A Letter from the Director Lutgarde Vandeput

Climate History of Anatolia and the Black Sea
   A history of Holocene climatic and cultural change in Cappadocia Neil Roberts

Frontiers of the Ottoman World
   Historical-archaeological investigations at Akkerman (Bilhorod-Dnistrovsky) fortress, Ukraine, 2010
   Svitlana Bilyayeva, Olena Fialko, Alex Turner and Tomasz Wazny

   Islam, trade and politics across the Indian Ocean: links between Southeast Asia and the Ottoman
   Empire, 16th–20th centuries Andrew Peacock

Settlement History of Anatolia
   The Boncuklu Project: investigating the beginnings of agriculture, sedentism and herding in central
   Anatolia Douglas Baird

   Domuztepe 2010 Stuart Campbell

   The Cide Archaeological Project 2010 Claudia Glatz, Bleda Düring and T. Emre Şerifoğlu

   The Avkat Archaeological Project 2010 John Haldon, Hugh Elton and James Newhard

   A decorated house found at Çatalhöyük Ian Hodder

   The Aşyan sites zooarchaeological study Evangelia Iocnnidou

   Kilise Tepe 2010 Mark Jackson and Nicholas Postgate

   Çaltular Survey Project 2010 Nicoletta Momigliano, Alan M. Greaves, Tamar Hodos and Belgin Aksoy

   The Kerkenes Project 2010 Geoffrey and Françoise Summers, Scott Branting and Joseph W. Lehner

   Pisidia Survey Project 2010: the high and the low in the territory of Pednelissos
   Lutgarde Vandeput, Veli Köse and Mark Jackson

Special Report
   John Garstang’s photographs of Turkey Alan M. Greaves

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Historical/archaeological investigations at Akkerman (Bilhorod-Dnistrovsky) fortress, Ukraine, 2010
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The interdisciplinary study of Akkerman fortress continued in July 2010 with archaeological investigations to determine the nature and depth of the ditch; further work on wood samples for dendrochronological dating; and geophysical prospecting of various parts of the fortress not previously surveyed.

The archaeological works involved an excavation in the ditch at T20 (see website – www.akkermanfortress.org – for location, passim), close to the banks of the Dnister liman (estuary) shore. There, a trench measuring 4m by 12.85–13.50m was dug across the ditch bottom. It reached a maximum depth of 1.55m from the present surface of the ditch on the scarp side and 0.88m on the counterscarp side; it could not be dug deeper because of waterlogging owing to this year’s high level of the Dnister. At this point the ditch had a depth of at least 8.55m below the modern ground surface. Three phases of construction became evident: (1) adoption of a natural channel cut through the rock by the force of the Dnister; (2) levelling with limestone blocks of the rock base where the revetment of the scarp and counterscarp were to be built; (3) construction of the scarp and counterscarp. Towards the top of the inner revetment of the ditch two features were noted: an arched setting that may have originally contained an inscription or relief and nearby a stone cannon ball incorporated in the revetment.

At the bottom of the left side of the scarp end of the trench the foundation and footing courses of a previously unexposed tower were discovered (to reveal these fully it was necessary to dig an additional trench 8m along the scarp and 3.5m wide). This remnant – with overall measurements of 3.01m along the northwest face, 6.10m along the southwest face and 2.65m along the southeast face – appears to be only the front half of the tower (T20a). A maximum of five courses of masonry survive in situ, standing to a height of between 80–100cm, the fourth course having a chamfered face, while holes for beams supporting an internal wooden floor were recorded on the inner faces of the two short sides. In the hollow interior of the tower, three stone steps were found. The masonry was set in a lime mortar, and mortar samples were collected for petrography and micro-structural analyses. A tower in the same location as this remnant is shown on several of the Russian plans of the fortress that date to between AD 1770 and 1807, and on the grounds of its apparent similarity to other towers built into the scarp (T3a, T12a, T19a) it can be assumed to have been a part of the original Moldavian fortifications. Evidently at least part of the ditch inner revetment hereabouts was built after T20a was demolished.

The stratigraphic sequence in and around the newly-unearthed tower remnant is still under analysis, and so it is not possible as yet to give a date for this structure. However, sgraffito and Miletus ware prevailed among the material excavated from the tower and nearby. Besides these, there were sherds of Iznik and Kutahya types, different forms and types of glazed and unglazed Ottoman ware, some European and Russian china, including examples of English transfer-printed wares. There were also several tobacco pipes, some with stamps (including Arabic script inscriptions and one bird image), while metal finds included iron horseshoes, numerous cannon balls and Tatar, Ottoman and Russian coins.

The dendrochronological team concentrated on laboratory examination of samples collected during the two previous seasons, 2008–2009. Most of the sample timbers used for construction came from regular and slow-growing trees, mainly oaks, and their tree-ring structure was favourable for dendrochronology – meaning that the samples chosen for study had a sufficient (>60) number of tree-rings. Timbers preserved in structures of the fortress were divided into two groups: ‘Akkerman-early’ (second half of the 15th century), representing the Moldavian/early Ottoman period, and ‘Akkerman-late’, based on timbers from the late Ottoman period (18th century).

‘Akkerman-early’ is relatively diverse chronologically, the time-span between the oldest and youngest timber in this group being almost 70 years. Timbers belonging to this group were used in the construction of the Citadel and the Barbican; in towers T20, T21 and T30 (Fisher Tower); in gates T6 and T22; in the half-tower in front of T3; and in the structure of the southern curtain wall, close to T15. These timbers represent different forest stands, but grew in the same geographical region, probably in the northern part of the Dniester river basin.

The ‘Akkerman-early’ oak chronology was successfully cross-dated against existing oak chronologies from Slovakia and southeast Poland, and shown to cover the period AD 1356–1507. Thirty two timbers of this group can be
absolutely dated, some of them with annual precision (felling year of the tree). The trees harvested for these timbers were cut between the winter of AD 1438/1439 and the winter of AD 1507/1508. A few months should be added for transportation down the Dnister. This dating locates in time the first chapters of the history of Akkerman fortress as it now stands. Details of the dendrochronological dating of the Moldavian/early Ottoman period will be presented in forthcoming papers.

In 2010 sampling action was focused on gathering additional material which survived the so-called restoration in 2008 of T30 (Fisher Tower): an undated group of these timbers from the late Ottoman period convinced us to undertake supplementary sampling in the ditch with the aim of extending the ‘Akkerman-late’ tree-ring chronology backwards. Preliminary survey revealed that the most promising timbers for future sampling are preserved in the ditch between T11 and T13. Dendrochronological work at Akkerman was synchronised with the National Geographic project ‘Bridging the gaps in tree-ring records: creating a high-resolution dendrochronological network for southeastern Europe for dating of historical objects and evaluation of regional climate patterns’, which should produce reference material to assist in the absolute dating of the ‘Akkerman-late’ chronology.

Nine areas of geophysical survey were completed in 2010, using a Transient Technologies VIY2-300 GPR and Synchro2 software. Subsequent processing and the production of vertical data slices were achieved with a combination of Synchro2, ReflexW, ArcGIS and a custom-written program. Survey areas 4, 5, 6 and 9 were within the garrison ward, where significant stretches of modern cobbling made GPR the only realistic tool. Preliminary processing of the data reveals linear anomalies in areas 4, 5 and 6 that corroborate the results from the 2007 and 2008 surveys. Area 9 produced the most interesting anomaly, the apparent remains of a rectangular feature within the garrison ward to the east of the Citadel.

Two surveys were undertaken in the civil ward: area 1 close to the minaret and area 3 in the southeast corner north of tower 11. Survey 1 detected only the remains of walls associated with the former mosque while survey 3 revealed that a wall first detected during the 2007 season as a partial linear feature makes a return at an obtuse angle, eastward, south of tower 10.

Three other areas, outside the fortress, were surveyed. Area 2a-b lies just northwest of the 2010 excavation trench at the northwestern end of the ditch and area 7 to the northwest of T20. The narrow area surveyed and the limited number of transects made interpretation of the data difficult, and the results, despite some evidence for structural remains, patchy and inconclusive. Area 8, within the Port Yard, confirmed the continuance of the now missing section of wall to the northeast of tower 27. When further processing and enhancement of the data and its integration with resistance and magnetic data from previous survey is undertaken, it is likely that the nature of some of the more elusive features detected in 2010 will be clarified.

A topographic survey of the fortress grounds was undertaken using a Trimble 3M total station. This should complement the geodesic survey of the actual fortress and allow for completion of a 3D model of the site.

Budgetary constraints meant that the historical team could not be at Akkerman this season. It continued to study the Akkerman-related documents from the Ottoman archives while the collection of plans of the fortress was augmented with further material from Moscow libraries.

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