Results of the First Archaeological Excavation and Environmental Survey at Fengtai, Qinghai Province, PR China, in 2001

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Objectives

The Department of Eurasian Archaeology of the German Archaeological Institute deals with human occupation and land use history in the steppe belt of Eurasia (e.g. Iran, Black Sea Coasts, Kazakhstan and Tuva). Qinghai Province, NW China, situated at the south-eastern margin of the Great Eurasian Steppe, has been chosen as one of the key areas for joint studies in order to evaluate the role of anthropogenic and climatic factors in environmental changes[1].

Qinghai Province is located at the northeastern edge of the Qinghai-Tibetan Plateau between ca 32° and 39° N and ca 90° and 103° E. This is a region with complex topography and hydrology. Mountain ridges and high plateaus elevating from about 2,500 to 4,500 m above sea level dominate the region. The present day climate is transitional from sub-humid to semi-arid with mean annual precipitation fluctuating between 250 and 600 mm per year and a strong water deficit. The main part of precipitation comes during May-September and is associated with the Pacific Monsoon. Up to 40% of the annual precipitation has been known to fall in a single storm[2]. This together with a spread of loess sediment and intensive land use has led to strong erosion activity in the region.

According to up-to-date knowledge the neolithic habitation of Qinghai started at about 4000 BC in the eastern part of the Province along the Yellow River and its tributaries. The features of the ancient cultures are very distinct and different from those observed in Central and Eastern China. However, at certain periods the cultural similarities to the adjacent territories, the modern Provinces Gansu and Sichuan, the Autonomous Regions Xinjiang and Tibet and even Southern Siberia, Kazakhstan and Iran are striking. The driving forces behind the rise and fall of these cultures, and human mobility and mi-

[1] The excavation campaign in June 2001 was organised by the Archaeological Institute of Qinghai Province (team members: Xu Xinguo, Xiao Yongming, Cai Linhai, Liu Xiaohe and Zhang Changshou) and the Archaeological Institute of the CASS (Wang Wei, Niu Shishan and Song Jiangning) with participation of the Department of Eurasian Archaeology DAI (M. Wagner, B. Griess, K.-U. Heussner). Zhao Zhijun (Archaeological Institute of the CASS) collected plant macrofossil remains, D. Jaekel (Berlin) investigated geomorphology of the area and Jin Guiyun (Jinan/Berlin) collected samples for pollen analysis from cultural layers and natural sequences. The field campaign continued in March 2002, when M. Ullrich and K.-U. Heussner (Berlin) made a cartographic plan of the site (Scale 1:500). We thank the cultural administrations of Qinghai Province and Huzhu County for their generous support of the work.

[2] Derbyshire et al. 1991.

gration phenomena in the region are still poorly understood for lack of sufficient archaeological information.

The term "Kayue Culture" was coined in 1958 as an idiom for the Bronze Age in the Qinghai region in order to distinguish it from the Bronze Age in the neighbouring Gansu Province, where it was named "Siwa Culture"[3]. The eponymous site Kayue (Ch'ia Yao) was discovered by the Swedish geologist Johan Gunnar Andersson in 1923[4]. Since that time approximately 1,700 Bronze Age sites attributed to the Kayue Culture have been found in central and eastern Qinghai Province. Their dating to the latter half of the second and the first half of the first millennium BC[5] is mainly based on ceramic vessel typologies. The Kayue Culture is supposed to have coexisted with the largely contemporaneous Nuomuhong Culture to the west in the Qaidam Basin and with the Xindian Culture to the east downstream the Yellow River in modern Gansu Province. More specific points related to the Nuomuhong Culture still remain largely within the realm of speculation for only the Nuomuhong site itself was partly excavated in 1959[6]. The early settlement history of the Qaidam Basin before the dramatic desertification therefore stays one of the most challenging topics of future investigation which remains cannot be touched upon here. The Xindian Culture, in particular its ceramic production, is much better known[7]. Only very recently have the cultural features of the Kayue Culture together with the few available radiocarbon dates been discussed to some extent and put into the context of the entire Bronze Age development of Northwest China by Shui T.[8]. Despite the large number of discovered sites our knowledge about the culture is limited. Some basic information was obtained by the partial excavation of seven graveyards[9]. So far no Kayue settlement has been investigated systematically.

The historical and palaeoenvironmental records from China suggest both long- and short-term climate changes which are regarded as the main factor having influenced settlement dynamics since the Mid-Holocene. Basically the economy of the region is very much dependent on climate. However, human impact on landscape dynamics at different scale and degree can be traced through the whole history of human habitation of this area. Today the politically initiated and government-promoted intense economic development of Qinghai Province dominates all aspects of land use.

The results of archaeological and palaeoenvironmental studies conducted in the Fengtai Valley, which is characteristic of a distinct type of landscape in Qinghai Province, i. e. mountain steppe, are important for an understanding of the history of settlement and landscape dynamics in the area. They also provide the opportunity to build up retrospective models of landscape developments back to the Neolithic. At the same time, this knowledge, together with the planned investigation and documentation of recent processes (e. g. mass relocation, population dynamics) in the area, provides a basis for the modeling of future scenarios of landscape development and land use strategies. In this

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[3] Xu 1988, 35.
[4] Andersson 1925, 18; 22f.
[5] Mei J. J. quotes current opinions about Kayue dates which all dwell on the same sparse material; Mei 2000, 64 Ann. 25.
[6] Zhongguo wenwu dituji, Qinghai fence 1996, 96.
[7] Recent summaries in Pak 1996, 287–299 and Shui 2001, 116–146.
[8] Shui 2001.
[9] Wagner 2001.

Fig. 1. Position of Fengtai site.

paper we present the main results of the first joint research project conducted at Fengtai site, Qinghai Province, in 2001.

Site setting

The Bronze Age settlement near Fengtai village, 46 km north of the provincial capital Xining *(Fig. 1)* was discovered by members of the Archaeological Institute of Qinghai Province in the course of systematic archaeological surveys in the early 1980s. It was declared a cultural heritage zone in 1986. On the basis of red grit tempered potsherds collected from the surface, the site was attributed to the Kayue Culture. According to the Atlas of Chinese Cultural Relics (Qinghai volume) the estimated size of the site is about 4,200 m^2 and the thickness of the cultural layer is 0.5 m[10].

In July 2000 the Archaeological Institute of Qinghai Province guided an archaeological field excursion for colleagues from the Archaeological Institute of the Chinese Academy of Social Sciences (CASS, Peking) and the Department of Eurasian Archaeology of the German Archaeological Institute (DAI, Berlin). The sites visited were either already excavated and known from publications, sites currently under excavation, or sites registered and protected but not yet surveyed. In Fengtai, which belongs to the last group, the joint research team collected a large number of various artefacts attributed to the Kayue Culture. Moreover, due to road construction along the south-eastern margin of the

[10] Zhongguo wenwu dituji, Qinghai fence 1996, 89.

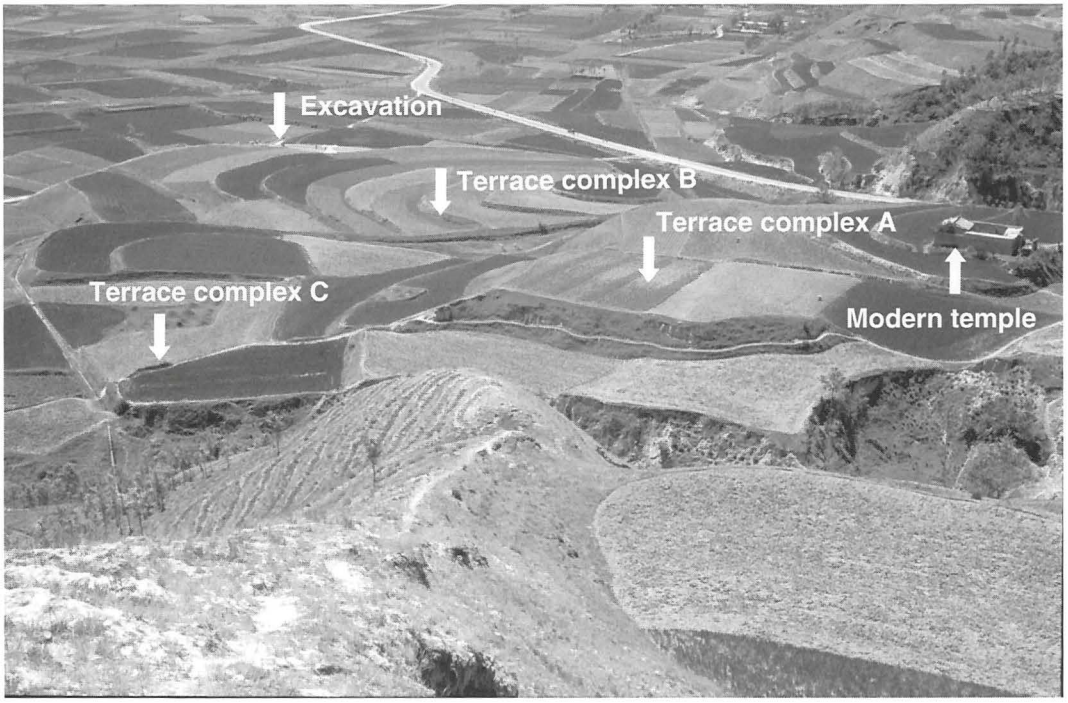

Fig. 2. Fengtai, view on the terrace complexes.

site sections were opened, exposing to view layered cultural deposits of about three meters in height. The stratigraphic observations and richness of stray finds lead to the assumption that the Fengtai site is a well preserved long-term dwelling place providing sufficient archaeological substance to merit close examination.

Our first and most essential task was to establish a chronological framework. By pottery analogues alone we could not narrow down the age of the settlement to a centennial scale. In order to understand the entire time range of this dwelling site, it was first of all necessary to get a sequence of absolute datings from a section representing all cultural layers from the youngest to the oldest. The excavation campaign was therefore primarily devoted to stratigraphic studies. Secondly, we sought to gain insight into house construction techniques and materials. Detailed information about the Kayue vernacular architecture would not only be a substantial addition to Bronze Age studies in Northwest China but would equally provide the necessary parameter for the preparation of subsequent extensive excavations.

Results of the excavation

Profile stratigraphy

Spread over an area of about 54,000 m^2 potsherds were found on the surface, in varying density covering the whole alluvial fan which opens south-eastwards to the main valley of the Beichuan River *(Fig. 2)*. The alluvial fan consists of three terrace complexes (A, B and C). According to oral information obtained from peasants the modern terracing of the

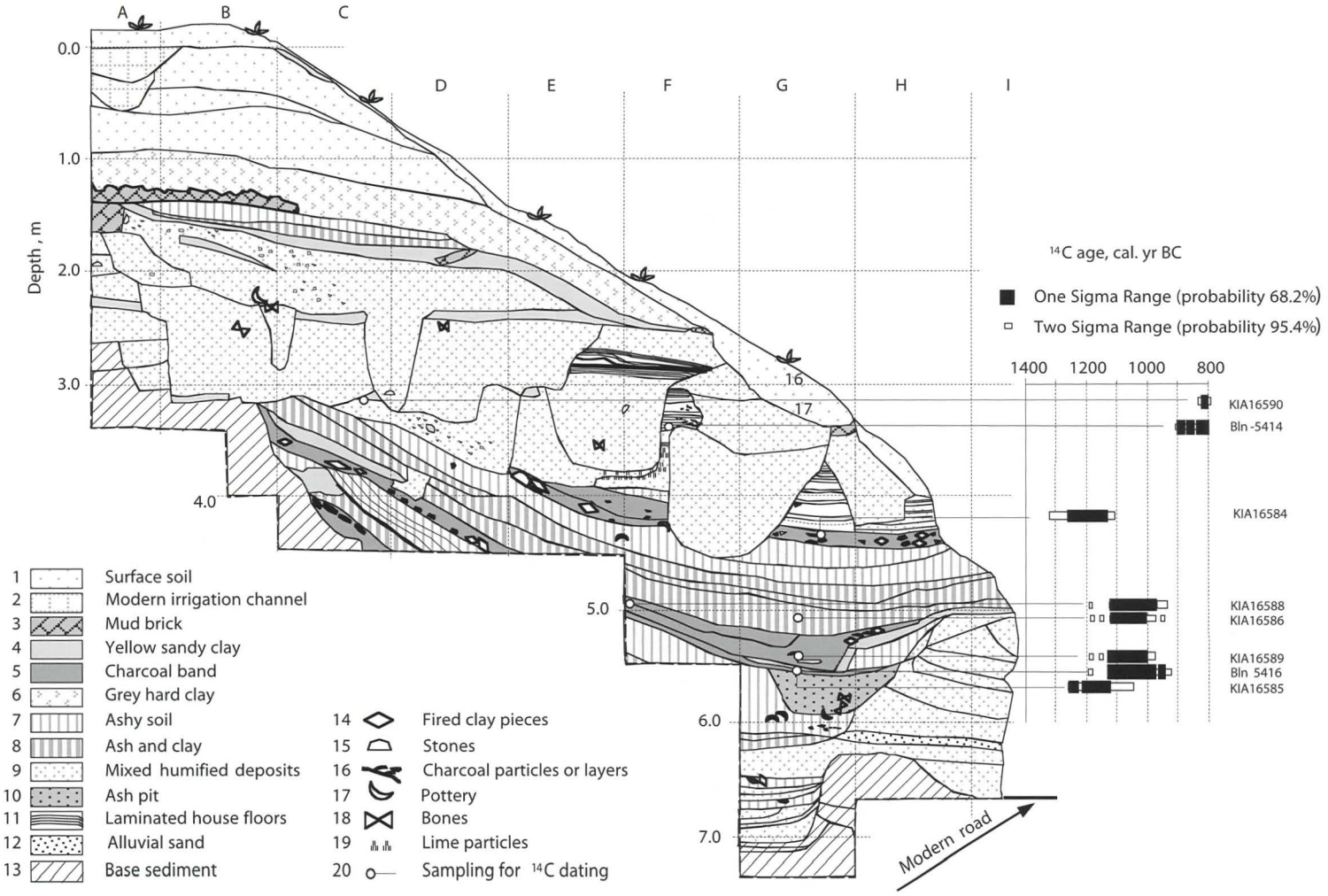

Fig. 3. Fengtai, trench TG 1, East Profile.

whole alluvial fan was done very recently, during the 1980s and the early 1990s. Only modest changes of the previous surface occurred in the upper part of Complex A and in the lowest southern part of Complex B. Therefore we decided to open the main trench TG1 at the southern rim of Complex B. Complex A lies at the highest elevation. It is named "Temple Hill" because of the active Lamaist temple located there *(Fig. 2)*. A gentle slope leads down from Complex A to Complex C; a natural depression separates terrace Complex A from terrace Complex B and the latter one from Complex C. Several years ago this topographic depression was further deepened by the villagers for irrigation purposes. Due to this soil relocation two sections (south-eastern side of the Temple Hill and north-western side of Complex B) were opened, allowing us to observe cultural layers near the bottom of the channel at a depth of ca. 4.5 m below the sediment surface. For a better understanding of the succession of the cultural layers the profile was cleaned and extended as trench TG 2.

Trench TG 1: East and West Profiles

The main trench TG1 has a width of 2 m and is approximately 8 m long. It has a general north to south orientation. In this chapter we discuss two profiles, representing stratigraphical features of the eastern *(Fig. 3)* and western *(Fig. 4)* banks of trench TG1, respectively. Despite the fact that the distance between the two profiles is only 2 m, the sediment stratigraphy presented in *Figs. 3* and *4* is not similar in every detail. The differences are caused by the complex slope geomorphology, sediment dynamics and the structure of the ancient housing.

In the upper 1.3 meters of the East Profile *(Fig. 3, column A)* the traces of two shallow irrigation grooves can be seen. These grooves are filled with sediments which do not contain any material suitable for dating. However, based on our experience and the information from the villagers they can be explained by the agricultural activities of the last century.

The uppermost of the ancient cultural layers was found at a depth of about 1 m *(Fig. 3, columns A.B)*. It is represented by grey hard clay overlying a collapsed mud brick wall. In this "mud brick layer" very destroyed vessel fragments and one almost complete small jar with a double handle were found. Charcoal particles picked up from the outer wall of the jar were radiocarbon dated to 930–820 cal BC[11] (KIA 16591; *Fig. 4, column A*). We assume that this date is the preliminary age of the mud brick wall *(Fig. 5)*. The foundation of this collapsed wall *(Fig. 3, column A)* is 0.3–0.5 m thick and grounds on mixed humified deposits at about 1.6 m below surface. In order to find out the function of the wall the excavation in the upper part of the slope was extended to 5 m × 5 m. This discontinuous character of the wall does not support the idea that it might have been a fortification enclosing the entire settlement. Most likely it was the wall of a single building or yard.

The amount of ash particles in two ashy layers underlying the wall *(Fig. 3, column B–D)* decreases downwards. These ashy soil and clay layers together with a yellow sandy clay band probably represent the open surface outside the wall synchronous to it. Below

[11] All radiocarbon ages in the text indicated as 'cal BC' are expressed in calibrated years BC. The age range covers two sigma probability (95.4%). For additional information see *Fig. 8*.

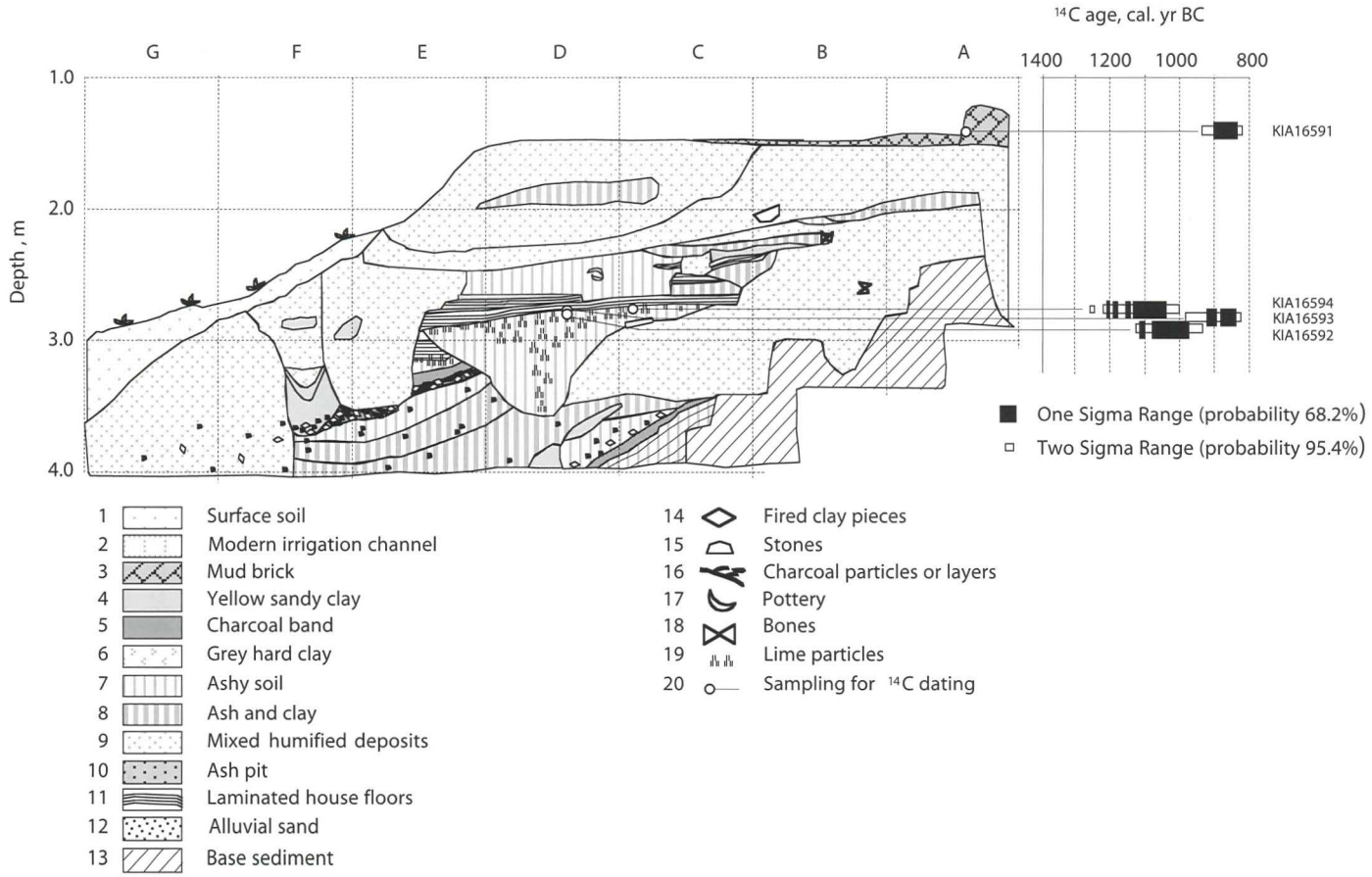

Fig. 4. Fengtai, trench TG 1, West Profile.

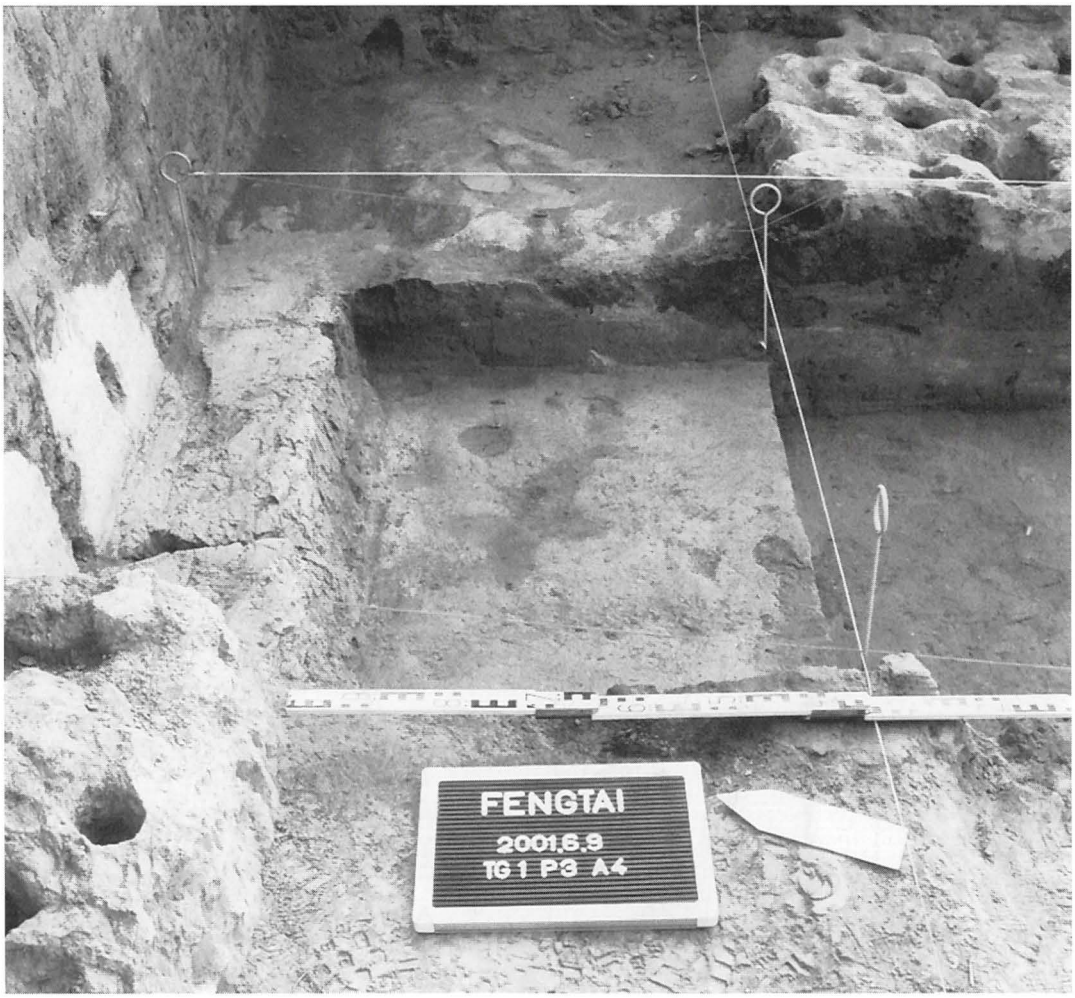

Fig. 5. Fengtai, trench TG 1, mud brick wall fragments ca 1.5 m below surface.

this former surface layer we observed several layers of mixed humified deposits disturbed by pits. The sediments contain large amounts of burned clay particles, potsherds, animal bones and stones. Fragments of horizontally oriented yellow sandy clay layers can be found at a depth of about 2.2–2.3 m and about 3.1 m *(Fig. 3)*. Similar features can be traced in the West Profile *(Fig. 4)*. We assume that these fragmentary layers represent former dwelling surfaces of different settlement periods. However, their precise dating is a matter of further investigation.

Laminated house floors can be detected in the East Profile *(Fig. 3, columns E.F)* between 2.7 and 2.9 m and in the West Profile *(Fig. 4, columns C-E)* at the same depth. High concentration of lime particles within and underneath the house floor layer is evidence of the custom of whitewashing floors. At this level we removed several surfaces of the extremely fine house floors at a depth of 2.63 to 2.83 m recovering inserted circular hearths and post holes *(Fig. 6)*. The charcoal particles taken from the upper and lower hearths *(Fig. 4, column D)* were radiocarbon dated to 980–820 cal BC (KIA 16593) and to 1130–930 cal BC (KIA 16592), respectively. Charcoal was also collected at 2.70–2.83 m

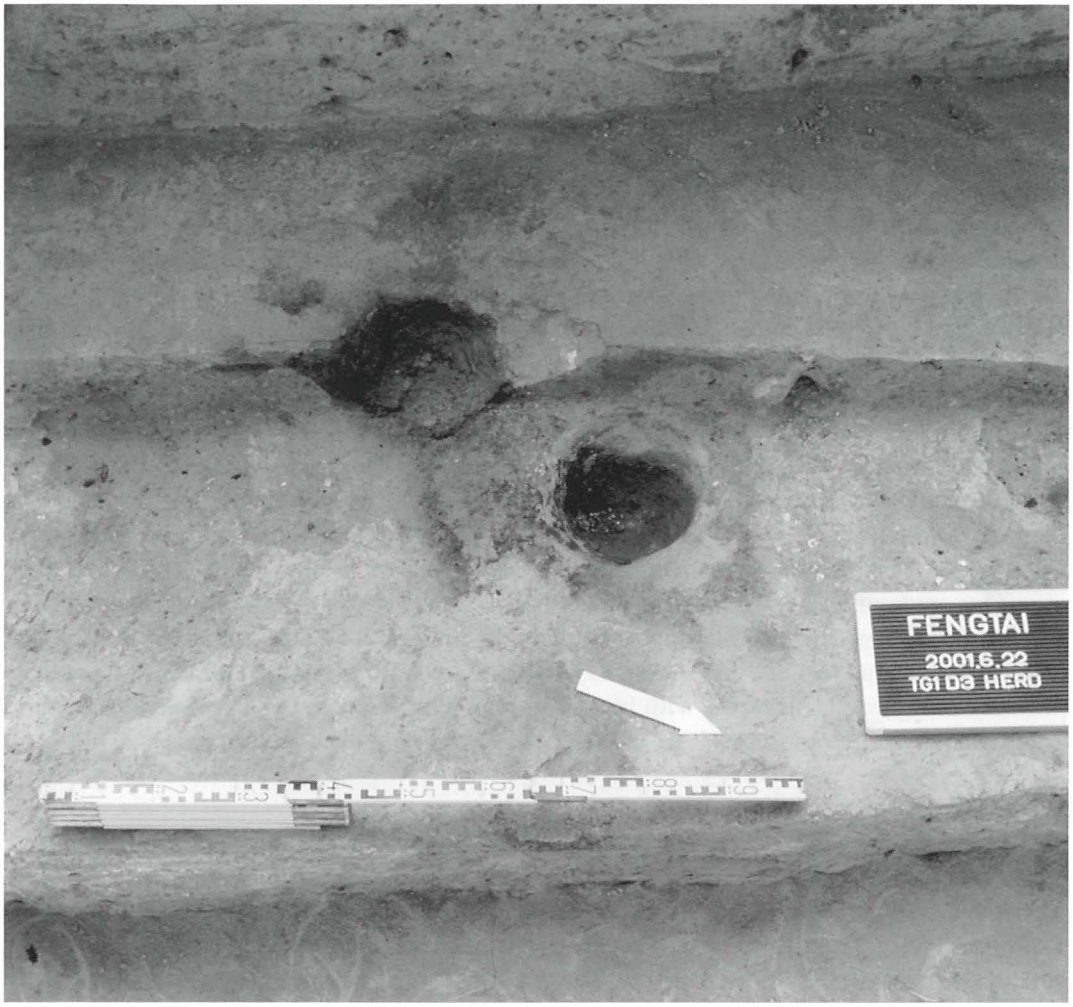

Fig. 6. Fengtai, trench TG 1, house floor in ca 2.8 m depth with hearth.

depth *(Fig. 4, column C)* and dated to 1260–1000 cal BC (KIA 16594). In the East Profile material for dating was found in the fragmentary preserved house floor layers situated at 3.17 m *(Fig. 3, column C)* and 3.34–3.44 m depth *(Fig. 3, column F)*. The charcoal from these samples was dated to 833–793 cal BC (KIA 16590) and 910–800 cal BC (Bln 5414).

The next clearly definable layer is a massive charcoal layer with abundant fragments of fired clay, visible in the East Profile from Column E to H in a depth of 3.8 to 4.3 m and appearing in the West Profile as a thin band in Columns E and F between 3.4 and 3.7 m. One piece of carbonised coniferous wood was dated to 1320–1110 cal BC (KIA 16584). All following buried layers down to the natural loess slope down steeply. They contain a remarkable abundance of ashes and burned wood fragments, preserved in pieces with diameters up to 10 cm and more than 40 year rings and lumps of mud-plaster with imprints of beams and twigs. The pottery is sooty or badly charred but evidently less fragmented than in the upper cultural layers. The lower and deepest cultural deposits do not yield any traces of rammed earth house floors, lime-plaster or mud brick rubble. Two

more charcoal layers can be regarded as marker horizons in the East Profile: from column B to H between 3.2 and 5.6 m and in column C between 4.0 and 4.4 m depth. Five selected charcoal samples have provided the following absolute ages: 1190–930 cal BC (KIA 16588), 1190–940 cal BC (KIA 16586), 1190–970 cal BC (KIA 16589), 1260–1040 cal BC (KIA 16585) and 1190–920 cal BC (Bln 5416). The last two dates are obtained from samples of mixed pieces of charcoal collected from the same layer in close proximity. They were processed in different ways: with conventional measurement in the laboratory of the German Archaeological Institute in Berlin and with AMS technology in Kiel. The Berlin lab date corresponds perfectly to the other datings of this group obtained by AMS in Kiel (KIA 16588, 16586, 16589). At the two sigma probability range of 95.4% these dates have an overlap of 150 years. Nevertheless, the date KIA 16585 is close to KIA 16584 which overlaps with the cluster of four corresponding datings for 80 years. We assume that these two older dates were processed from old wood particles within the whole assemblage of burned wood, and therefore do not represent the age of this particular cultural layer (old-wood effect). Direct comparison of the conventional and AMS radiocarbon dating methods shows the risk of using only AMS dates acquired from bulk material due to a possible age diversity of the samples.

The undisturbed loess was reached in the upper parts of the terraced trench in column A to C and in the lowermost parts in column G and H. The bottom of the deepest cultural layer was reached in column G at 7.12 m beneath the surface. Due to this unexpectedly complex stratigraphy with lots of architectural features the scheduled excavation time was not sufficient to reach natural soil for the full length of the trench.

Trench TG 2: South Profile

Already during our first survey in 2000 we observed cultural layers in the recently opened sections in the modern irrigation channel between terrace complexes A and B. Ashy soil, potsherds and animal bones were visible in a thick layer 0.5 m above the channel floor approximately 4.6 m below the eastern terrace surface on top of which a high density of ceramic rubble was recorded. The brick-red and thick-walled pottery picked out from the section matched the ware which had been collected on the surface. Therefore, a more or less continuous sequence of cultural deposits – comparable to trench TG 1 – was to be expected. Surprisingly, after the section walls had been cleared of a grassy overgrowth, the profile was found to reveal no traces of cultural layers or even stray finds but instead a layer of yellow sandy clay *(Fig. 7, layer 2)* followed by clean loess with only some bands of light grey palaeo-soil in the lower parts *(Fig. 7, layer 1)*. Instead of upward the cultural deposits continued downward. Layer 3 *(Fig. 7)* with a certain amount of grey clay, fired clay and charcoal particles overlaid a thick horizon with big lumps of fired clay and burned wood. Among this conglomerate of badly burned material were big stones and animal bones. Of particular interest was the presence of quite astonishingly well preserved ceramic vessels *(Fig. 11)*. Taking all aspects into account the assemblage of TG 2 indicates a dwelling place which was destroyed by fire. Since a relocation scenario can be excluded we have to consider the question of why the middle zone of the settlement is covered by four meters of loess whereas the sediment cover at the western and eastern rim ranges only between 0.3 and 1.5 m and consists of heavily reworked soil. To put it another way, to understand the entire settlement plan the reconstruction of the contemporary surface as well as the subsequent processes of site formation is necessary. The dig in

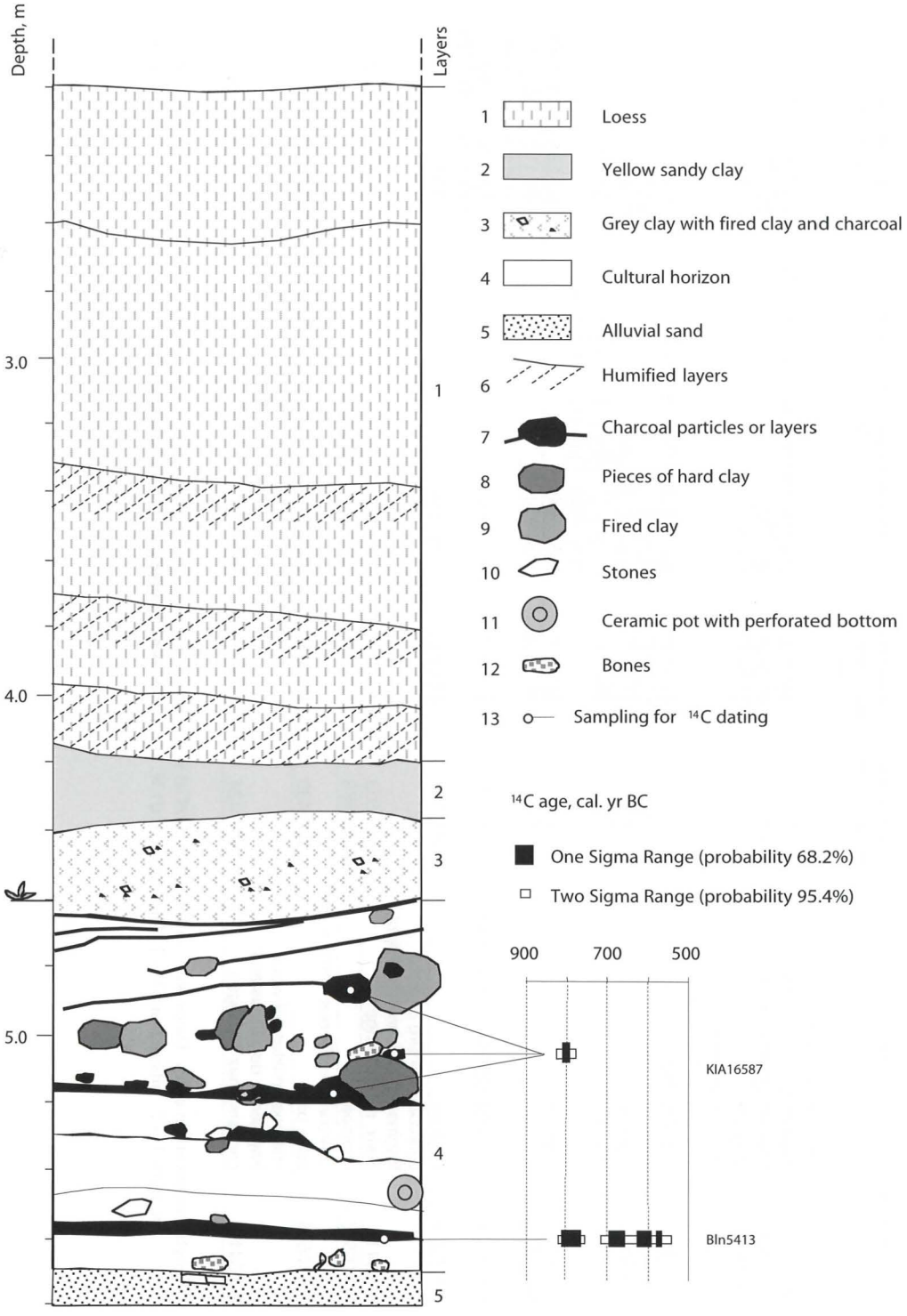

Fig. 7. Fengtai, trench TG 2, South Profile.

Laboratory No.	Material	Depth in the sequence, cm	Radiocarbon age, uncal. yr BP	Calibrated age, yr BC (probability 68.2%)	Calibrated age, yr BC (probability 95.4%)	Period
Bln 5413*	charcoal (conifers, *Pinus* fragments, 5 to 11 rings)	560	2564±36	810-760, 690-660, 620-590, 580-560	820-750, 710-540	Late
KIA16587*	charcoal (deciduous tree twig)	480-540	2615±25	812-792	830-765	Late
KIA16590	charcoal	317	2645±25	824-800	833-793	Late
Bln 5414	charcoal (mixture of wood fragments: *Populus* (?) and conifers, max 25 rings)	334-344	2690±34	900-875, 860-850, 845-800	910-800	Late
KIA16591	charcoal	143	2730±25	900-830	930-820	Late
KIA16593	charcoal	283	2755±30	920-890, 880-835	980-820	Late
KIA16592	charcoal	292	2865±25	1110-1100, 1080-970, 960-940	1130-930	Late
KIA16594	charcoal	270-283	2915±30	1210-1200, 1190-1170, 1160-1140, 1130-1040	1260-1240, 1220-1000	Late/AT0
KIA16588	charcoal	496-501	2870±25	1130-970	1190-1180, 1130-930	Early
KIA16586	charcoal (deciduous tree twig)	506-508	2880±25	1130-1000	1190-1170, 1160-1140, 1130-970, 960-940	Early
KIA16589	charcoal	543-557	2885±25	1130-1000	1190-1170, 1160-1140, 1130-970	Early
Bln 5416	charcoal (mixture of wood fragments: conifers and *Populus-Salix*, max 11 rings)	546-568	2868±32	1130-970, 960-940	1190-1180, 1130-920	Early
KIA16585	charcoal	546-568	2950±25	1260-1230, 1220-1120	1260-1040	Early
KIA16584	charcoal (coniferous tree 9 rings, outer part)	410-430	2975±25	1260-1120	1320-1110	Early
Bln 5415	charcoal (mixture of wood fragments: deciduous and conifers, max 10 rings)	404-424	2729±36	900-830	970-950, 930-800	Early/ATY

Fig. 8. Fengtai, radiocarbon dates. Dates were calibrated by OxCal v 3.5 (Bronk Ramsey, 2000). Atmospheric data from Stuiver et al. (1998). Dates indicated with a star are from TG 2, others from TG 1. The values of d13C are in the normal range for organic samples. ATO – age too old; ATY – age too young.

TG 2 could not be continued down to natural sediments because of the existing irrigation channel. Two charcoal samples from TG 2 were dated independently in the laboratories of Kiel and Berlin. Both samples have a clearly distinguishable small time variation *(Fig. 8)*. For AMS we chose a deciduous tree twig and for the conventional method a carbonised *Pinus* fragment of five to eleven rings. The AMS date provides an age of 830–765 cal BC (KIA 16587) matching the range of datings for the upper layers in trench TG 1. The conventional date of 820–540 cal BC (Bln 5413) also falls into this time bracket. The long range is caused by the plateau of the calibration curve. Therefore we conclude that the assemblage of trench TG 2 corresponds to the younger data cluster of trench TG 1.

The litho- and chronostratigraphy of both trenches being compared allow for the following summary: The lower cultural layers in trench TG 1 between 3 and 7 m are characterised by a steep slope, a tremendous amount of ash, burned wood and pieces of mud-plaster. The absolute age determination of samples from this group of layers, ranges between 1190 to 920 cal BC, i.e. the Early Period, excluding the dates which are regarded as too old due to the old-wood effect *(Fig. 8)*. This sedimentary and chronological cluster has not been found in trench TG 2, perhaps for lack of sufficient depth.

In trench TG 1 at a height of over 3 m the profiles show horizontal house floors with multi-layered mud- and lime-plasters *(Fig. 3, columns E.F; 4, columns C-E;* about 2.7 to 2.9 m deep). By extending the trench at this level beyond the limits of the house floor to the surrounding footstep-hardened dwelling surface a grove-like wall-base could be detected, but no post holes or any other traces of wall construction material were found. By contrast, very distinct remnants of a wall made of adobe were laid open in the first prehistoric cultural layer at about 1.5 m depth. The one date directly related to the wall fits the cluster of dates obtained from the horizontal house floors. Combined with the two dates from TG 2, the dates for the upper set of layers range from 980 to 750 cal BC, giving an age orientation for the Late Period *(Fig. 8)*. It may be, however, that there is a more discrete chronological gap between the lime-floors and the adobe wall which does not show clearly in the present data set but can be proved in future campaigns.

The periodisation introduced here is not valid for the entire Fengtai site without further proof by large-scale excavation. We use it to sort out and describe the stratigraphic evidence extracted from the two trenches opened in 2001 and as an expression of the fortunate convergence of sedimentary and chronology records.

Ceramic finds

Dominating among the objects unearthed from all layers are different kinds of fragmented vessels of coarse tempered reddish-brown ware and fine red ware. The highest concentration of potsherds was found in the charcoal layers of trench TG 1, in particular in columns G and H at a depth of between 5.5 and 6.0 m. Therefore the bigger part of the recorded potsherds yield traces of burning, often to the degree of being completely carbonised. The entire spectrum of reconstructed vessel types in Fengtai is relatively poor. It is mainly limited to big, thick-walled, bulbous jars with double vertical handles and wide bowls with a wall thickness up to two centimetres. The colour ranges from dark brown to brick-red or light brown; light grey or polished dark black ware is extremely rare. A red slip around the mouth, on the outside surface and inside the neck, as well as on the handle was obviously highly in favour. Many pieces bear a rather carelessly applied paste-like blood-

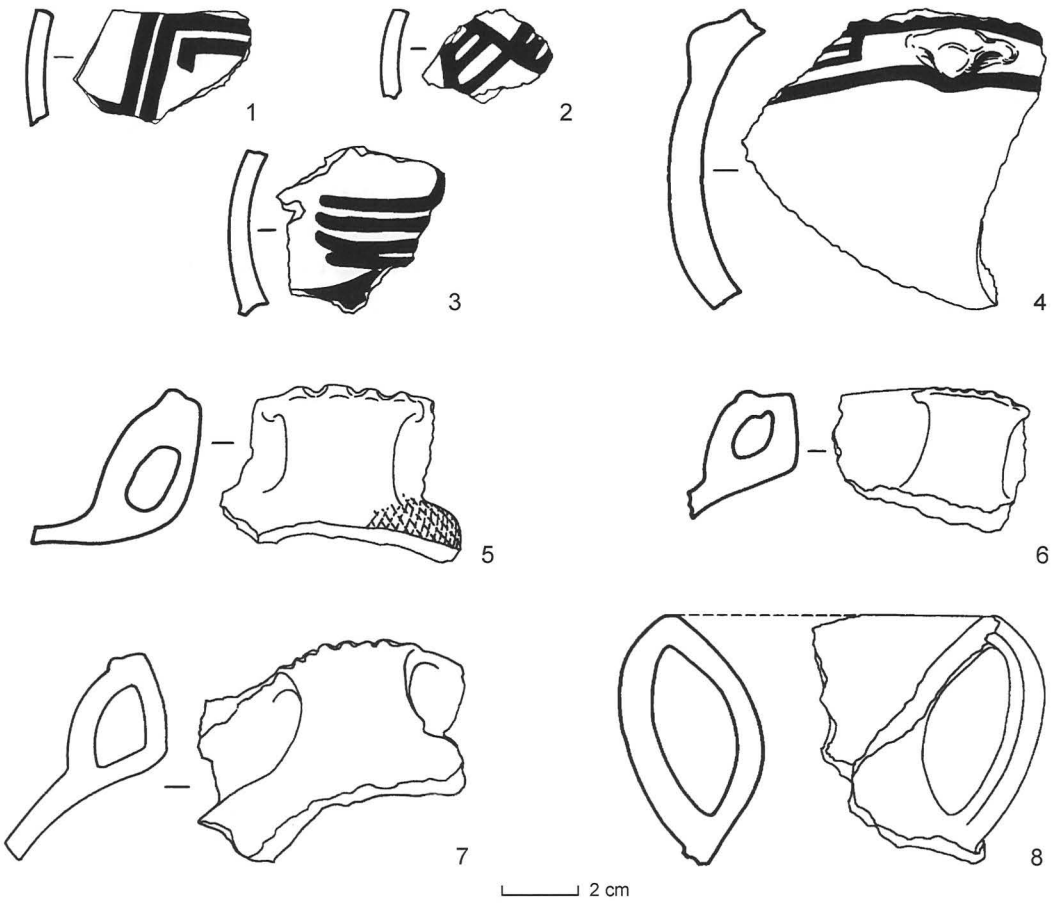

Fig. 9. Fengtai, pottery, Early Period (1190–920 cal BC), trench TG 1.

red slip. Types of plastic decoration that were observed include applications in the shape of buckles, flanges and ridges with fingerprints, furthermore impressions of cords, mats, irregular notches and cuts. This kind of rough ceramics was recorded in all layers from top to bottom without obvious typological variations related to chronology. Some pottery characteristics could nevertheless be distinguished for the early and late periods as marked by sediment stratigraphy and absolute chronology as discussed above.

At a depth of 5.5 to 5.7 m in column G in the lower position of the largest charcoal layer the complete orifice part of a jar came to light *(Fig. 9,8)*. Its long double handles arch down from a flaring mouth over a curved-in neck to gently looping shoulders. This very peculiar neck curvature combined with long loop-handles finds parallels in vessel types from Dahuazhongzhuang, Panjialiang, Banzhuwa II[12] and Huangzhai I[13]. In both assemblages this shape is regarded as significant for an early phase of the Kayue development which is believed to be closely linked with the preceding Qijia Culture. To some

[12] Wagner 2001, 48; 52; 41 Fig. 5,4.
[13] Shui 2001, 241.

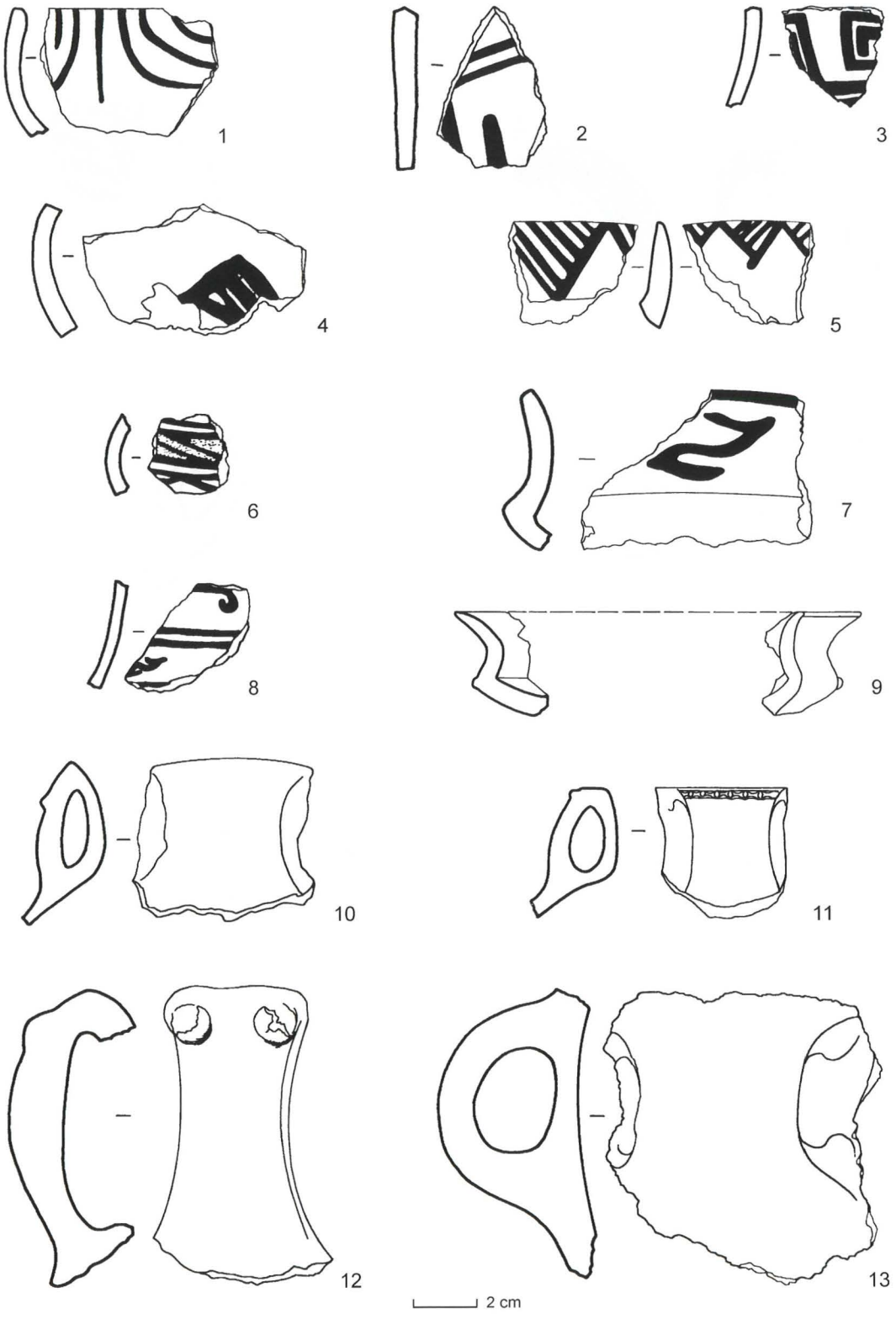

Fig. 10. Fengtai, pottery, Late Period (980–750 cal BC), trench TG 1.

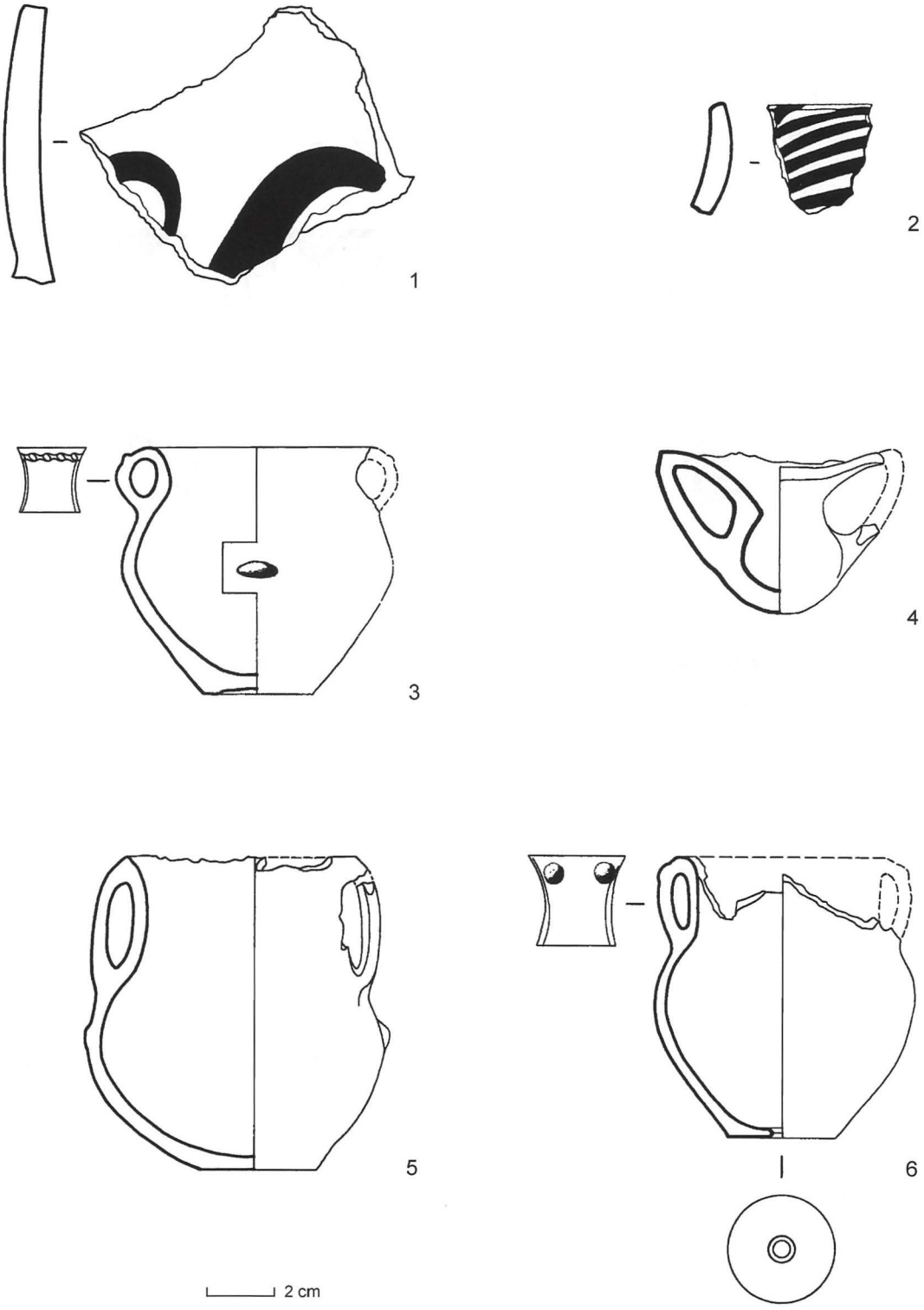

Fig. 11. Fengtai, pottery, Late Period (980–750 cal BC), trench TG 2.

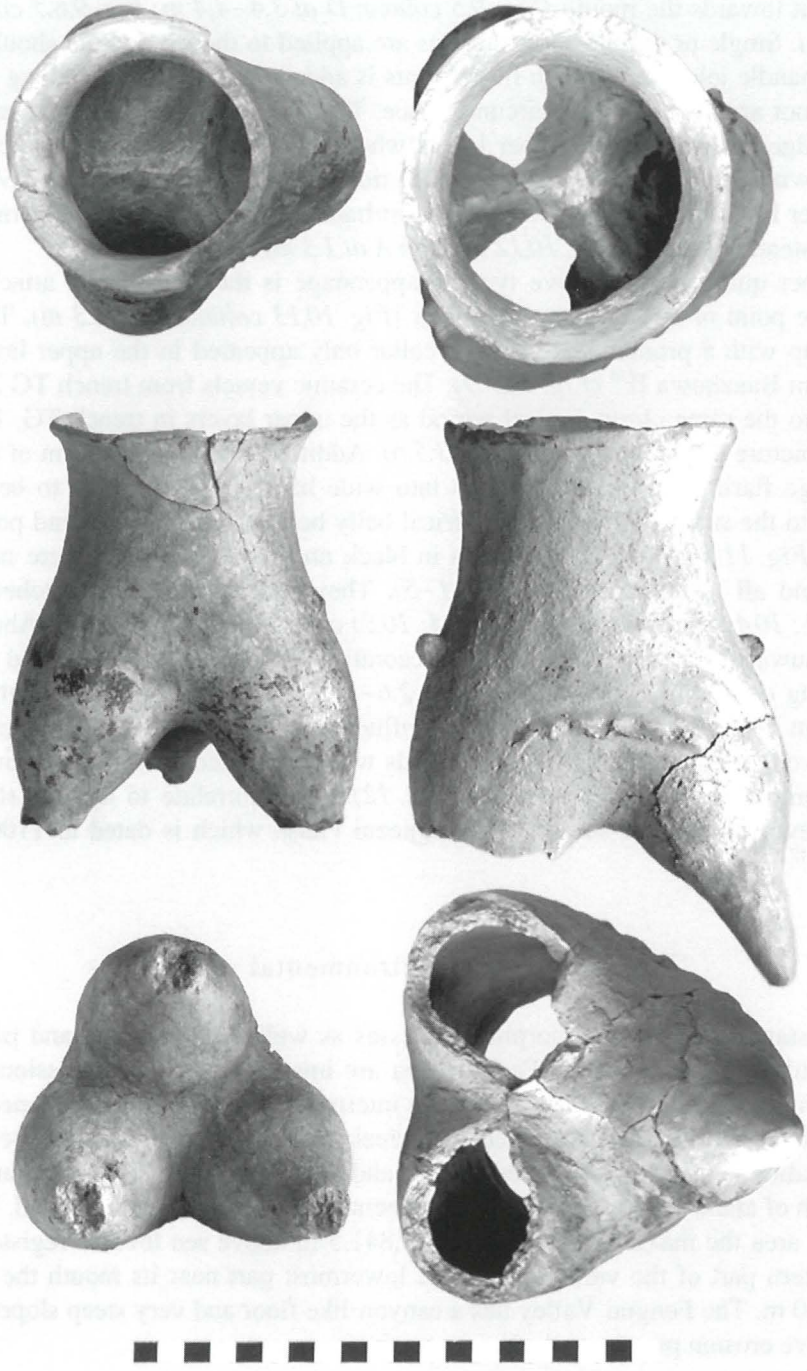

Fig. 12. Fengtai, pottery, survey trench beside the temple in 0.3 m depth.

degree the stratigraphic position of this jar in Fengtai supports this idea. The most frequently recorded orifice form, however, is the one with a short, straight neck, slightly bending out towards the mouth *(Fig. 9,5 column D at 3.4–4.4 m; Fig. 9,6.7 column G at 5.4–5.7 m)*. Single or double short handles are applied to the lip and the shoulder. Close to the lip-handle join a ridge with fingerprints is added which only runs along the handle width but not around the whole circumference. This form of rim-handle with applied fingerprint-ridge was rare in the upper layers where only few pieces expose a comparable shape but with barely visible remnants of the ridge *(Fig. 10,10 column A at 1.9 to 2.1 m)*. In the upper layers the more characteristic rim-handle shape is the straight form with two buckles instead of a ridge *(Fig. 10,12 column A at 1.3 m)*.

Another quite representative type of appendage is the ring handle attached to the belly at the point of its maximum diameter *(Fig. 10,13 column A at 1.3 m)*. The type of shallow cup with a pronounced concave collar only appeared in the upper layers and is known from Banzhuwa II[14] *(Fig. 10,7.9)*. The ceramic vessels from trench TG 2, believed to belong to the same chronological period as the upper layers in trench TG, 1 present a complete picture of the jar type *(Fig. 11,3.5.6)*. Additionally, a unique form of a little cup with a huge flaring mouth that merges into wide handles which seem to be oversized compared to the small volume in a spherical belly bears a dark-red slip and polish inside the neck *(Fig. 11,4)*. Painted ornaments in black on brick-red ground were met in both trenches and all layers *(Fig. 9,1–4; 10,1–5)*. They consist mainly of hatched triangles *(Fig. 9,2.4; 10,4.5)* and meander *(Fig. 9,1; 10,3)* correlated for instance to Ahatla finds[15] and Banzhuwa pottery[16]. A very specific decoration feature for the late period is black or red painting on a white coating *(Fig. 10,1.2.6–8; 11,1)*. In this, markers of the Xindian Culture can be recognised. The Xindian influence became even more evident when a group of well preserved baggy-legged tripods were excavated in a trial section close beside the temple on the highest terrace *(Fig. 12)*. They correlate to the last stage of the Xindian development, the so-called Zhangjiazui Phase which is dated to 1100–800 BC by Shui T.[17].

Results of the environmental survey

The understanding of the geomorphic processes as well as the present and past climate and vegetation dynamics in the Fengtai area are important for the discussion of the archaeological finds. The Fengtai Valley is an intermountain depression deepened by water erosion. At present it is being drained by a creek, flowing eastwards to the Beichuan River. The valley is oriented from west to east and has a length of about 3 km and a maximum width of about 1.4 km. Thus, the catchment area of 4 km^2 is rather small. Within the catchment area the maximum elevation of 2,841.5 m above sea level is registered in the south-western part of the valley and in the lowermost part near its mouth the altitude is about 2,530 m. The Fengtai Valley has a canyon-like floor and very steep slopes, suggesting intensive erosion processes during recent times.

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[14] Wagner 2001, 41 Fig. 5,3.10.
[15] Shui 2001, 231 Fig. 24, M36:1.M53:1.M51:1.
[16] Wagner 2001, 40 Fig. 4,9.
[17] Shui 2001, 122–123 Fig. 2; 131.

The loess sediments accumulated in the valley cover the underlying Tertiary red clay. The surface of the clay horizon, becoming lubricous after moisture penetration, is highly vulnerable to the loess movement and associated landslides. The earthquakes, which are frequent in the region, might be another factor causing the landslides[18].

The southern slope of the valley is under a strong influence of linear erosion. It is cut by seven large gullies. The distance between neighbouring gullies varies from 200 to 300 m. The steeper northern slope has been considerably changed by landslide activity and later erosion processes. Remnants of several big landslides can be observed in the middle as well as in the lower part of the valley. Two older slides and a younger one with still very steep edges are clearly visible from the excavation place. The danger of landslides could be the reason why the villagers have built their houses along the southern slope of the valley. The so-called cattle-terraces and sheep-tracks are very characteristic features of the slope micro-relief.

The excavation area occupies an alluvial fan in the lowermost part of the Fengtai Valley, where it opens to the Beichuan Valley. The configuration of the fan is very pronounced in the topographic maps as well as in Fig. 2. In the past the fan topography was complicated by landslides coming into the valley from the northern slope. In recent times its surface has been substantially changed by terracing *(Fig. 2)*.

The distal part of the fan has a very sharp rim, which declines to the main valley. This feature can be easily explained by the side erosion associated with floods in the main valley, and/or by the agricultural and other activities of the local people. Two depressions which separate the Temple Hill from the farm houses to the west and from terrace Complex B are most likely to have a fluvial origin.

Characteristics of the present-day climate can be obtained from the global climate data set[19]. An updated version of this database contains mean monthly values for precipitation, temperature and sunshine hours, averaged for the grids with 30' latitude and longitude resolution[20]. The topography from ETOPO5 indicates modal elevation. The modern climatic variables in the Fengtai region, in the elevation range of 2,870–2,540 m, vary from 320 to 370 mm (annual precipitation – P), from –12.8 to –9.5 °C (mean temperature of January – T_I), from 14.5 to 16.0 °C (mean temperature of July – T_{VII}), from 940 to 1,300 °C-day (annual sum of mean daily temperatures above 5 °C called sum of growing degree days – *GDD5*) and from 0.52 to 0.6 (ratio of actual to potential evapotranspiration called moisture index – α). The last two characteristics are important bioclimatic variables, used in the vegetation modelling to define the climatic boundaries between the principal vegetation types or biomes[21]. For example, $\alpha = 0.65$ marks the boundary between cold deciduous (e.g. birch, poplar, larch), cool temperate (e.g. elm) or eurythermic coniferous (e.g. pine, juniper) arboreal taxa which require $\alpha > 0.65$ and cool steppe vegetation with $\alpha < 0.65$. Similarly, $T_{VII} = 23$ °C separates a cool steppe from a warm steppe biome[22]. The definition of the principal biomes in the BIOME1 model suggests that the present-day natural vegetation in Fengtai region should be a cool steppe. However, the modern vegetation of the area reflects a strong anthropogenic influence. Agricultural and pasture lands dominate the modern landscape. Most of the natural or man-made flat sur-

[18] Derbyshire et al. 1991.
[19] Leemans/Cramer 1991.
[20] Cramer, pers. communication.
[21] Prentice et al. 1992.
[22] Prentice et al. 1992.

faces are used for agricultural purposes. Among the plants grown by the villagers are raps, potatoes, wheat, cabbage, cannabis, linen, and other herbaceous plants. Wheat fields appear up to at least 2,800 m. Land, which is not suitable for agriculture like steep mountain slopes is used as pastures for numerous sheep, goats, cows, yaks, donkeys and horses. The plant communities of the pastures are represented by various steppe and meadow plants, including grasses, sedges, *Artemisia* and other Asteraceae species, as well as Apiaceae, Fabaceae, Rosaceae and Polygonaceae. During the past decades central and local governments have paid special attention to the forestation of the area. Small patches and isolated stands of poplar trees grow in the Beichuan River Valley and on mountain slopes exposed to the north. There we found few young spruce (*Picea*) trees of 0.5 to 1.0 m height. Trees have been planted in the local environments with better moisture conditions, protected from direct sunshine and strong wind. Among the other arboreal taxa growing in the vicinity of Fengtai, elm (*Ulmus pumila*) and sea buckthorn (*Hippophae rhamnoides*) should be mentioned. Forest patches of birch (*Betula platyphylla*), spruce (*Picea crassifolia*) and juniper (*Sabina przewalskii*) are shown in the Vegetation Atlas of China (Scale 1:1,000,000) ca 15 to 30 km north of Fengtai[23].

Until recently palaeoenvironmental data from the region were very scarce. The earlier records obviously lack radiocarbon dates and their use for the discussion of the short-term climate and environmental changes of the Bronze Age period is limited. Mid-Holocene palaeoenvironmental records summarised by Chinese authors suggest that the period between ca 2550 and 2050 BC was wetter and warmer than at present and the number of archaeological sites in North China increased notably at that time[24]. Between 2635–2295 BC pine pollen dominated the pollen spectra from Haiyuan Ruin (36°15′ N, 105°40′ E) located in the present-day semi-arid steppe, and Qinghai Lake (36°54′ N, 100°11′ E) experienced high water levels. However, around 1000–1100 BC the level of Qinghai Lake dropped significantly, suggesting a sharp aridisation of the climate[25].

A recently published palaeoclimatic interpretation of the Holocene sedimentary, pollen and oxygen isotopic data from the Hongshui River section (38°10′46″ N, 102°45′53″ E, 1,460 m a. s. l.), Tengger Desert, suggests several notable changes in temperature and precipitation in the region[26]. Three phases of temperature decrease, coinciding with the advances of glaciers in the Qilian Mountains and on the Tibetan Plateau, have been reconstructed at 3120–2720, 2350–1790, 1560–1280 cal BC. The latter phase with relatively cool and moist conditions in the Tengger Desert was followed by a phase of extreme aridity centred around 1050 cal BC[27].

Another Holocene pollen record from the recently dried-up Eastern Juyan lake (41.89° N, 101.85° E, 892 m) in the Alashan Gobi suggests that a climatic phase wetter than at present occurred there between ca 1250 and 850 cal BC interrupting the time interval with relatively dry conditions[28]. This wetter phase coincides with the radiocarbon-dated time interval during which the excavated settlement existed at Fengtai.

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[23] Vegetation Atlas of China 2001.
[24] Shi et al. 1993.
[25] Shi et al. 1993.
[26] Zhang et al. 2000.
[27] Zhang et al. 2000.
[28] Herzschuh et al. 2003.

Laboratory No.	Material	Location	Radiocarbon age, uncal. yr BP	Calibrated age, yr BC (probability 68.2%)	Calibrated age, yr BC (probability 95.4%)
ZK 0061	wooden post	Dulan Nuomuhong 96°24'E, 36°27'N	3670±90	2200-2160, 2150-1920	2350-1750
BK 81027	M207 wood ash	Xunhua Ahalta Hill Tuolongdu-men 102°24'E, 35°48'N	3450±80	1810-1680, 1670-1660, 1650-1640	1950-1520
BK 81026	M12 wood ash	Xunhua Ahalta Hill Tuolongdu-men 102°24'E, 35°48'N	3230±80	1610-1410	1690-1370, 1360-1310
ZK 1326	coffin wood	Guinan Guantang 100°44'E, 35°35'N	2980±75	1370-1340, 1320-1110,1100-1080, 1060-1050	1410-1000
BK 81030	M256 wood ash	Xunhua Ahalta Hill Tuolongdu-men 102°24'E, 35°48'N	2860±100	1210-900	1400-800
BK 77055	wood ash	Guinan Jiatuhu 100°44'E, 35°35'N	2930±90	1270-1000	1390-900
BK 80014	M1046 coffin wood	Datong Shangsunjiazhai 101°40'E, 36°56'N	2930±80	1260-1230, 1220-1000	1380-1330, 1320-910
BK 77013	coffin wood	Datong Shangsunjiazhai 101°40'E, 36°56'N	2860±90	1210-1200, 1190-1170, 1160-1140, 1130-900	1300-820
ZK 0062	woolen cloth	Dulan Nuomuhong 96°24'E, 36°27'N	2720±115	1050-780	1300-500
ZK 1325	coffin wood	Guinan Dayukou 100°44'E, 35°35'N	2720±75	970-960, 930-800	1070-760
ZK 1327	M78 human bones	Huangzhong Panjialiang 101°30'E, 36°30'N	2660±105	980-750, 690-660, 630-590, 580-560	1050-400
BK 81028	M158 wood ash	Xunhua Ahalta Hill Tuolongdu-men 102°24'E, 35°48'N	2630±100	920-750, 690-660, 650-540	1000-400
ZK 1105	M19 wood	Guide Shanpingtai 101°27'E, 36°2'N	2640±70	900-760	980-750, 720-520
ZK 1107	M44 wood	Guide Shanpingtai 101°27'E, 36°2'N	2610±60	890-880, 840-750, 690-660, 630-590, 580-560	910-520
BK 80013	M1042 coffin wood	Datong Shangsunjiazhai 101°40'E, 36°56'N	2580±80	830-750, 700-540	900-870, 860-410
BK 80011	M979 coffin wood	Datong Shangsunjiazhai 101°40'E, 36°56'N	2510±80	800-520	800-400
BK 80012	M989 coffin wood	Datong Shangsunjiazhai 101°40'E, 36°56'N	2430±80	760-680, 670-640, 590-580, 550-400	790-390
ZK 1323	M coffin wood	Huangyuan Dahuacun 101°18'E, 36°42'N	1780±80	130-350 AD	70-430 AD

Fig. 13. List of radiocarbon dates for the Kayue Culture (adapted from: Radiocarbon Dates 1991, 285–289).

Discussion and conclusions

First results of the excavation at Fengtai suggest that the excavated part of the Bronze Age settlement existed for approximately 400 years, the last 200 years of second mil BC and 200 years of the first mil BC (e. g. 1000 ± 200 cal BC). The radiocarbon dates we have obtained *(Fig. 8)* help to narrow down the time interval in which the Kayue Culture is usually placed *(Fig. 13)*. Both sedimentary and chronology records correspond with each other, helping to divide the history of the opened settlement into two periods. This conclusion is supported by the pottery complex. The lower layers of trench TG 1 attributed to the Early Period (1190–920 cal BC) only provide vessel and decoration types characteristic for the Kayue Culture. The upper layers of trench TG 1 and the cultural deposits of trench TG 2, attributed to the Late Period (980–750 cal BC), in addition to Kayue types also reveal Xindian types of the Zhangjiazui Phase. However, our dating for this period only partly support the dating suggested by Shui T. for the Zhangjiazui Phase. The results of the first excavation at Fengtai support the hypothesis that the Xindian Culture gradually expanded from the banks of the Yellow River northward into the area occupied by the people of the Kayue Culture.

At Fengtai we found three modes of house construction, which can be described as follows. The lower cultural layers in trench TG 1 are characterised by a steep slope, a

tremendous amount of ash, burned wood and pieces of mud-plaster but the absence of dwelling floors. This indicates a distinct mode of house construction built against the slope which is laid out on two (or more) levels with timber as the main construction material. The upper level might have been organised with a veranda open to the east, i. e. the Beichuan River Valley, constructed and supported by a woodframe system utilizing columns and beams. The rear side of the house built into the slope rests on base sediment as shown in approximately 3 m depth in columns A–B *(Fig. 3)*. The lower level can be imagined as having accommodated the slope leaving only an open space under the horizontal wooden floor of the upper room and/or the veranda. The room or gap might have been used for storage and livestock and has gradually been filled with discard and refuse as indicated by the layers in column G at 6.0 to 7.0 m depth (Fig. 3). Whether the lower level was closed by walls could not be determined although the barrier in columns G–H hint at it. Present day analogues to such a kind of house construction can be found in similar landscapes and climate conditions, i. e. mountainous environments, for example in Nuristan, a very remote area of NE Afghanistan. The adequate vernacular response to the steepness of terrain[29], Nuristani multi-storey houses exhibit features like those derived from our excavation results at Fengtai. The absolute age of the timber-house period at Fengtai, i. e. the age of the lower cultural layers, is about 1190 to 920 cal BC.

After the devastation of the timber houses by fire and a levelling of the ground the site witnessed a second construction period but with a different type of housing. The profiles show horizontal house floors with multi-layered mud- and lime-plasters *(Fig. 3, columns E.F; 4, columns C–E about 2.7 to 2.9 m deep)*. By extending the trench at this level beyond the limits of the house floor to the surrounding footstep-hardened dwelling surface the grove-like wall-base could be detected. However, no post holes or any other traces of wall construction material were found.

The third architectural feature of the settlement found in the uppermost of the ancient cultural layers at a depth of about 1 m *(Fig. 3, columns A.B)* is the collapsed mud brick wall. The suggested age of the wall is 930–820 cal BC. We found that the wall was not a fortification enclosing the entire settlement, but more likely the wall of a single building or yard.

Summarising the results, we attribute the Early Period of wood house construction to the Kayue Culture. The construction of mud-floor houses and a mud brick wall is synchronous to the spread of the Xindian Culture.

Discussion of the human and environmental history of Fengtai valley must take the present-day conditions into account. Our analysis of the modern climatic variables suggest that the moisture deficit is the main limiting factor for tree growing in Fengtai area. However, even the present conditions support the growth of planted deciduous and even coniferous tree species in certain locations. The assumption that the region at the period between 1500 and 900 cal BC experienced slightly wetter conditions than at present is in agreement with the archaeological results. The features of house construction of the Early Period suggest that the area around Fengtai was at least partly forested during that time. This hypothesis of a wetter climate coincides with the timber-house period. However, it needs to be carefully checked by pollen and plant macrofossil analyses. Palaeoenvironmental records from NW China suggest dramatic changes towards aridity, which occurred in the region at about 1000 cal BC. Preliminary excavation results from Fengtai discussed in the present paper propose a possible break in the lifestyle of the settlers (e. g.

[29] Oliver 1998, 136f. 1007; 1017.

abundant burned wood fragments, change in the house construction style) at around this time. Thus, additional data from the Fengtai area is needed to correlate the complex archaeological records with the palaeoenvironmental data from NW China. The results of our first excavation campaign in 2001 contribute substantial data to the discussion of cultural contacts between Qinghai and Xinjiang during the late Bronze Age[30].

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[30] Mei 2000, 65.

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青海省丰台遗址2001年考古发掘与环境调查报告

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引言

青海省位于青藏高原东北边缘和欧亚大草原东南边缘，是研究人类活动和气候变迁对环境影响的关键地区。考古发现表明，公元前4000年左右在其东部的黄河及其支流出现了最早的新石器时代聚落。这里的古文化特征明显有别于中原和东部沿海地区，而与其周围的分布在甘肃、四川、新疆、西藏乃至西伯利亚南部、哈萨克斯坦和伊朗等地区的古文化有着惊人的相似性。到目前为止，由于考古学材料的缺乏和相关研究的局限，对这里的古文化的兴盛与衰落、民族迁徙等现象还没有比较清楚的认识。

卡约文化是青海省东部地区的一支青铜文化。学术界根据几处墓地的发掘资料对其有了初步的认识，并根据陶器形态和少量的测年数据确定了大致年代，但此前还没有对任何一处卡约文化的聚落遗存进行系统的调查和发掘。

中国的历史和古环境记录都表明，长期的和短期的气候变化都对中全新世以来的聚落变迁产生了影响。对丰台遗址的考古学和古环境研究将有利于科学地认识这个地区聚落和地貌变迁的历史。

遗址概况

这处青铜时代的聚落位于互助县丰台村东，北距西宁46公里。1980年代，青海省考古所发现了这处卡约文化遗址，2000年青海省考古所和中国社会科学院考古研究所组织、德国考古院欧亚考古所配合对该遗址进行了详细调查，2001年6月进行了首次为期一个月的发掘，主要目标是建立该聚落的时间序列、了解房屋建筑技术和材料特点。

发掘结果

地层堆积

共发掘了两个探沟。

探沟1 （东西剖面）

该探沟为正南北方向，宽2、长8米。在东剖面的上部1.3米有上个世纪农业活动留下的沟渠；其下面是灰硬粘土叠压倒塌的土坯墙，扩方的结果表明这个土坯墙规模很小，可能属于一个小型建筑，放射性碳测年数据为 930－820 cal BC，土坯墙下面是两个灰土层，其中的草木灰的含量向下逐渐减少，这两个灰土层可能是与土坯墙同时期的古地面；在这个古地面之下是几个被灰坑打破的连续堆积的腐殖质层，其中含有大量的烧土颗粒、陶片、动物骨骼和石头，在 2.2－2.3 米和 3.1 米深度明显地可以看到水平分布的黄色的沙土层，这些堆积可能代表了聚落内不同时期居住面。在东西剖面的 2.7－2.9 米之间都发现了层状堆积的房屋居住面，其中含有大量的石灰颗粒，可能表明这里的居民有用石灰铺地面的做法，在这个堆积中发现了灶址和柱洞，从灶址中采集的炭屑的放射性测年数据是从 980－820 cal BC到1130－930 cal BC；下面是一个含有大量炭屑和烧土颗粒地层堆积， 在东剖面位于3.8 到4.3米深度，而在西剖面则位于3.4－3.7米深度，一块炭化的针叶树放射性测年数据为1320－1110 cal BC，以下的层位中含有丰富的炭屑，文化层最深处达7.12米。

探沟2 （南剖面）

这个探沟是我们清理了现代灌渠所形成的断面。第一层为含有少量浅灰色古土壤的黄土；第二层为黄沙土；第三层含有灰土、烧土、炭屑，其中还有石头和动物

骨骼，最引人注目的是保存完好的陶器，综合各项因素，我们认为这里是一处被火灾毁掉的房屋，两个炭屑样品的放射性测年结果是 830－765 cal BC。

综合两个探沟的堆积特征，可以将该聚落分为两个阶段：探沟1的3－7米的文化层年代为 1190－920 cal BC，属于早期；探沟1的3米以上、探沟2的年代为 980－750 cal BC，属于晚期。当然，对整个遗址的完整分期还需要今后更大规模的发掘来完成。

陶器

发现的遗物以陶片为主。因为在探沟1的炭屑层发现的陶片最多，所以多数陶片都有烧烤的痕迹。能够复原的器形很少，主要是双耳大罐和敞口碗；陶胎一般较厚；以夹粗砂陶为主，有少量的泥质陶；陶色从暗褐色到砖红色或者浅褐色，浅灰色或者磨光黑陶很少；在陶器的口部、颈部的外表或者内侧以及把手上普遍装饰红色的条带；在铆钉上常见带指甲纹的附加堆纹，还有绳纹、席纹、不规则的戳印纹等纹饰。根据双耳罐的双耳位置和腹部等特征可以将陶器分为早晚两期，早期多为短直颈、口部稍微向外敞开，单或者双的短把手附在唇和肩之间，流行附加堆纹；晚期环状把手附加在腹部的最大直径位置，附加堆纹被扣代替。

环境调查结果

对于丰台地区地貌、气候和植被变化过程的理解将有助于认识这里的考古学文化变迁。丰台沟是典型的被河水冲刷的山间低谷，这里的地貌特点显示了土壤侵蚀的过程。由于黄土堆积叠压在第三纪红粘土上面，当有水渗入以后红粘土的表面变得很滑，容易引起黄土的位移，由此引发泥石流，同时，地震可能也是导致泥石流的另一个因素。从现代地貌特征也能清楚看到过去的泥石流留下的痕迹，这种经常出现的地质灾害可能是影响聚落变迁的一个主要原因。

对全新世古气候研究的结果表明，在 2550－2050 BC年间气候比现在温暖湿润，但是 1100－1000 BC 青海湖经历了水位明显下降的过程。最近发表的孢粉和同位素研究结果表明，腾格里沙漠在中全新世经历了几次明显的温度和降水变化，其中在 3120－2720、2350－1790、1560－1280 BC 有三次降温，对应祁连山的冰川扩大，在1050 BC 前后有一次强烈的干旱事件。另一个全新世的孢粉结果表明，1250－850 BC 有一个相对湿润的阶段，正对应于丰台遗址发掘所揭露的阶段。

讨论与结论

丰台遗址的第一次发掘表明这个青铜时代的聚落延续了400年，地层学和类型学记录都表明已经发掘的部分可以划分为早晚两个阶段，早期（1190－920 cal BC）属于卡约文化，晚期（980－750 cal BC）除了有卡约文化的特征外，还显示了辛店文化张家嘴类型的特征。发掘资料支持辛店文化从黄河岸边向北到达卡约文化分布区的假设。

在探沟1的5.5－5.7米深处，炭屑最丰富的层位下部出土了一块罐的口部残片，形制相似的陶器在大华中庄、潘家岭、半主洼Ⅱ和黄寨Ⅰ都有发现。因为这种器形与卡约文化的前身齐家文化的同类陶器有着密切的联系，有人认为这是卡约文化早期的重要发现。从某种程度上讲，这类陶器在丰台遗址的地层位置支持了这种观点。晚期陶器的装饰、形制都反映了辛店文化的特征，在遗址上现代庙宇附近发现的一组保存完好的袋足鬲更明确说明了辛店文化的影响，它们相当于辛店文化晚期阶段的张家嘴类型，年代为 1100－800 BC。

在丰台遗址发现的房屋建筑遗迹可以分为三种。第一种是木构建筑，在相当于卡约文化时期的下部文化层中发现的大量的灰烬、烧过的木头和膏泥等，

可能说明这里曾经有木构建筑，但后来毁于火灾；在这类建筑以上的地层中发现了多层膏泥和石灰互层的居住面和踩踏面以及墙的基槽，但没有发现柱洞，这是第二种建筑；在最上面的文化层发现了倒塌的土坯墙，这是第三种建筑，后面两种建筑形式相当于辛店文化向北扩展时期。

讨论丰台遗址环境与人类关系的历史必须考虑其现代状况。对现代气候的分析表明湿度不足是影响树木生长的主要因素，但即使是现在的湿度状况，这里也还可以生长落叶阔叶林和针叶林。古气候研究的结果1500－900和1190－920 cal BC这里经历了比较湿润的状况符合考古发现，因为早期阶段的木构建筑说明当时这里可能有森林存在。当然，这些结论还都需要进一步的孢粉和其它古环境研究来证明。

(Translated by Jin Gui-Yun)

Резюме

Первые результаты раскопок 2001 года в Фэнтае показали, что исследованная часть поселения застраивалась на протяжении более четырехсот лет, начиная с конца II тыс. до н.э. По данным стратиграфии, подкрепленным радиоуглеродными датировками, в истории поселения выделяются два основных периода развития – ранний (1190–920 гг. до н. э.) и поздний (980–750 гг. до н. э.).

В раннем периоде основным строительным материалом было дерево. Использование древесины для строительства жилищ может свидетельствовать о существовании в окрестностях поселения лесной растительности. Такое предположение согласуется с региональными палеогеографическими данными, подтверждающими наличие благоприятных климатических условий в рассматриваемый интервал времени. Для позднего периода характерными являются строения из сырцового кирпича с многослойными глиняными полами, покрытыми побелкой.

Керамика раннего периода представлена, в основном, изделиями культуры каюэ – толстостенными кувшинами с двумя ручками. В позднем периоде появляются сосуды культуры синьдянь фазы чжанцзяцзуй, для которых характерным является другой стиль декора – красная и черная раскраска по белому ангобу.

Таким образом, первый сезон раскопок поселения Фэнтай подтвердил предположение о том, что к северу от реки Хуаншуй влияние культуры синьдянь распространяется позднее чем на юге, у Желтой реки, и не вытесняет полностью керамику культуры каюэ. В Фэнтае впервые удалось скорректировать относительную хронологию поселенческих слоев этих культур и уточнить их абсолютный возраст.