 5.

## ZK-229

1260 (1170) B.C.  $\pm$  90, on charcoal from Ta-fun-tzu, Yunnan province.

## ZK-242

1990 (1880) B.C.  $\pm$  95, from a portion of a wooden board found at Chueh-mu-ch'iao, Chia-hsing county, Chekiang province. In association was a large quantity of black pottery belonging to the Liang-chu culture. *KK*, 1974, no. 4.

## ZK-243

80 (130) A.D.  $\pm$  85, on a wood sample from Chi-nen-ch'eng, Kiang-ling county, Hupei province.

## ZK-252

490 (420) B.C.  $\pm$  90, on a carbonized wheat sample from Tiao-yu-t'ai, Anwei province. The site is 2.5 m (above ground plain), 590 sq. m in area. At the south of the site is an oval-shaped red earth flat surface (or platform) whose maximum diameter is 2.5 m, minimum diameter is 0.96 m, and height is 0.45 cm; on its western side was placed a large pottery *li*-vessel, a *Kuan*-shaped jar, a bowl, and a *p'an*-basin. The sample is taken from inside the *li*-vessel. *KKHP*, 1957, no. 1.

## ZK-256

4790 (4600) B.C.  $\pm$  120, on an ebony wood sample from Huang-shan-ch'i, Tse-yang county, Szechuan province. The sample is from the fine gravel layer located below the second layer of gray earth. See generally "Tse-yang Man."

## ZK-257

1245 (1155) B.C.  $\pm$  90, on charcoal from Erh-li-tou, Loyang, Honan province. Sample is from the third cultural layer. *KK*, 1974, no. 4.

## ZK-271

1105 (1130) A.D.  $\pm$  80, on charcoal from Tung-jen, Suipin county, Heilungkiang province. In association are artifacts of the Chin dynasty (A.D. 1115-1234).

## ZK-273

530 (570) A.D.  $\pm$  80, on charcoal from Tung-jen, Sui-pin county, Heilungkiang province.

Probably the most significant of the dates published in this list is that of 8920 B.C. (ZK-39) for the Early Neolithic remains at Hsien-jen-tung. The site is located in a mountain range some 200 miles inland, above a tributary of the Yangtze in north-eastern Kiangsi province. Cultural deposits were found in a cave at the juncture of an upland plateau and the foot of a small hill, in a very attractive and easily accessible setting. Indeed, the cave was frequented at intervals long after the main prehistoric activity there, and much of the cave floor showed signs of recent disturbance. To determine the associations of ZK-39, we must make a rather detailed examination of the stratigraphy (Fig. 1), since the notes accompanying the date are not as specific as might be desired.

The upper level (IA) is a recent deposit of gray-brown topsoil with porcelain sherds, bits of charcoal, snail shells, and hearths of gray-black soil (IB) which

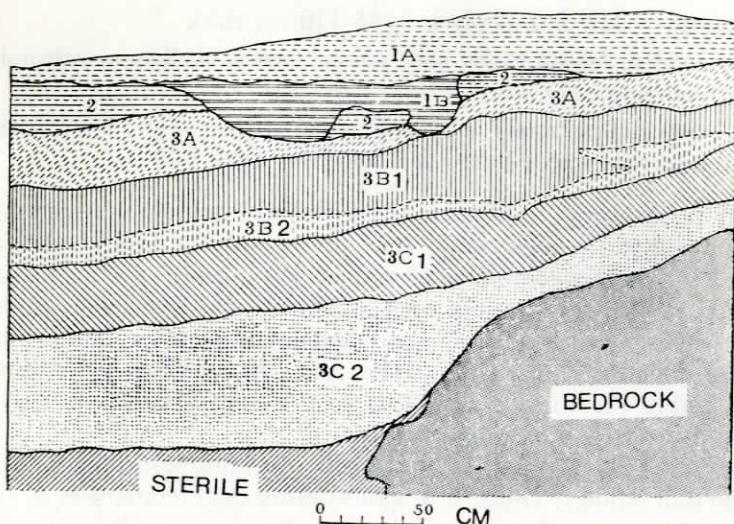


Fig. 1 Hsien-jen-tung stratigraphy.

extend down 35–50 cm into earlier deposits. In three of four areas excavated, the second layer (II) was found to have been disturbed by these later penetrations. However, in one area Level II was found intact, 10–20 cm thick, and consisted of a dark gray-brown loose sandy soil with shell and animal bone refuse. Cultural material from this level included coarse corded pottery, fine burnished or net-stamped ware, one ting tripod foot, well-polished adzes and perforated knives—an assemblage known from other sites in Kiangsi and deemed to be of Late Neolithic, “Lungshanoid” affinity. The original site report refers to this stratum as the “upper layer cultural deposit,” and the notes on ZK-39 seem, at first perusal, to identify this layer as the provenance of the sample. In view of the fact that an age of nearly 11,000 years for a Lungshanoid assemblage would constitute a Jomon-style revolution in the prehistoric chronologies in China (which are now pegged to dozens of C-14 dated sites), it is easier to believe that the shell was brought up in the deposit by a fire pit or other ground disturbance by the Lungshanoid inhabitants.

There are, however, stratigraphic indications that the sample actually relates to an earlier cultural deposit. Within the “lower layer” described in the site report, there are several distinct soil strata:

- IIIA gray ash layer with red burnt earth, 30–65 cm thick, small quantity of coarse corded sherds and charred bones and shells
- IIIB brown layer, 20 cm in thickness
  1. fine sandy soil, with sharp stone fragments and gravel; many broken bones, shells, bone and stone tools, coarse potsherds, and three human skull fragments
  2. fine gravel deposit with gray-white ash and red burnt earth; fewer artifacts



IIIC grayish-yellow fine sandy soil, 45–110 cm thick

1. reddish brown sandy soil; animal bones, shells and cultural material comparatively more
2. dark yellow sandy soil, harder and stickier than above; less cultural material; sterile below 2.3, and into water table

The “sticky reddish-gray soil” from which the shell sample derives may well be IIIA, as opposed to the loose sandy gray-brown soil of Level II. Artifacts from Level III are described collectively, and consist mainly of chipped stone and polished bone implements, pierced shell ornaments, and serrated-edge shell tools. A few polished stone tools were also uncovered, and perhaps their incidence, and that of corded pottery, over IIIA, IIIB, and IIIC reflects significant cultural differences within the various substrata. (See Chang 1969 for a more detailed description of the Hsien-jen-tung material.)

The economic base of the early inhabitants was hunting-fishing-gathering, and much of the tool industry (Figs. 2, 3, and 4) bears close similarities to that of the Upper Paleolithic (especially in the polished bone harpoons, and “choppers/chopping tools”). The pottery, however, shows a lack of sophistication in decoration, shape, and mode of manufacture. This primitiveness in the ceramic industry, coupled with the relatively low proportion of pottery sherds (95) to stone implements (130) and other habitation debris in Level III, would tend to suggest (a) that pottery was a new and undeveloped component of the technology, and/or (b) that the use of pottery was not of major importance to the early cave-dwellers. Such a cultural setting dated to the tenth millennium B.C. is entirely consistent with the earliest Jomon and Late Hoabinhian cave contexts, and with general East Asian prehistory as currently reconstructed. While the date is not particularly surprising, then, it is nonetheless of great importance in extending the Neolithic of southern and central China several thousand years. This assemblage of corded pottery and chipped and polished tools is very likely part of an early Holocene cultural complex on the China mainland often proposed, hypothetically, as the parent of Jomon cultures in Japan. Furthermore, several cave or shellmound sites in South and Southwest China with similar cultural remains are often grouped generally under the Hoabinhian. [The coastal shellmounds have a more advanced material culture, and probably represent a later phase related to rising sea levels between 6000 and 4000 B.C.; one shellmound on Quemoy has recently been dated to 4200 B.C. (Lin 1973).] Hsien-jen-tung itself has been so classified (Aigner 1974), although the criteria distinguishing Hoabinhian from other, perhaps similar complexes (e.g., Chang’s “Corded Ware Horizon”) are not at all clear. It is to be hoped that as new dates (with precise associations) become available for this and other Early Neolithic sites in China, comparative studies will begin to illuminate the regional facies of this wide-ranging early Holocene cultural horizon, which probably includes Hoabinhian and Earliest Jomon.

In contrast, the next oldest date (4790 B.C., ZK-256) is puzzling in its recentness, for the sample appears to be in association with (presumably) Upper Pleistocene remains. The site is a former bed (now flood terrace) of the Huang-shan-chi river, in western Szechuan. The sample derives from the riverbed stratum (yellow sand, gravel, and small cobbles, overlain by 6 to 8 m of alluvial gray and yellow clays) which also yielded fossils of both Lower-Middle and Upper Pleistocene fauna. The

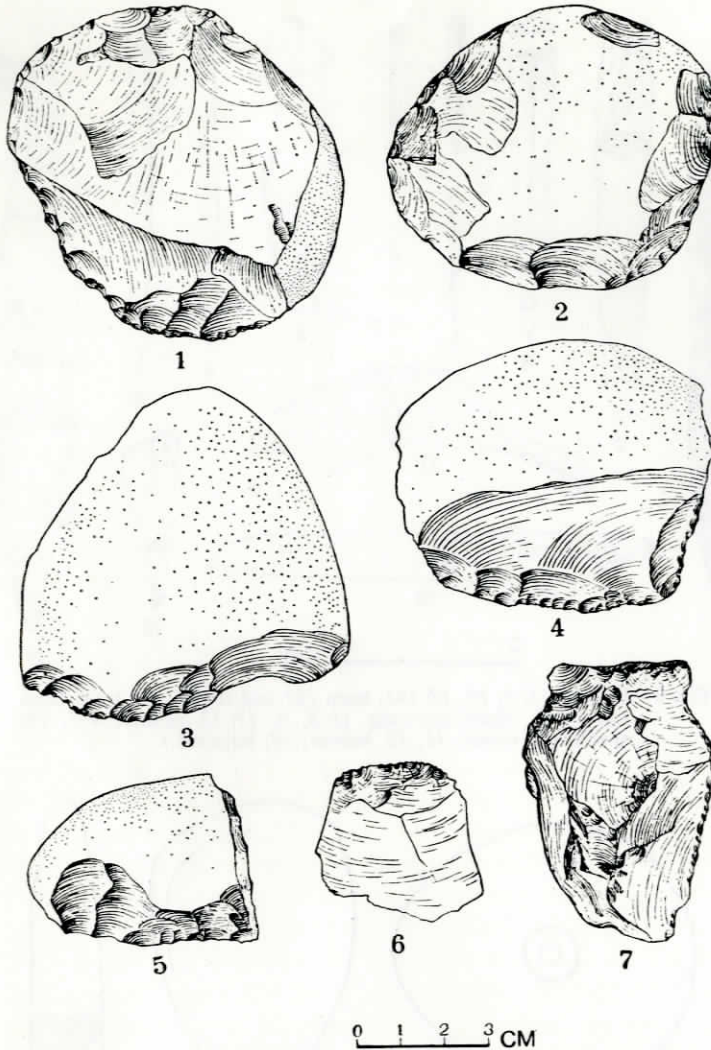


Fig. 2 Chipped stone tools from Level III, Hsien-jen-tung.  
 1-2, rounded tools; 3-5, chopping tools; 6-7, scrapers.

Tse-yang Man remains were in the latter context, and have been estimated to be at least twenty thousand to thirty thousand years old. The C-14 dating of Tse-yang thus continues to be a "major discrepancy" (Chang 1973), for the new date corroborates a previous determination of 5535 B.C. on another wood sample from the same stratum. While the exact positions of wood samples *vis-à-vis* the fossils are not available, one reconstruction of the geological sequence (Pei 1952) is that the human and animal remains were deposited in the stream gravels and sands. With a subsequent change in the stream course, the former bed grew over, and tree roots, trunks, and branches were buried in the stratum under subsequent clay deposits laid down by flooding in post-pleistocene times. The C-14 dated samples would thus belong to a period well after the deposition of the fossils.



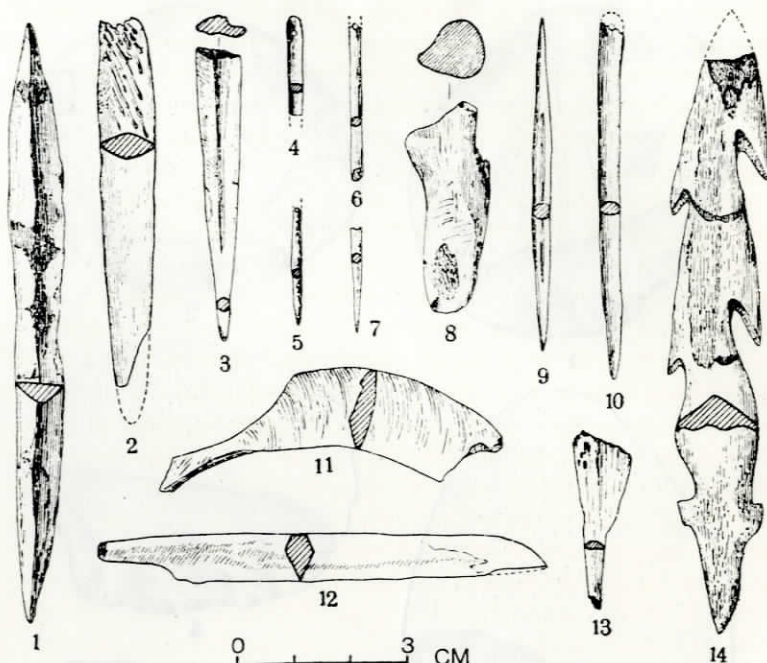


Fig. 3 Bone (1-7, 9, 10, 12-14), horn (8) and tooth (11) tools from Level III, Hsien-jen-tung. (1-3, 9, 11-13, points; 4-7, 10, needles; 8, chisel; 11, 12, knives; 14, harpoon.)

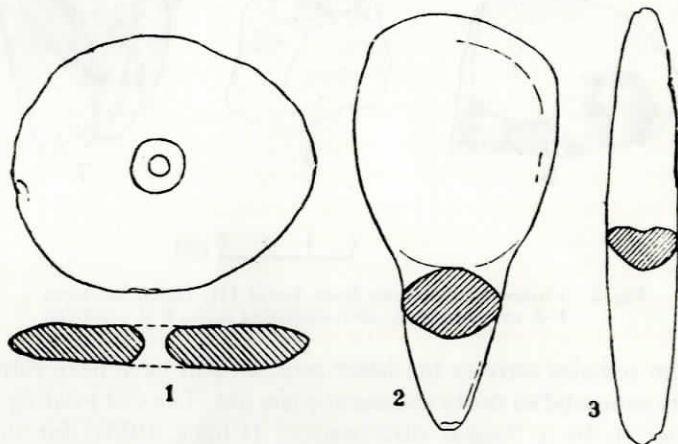


Fig. 4 Polished stone tools from Level III, Hsien-jen-tung. 1, pierced tool [1/4]; 2, 3, pointed tools [1/2].

Yangshao and Lungshanoid sequences have been considerably illuminated by the new dates. The Early Yangshao site at Pan-po in Shensi was already placed at 3600-4100 B.C. by a series of four previous dates. Another early level of Yangshao culture is dated to 3730 B.C. (ZK-134) at Hou-kang in Honan, supporting a previous date of 3535 B.C. from the same level there. The Hou-kang stratigraphy

was one of the first (and most publicized) to show Lungshan over Yangshao remains, and became a cornerstone in the theory that "Lungshan evolved from Yangshao." Indeed, the Lungshan cultural level at Hou-kang is as removed from Yangshao in time (1960 B.C., ZK-133) as it is in stratigraphy. Later phases of the Yangshao are dated to 3075 B.C. (ZK-185) in Honan, and 2240 B.C. (ZK-169) in Shensi.

The really surprising dates, however, are those from the early Lungshanoid Ching-lien-kang culture in the Yangtze Delta. Ta-tun-tzu (ZK-90) is one of the most important sites of this phase, principally because of the stratigraphy and cultural sequence it reveals. The site is in Kiangsu province, north of Nanking; archaeological remains were found on an earth terrace generally 4.3 m above ground plain and covering some 50,000 sq. m. The deposit averaged 4 to 5 m in thickness, with three cultural strata: (1) recent and historical; (2) Liu-lin culture; (3) Ching-lien-kang culture. In the lower level, several burials were found (oriented to the east) accompanied by grave goods of rectangular polished adzes, pierced round axes and flat knives, and painted pottery with flower petal, interlocking spiral or multipointed star motifs—traits typical of Ching-lien-kang. The date of 3835 B.C. (ZK-90) confirms a previous determination of 3395 B.C. on another site of this culture near Shanghai. The dates put Ching-lien-kang at a decisively earlier period than other Lungshanoid or classical Lungshan phases at Liu-lin, Liang-chu (1990 B.C., ZK-242; 2750 B.C., previous), Hou-kang II (1960 B.C., ZK-133), Miao-ti-kou II (2310 B.C., previous), the Hopei-Honan Lungshan (2100 B.C., ZK-200; 2000 B.C., previous) and Chiu-chia-ling (2245 B.C., ZK-125; 2195 B.C., ZK-124; 2270 B.C., previous).

Of course, the proto-Lungshan(oid) to Lungshan sequence was evidenced in the Ta-tun-tzu stratigraphy, although at the time almost no one (except the excavators) recognized its true significance. Rather, the presence of slipped and painted pottery remotely reminiscent of Yangshao styles, together with vessel shapes of the later Lungshan, was generally taken as an indication that Ching-lien-kang was one of the "mixed" borderline cultures in the evolution from Yangshao to Lungshan. But the excavators, in an extraordinary judgment based on pottery typology (and certainly "going against the tide" in 1964) put the relative age of Ching-lien-kang as "probably contemporaneous with Yangshao culture in the Central Plains." Equipped now with absolute dates to support such a contention, we would be back, full circle, to the old "Two Culture Theory"—were it not for the probability that Ching-lien-kang was one of several flourishing local cultures of the fourth (and fifth?) millennium B.C., some grouped under the loosely defined "Yangshao," others either unknown or of unsuspected antiquity.

The classical Lungshan continued into the early second millennium B.C., during which time it was overlapping in certain areas with the earliest Shang civilization (1620 B.C., ZK-212), in culture sequences generally well established. In regions to the south, the Geometric Horizon was emerging in this general time frame. The origins of geometric stamped pottery have, however, been pushed back somewhat by a previous date of 2335 B.C. on a site in Kiangsi province, which had a small quantity of crudely stamped, geometric pottery directly associated (in a fire pit) with the sample. Shih-min An (1972), in discussing this date, observed that "this kind of simple decoration is proven to have appeared earlier [than previously estimated] and served as the foundation for the widespread geometric pottery



culture of Southeast China." For Kwangtung province, the 2085 B.C. date (ZK-103) from the Hou-shan-kang riverine shellmound is a most interesting one, but its cultural association is not given. There are two distinct Neolithic strata in the midden deposit: the upper is characterized by "soft geometric" pottery and polished tools; the lower has plain, incised, and painted pottery, with fewer polished and more chipped tools.

The earliest phase of the Geometric Horizon probably ended around 1500 B.C. with the appearance of hard pottery and bronze. Again from a site in the Nanking region, the two dates from Peh-yin-yang-ying (ZK-28 and ZK-142) are most important for the chronology of the Geometric Horizon. Although the samples were collected during later, unpublished excavations at the site, the reported stratigraphy sheds some light on the probable context of the dates. The site has four strata: the lower with painted pottery and other material of Ching-lien-kang type, the middle two belonging to Hu-shu (a local Geometric) culture, and the upper of historical age with a cemetery dating to Eastern Chou (ca. 600-300 B.C.). In the early Hu-shu stratum (1540 B.C., ZK-142) small pellets of bronze were discovered, along with evidence of oracle-taking on the medium of turtle shells, sacrificial practices (burials of headless corpses or heads only), and other cultural phenomena also appearing in Shang society. By the later Hu-shu (1195 B.C., ZK-28) hard pottery and bronze were in full use at the site. Similarly, high-fired stamped wares are in association with the 1620 B.C. date (ZK-212) at Erh-li-tou, and probably with those of 1010 B.C. (ZK-204) near Shanghai and 1140 B.C. (ZK-98) at Tan-shih-shan. The third (and lowest) layer at the latter site also included painted pottery, "egg-shell" black ware, and polished stone rings and crescents. Finally, a further date of 1100 B.C. is known from a site with hard stamped pottery in Hoifung, Kwangtung, coded TAS by Maglioni (1975)—probably the first, and until 1972 the only, C-14 date from mainland China.

As of this writing there are more than 70 dates on archaeological sites in China. The major task of assimilating this data has just begun. One hopes that in due course more precise information will be published on the vitally important stratigraphic position and cultural associations of each sample, as well as interpretive studies and new syntheses. In the end, of course, many of the perennial questions cannot be answered by dating. Issues such as the relationships of Jomon and Hoabinhian; the stimuli and interaction of Yangshao and Lungshanoid; and the mutual influence or parallel development of Shang civilization and early Geometric cultures will probably find only temporary resolution in the new interpretive frameworks that are undoubtedly soon to come.\*

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All figures and captions are from *K'ao-ku-hsueh-pao*, 1963, volume 1.

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