3_5_3_1_Plant_usage_and_molluscan_evidence (2013_&_2014)_(Dan_Miller)

Plants

The 2014 season included an extensive palaeo-environmental testing program, with over 285 samples collected and c. 4,050 l. of deposit processed in the field. This produced a very limited archaeo-botanical (charcoal) assemblage, and the first molluscan (shell) evidence from the site. The combined data are summarised in Table 1 (ADS LINK TO 3_5_4_3_SPREADSHEETS/ 3_5_4_3_1_ENVIRONMENTAL_RAW_DATA). The results are presented by groups of contexts (ADS LINK TO 3_5_4_3_SPREADSHEETS/3_5_4_3_2_ENVIRONMENTAL_GROUPED_DATA). Critically for the C14 dating goals, the extremely low levels of wood charcoal across all features except pits raises a number of unanswered questions about the total amount, life-use, destruction, and taphonomy of charred timber on the site.

In 2014, the author's own version of bucket-flotation/sieving was used, derived from North-West European traditions of wet-sieving and screen-processing. These techniques are especially suited to deposits with low charcoal content, often wet or moist. The method can be extremely efficient, with very high recovery rates, especially of semi-buoyant items, such as sediment-infiltrated charcoal and shells.

It can therefore be stated with certainty that many of the Nebelivka deposits, especially those associated directly with houses, are virtually charcoal- free, including micro-charcoal in silt/clay fractions. Isolated fragments (eg <1mm to 4mm) and sparse wood charcoal only is the norm when charcoal is present. This also applies to the variously charcoal-rich pit layers, where wood-only charcoal accounts for 99.99%+ of all charcoal, and frequently is the only charcoal observed. The extent of timber use, and supply, is an interesting issue, as the molluscan evidence indicates that developed Holocene woodland was never present at the site.

Evidence of cereals and other plants from the 2013 and 2014 seasons at Nebelivka is extremely limited, in line with the paucity of the charcoal assemblage in most features. Similar conclusions were reached in the 2009 and 2012 seasons. Non-wood charred plant remains are remarkably rare – only a single cereal glume-base and no more than 10 scattered *possible* Trypillia cereal grains were recovered in total between 2012 and 2014. Five charred

Rumex sp. and four *Atriplex* sp. seeds are potentially not introduced from modern burning of fields, and may be archaeological 'weeds'. Additionally, no unambiguous cereal or cereal chaff has been observed in the various impressions, phytolith sheets and 'charcoal skins' in multiple baked daub samples at Nebelivka. Although not fully studied at present and in contrast to Pashkevytch's findings, the daub does seem to have contained many small leaf fragments of non-cereal grasses, consistent, for example, with herbivore dung. No archaeological features or finds can be directly linked to crop processing, and 'off-site' processing must remain purely conjectural as there are no known contemporary 'crop processing' sites or areas for the local region around Nebelivka. Conceptually, the absence of large-scale crop processing evidence, with unknown disposal patterns of the products and by-products, is hard to distinguish from a situation where cereal production in total was never very high, or very large in scale.

Molluscs: the immediate and inherited landscape

Holocene mollusc assemblages relating to the period before the establishment of the mega-site, are strongly indicative of heavily grazed grassland. Even allowing for the potential complex taphonomy of chernozem soils with their *krotovina* and other pedogenic processes, and the potential post-depositional mixing of Holocene/Pleistocene strata, the absence of woodland species and the predominance of grassland/steppe taxa across all periods is stark. This conclusion alone has potentially wide ramifications for the landscape where the mega-site was settled.

Although mollusc shell was often quite sparse, a total of c.4,000 shells has been recovered and classified (Table 1). Samples were collected from excavated pits (ADS LINK TO 3_5_4_2_IMAGES/3_5_4_2_1_SAMPLE 112_PIT_SONDAZH_1), ditches (ADS LINK TO 3_5_4_2_IMAGES/3_5_4_2_2_SAMPLE 135_BIG_DITCH) and house deposits (ADS LINK TO 3_5_4_2_IMAGES/3_5_4_2_3_SAMPLE 23_TP_1_5), as well as test pits into the Holocene soils and substrate, and samples from the strata sealed by an Early Bronze Age barrow (Russian '*kurgan*') (ADS LINK TO 3_5_4_2_IMAGES/3_5_4_2_4_SAMPLE 49_KURGAN). Given the low abundance of shells, many samples could be immediately scanned and assessed at the sieving stage. The majority of molluscs has been scanned and examined off-site.

The discovery that *Heliocipis. striata* is clearly a dominant component at Nebelivka, in combination with the regular findings of *Chrondula tridens* and *Tuncatellina* cf. *cyclindrica*, and the dominance of *Vallonia* sp., provides a diagnostically steppe-like assemblage in all contexts and periods. In fact, the highest densities of these steppe-grassland species occurred in the buried Holocene soil and underlying layers, suggesting the persistence of steppe biota over the entire examined sequence. Notably absent is virtually the whole suite of 'classic' Holocene climax-forest species. Clausiliidae and Zonitidae, which are rare here, are only suggestive of limited shrub-like habitats or isolated stands, and not necessarily woodland *per se*. *Caryichium tridentatum* is also present, suggesting some shrub-like/minimally-wooded shady areas in the open steppe, but not really a forest - steppe as such.

Obviously imported to the site are the aquatic species. It should be noted that the freshwater mussel, *Unio* sp., is not a suitable foodstuff, and should be considered along with *Theodoxus fluviatalis* and *Pisidium* sp., in terms of viable transport mechanics. The possibilities include transport in nets with large fish brought to the site. Importation of reeds and maybe other long grasses such as the *Succinea* sp. elements found in 'floor' and pit deposits could also be considered in relation to the use of hay/straw-like materials in fodder and bedding, and possibly also the presence of herbivore dung, mud, and 'hoof-trample'. Peaks of *Succinea* in 'house floor' deposits hint that bundles of reeds may have been used in house construction. This opens a new approach to Trypillia house-building, especially in the light of the arched rooves of some Trypillia clay house-models. The highest density of *Unio* sp. fragments occurs in the daub-rich destruction layers but only a single (terrestrial) shell has been observed in all the available daub sampled or seen on site.

Finally, samples from the ditches provide some interesting suggestions for archaeological interpretations. Species variance from the local Pleistocene substrate is suggestive that the 'Big Ditch' boundary segment was indeed perhaps up to c. 1.4m deep, and appears to have been an open feature, creating a favourable sheltered habitat for *Succinea* sp. This model is not inconsistent with additional structural features such as a palisade reinforcing the deep, open ditch. This situation differs from the 'Triple Ditch' boundary segment, where each ditch appears much shallower (max c.0.4 to 0.7m), and with an associated fauna that suggests the 'ubiquitous steppe-grassland' was uninterrupted, with no distinct microhabitat for molluscs developed here.

In conclusion, the immediate contemporary and inherited landscape of the Nebelivka mega-site appears very significantly open (*contra* the pollen sequence: [ADS - LINK TO SECTION 3_4_1_REPORT]). This is reminiscent of ideas first suggested by Gradmann in the early 20th c. about the forest-free loesslands of Central Europe, with the primary Neolithic often exploiting existing openings and grassland rather than felling climax forest.