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New Research on Archaeological Wood and Wooden Artifacts in Kiev

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Abstract

Wood is usually poorly preserved in the cultural layers of medieval Kiev. Exception is the wet cultural layers dated from the 10th century to the first half of the 11th century, where natural conditions are favorable for conservation of organic matter. In these layers the most of Wood is usually poorly preserved in the cultural layers of medieval Kiev. Exception is the wet cultural layers dated from the 10th century to the first half of the 11th century, where natural conditions are favorable for conservation of organic matter. In these layers the most of wooden artifacts were found [??????, ???????, 1975; ?????? 1981, ?. 319? 325; ????????, 1991, ????. XVI?XXII; ????????, 2015, ?. 42?45]. In other cases when studying Ancient Rus layers in Kiev remnants of wood, wooden artifacts and especially small wooden objects are absent or at best are represented by single samples. So any new finding of archaeological wood in Kiev is noteworthy and important for replenishing the archaeological Ancient Rus wood database. For a long time archaeological wood from Kiev remained out of attention of scholars. Systematic studies of Ancient Rus wood and especially charcoal began to appear only recently. Now the state of research of the fossil wood and charcoal in Ukraine can be characterized as an initial stage, that is, a stage of accumulation of material [????????, 2016]. Now the importance of such researches in the context of studying relationship between paleoecology and bioeconomic human activity is indisputable. The main directions of such researches are the study of wood as the main material for building and manufacturing, and its role as fuel. One of the most important directions of the modern study of the fossil wood in this connection is the definition of wood species. Considering the fact that most of the archaeological wood is stored in a charred form we have to take into account that along with the usual dendrological studies an important place in its studying is occupied

Index terms— ancient rus, kiev, wood processing, fuel, wood identification, anthracology.

layers of medieval Kiev. Exception is the wet cultural layers dated from the 10th century to the first half of the 11th century, where natural conditions are favorable for conservation of organic matter. In these layers the most of wooden artifacts were found [Ð?”?????, ???????, 1975; Ð?”????? 1981, ?. 319-325; ????????, 1991, ????. XVI-XXII; ????Ñ?”Ñ?”??, 2015, ?. **??**42] **??**43] **??**44] **??**45]. In other cases when studying Ancient Rus layers in Kiev remnants of wood, wooden artifacts and especially small wooden objects are absent or at best are represented by single samples. So any new finding of archaeological wood in Kiev is noteworthy and important for replenishing the archaeological Ancient Rus wood database.

For a long time archaeological wood from Kiev remained out of attention of scholars. Systematic studies of Ancient Rus wood and especially charcoal began to appear only recently. Now the state of research of the fossil wood and charcoal in Ukraine can be characterized as an initial stage, that is, a stage of accumulation of material **??**????????, 2016]. Now the importance of such researches in the context of studying relationship between paleoecology and bioeconomic human activity is indisputable. The main directions of such researches are the study of wood as the main material for building and manufacturing, and its role as fuel. One of the most

important directions of the modern study of the fossil wood in this connection is the definition of wood species. Considering the fact that most of the archaeological wood is stored in a charred form we have to take into account that along with the usual dendrological studies an important place in its studying is occupied by the anthracology (science that deals with the study of fossil coal in general). In archeology the methods of this science are used to identify species of fossil charred wood. Charcoal associated with dated cultural layers of settlements, gives additional data on the nature of the woody vegetation of the microregion in each defined period. The samples obtained directly from archaeological sites allow to identify basic tree species, used in production and economy and show preference to one or another species in various sectors. The obtained data can be the basis for studying the raw material base of the wood processing in Ancient Rus, the fuel base and the other branches related to the use of the wood.

In this regard, it is necessary to pay attention to the wooden artifacts found in Kiev Podil, Kyrylivska str., 37 in 2016. The importance of materials in question is that they are represented not only by separate small fragments of wood and charcoal, as it takes place usually but also by the remnants of structures, by particular products and by the remnants of the woodworking industry (wood chips and fragments of wood with the traces of processing). This is very

1 Materials and Methods

ll the wood from this dig can be divided into three groups by date. This is the wood dated by the time periods from the 18th to the early the 7th century. The Ancient Rus period and the latest one are represented by the remnants of structures, by fragmented wooden products, by wood chips and wooden pieces of uncertain destination and by charcoal. Materials of the 7th century are represented only by small pieces of charcoal.

The materials for studying were obtained by manual selection from the soil or from filling of the objects (samples of the wood of details of structures, small wooden objects and partly charcoal) as well as the method of flotation and ground washing (the most of charcoal). The identification of tree species required the use of natural sciences methods. The basis of wood identification is studying features of microstructure, which are characteristic for wood of each kind of tree. The method assumes their diagnosis in three sections. Obtained results were compared with the data of wood determinants. The determinants on wood of different Eastern European tree species were published repeatedly **??**???????, 1940; Ð?”????????? ? ??., 1946; ??????, 1959]. When the structure of the wood is preserved satisfactorily tree species can be identified to the genus.

The results of wood and charcoal identification are represented in the tables (Tab. 1-4).

2 II.

3 The Main Results of the Study

Among the materials of the 18th century small wooden objects were found in one of the buildings. They are fragmented bottom of barrel with the diameter of 48 cm (fig. **??**: 1) and knife-like object 28 cm long (fig. **??**: 3). This object may be interpreted as a tool for weft tampering in weaving. Analogies of such tools are known from Slavic ethnography **??**?????????, 1956, ???. 24]. Another wooden object was discovered in the cultural layer dated from 18th century (fig. **??**: 2). This is bifurcated tool 12.8 cm long. The most possible interpretation is its definition as a tool for weaving (ropes, belts, etc). Analogies are different bifurcated tools used for weaving ropes or belts are widely known in the ethnography of many peoples of Eurasia. All mentioned artifacts were made of pine.

Among the structures with the preserved wooden details, the object 1 dated to 18th century is of special interest. It could be interpreted as a lower part (probably cellar) of above-ground building. This preserved lower part had a wooden covering of the ground walls, which was made from vertically stacked timber fortified on the bottom by a frame structure on two crowns built of square timbers. The building had a plank floor. All the wooden details were of pine with the exception of the lower timbers built of oak. Wood chips taken from filling of the top of the building (preserved only in stratigraphic level on the wall of the dig) are also of pine. They may indicate material for the construction of the upper, terrestrial part of the building. Such a choice of raw materials for construction is consistent with the tradition well-known in Slavic ethnography, when the main material for the walls of the building was pine wood, but the lower part was constructed of oak wood. In Eastern Europe, this practice has been extended at least at the 1st half of the 20th century **??**??????????, 1924, ?. 6; ???????, 1941, ?. 37]. It should be noted that this tradition developed gradually. In residential buildings in ancient Kyiv such combination of too kinds of wood was demonstrated only by isolated examples [????????, 2010, ?. 539]. In Ancient Kiev and its outskirts residential buildings were constructed mainly of pine wood only.

The rest of the wooden structures of 18th century found within the dig were also constructed of pine. Oak constructions were not numerous. One of the planks of the 18th century fence was of an oak tree (the rest were of pine). The use of single oak plank may indicate a possible repair of this fence. Several poles of some structure found in the northern part of the dig were also made of pine wood, and only one was of oak wood. Judging by the fact that the oak pole unlike the rest ones was preserved only as wood chips in the pole hole, it was the earliest of all. The rest poles were preserved to a height of about 0.50 m from the daylight surface of that time.

Among the Ancient Rus materials, the woodworking complex related to the cultural layer of 11th century is of the greatest interest. It consisted of waste from wood processing. These are wood chips (the overwhelming

majority is of pine), and a pine bark. Among the pieces of wood there were wood chips from the primary processing of logs and those that were waste from making some wooden products (small pieces of wood in the form of small planks and bars). This may indicate a presence of woodworking workshop situated somewhere nearby. The experience of handicraftsmen-woodworkers at the end of the 19th and early 20th centuries shows manufacturing of many kinds of products (details of wagons and sledges, wooden shovels, some kinds of barrels, etc) in the area of logging **??**??????????, 1924, ?. 73-81]. In this regard, it is worth mentioning the layer with the wood chips discovered on the north-western outskirts of the Kiev Podil. This layer refers to the period preceded the colonization of this territory (i.e. before the end of 11th century or the beginning of 12th century) [????????, 1991, ?. 39-40, 69-70]. At this time, timber could be stored here for drying and initial processing. It can be noted a large number of pine bark in this layer (my observation during the excavations in 1993). The complex discovered in 2016 was located near this area. In the complex in question, besides wood chips and bark, the part of tool was found (fig. **??**: 4). It had oblong form with a recess cut on one side. In the same complex a part of stave of some cooperage product (fig. **??**: 7)Volume XVII Issue II Version I 32 (D)

and two pegs from some structures (fig. **??**: 5, 6) were also found. These materials, except the part of unidentified tool, were studied for wood identification. The stave and one of the pegs were of pine wood and another peg was of oak wood (fig. **??**: 5).

A wood of three poles from the fence dated to 11th century was also studied. It was identified as pine.

Among the analyzed charcoal samples a charcoal from the heating devices deserves special attention.

Studying charcoal as the main kind of fuel, in my opinion, is promising. This applies both to domestic and technical fuel. The source for studying this aspect of human economic and productive activities is coal from ovens (including those of technical purpose), furnaces and fireplaces. Such charcoal is a source of information about composition of local woody vegetation and the principles of its possible selection taking into account calorific values of different wood species creating the desired temperature heating mode. This direction of research in spite of the Western European researchers' Veal, 2012?;2012?;2013], in Ancient Rus archeology until recently remained uncharted area. Its development began only in recent years after the first results from the Hlinske archaeological complex in Poltava oblast (charcoal from furnace and fireplace) [????????? ?? ??., 2016, ?. 115]. Subsequently, materials from some other Slavic-Rus sites (Vypovziv and Svedlovka, both in Chernihiv oblast) were obtained and identified by the author. Studying the fuel from the dig in Kyrylivska str., 37 is one more step in this direction.

Residues of fuel from the oven of the 18th century was represented by pine, oar and birch. This correspond to the general tendency of its selection that is seen in the ethnographic present. Birch, old resinous pine and oak belonged to the group of the most valuable fuel **??**??????????, 1924, ?. 14]. The birch charcoal mixed with the remains of bones, eggshells, fish scales, etc. was also found in the filling of another object. As judged by nature of filling this object could serve as a pit for garbage. The birch charcoal in this context also may be interpreted as remains of fuel. In this object the charcoal of pine and of other species of trees were also found (Tab. 3, object 8).

Charcoal from Ancient Rus and Slavic objects, which can be associated with fuel (oven 2, fireplace, Slavic oven 7) is represented only by oak and pine. It is worth noting that Old Rus and Early Slavic materials do not yet allow us to speak of any significant advantage of birch as fuel in these periods. The author's investigations reveal only isolated samples of charcoal from fuel on separate Slavic and Rus sites They are Vypovziv hillfort of 10th century and Sverdlovka settlement (Romny culture, 8-10 centuries). It should be noted that birch in general is very rare among of fossil coals of Ancient Rus period. This may be explained either by its relatively low specific gravity in the forests of the studied microregions in medieval period or by relatively small amount of materials studied for today. The presence of birch bark in the Ancient Rus cultural layers of Kiev is in favor of the second assumption. It is also possible that birch was used more for technical purposes (for obtaining tar) therefore its wood is not preserved. In general the reasons for such situation can be detected only with further research.

As a result of anthracological research single samples of charcoal of such wood as ash-tree (Fraxinus sp., apparently Fraxinus excelsior), poplar or aspen (Populus sp.), willow (Salix sp.), linden (Tilia sp.) and a tree of rose family, apparently pear-tree or apple-tree (Rosaceae) were also identified. These are very small solitary pieces of charcoal that cannot be interpreted.

Thus the studied wood is mainly represented by such species as pine (Pinus sp,), probably common pine (Pinus sylvestris), oak (Quercus sp.) and birch (Betula sp.). Pine and oak were represented both by unburned wood and by charcoal, and birch was found only as charcoal. The distribution of wood of these tree species is not the same for different periods.

In all chronological sections pine prevails. The most of wooden artifacts (structures and small objects) were made of pine. In particular details of cooperage products from the complexes of 11th century and 18th century, as well as both weaving tools found in the 18th century layer were made of pine wood. Pine charcoal is represented as the remains of both working wood and fuel. This fact can be considered as a marker for the presence of pine forests in the immediate proximity to the site, may be higher on the hill.

Kiev is located on the border of the Eastern Polissia (forest zone) with forest-steppe zone. The Eastern Polissia covers the right bank area of the Dnieper river, the area between the Dnieper and the Desna rivers and partly the area of the left bank of the Desna river to the watershed with the Supoy and Sula rivers that are the tributaries of the Dnieper Pine and oak are the main forest-forming species here [?????????, ????????, 1966, ?. 148].

Some researchers explain the proliferation of pine forests in the Ancient Rus period by anthropogenous factor that was a specificity of development of territories by the Ancient Rus population. Sandy and loamy podzolic soils preferred by pine were less suitable for farming therefore such soils were mastered last. Oak forests gradually reduced for plowing which narrowed the area of oak distribution **??**????????, 1981, ?. 21; ????????, 1991, ?. 68]. It also should be taken into account that the productivity of pine is much higher than that of oak **??**????????, 1963, ?. 201], therefore the pine forests cut down could be restored rather quickly. Thus, coniferous forests could be a significant reserve of raw materials in the area of their distribution.

Oak also has a significant role in the economy of the local population in the studied area. Among the analyzed charcoal samples from Kyrylivska str., 37 oak occupies a second place. Its wood was used as a fuel and a working wood throughout the entire time of the economic activity of the Kievan population here. Therefore, the advantage of the mentioned kinds of wood in the investigated complexes is expected. Birch, the third wood by the number of charcoal pieces, was discovered only in the complexes dated from 18th to 19th centuries. In its period it was used as a fuel. Among the charcoal samples from the cultural layers with the date of the 7th century and of the 11th and 12th centuries birch is absent. Except separate cases a material of products and structures of the 11th century is represented by pine wood. Only one of the pegs was of oak wood.

4 III.

5 Conclusions and Prospects for Further Research

The results of studying of archaeological wood allowed to trace the particular use of its different species in a particular area for a long period.

In general, the composition of studied wood species does not contradict the data on the woody vegetation of the region. All wood belongs to local species. The selection of raw materials is traditional for the region. Investigations in Kyrylivska str., 37 in 2016 confirmed the composition of the wood species that were preferred in different branches of the economy. First of all, they are pine and oak (used both as material for woodworking and as fuel) with predominance of pine. The third place is occupied by birch. It is represented only by charcoal of the fuel. The role of birch as a fuel in the everyday life of people in the 18th and 19th centuries received one more confirmation.

The importance of the results obtained for the further development of the source base for the fossil tree is beyond doubt. Obtaining sufficient information due to further research of materials from different settlements will allow it to be used in the context of the study of paleoecology and economic activity during this period.

Wooden artifacts dating back to the 18th and early 19th centuries are important for replenishing the ethnographic material database. This applies to both individual products and structures. Materials of the 11th century allow expanding the informative base for the history of wood processing and using in Kiev.

Further dendrological and anthracological studies of the materials from the Slavic and Rus sites will make it possible to specify the obtained results and will allow reasonable interpretations on the use the wood of different tree species for different needs (using wood as the fuel or as the building and working raw material). [1]

[Note: 18 ?????? 19 ??., 11-12 ??. ? 7 ?.]

Figure 1: ??????-???????? ?.?. ????? ???????????? ???????????????? ?????? ? ?????????? ?????????? ? ????? (???????? ?????, ??. ????????????, 37, 2016 ?.). ?????? ?????? ? ??????? ?????? ?????????? ???????????? ????????????????? ?????????, ?????????? ? 2016 ?. ? ?????????? ???????? ?? ???????? ??????: ????????? ?????????? ???????????? ? ??????? ? ????. ??? ?????? ?? ???????, ?????? ?? ?????????, ???????????? ?? ??? ??????: ?????????

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(Pinus sp.), ? ????????? ???????
????? (Quercus sp.). ??????? ??????? (?????)
???????????

Figure 2: ????????? ???????? ??????? ??????? ?????? (??????? ?????? ??????????, ???????, ???????? ?????) ? ???????? ? ???????? ?????? (??????? ????? ????). ? ????? ?????? ?????????? ????? ?????? ????? ?????????? 18-19 ??. ????????? ??????? ?????????? ? ?????? ????????? ???????: ?????? ????????? ? ??? ?????. Ð?"????? ????????????? ??????? ??????????? ?????????? ????????????? (?????) ? ????????? ????????????????????? ????????? (????, ?????, ???????? ???????). ???????? ????? ????? ???? ???? ????????. Ð?"????? ?????????? 18 -?????? 19 ??. ? 11 ??. ???????????? ??????

???????? ?????: Ð?"?????? ????, ????, ????????? ??????, ???????, ?????????? ????????, ????????????.

[Note: I.]

Figure 3: ????? ??????: ????? ? ?????? ??? ???? ????

12

sp.) -8

Figure 4: Table 1 : 2 :

3

Complex	Number of Samples	Wood
Object 3, oven.	232	Pine (Pinus sp.) -135 Oak (Quercus sp.) -60 Birch (Betula sp.) -37
Cultural layer, under the heap of bricks	12	Pine (Pinus sp.) -12
Cultural layer, charred spot	1	Birch (Betula sp.) -1
Object 8, filling	438	Pine (Pinus sp.) -420 Birch (Betula sp.) -12 Poplar or aspen (Populus sp.) -2 Oak (Quercus sp.) -2 Willow (Salix sp.)(?) -1 Rose family (Rosaceae) -1

Figure 5: Table 3 :

4

Complex	Number of Samples	Wood
Cultural layer 3, 12th century	18	Oak (Quercus sp.) -10 Pine (Pinus sp.) -7 Rose family (Rosaceae) -1
Object 9, filling, 11th century	9	Pine (Pinus sp.) -5
Object 11, filling, 11th century	13	Ash-tree (Fraxinus sp.) -11 Pine (Pinus sp.) -2
Spot of ?harred wood (cultural layer 4), 11th century	16	Pine (Pinus sp.) -8 Oak (Quercus sp.) -7 Linden (Tilia sp.) -1
Ditch 10 (cultural layer 4), 11th century	81	Pine (Pinus sp.) -81
Ditch 18(cultural layer 4), 11th century	1	Oak (Quercus sp.) -1
Cultural layer 4, 11th century	71	Pine (Pinus sp.) -4 Oak (Quercus sp.) -67
Oven 2, 11th century	59	Oak (Quercus sp.) -59
Fireplace, 11th century	24	Pine (Pinus sp.) -21 Oak (Quercus sp.) -2

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Figure 6: Table 4 :

Deciduous

		tree -1		
Cultural layer 5, 11th century		103	Pine (Pinus sp.) -103	
	Oven 6, 11th century	21	Oak (Quercus sp.) -21	
	Oven 7 (7th century.)	89	Pine (Pinus sp.) -15 Oak (Quercus sp.) -74	
Dwelling of 7th century, the floor			21	Oak (Quercus sp.) - 21

Literature

1. ?????? ?. ?. Ð?”?????????????? ???????? ????????? ?????????? ???????????????? ? ???????????????? ????? ????. -??????????-????????? ?.?., Ð?”????????? ?.?., ????Ñ?”Ñ?”?? ?.?., ???? ?.?. Ð?”????????? ???????????????? ??????????? ????????? ? 2015 ???? // 42-49.

12. ???????? ?.?. ?????????????? ????????? ??? ???????? ??? ???????????? ?????????????: ?????????? ???????? ? ?????? ?????????? (?? ?????????? ????? ????) // ?????????? ??????????????????? ?????????. ???. II-?

Figure 7: Table Deciduous

[??????? et al. ()] , ? Ð?” ??????? , ???????? , ??????? . 1941. ??????. (89 [3] ?., ??)

[???????? and Ð?”?? ()] ? ? ???????? , Ð?”?? . *??? ???????? ? ????????. -??????*, 1963. (234 ?)

[Veal ()] ‘Examining continuity in landscape exploitation: Late Roman fuel consumption in Silchester’s Insula IX // Silchester and the Study of Romano-British urbanism/ -Portsmouth’. R Veal . P. 227-245.. Journal of Roman Archaeology. -Supplementary series 2012?. 90.

[Veal ()] ‘From context to economy: charcoal as an archaeological interpretative tool. A case study from Ponpeii (3 rd c. BC -AD 79) // More that just Numbers? The Role of Science in Roman Archaeology’. R Veal . Journal of Roman Archaeology. -Supplementary series 2012?. 91 p. .

[Veal and Thompson (2004)] ‘Fuel supplies for Pompeii. Pre-Roman and Roman charcoals for the Casa delle Vestali // Charcoals from the Past: Cultural and Palaeoenvironmental Implications’. R Veal , G Thompson . S1807. *Proceedings of the Third International Meeting of Anthracology*, (the Third International Meeting of AnthracologyCavallino -Lecce (Italy) 2008. June 28th -July 1st 2004. p. . (British Archaeological Report)

[Veal ()] *Fuelling Ancient Mediterranean cites: a framework for charcoal research // The Ancient Mediterranean Environment between Science and History -Leiden*, R Veal . 2013. Boston. p. .

[Marston] *Modeling wood acquisition strategies from archaeological charcoal remains // Journal of Archaeological Science*, J M Marston . 2009. - 36. - P. 2192-2200. http://www.museunacional.ufrj.br/arqueologia/docs/aulas/RitaMNA787/Marston_JAS2009.pdf