

Appendix I

Site summaries

Middle Neolithic

Virovitica-Brekinja

The excavation site of Virovitica–Brekinja is situated in a lowland region, west of Virovitica. Between June and August 2005 rescue excavations were conducted at the site by Tanjana Sekelj Ivančan (Institute of Archaeology, University of Zagreb) and Jacqueline Balen (Archaeological Museum Zagreb). Excavations revealed the edge of a single-layered, late Starčevo culture settlement extending over 5,400m² (Sekelj-Ivančan and Balen 2006). Within the trench work areas, fencing and a section of a house (the rest was located outside the trench line) were identified. Finds included worked stone, querns, grinding stones, pottery and a female figurine (*ibid.*). AMS dates of *ca.* 5400-5200 cal BC have been retrieved from the site (J. Balen. 2011, pers. comm.). Five samples (*ca.* 55 litres) were collected from pits excavated within the settlement area.

Late Neolithic

Turska Peć

Turska Peć cave is situated above the hamlet of Zeljovići at the height of about 355 metres above sea level, near Dugi Rat along the Dalmatian coast. Small-scale excavations began in 1989 and identified a multi period site including Late Neolithic deposits (Kliškić 2006a). In 2003 the Archaeological Museum Split began systematic excavations directed by Damir Kliškić. These excavations are still ongoing. From pottery typologies, deposits dating to the Late Neolithic Hvar culture have been identified. To date three trenches have been opened (Fig I). Finds include pottery, stone tools, animal bones and small personal ornaments (Kliškić 2006b; Kliškić 2007). During the 2008 excavation season, 13 samples (186 litres of sediment) were collected from levels dating to the Hvar period in Trench 2 (2x3m²) and nine samples (118 litres) from the same period within Trench 3 (2x2m²).

Čista Mala - Velištak

The archaeological site of Čista Mala – Velištak is situated in Velimsko polje (Velim plain) to the north of Vodice in Dalmatia. The site was discovered in 2007 during construction work and excavations subsequently began in the same year by Emil Podrug (Šibenik Municipal Museum). The excavations are still ongoing. To date six trenches have been opened (A-F) covering over 196 m² (Fig II). Initial pottery analysis suggested that the settlement dated to the Late Neolithic Hvar culture. This was later confirmed by two radiocarbon dates, which ranged from 4900-4700 BC (Podrug 2010). Traces of house floors, fireplaces and pits have been identified within the four trenches. In particular, pits SU24 and SU46 showed periodic layering of soil and hearths (*ibid.*). Seventeen samples were collected from Trench A (6.5x5m²), two from B (5x5m²), four from C (5x5m²) and five from D (5x6.5x2.5m).

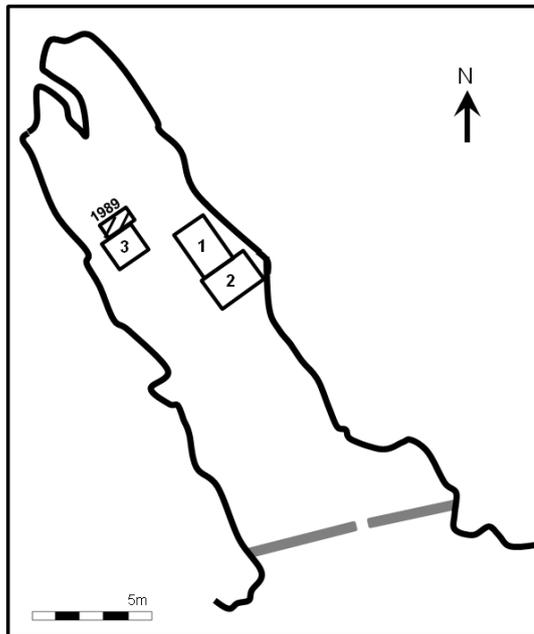


Fig I. Turska peć trench locations. After Kliškić 2007:535.

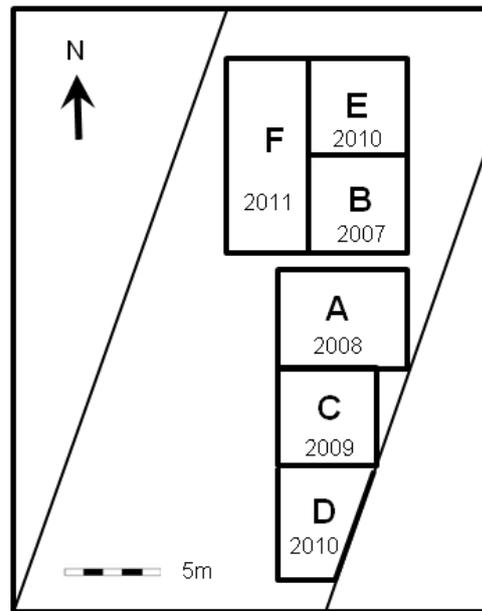


Fig II. Čista Mala Velištak trench locations and year excavated (E, Podrug 2012, pers. comm.)

Ivandvor-Gaj

The site of Ivandvor – Gaj is situated on an elevated ridge, 3.5 km west of Đakovo and was excavated during 2005-2007 by the Institute of Archaeology, University of Zagreb and the Archaeological Museum Zagreb. This excavation was conducted due to the construction of the A5 motorway, from Beli Manastir to Osijek. An area of 16,000m² was excavated, revealing structures dating mainly to the Late Neolithic,

Roman and Medieval period (Balén *et al.* 2009; Lipovac Vrkljan and Šiljeg 2006). The earliest settlement dates to the Sopot culture which is potentially enclosed by a circular ditch (Balén *et al.* 2009). A number of small and large pits were identified, but no houses or hearth features were recognised. AMS dates have produced two clusters: 5050-4780 and 4730-4490 (*ibid.*). Fourteen pits were sampled (*ca.* 154 litres) from the Sopot settlement.

Sopot

The eponymous site of Sopot is situated 3 km south-west of Vinkovci, on the right bank of the river Bosut. The tell site is elliptical in shape, measuring 113m by 98m and 3 metres deep. Previous excavations have been conducted by M. Klajn in the late 1930s and S. Dimitrijević in 1967 (Dimitrijević 1968). Systematic excavations at Sopot were conducted between 1996 and 2008 by Vinkovci Municipal Museum, directed by Maja Krznarić Škrivanko. A total of 376m² was excavated from a 37m long section transecting the settlement, beginning in the south-west corner (Krznarić Škrivanko 2000, 2003)

Three Late Neolithic Sopot phases have been identified at the site as well as an Early Neolithic Starčevo settlement (Krznarić Škrivanko 2011). During the early Sopot phase (5050-4550 BC), a fortified ditch, 6m wide and 6m deep, surrounded the settlement (Krznarić Škrivanko 2003). The ditch is clearly seen from the magnetic survey conducted at the site during 2010 (Fig III). At the end of phase I the ditch was filled in and during phase II (4790-4320 BC) the settlement expanded (*ibid.*). One house (SJ23) excavated above the ditch was rectangular with the dimensions 6.70 x 4m and had evidence of internal room divisions and artefacts such as grindstones, blades, burins, clay weights and pieces of bracelet and pendant made of the *Spondylus* shell (*ibid.*). The final Sopot phase has been dated to 4340-3940 BC (Krznarić Škrivanko 2011). Building cycles at the site are typically characterised by the burning of an old house, which is then covered with a layer of soil, before a new house is constructed.

In 2000 one environmental sample was sent to the Botanical lab in Zagreb University to be processed. This sample yielded grains of spelt (*Triticum spelta*) and bread wheat (*Triticum aestivum* ssp. *vulgare*) and a C14 date of 4540-4310 cal BC

was retrieved (M, Krznarić Škrivanko 2007, pers. comm.). A total of 144 samples (2,842 litres) were collected from across the excavated area (Fig III).

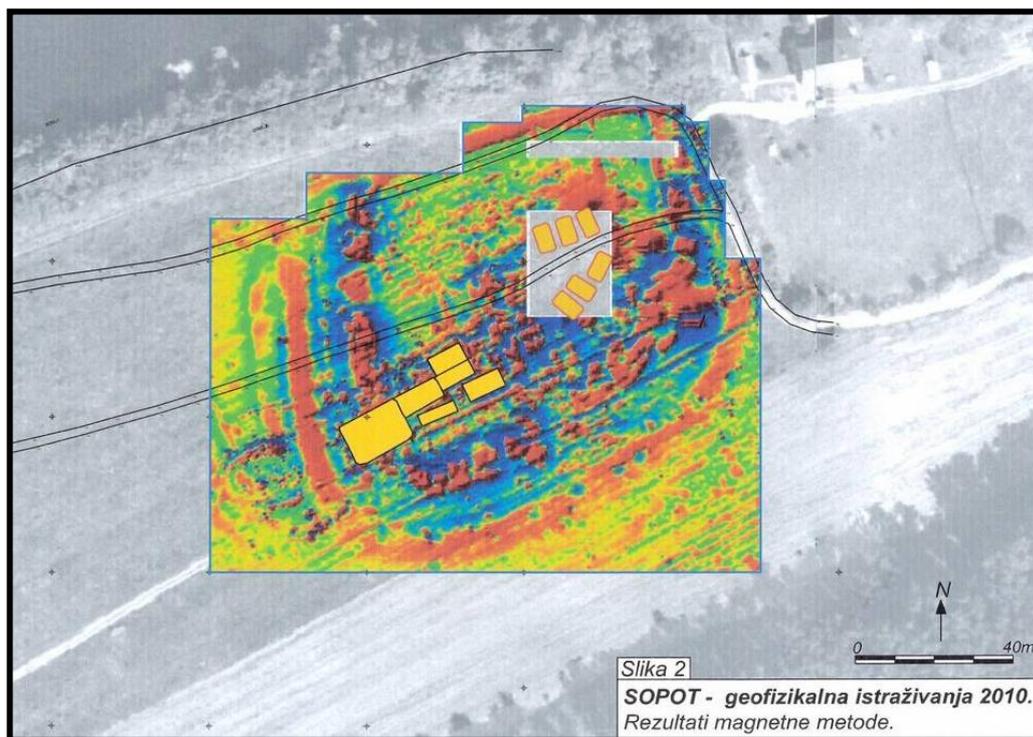


Fig III. Detailed magnetic survey of Sopot including the position of the 1996-2008 excavation trenches (in yellow) in the bottom left of the settlement. Courtesy of Vinkovci Municipal Museum.

Ravnjaš

Test excavations began at Ravnjaš near Nova Kapela in 2006 by Nova Gradiška Municipality Museum, directed by Marija Mihaljević. Between 2006 and 2008 excavations revealed a phase 2 Sopot Culture tell settlement (Mihaljević 2006a, 2007b, 2008a). A series of house floors and pits were excavated and a considerable amount of pottery, lithics and flat weights were recovered from two trenches (1 and 2). During the excavations, 48 samples (528 litres) were collected from features in Trench 1 and 23 samples (*ca.* 253 litres) from Trench 2.

Late Neolithic/Copper Age

Slavča

Slavča is located 1km north of Nova Gradiška, on the Slavča Hill, which is part of the Psnj mountain range. The tell site has been continuously excavated since 1997 by Nova Gradiška Municipality Museum, directed by Marija Mihaljević. To date a

number of trenches have been opened across the settlement covering an area of over 500m² (Mihaljević 2004, 2005, 2006b, 2007c, 2008b, 2009). Pottery styles have indicated a number of cultures at the site such as Sopot, Lasinja, Kostolac and Vučedol Cultures (Skelec 1997). Numerous pits, postholes and general occupation layers have been excavated producing a large amount of pottery, lithics and animal bones (e.g. Miculinić and Mihaljević 2003; Šošić and Karavanić 2004). Between 1999 and 2007, 82 samples (*ca.* 902 litres) were collected from all four cultural phases across the settlement.

Copper Age

Đakovo-Franjevac

During 2007, rescue excavations directed by Jacqueline Balen (Archaeological Museum Zagreb) were conducted at Đakovo-Franjevac prior to the construction of the A5 motorway from Beli Manastir to Osijek. The site is located on an elevated position 2 km northeast of Đakovo. A total of 36,000m² was excavated revealing a large Copper Age settlement and a smaller Medieval site (Balen 2007a). AMS dates suggest the prehistoric settlement spanned the period 3300 - 2700 BC and the pottery belongs to the Kostolac Cultural tradition (Balen 2011:9). Numerous features were identified at the settlement including pits, fences, hearths, as well as a burial and most importantly pit dwellings revealing both work and residential areas (*ibid.*). Eighteen pits were sampled, including an irregularly shaped pit (SJ19), 7x5m and 0.7m deep, which contained 3 ovens exhibiting intensive burning within the feature. A storage pit that was subsequently turned into a burial pit (SJ160) containing a man and two animals was also sampled (Balen 2011:88). A total of 29 samples (*ca.* 302 litres) were collected.

Jurjevac – Stara Vodenica

During 2008, rescue excavations directed by Jacqueline Balen (Archaeological Museum Zagreb) were conducted at Jurjevac-Stara Vodenica prior to the construction of the A5 motorway from Beli Manastir to Osijek. The site is located on a mildly elevated position next to the Vuka River, 5 km north of Đakovo. A total of 16,000m² was excavated revealing two small prehistoric settlements and a Medieval site (Balen 2008a). AMS dates from one of the sites spanned the period

4320 - 3960 BC and contained pottery belonging to the Lasinja Cultural tradition, while the other dates to the Middle Bronze Age (*ibid.*). At the Copper Age site no houses or hearth features were identified, only a number of pits were present. Twelve samples (*ca.* 132 litres) were taken from 12 pits within the Copper Age settlement.

Pajtenica-Velike Livade

During 2006, rescue excavations directed by Jacqueline Balen (Archaeological Museum Zagreb) were conducted at Pajtenica-Velike Livade, located to the north of Đakovo, prior to the construction of the A5 motorway from Beli Manastir to Osijek. A total of 18,000m² was excavated revealing the existence of two settlements, one from the Copper Age and one to the late Middle Ages (Balen 2006a). AMS dates suggest the prehistoric settlement spanned the period 4350 - 3540 BC and pottery from the site belongs to the Lasinja Culture (*ibid.*). Only a small section of the settlement was examined due to the extent of the excavation line but pits and pit dwellings were identified. Twenty seven samples (*ca.* 297 litres) were collected from 25 pits within the Copper Age settlement.

Potočani

The site of Potočani, located to the west of Velika in the Požega valley was initially surveyed in 2000 and 2003 when a number of prehistoric and medieval settlements were identified. A probe trench was subsequently excavated in 2007 by Hrvoje Potrebica (Institute of Archaeology, University of Zagreb) and Jacqueline Balen (Archaeological Museum Zagreb). Excavations revealed a large burial pit filled with 50 individuals of different ages and sex (Balen 2007b). The manner of deposition suggests that the bodies were not buried *per se* but dumped in a mass grave (*ibid.*). Pottery within the pit is that of the Copper Age Lasinja Culture and an AMS date of one of the bones is from 4200 BC (Balen 2007b). Five samples (*ca.* 55 litres) were collected from the burial pit.

Vučedol

The latest large-scale excavations at Vučedol began in 1984, involving the Archaeological Museum Zagreb, Zagreb University and the Municipal Museum of Vukovar. The site is currently directed by Jacqueline Balen (Archaeological Museum

Zagreb). The Copper Age tell settlement is situated on the right bank of the Danube, in eastern Slavonia, 5 km east of Vukovar. The settlement occupied four flat-topped mounds, up to 5m above the surrounding land (Forenbaher 1994). Excavations over the last two decades have focused on Streim's Vineyard (Fig IV). The settlement can be roughly divided into three occupational phases: the earliest characterized by early, classic Baden pottery; the next by Kostolac pottery; and the latest by classic Vučedol incrustated ware (Forenbaher 1994).

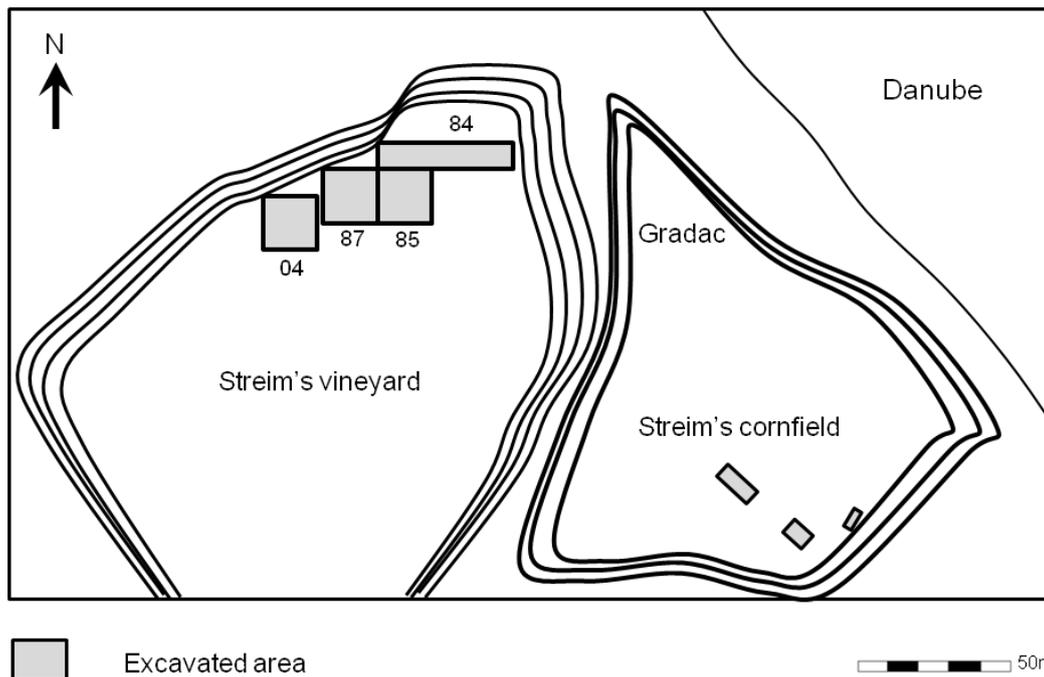


Fig IV. Map of three of the mounds upon which the Vučedol settlement is located and the excavated trenches. Adapted from Balen 2005b:43

Between 2004 and 2008 a new trench was opened (04, Fig IV) covering 400m² within which Vučedol culture levels were excavated (Balen 2004, 2005b, 2007c, 2008b). A number of house floors were discovered situated E-W and SJ56 in particular showed 3-6 episodes of restoration where 2-6 cm of flooring was periodically relaid (Balen 2008b). Within the house floor of SJ54, along with other moveable finds, was discovered a decorated clay model boot (Balen 2007c). Thirty five samples (385 litres) were collected from trench 04 during 2005-2008, including twelve samples (132 litres) from SJ54 and nine (99 litres) from SJ56.

Virovitica-Bateliје

During 2005 an area of 4500m² was excavated, directed by Jaqueline Balen (Archaeological Museum Zagreb), in response to plans to build the Virovitica bypass. Located in the lowland area west of Virovitica, the site of Virovitica-Bateliје has been extensively damaged by intensive ploughing. AMS dates suggest the prehistoric settlement spanned the period 3700 to 3400 BC and artefacts from the site belong to the Retz-gajary and Boleraz Cultural traditions (Balen 2006b). The trench encompassed only a small part of the settlement which stretched out in a SW-NW direction from the bypass. A number of pits, postholes and channels were identified; however, no houses or hearth features were preserved (*ibid.*). Three samples (33 litres) were collected from three pit features from the Copper Age settlement.

Vinkovci/Matije Gupca 14

In 2007, rescue excavations were conducted at the address of 14 Matije Gupca in Vinkovci, near the river Bosut. Due to the area being in the registered and protected archaeological zone of Vinkovci town, full excavations were conducted by Maja Krznarić Škrivanko, Anita Rapan Papeša and Hrvoje Vulić (Vinkovci Municipal Museum). An area of 250m² (15.05 x 16.65m) was excavated (Miloglav 2007). Sixty two stratigraphic units were recorded from the Late Neolithic, Copper Age and Roman period, including 16 pits and a sequence of 6 Vučedol house floors (Krznarić Škrivanko 2007; Miloglav 2007). Four samples (216 litres) were collected from three pits dating to the Copper Age Vučedol culture.

Neolithic/Copper/Bronze Age*Tomašanci – Palača*

During 2008, rescue excavations, directed by Jacqueline Balen (Archaeological Museum Zagreb), were conducted at Tomašanci – Palača prior to the construction of the A5 motorway from Beli Manastir to Osijek. The site is located on a ridge and descends down to a flat, lowland, marshy area, 8km north of Đakovo. A total of 64,000m² was excavated revealing Early and Late Neolithic levels, two middle Copper Age settlements and an Early Bronze Age site (Balen 2008c). AMS dates from the Late Neolithic levels date to *ca.* 4300-3900 BC, while the Copper Age site

dates to *ca.* 3700-3600 BC. The pottery traditions also ranged from the Neolithic to Bronze Age including Starčevo, Sopot, Lasinja, Retz-gajary and Vinkovačka cultural groups (J, Balen 2012, pers. comm.). A number of pit features were identified as well as pottery, animal bone and worked stone (Balen 2008c). In total 55 samples were collected from three different periods, one sample from a Sopot pit, 26 from the Copper Age settlement and 28 from the Early Bronze Age site.

Late Bronze Age

Mačkovac-Crišnjevi

Systematic excavations began at the site in 1997, directed by Marija Mihaljević (Nova Gradiška Municipal Museum). The settlement is located 1 km north of Mačkovac which is situated on the left bank of the Sava River, approximately 15 km south of Nova Gradiška, Croatia. The settlement is elevated up to 2m above the floodplain and covers an area of approximately 2 hectares (Karavanić et al. 2002). Three trenches were opened in 1997 and 1998 covering around 323m². Numerous features have been identified within the excavated area including house floors, hearths, pits and in particular evidence of a metallurgical work area (ibid.). Previously a Bronze Age hoard was recovered from the site in 1985 and since then further bronze items as well as pottery and animal remains have been found (Karavanić et al. 2002). The identification of a number of bronze needles and pottery types have dated the site from the middle to beginning of the Late Bronze Age, concurrent with the Virovitica group and culturally belonging to the Barice-Gredani group (ibid.). Between 2000 and 2003, 28 samples (308 litres) were collected from 18 features.

Crišnjevi – Oštrov

Crišnjevi – Oštrov is a Late Bronze Age necropolis and is believed to have belonged to the nearby settlement of Mačkovac-Crišnjevi. Between 2003 and 2009 excavations were conducted by Marija Mihaljević (Nova Gradiška Municipal Museum). To date the excavations have revealed 73 graves, belonging to the Barice – Gredani group (13th -12th century BC) of the Urnfield Culture (Mihaljević and Kalafatić 2005, 2008, 2009; Mihaljević 2007a). All the graves show a similar burial ritual, where the burnt bones of the deceased are collected into a vessel and laid into

the ground upside down (Mihaljević and Kalafatić 2008). Three samples (33 litres) were collected from three different grave areas, although two (from area M10) were from two closely associated graves.

Orubica-Veliki Šeš

During 2007 a test trench was excavated north of Orubica to establish whether archaeological remains were present. Directed by Marija Mihaljević (Nova Gradiška Municipal Museum), an area of 50m² was examined, revealing the remains of a Late Bronze Age settlement, *ca.* 13th – 12th century BC (Mihaljević and Kalafatić 2007). Features such as a house floor, hearth, ditch and pits were identified along with pottery and bone (*ibid.*). Two samples (22 litres) were collected from two different general occupation levels.

Feudvar

Feudvar is located on the western edge of the Titelski Breg Plateau near the modern village of Mošorin. The loess plateau is 50m high, 17 km long and 7 km wide. It is situated in a broad flood area called Šajkaška on the western fringe of the convergence of the Tisa and Danube rivers in the wider region of Vojvodina (Hänsel and Medović 1998). Vojvodina is a part of the larger fertile lowlands of the Pannonia Plain, and has similar climatic and geological characteristics to Slavonia in eastern Croatia. Directed by P. Medović, Museum of Vojvodina, Novi Sad, and B. Hänsel, Freie Universität, Berlin, substantial excavations and environmental recovery were conducted on the core Bronze and Iron Age fortified tell settlement of Feudvar between 1985 and 1990. The archaeobotanical work was undertaken by Prof Helmut Kroll, Kiel University, Germany. To date a number of publications exist on the archaeological remains, including an archaeobotanical summary of the results from the site as well as a more detailed report of the Early Bronze Age levels (e.g. Kroll 1997; Kroll 1998). From these reports it is clear that the archaeobotanical remains from this site are extremely rich, especially for the region. With the kind permission of Prof Helmut Kroll and the current director Prof Frank Falkenstein (University of Würzburg, Germany), samples collected in 1988 from the Late Bronze Age levels located in the western trench (19m x 46m) were chosen for analysis (Fig V).

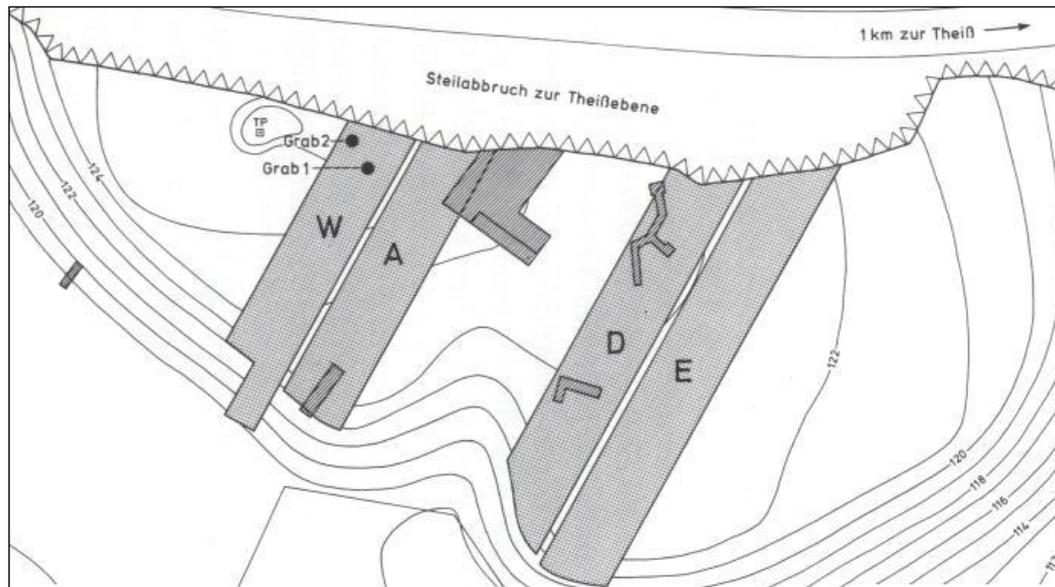


Fig V. Excavated trenches at Feudvar (W = western trench). Taken from Hänsel and Medović 1998:53, abb.3.

Within the western trench, excavators uncovered a number of rectangular wattle-and-daub houses of varying sizes (up to 12 x 6m) situated in rows and separated by narrow alleys. Most had interior plastered hearths and grain storage vessels, while some had loom weights and grinding stones on the floors (Hänsel 1991). Two houses were particularly characteristic, with one known as the fish house, containing large numbers of fish remains, and the baker house, which contained large numbers of grain and chaff (H, Kroll 2010, pers. comm.). The recovery of bronze and flint sickles attests to the harvesting of crops at the site. Aside from the common domestic animals, wild cattle, deer, and wild pigs were also found at the site indicating hunting, while remains of harpoons or hooks indicate fishing (Becker 1991). Worked bone, horns and antlers were also found at the site, particularly in refuse pits. See Hänsel and Medović 1991,1998 for further details of the excavation.