SOME ARCHAEOLOGICAL EVIDENCE FROM THE AŞIKLI EXCAVATIONS FOR CLIMATIC FLUCTUATIONS IN CENTRAL ANATOLIA DURING THE EARLY HOLOCENE 10./9. MILL. B.P.
(1 table, 7 figs)

*Ufuk ESİN**

ABSRTACT

Since no clear evidence is yet available of an abrupt climate change in Asia Minor during the calibrated years between 2200 and 1900 B. C. (uncalibrated radiocarbon years ca. 3800 - 3600 B. P.), this paper aims to provide some archaeological data excavated at the pre-pottery site of Aşıklı Höyük which can probably indicate some climatic changes that took place in short intervals during the Early Holocene in Central Anatolia. This data may afford a better understanding of the global climate changes in the Old World.

The Aşıklı mound lies 25 km south-east of the city of Aksaray on the riverbank of the Melendiz Su in Western Cappadocia. According to a large number of uncalibrated radiocarbon assesments the site has been dated to the tenth/ninth Mill. B. P. (calibrated to the eighth/ninth Mill. B.C.; table 1; Esin 1994, Esin et al. 1991). Relevant archaeological data found at Aşıklı includes :

a) Renewals of the mud-brick architecture in short intervals from bottom to top during the all subphases of level 2.

b) A thick alluvial deposit comprising of sand, pebble and silt above an earlier habitation level situated directly on the

* Prof. Dr. Ufuk Esin, Istanbul Üniversity, Faculty of Letters, Dept. of Prehistory.

riverbank on the southern exterior of the mound. These may indicate that there were some quick changes in climate (figs. 1-7). Palynological data obtained from the virgin soil in the deep-sounding on the North of the mound has been correlated with the Akgöl (Adabağ, Ereğli-Konya) diagram of the Late Glacial Period. These together with the previously mentioned archaeological data may confirm the possibility of some climatic fluctuations durig the transtion from the Late Glacial into the Early Holocene Period (Woldring 1998,, Bottema and woldring 1984, 133-135).

1. INTRODUCTION

The aim of the NATO-ARW workshop on the «Third Mill. B. C. Abrupt Climate Change and Old World Social Collapse» has been described by G. KUKLA as a critical revision of the available evidence, an assessment of the accuracy of the dating and palaeoclimatic interpretations an assembling of data which points to associated changes in atmospheric and oceanic circulation, an assessment of the impact of the climate on early societies as well as a proposal research goals «which would further clarify the issue» (G. KUKLA 1995).

If Anatolian cultures of the «*Third Mill. B. C.*» - or more precisely «*from 2200 to 1900 B. C.*» - underwent «*a social collapse*» due to an «*abrubt change in climate*», it should be inquired first of all «*how satisfactory the available data from Asia Minor is ?*», before making such an important assumption. This should be asked in accordance with the basic requisites set forward by KUKla and stated above. Methodologically one must also remember that in order to recheck any data for that world-wide (interregional/intercontinental, contemporary, climatic, socio-economic and socio-cultural) event, one should at least use the same time-scale and the same terminology for comparisons (cf. KUKla 1995, the dates used in «Abstracts» of that work-shop by the participants; Mellink 1992, vol. II, 177-178; Stuiver and Reimer 1993). Before making any assumption of «an abrubt climate change» in Anatolia between the years 2200 - 1900 B. C.; some prerequisites and information are needed. Therefore in the Anatolian case, the following remarks may be made :

1. Dating and Stratigraphic Sequence of the Early Bronze Age (EBA) and Early Middle Bronze Age (EMBA) Cultures in Anatolia :

As is known, the EBA cultures as well as the transition from EBA to MBA in Anatolia are mostly dated by comparative relative chronology. However, over the last decades, a large number of radiocarbon assessments of these cultures have been provided by several radiocarbon laboratories (cf. Mellink 1992, vol. I, 213-219, vol. II, 175-178). When a culture of the third Mill. (EBA) or of the second Mill. B. C. (MBA - LBA) is dated by uncalibrated radiocarbon B. P. years and then converted into calibrated B. C. calendar years, it becomes 300/400 years earlier than its usual, archaeologially accepted chronology, which is based either on historical dates from the early second Mill. B. C. or on conventionally-accepted relative chronology (cf. Bittel 1976, 306-307; Mellaart 1978, 27; Ehrich 1992, VIII-X; Pearson and Stuiver 1993, 32-33; Stuiver and Becker 1993, 61; Kuniholm 1993 a, 372)[1].

In many cases, there are different views on dating the same EBA or early MBA culture, even the same archaeological, comparative, relative chronology is used. In this respect, Trojan I-VI cultures (from the third and second Millenium B. C.) are good examples how differently each Trojan city has been dated by several scholars using the same methods (Korfmann and Kromer 1993, 137-138, fig.1).

The historically dated cultures of Asia Minor begin with the Assyrian Colony Period in central Anatolia, not earlier than the first quarter of the Second Mill. B. C. (ca. 1950-1850 B. C., Kültepe (Kanish)/Karum II and ca. 1850-1750 B.C. Kültepe (Kanish)/ Karum Ib; cf. Mellink 1992, vol. I, 219-220).

Most of the EBA I-III cultures at key-sites in different regions of Anatolia investigated so far, were abondoned due to disastrous

1 It should be recalled that when uncalibrated radiocarbon B. P. dates are converted into calibrated B. C. dates, in most cases 2 or 3 calibrated dates are available for the same culture or occupation level of which either only one date is to be chosen for archaeological use, or none of them fits into the archaeological, comparative, relative chronology (cf. Mellink 1992, vol. II, 176-178).

conflagarations and it is not yet archaeologically known whether or not there was a cultural gap in their sequences (Mellink 1992, vol. I, 219-220). In order to make this more specific, an example may be given in the case of Troy, the best-known site in North-western Anatolia. During the course of the third Mill. B. C.; the Troy I settlement was followed by the Troy II and Troy III-V cities which were seperated from each other by drastic burnt débris (Blegen 1964, Korfmann 1994, Korfmann and Kromer 1993). There is no indicatian of an abrupt change in climate or social collapse between the Troy II and the following Troy III-V settlements. However a change in diet occurs during the Troy III settlement, with a trend toward game animals (Blegen 1964, 89-91; Korfmann and Kromer 1993, 169)[2]. Although radiocarbon assessments of Troy I-V are mostly overlap, the time-span between calibrated 2200-1900 B. C. years partially corresponds to the period of Troy II and to Troy III, IV and V (Korfmann and Kromer 1993, 158-169). On the basis of calibrated B. C. dates of Troy, Korfmann suggests 2 gaps in its stratigraphic sequence. The first hiatus occurs between Troy II and Early Troy III (ca. 2500-2390 B. C.), and the latter between Troy V and VI, from ca 1880 to 1700 calibrated B. C. years (Korfmann and Kromer 1993, 168-169, fig. 23). Recently he also accepted the date of Troy IV as «...a little before 2000 B. C.» which again makes it possible to date Troy V between 2000-1900 B. C. (Korfmann 1994, 2).

Since the sequences of EBA I-III cultures at key-sites in various regions of Anatolia follow each other as observed at Troy, without any basic cultural interruption over the time-span of 2200-1900 calibrated B. C. years, it can not be concluded that a climate change occured during that period (Mellink 1992, vol. I, 213-219, vol. II, 178-179; Korfmann and Kromer 1993).

2 According to I. Kayan, the rapid retreat of the sea in the vicinity of Troy started at ca. uncalibrated 5000 14-C yrs B. P. (ca. calibrated 3770 yrs. B. C.) and continued until ca. uncalibrated 3000 14-C yrs B. P. (ca. calibrated 1250 yrs B. C.; Kayan 1988). This data, acquired by his research covering a time-span of ca. 2000 years, indicates that there was a long-term, slow change in climate between ca. 3770-1250 B. C., but not particularly abrupt one during 2200-1900 B. C.

2. Dendrochronological Data :

P. I. Kuniholm could provide important dendrochronological data for the period of time between 2259 ± 37 B. C. and 757 ± 37 B. C. which is a whole sequence of 1503 years without any gap (Kuniholm 1993 a). Thereafter, he could add another 259 years in the Iron Age section of the time scale which could extend the total length of the time span to 1761 years (Kuniholm 1993 b, 453). The first date was obtained from the innermost ring of the oldest timber at Kültepe/Kanesh from «Warsama Palace» (ring 262); and the other from the timbers in the Midas Tomb of the Phrygian capital city at Gordion (Kunholm 1993 a, 371). The last date has also been calculated from the Phyrigian Tumulus at Tatarlı near Dinar in the province of Afyon which matches the juniper ring sequence from the Midas Tumulus at Gordion (Kuniholm 1993 a, 371-373; 1993 b, 453). For these dates Kuniholm used the 1986 calibration curve. According to him, the 1993 calibration curve brings the dates downward in time about 37-39 years and he couldnt observe any indication for a change in climate in those rings between 2259 ± 37 B. C. and 757 ± 37 B. C. (Personal comminication from Dr. Kuniholm in 1995). Another dendro-date for the «Warsama Palace» at Kültepe/Kanesh has been obtained as 1849 ± 37 B. C. (ring 672). This wasprovided by a collection of 20 timbers at the same palace (Kuniholm 1993 a, 372).

If these dendro-ring and dendro-dates are taken into consideration it can be assumed that there was no drastic change of climate in Central Anatolia between 2200-1900 B. C.

3. Soil and Phytolith Analyses :

So far as it is known, soil and phytolith analyses have been recently started at a few EBA or MBA sites in Anatolia, such as Troy. Their results have not yet been fully published. Based on these analyses, it is not possible at present to make any assumptions of a change in climate between 2200-1900 B. C.

On the other hand, so far as is known the palynological record does not imply any drastic climate change for the same period (van Zeist et al. 1975, 138, table 8, 140-141; Bottema and Woldring 1984, 146-148).

Acccording to above mentioned remarks it may be concluded that no cultural gap/collapse is to be observed in the stratigraphic sequences of the EBA sites between 2200-1900 calibrated B. C. years. There is also no indication of a change in climate in the ring sequence obtained from Warsama Palace at Kültepe/Kanesh. Moreover, soil and pytolith analyses are thus far noticeably lacking for the EBA and MBA sites of Anatolia (Mellink 1992, vol. I, 213-220)[3].

Due to variations in morphology, topography, paleosol and soil compositions in each region of Anatolia, more detailed, multi-disciplined studies are required in order to better understand the periodical, global cycles of climate and their impact on early human societies of Asia Minor during the Holocene (Atalay 1992, 10-20).

As known, the sequence of climate changes over the past 100.000 years has been studied with the 1500 m long ice core obtained from Greenland, based on the distributuion of oxygen isotopes in the ice core (Degens et al. 1978, 142). The upper part of the ice core covers the last 15000 years and gives important information about climatic changes and fluctuations for the transition period from the Last Ice Age (Würm Glaciation) to the Holocene. According to the ice core studies the rise in the temperature caused (ibid.):

a. Decrease in snow and increase in rain fall

b. Oscillations on the coast lines of the seas, lakes andof rivers

c. Chnges in wind direction

d. Changes in the type and distribution of flora and fauna

e. Changes in geomorphology, soil and sediments.

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3 A few soil analyses are completed for the Ubaid site at Değirmentepe (Malatya) as well as a few soil and phytolith analyses have been recently made for the aceramic settlements of Aşıklı in Central Anatolia.

This combination of factors altogether was also responsible for the changes in ecological conditions in the abiotic and biotic enviroments of human societs. In order to adapt themselves to new neothermal, ecological conditions human societies in Southwestern Asia, including Anatolia made changes in their traditional types of dwellings, technology and subsistence economies. These factors were the reason behind those human societies' development of a new mode of life over the course of a few thousand years. This evolutionary process has been named as «*Neolitic Revolution*» by V. Gordon Childe (1958, 59-86).

Aşıklı is a prehistoric site which belongs to one of the developmental stages of the Neolitic Revolution called «Pre-Pottery or Aceramic Neolithic».

On the other hand first hand information on climatic changes in prehistoric Anatolian sites from the Late Glacial Period to the Early Holocene is either unavailable or rare. However, salvage excavations at the pre-pottery site of Aşıklı have recently provided some data which may be associated with climatic fluctuations during the transition period from the Last Ice Age to the Early Holocene.

Therefore, the aim of this paper is to present this data from Aşıklı, in order to stimulate discussion about it and initiate further multi-disciplinary research projects on climate change, ecological and cultural developments during the Early Holocene in Asia Minor, particularly in central Anatolia. After abrief description of the site, these will be noted below.

2. THE PRE-POTTERY NEOLIHIC SITE OF AŞIKLI

Aşıklı Höyük lies ca 25 km Southeast of the city of Aksaray, at the coordinates 34° 13′ 45″ E and 38° 21′ 02″ N, 1119.45 m above the sea level (fig. 1). Today, the climate of the region is continental. The mound is situated on a bank of the Melendiz river which originates from between the Meleniz and Hasandağ mountain ranges ca. 40 km to the South and runs through the famous canyon-like Ihlara valley, full of cave churches from the Early

Christian period, before reaching the village of Kızılkaya where the mound is located (fig. 1; Esin et al.1991).

A landscape of tufa cones, andesite and basalt rocks surrounds the vicinity of Aşıklı. This was formed by tectonic activities and by eruptions of Hasandağ which began during the Late Miocene, continued into the Pliocene lasted thrcughout the Pleistocene and probably even continued into the beginning of the Holocene (Emre 1991, 91 ff, 171-175, 195-197, table II; Toprak et al. 1994, 4-5). Due to these tectonic eruptions many obsidian sources are available in the neighbourhood of Aşıklı. These sources were exploited by prehistoric human communities to make implemets and weapons. In that cappadocian landscape the narrow, green valley of the Melendiz River is suitable for agriculture.

The Aşıklı mound will be partially submerged by the rèservaire lake of the Mamasın-dam when its water level is raised to 1109.25 m. In 1989, salvage excavations were therefore initiated at the site by the Prehistory Section of the University of Istanbul (Esin et al 1991, Esin 1994). During the course of excavations at Aşıklı from top to bottom layer 2 with its 10 subphases was extensively dug (figs. 1-2). In order to control the stratigraphy operations were undertaken in a step-trench in squares «4 F-H» to the North of the mound where also virgin soil was reached in a deepsounding (figs. 1-2, 4-5; Esin 1995, 72, figs. 5). In 1993, a part of an earlier settlement was discovered. It is located outside of the mound-cone, to its South, directly on the present bank of the Melendiz and even continues into the river (figs. 1, 6). This habitation level was found beneath an alluvial deposit 1.5 m thick, which consisted of a layered sequence of silt, gravel, sand and again of gravel (figs. 1, 6-7).

Therefore, it is clear that some early habitation levels of Aşıklı were rapidly flooded by the Melendiz river and that the previous extensions of earlier Aşıklı settlements were probably larger than the later ones found in layer 2 at the mound.

A virtually homogeneous aceramic, neolithic culture has been discovered at Aşıklı. It is still unique in Anatolia and in Southwestern Asia (figs. 1-2). This culture was established by specialized hunters, gatherers and early farmers during the tenth Mill. B. P. according to a consistent serie of radiocarbon assesments (calibrated ninth/eight Mill. B. C., see Table 1; Buitenhuis 1994, forthcoming; van Zeist and de Roller 1995). The large amount of hunted animal bones analyzed by Buitenhuis from the Biologisch-Archaeologisch Instituut at Groningen indicates that the domestication of animals had not yet started at Aşıklı (Buitenhuis 1994, forthcoming). The susbsistence economy was mainly based on meat protein obtained from game animals, collected edible plants, fruits and also on cultivated wheat, barley and various pulses (van Zeist and de Roller 1995).

The settlement in the subphases of layer 2 at Aşıklı have an unusual lay-out which suggests planned villages (figs. 1-3). The settlements dug so far consist of 3 sections : One to the North, the second to the South of a wide peble street labelled «GA», and the third to the Northeast of the mound, situated in an East-West direction (figs. 1-2; Esin 1994, 125, fig. 1, 129, pl. 9; 1995, 70, 72, figs. 2, 5). It seems that in the most eastern part of the third section, settlements of the last 3 subphases do not extend any further (fig. 1). This section was bordered by a large surrounding wall made of stone, of which a part has been recantly dug (fig. 1).

The buildings at Aşıklı were usually made of large, primitive mud-bricks, without stone foundation walls and have 1-3 rooms (figs. 2-3; Esin et al. 1991, 165, pl. 7; Esin 1965, 72, fig. 5). It seems that they were used by the inhabitants of Aşıklı as houses. Generally, at least one or two mud-brick walls of the houses were renewed at short time intervals and reused in later subphases (figs. 3-5). Two or three houses were placed together, forming small quarters which were seperated from each other by narrow corridors or small court-yards (figs. 1-3; Esin et al. 1991, 165, pl. 7; Esin 1994, pl. 9; 1995, 70, 72, figs. 2, 5). Large spaces, sometimes large pits on the North and Northeast of the settlements were left between the quarters, most probably for sharing the meat of hunted game among the occupants (fig. 2; Esin 1995, 72, fig. 5, squares 4 H and 6-7 J-K). At the same time these areas were also used for dumping garbage which was then burnt, forming thin veins comprised of animal bones, obsidian disposal, charred wood or twig pieces, plant remains and hack berry (celtis) seeds.

Two buildings to the Southwest of the pebble-paved street «GA» and a part of the third section on the East seem to have had another function than for daily use (figs. 1-2). One of the buildings to the Southwest of the street «GA» is square in plan and had at least 5 subphases. In each subphase the building had a red painted floor and walls. Only in its third subphase was the red painted floor partially restored. In its restored section it was painted yellow (Esin 1994, 125, fig. 1, Building «T»). The second building is bordered on its northwestern side by a chest-wall consisting of two parallel walls with a space in between which was divided into 4 empty rooms (Esin 1994, 125, fig. 1, pl. 9). Because of their different architectural character these buildings probably belonged to a ruler or ruling elite. The building with painted floors and walls may also have been used for religious or ceremonial practices and a comparison is to be drawn with the temple of Nevali Cori at Kantara in the province of Şanlı Urfa in Southeasern Anatolia is warranted (Hauptmann 1993, 41 ff.).

The main industry at Aşıklı was based on obsidian tools and weapons, with blades and scrapers predominating. The blade industry of Aşıklı as so far known from other pre-pottery sites in Anatolia or the Near East was without parallel (Esin et al. 1991, 133, 145-149, 170, 174, pls. 12-16; N. B. Atlı 1994, forthcoming). Other industries are represented by bone/horn tools, ground and polished stone artifacts (Esin et al. 1991, 167-169, pls. 9/2-3, 10-11). Half baked or baked objects in conical, spherical and cylindrical form have also been discovered (Esin 1995, 73, figs. 6, 7). Surprizingly the settlers of Aşıklı used hot worked and cold hammered native copper (Esin 1995).

The burial customs in the settlements of Layer 2 appear to consist of intramular, subfloor inhumations (Esin et al. 1991, 167, pl. 9/1). The deceased were buried in earthen pits under the floors of the rooms of mud-brick buildings usually in the «hocker» position. Sometimes the buried were wrapped in recd-matts. Usually the only gifts left with the burials were necklaces or bracelets made of stone beads. Among them there were also massive beads made of native copper or of hot worked copper sheets (Esin 1995).

3. SOME EVIDENCE FROM AŞIKLI FOR CLIMATIC FLUCTUATIONS DURING THE EARLY HOLOCENE

Data from Aşıklı which presumably indicates climatic conditions is scant but varied. It may be categorized according to archaeological, botanical and geomorphological evidence :

1. Archaeological Data

In the course of excavations at Aşıklı, particularly in the step trench 4 F-H to the North of the mound, has been observed that each settlement in each subphase of layer 2 changed slightly in plan in camparison with the preceeding settlement in an earlier subphase (figs. 3-5; Esin 1995, 70, fig. 5). As mentioned above, in each subphase one of the main mud-brick walls of houses/rooms were usually restored and reused during the next, higher subphase. However, other walls of the same houses/rooms were newly built and placed slightly inwards or outwards in the buildings. This then caused changes in the plans (figs. 3-5). According to the radiocarbon assesments of Aşıklı these renewals and rebuildings of the mud-brick walls and the formation of layer 2 subphases took place at very short time intervals (Table 1). Therefore, it may probably be suggested that the reason for these closely spaced renewals of walls and settlements in the subphases was connected with the humid climatic conditions. Even today, in many villages of Anatolia the mud-brick walls and roofs need to be restored almost every year if the precipation level is high. If this suggestion is correct, it may be assumed that during the time of layer 2 at Aşıklı, between ca. 8400-8900 B. P. (calibrated ca. 7400-8000 B. C.) the climate was humid (Table 1, figs. 1-5).

2. Botanical Data

This data consists partly of pollen record and partly of plant remains obtained from Aşıklı. In the deep sounding of the step trench 4 F-H in 1991, pollen carrots were taken by H. Woldring and H. Buitenhuis, from the virgin soil directly underneath the cultural deposit from a depth of 15.50 m (Woldring 1998,). According to Woldring the pollen diagram of Aşıklı may be compared to the Late Glacial pollen record of Akgöl (Adabağ/Ereğli) which is situated in the province of Konya and ca. 100 km Southwest of Aşıklı (Personal communication from Dr. Woldring in 1993; Woldring 1998, Bottema and Woldring 1984, 133-135; van Zeist and de Roller 1995, 180). Both records represent the flora of the Last Ice Age, consisting of low values of arboreal pollen and non-arboreal pollens of Akgöl even make up more than 90 % of the pollen sum (Woldring op. cit.; Bottema and Woldring 1984, 131-136).

The Late Glacial section of the Akgöl diagram, Subzone la has been dated by radiocarbon assesments between 13000-12500 B. P. (Bottema and Woldring Op. cit. 133). In ca. 500 years the climate was relatively dry, and evaporation played an important role (ibid). Steppe vegetation therefore prevailed during this subzone (ibid). Subzones 1b-1d of the Late Glacial of the Akgöl diagram are compared by the authors with Older Dryas, Alleröd and Younger Dryas of Western Europe (ibid. 134).

During subzone 1b of the Akgöl diagram between 12300/12200- 11720 B. P. a slight increase in trees probably indicates an increase in precipitation. Grasses are tought to have grown, a slight spread of birch (Betula) on the volcanoes (Hasandağ, Karadağ, Karacadağ) has been detected, and Cupressaceae began to grow on their slopes (ibid. 133).

Subzone 1c of the same diagram is dated between 11720-11160 B.P. A slow and steady increase in tree and grass growth continued. Oak and cedar appeared on the mountains and a grass-steppe vegetation occured in the plain with a strong decrease in Artemisia (ibid.). On the other hand, around 11160 B. P., during subzone 1d, which lasted a few hundred years, it seems as if a colder and drier climate was the reason for the revival of Artemisia, although trees on the mountains stayed alive (ibid.). According to the Akgöl diagram it seems that at about 10840 B. P. the steady spread in grass-steppe vagetation and the increase in trees such as Betula (birch) on the volcanic soils and a large amount of Hippophaë shrub occured (ibid. 134). This subzone has been compared by the authors with subzone 1c which was more humid and warmer than subzone 1d (ibid.).

During zone 2 of the same diagram, which has been assumed to be the beginning of the Holocene, between the years 9000-8040 B.P., important changes took place, particularly in the mountain belt of Hasandağ, Karadağ and Karacadağ (ibid.). According to the authors, deciduous oak trees spread, and Juniperus increased. Corylus, Ostrya and Carpinus orientalis began to grow. Steppic vegetation, mainly grasslands, prevailed in the Konya plain (ibid. 134).

According to uncalibrated radiocarbon measurements, the earlier part of zone 2 of the diagram is almost contemporary with the time span of the settlements in the subphases of Layer 2 at Aşıklı, although the taxa of trees and grasses are not the same in both places (Table 1; Bottema and Woldring 1984, 134; van Zeist and de Roller 1995, 181-182). In addition, cultivated plants, weeds and/or grasses, trees such as Pistacia, Amygdalus and Celtis grew in the vicinity of Aşıklı. Some pieces of charred wood discovered in the step trench 4 G-H to the North of the mound have also been collected as samples for dendrochronology. They have been identified by Kuniholm as oak trees (Personal communication from Dr. Kuniholm in 1993).

Since the pollen record of Aşıklı can be compared with Zone 1 of Akgöl, wich represents the last phases of the Late Glacial, it can be assumed that before 9000 B.P. the climate in the vicinity of Aşıklı was dry and cold (van Zeist and de Roller 1995, 180). It may be suggested that with the beginning of the Early Holocene between 9000-8400 B.P.,the climate changed and more warmer and humid conditions also prevailed in the vicinity of Aşıklı, if the plant taxa obtained from the excavated subphases of Layer 2 are taken into consideration (van Zeist and de Roller 1995, 181-182).

3. Geomorphological Data

As mentioned above a part of a settlement earlier than that of layer 2 of Aşıklı was discovered directly on the present bank of Melendiz river (figs. 6-7). This settlement was flooded by the waters of the same river, which probably ran at that time much further away from the site. After inundation, the settlement was overlain by a deposit of 1.5 m thickness consisting of gravel, sand, gravel and silt layers. This indicates a rapid flood and was most probably the reason for the end of the habitation at that level. It is not yet clear when and how the reoccupation of Aşıklı started again. In any case, it can be stated that the settlement which was submerged was earlier than the oldest habitation of layer 2 on the mound and be dated to before ca. 8900 B.P. because of the radiocarbon assessments of the same layer (Table 1, GrN 19116). Therefore, if this rapid flood will be accepted as an indication of a sudden climate change at the beginning of the Early Holocene, questions and answers should come from further geomorphological research.

4. CONCLUSIONS

As far as it is known, there is not yet conclusive evidence available from Anatolia to indicate that after a drastic change in climate a social collapse occured between the calibrated years 2200-1900 B. C. (cf. Mellink 1992, vol. I, 213-2220, vol. II, 177-178).

In order to better understanding the reasons and the cycles of the periodicity of global climatic changes at the beginning of the Holocene in Anatolia, an attempt has been made to provide some data obtained from excavations at the pre-pottery, neolithic site of Aşıklı (province of Aksaray) in Western Central Anatolia (figs. 1-2; Esin et al. 1991, 159-160, pls. 1-2; Esin 1994; 1995). This data can be categorized as archaeological, botanical and geomophological.

From top to bottom, the archaeological layer 2 of Aşıklı has been uncovered more extensively than the others. So far 10 subphases of the same layer have been brought to light, particularly in a step trench in squares «4 F-H» to the North of the mound. There, in a deep sounding, virgin soil was reached (figs. 1-2, 4-5; Esin et al. 1991, 161-163, pls. 4-6; Esin 1995, 72, fig. 5). The settlements in the subphases of layer 2 at Aşıklı have been dated by radiocarbon assessments as being over the time range ca.

8400-8900 B. P. (calibrated between ca. 7400-8000 B. C.; table 1; van Zeist and de Roller 1995, 179).

The pollen record was obtained from virgin soil in the deep sounding of the step trench «4 F-H». This was underneath the cultural deposit of layer 2 of Aşıklı which is earlier in date than 8900 B. P. According to Woldring, if compared with the pollen record of Zone 1 of Lake Akgöl (Adabağ, Ereğli/Konya province), ca. 100 km Southwest of Aşıklı. The pollen record should be dated to the Late Glacial Period of Zone 1 of lake Akgöl (Ereğli/Konya province Woldring 1998, personal communication from the author in 1993; Bottema and Woldring 1984, 133-135). According to the pollen record of Zone 1 of Akgöl the climate in Central Anatolia was dry and cold during the Late Glacial Period. This has been dated by radiocarbon assessments between ca. 13000-9000 B. P. Bottema and Woldring also accept that the Late Glacial Subzones 1b-1d of Zone at Akgöl may be compared with the Older Dryas, Alleröd and Younger Dryas of northwestern Europe (Bottema and Woldring 1984, 134). Therefore it can be assumed that the pollen record of Aşıklı may be dated at approximately just before 9000 B. P.

As mentioned above, a section of a settlement earlier than layer 2 of Aşıklı has been discovered directly on the present bank of the Melendiz river and which had been submerged under sedimentary deposits. The character of the soquence of the geological deposition directly above the settlement appears to indicate that the flood occured rapidly (figs, 1, 6-7). Although the reason for this inundation is not yet clear, some climatic factors may have been responsible for this catastrophic event. Archaeologically it is to be observed that after the inundation habitation at Aşıklı must have been interrupted for a while.

In light of evidence from zones 1 and 2 of Akgöl, it is clear after the dry and cold conditions of the Late Glacial Age, ca. 9000 B. P., with the introduction of the Holocene Period, important changes in the climate were initiated. If the beginning of settled life and plant cultivation at Aşıklı is taken into consideration, this flood episode of the settlement on the river bank may reflect milder but more humid conditions than before (van Zeist de Roller 1995, 181-182). Only more favorable climatic conditions could have been the reason for settled life of human communities who had been previously living in this region.

The closely spaced renewals of mud brick walls, as well as the occurence of settlements at short time intervals in the subphases of Layer 2 at Aşıklı may also indicate that humid climatic conditions continued in the vicinity of Aşıklı during the Early Holocene Period between ca. 8900-8400 B. P.

Certainly aforementioned assumptions and the hiatus between the submerged settlement and reoccupation in layer 2 of Aşıklı need further investigations and studies, not only archaeological but also in other fields related to climate research. In order to better understand the conditions of the Early Holocene Period in Central Anatolia multidisciplinary research projects should be initiated and supported.

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Aşıklı Calibrated ^{14}C Dates*

Lab.		Cal. yr B.C.			^{14}C yr B.P.	Cal. yr B.P.		Layer/ Phase	Trench	Room/Grid
GrN	19366	7479	7458	7442	8400 ± 40	9429	9408		3P	HG 5/d-e
GrN	19365	7484	7451	7449	8420 ± 30	9434	9401		3P	HG 2/e
GrN	19114	7534			8515 ± 40	9484		2	5L	CY 6/e
GrN	19868	7537			8530 ± 110	9487			7J	JA, 21, -0.95/1.
GrN	19358	7541			8550 ± 70	9491		2	4H	S 8/d
GrN	20355	7541			8550 ± 60	9491		8e	3R	NM, -9.70
GrN	19866	7543			8560 ± 40	9493			4H	JV, 2/e
GrN	30256	7543			8560 ± 60	9493			14AB	NV, -14.63
GrN	19359	7545			8570 ± 70	9495		1	4H	S 10/e
GrN	20041	7546			8575 ± 20	9496			6N	KY, 5-8/b-e
GrN	19862	7547			8580 ± 50	9497			3P	HK, 1-3/b-c
GrN	19364	7548			8585 ± 45	9498			3P	HK 2/d
GrN	19121	7549			8590 ± 80	9499		2	2K	AN G under
GrN	19361	7570			8595 ± 60	9520		2	6J	GD 7/b
GrN	18619	7575			8610 ± 55	9525		1b	2R	AA 9/a-b
P	1239	7575			8611 ± 108	9525			N Slope	
GrN	19362	7580			8630 ± 30	9530		2	6J	GD 8-9/c
GrN	19867	7580			8630 ± 50	9530			2R	LS, 7/g
GrN	19863	7583			8640 ± 20	9533			7L	JA, 5-6/b
GrN	19861	7612			8670 ± 60	9562			7J	JA, 3/g
GrN	20351	7612			8670 ± 40	9562		2b	5J	BI, -1.179
GrN	19363	7670	7623		8675 ± 25	9620	9573	2b	4H	C 1/g
GrN	19360	7695			8695 ± 25	9645		2	4H	C 7 Fire place
GrN	19115	7830	7700		8710 ± 100	9780	9650	2	4J	EN 8k
GrN	19117	7830	7700		8710 ± 130	9780	9650	2	2K	AN 10/c
GrN	20354	7834	7828	7699	8710 ± 70	9784	9778	2a	4J	EN, -2.47
GrN	18620	7845	7824	7702	8720 ± 55	9795	9774	2	3J	AM 2/h-i
GrN	19860	7845	7824	7702	8720 ± 50	9795	9774		7J	JA, 6/i
GrN	19870	7845	7824	7702	8720 ± 80	9795	9774		6N	KY, 5-8/b-e
GrN	20352	7845	7824	7702	8720 ± 40	9795	9774	2c	4K	CK, -3.25
GrN	20684	7845	7824	7702	8720 ± 70	9795	9774		14AB	NV, -14.63
GrN	18618	7850	7822	7703	8725 ± 50	9800	9772	2b	3J	İ 4-5/g
GrN	18617	7857	7820	7705	8730 ± 45	9807	9770	2	4H-G	E
GrN	19869	7870	7816	7707	8740 ± 70	9820	9766		6O	LB, 617/b
GrN	20353	7870	7816	7707	8740 ± 60	9820	9766	2e	4G	MS, -4.92
GrN	19118	7885	7805	7730	8760 ± 45	9835	9755	2	2K	AN 10/c
GrN	19119	7885	7805	7730	8760 ± 40	9835	9755	2	2K	AN
GrN	19858	7892	7782	7765	8770 ± 90	9842	9732		4H	JY, 7-9/c
P	1242	7896	7761	7739	8778 ± 128	9846	9711		NW	
P	1241	7904	7754	7747	8793 ± 127	9854	9704		NW	
P	1238	7912			8807 ± 128	9862			N Slope	
GrN	19120	7916			8815 ± 70	9866		2	2K	AN 9/b
GrN	20349	7930			8840 ± 50	9880		2e	4H	MS, -4.68
GrN	19865	7952			8880 ± 70	9902			4H	JY
GrN	19116	7973			8920 ± 50	9923		2	2J	FF 6/b
P	1240	8016			8958 ± 130	9966			NW	

(*) For calibration «CALIB rev. 3.0.3» has been used with calibration dataset 1 and calculation methode A : Intercept with curve. (M. Stuiver - P. Reimer : Quaternary Isotope Laboratory/University of Washington).

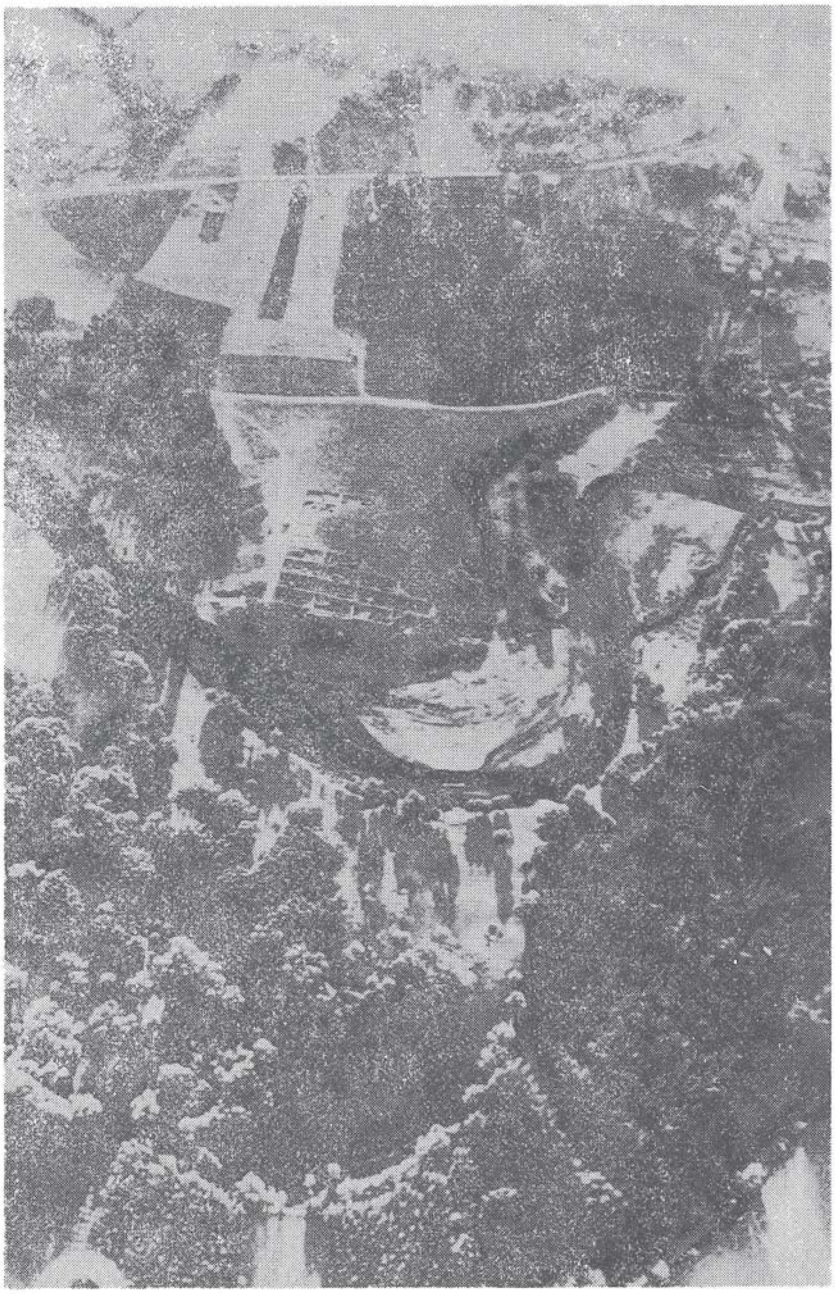

Fig. 1 — Air view of Aşıklı with the Melendiz river and its valley. Seen from the West.

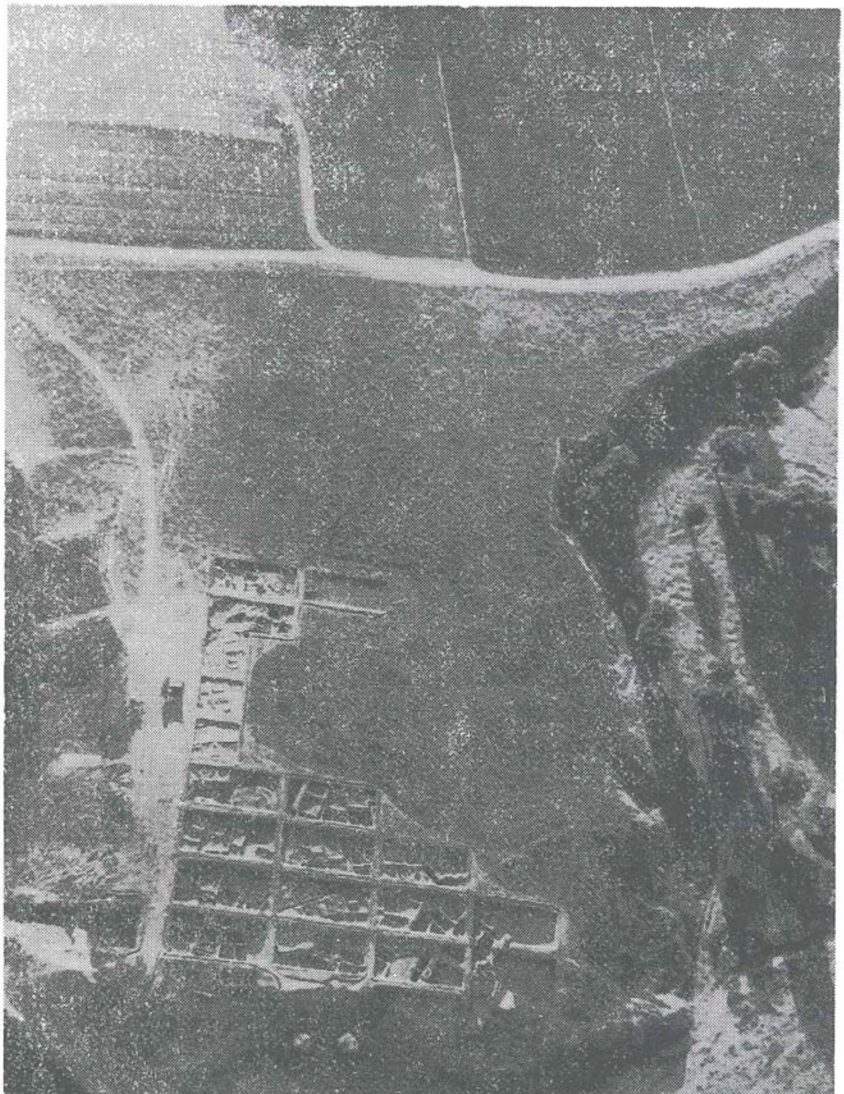

Fig. 2 — Air view of Aşıklı. Layer 2. To the North of the mound, step-trench «4 F-H». Seen from the West

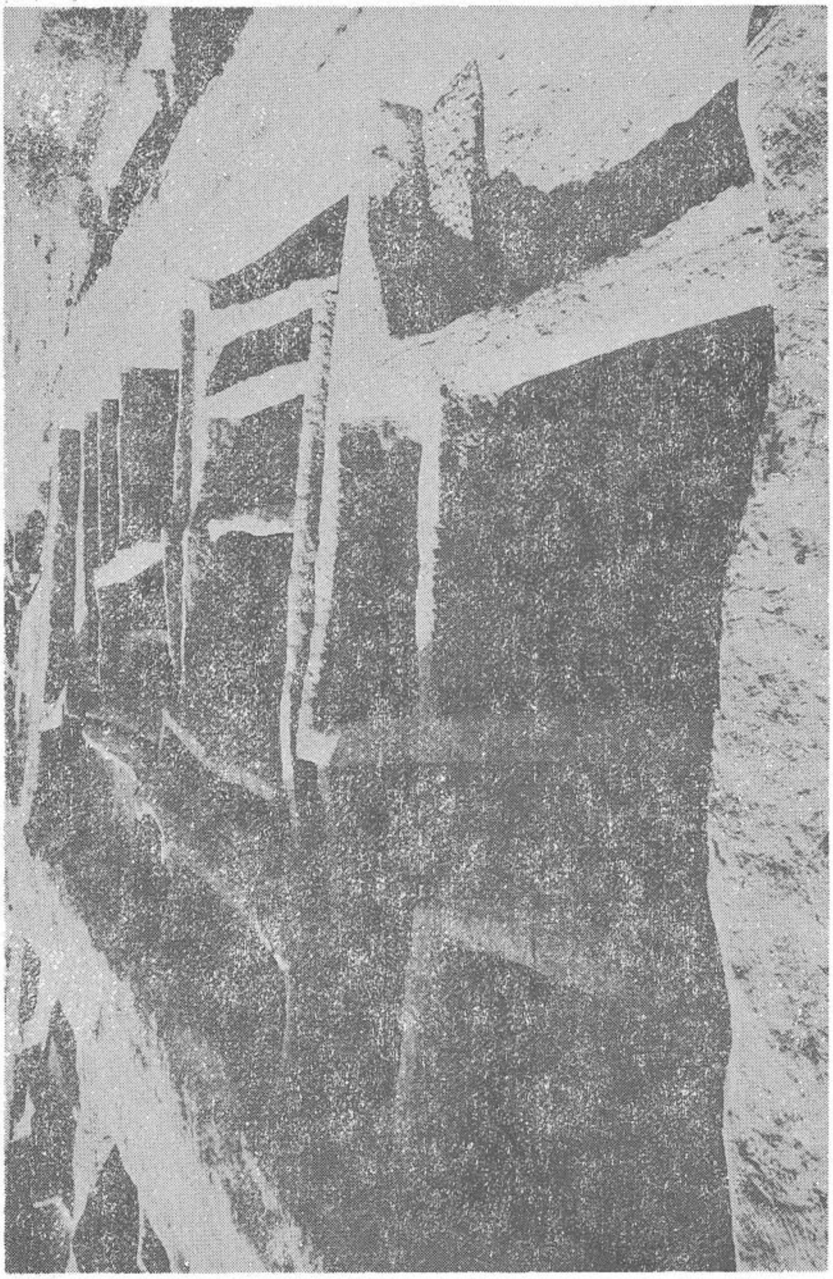

Fig. 3 — Aşıklı. Layer 2. Trench 4 J-K. The renewals of mud-brick walls in subphases 2a-2c. Seen from the Northwest.

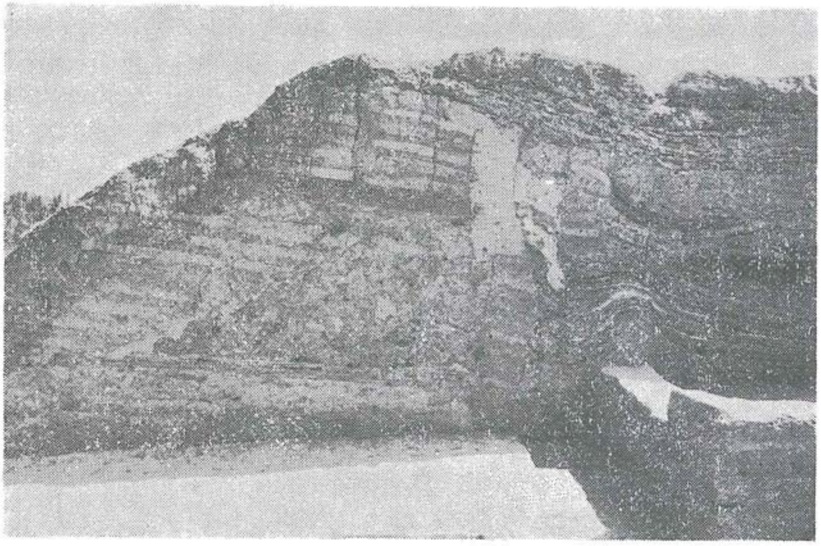

Fig. 4 — Aşıklı. Layer 2. East profile of the step-trench «4 G-H». The renewals of the mud-brick walls in the sub-phases 2b-2d. Seen from the West.

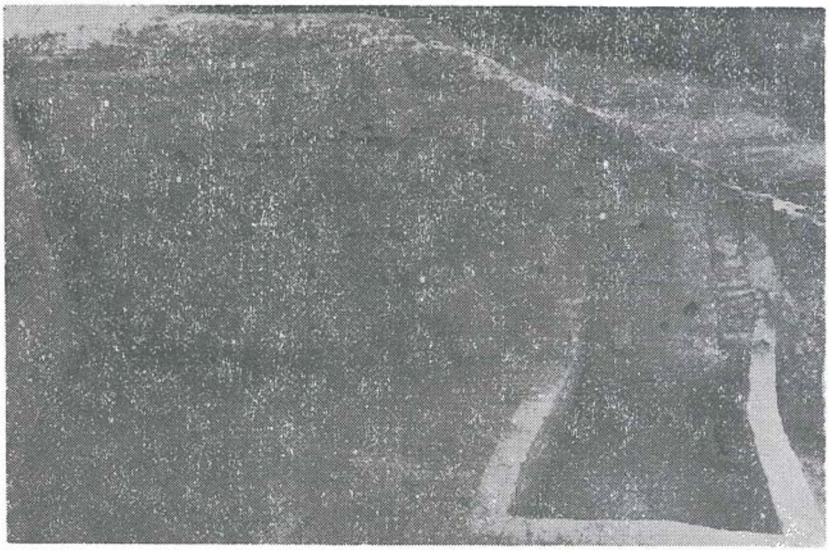

Fig. 5 — Aşıklı. Step-trench 4 F-G. Renewals of mud-brick walls of houses/ rooms in different sub-phases at short time intervals. Seen from the East.

Fig. 6 — Aşıklı. A section of the flooded settlement on the present bank of the Melendiz river. Overlain by the flood deposit. Seen from the Northeast.

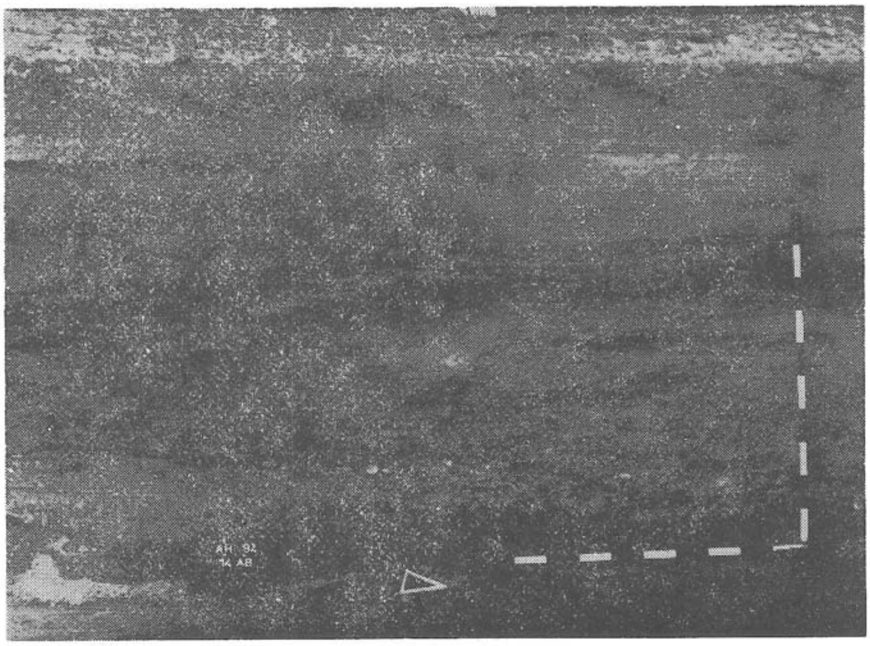

Fig. 7 — Aşıklı. Layers of flood deposit. Seen from the East.