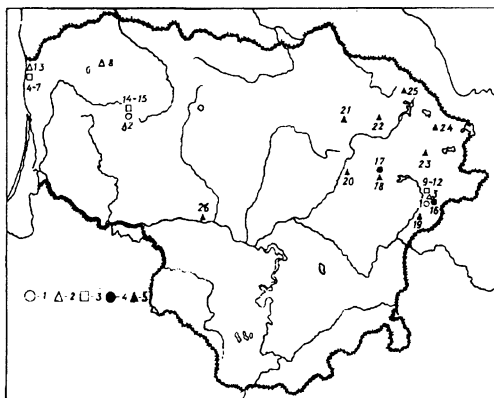


Stock Breeding in the Baltic Culture Area

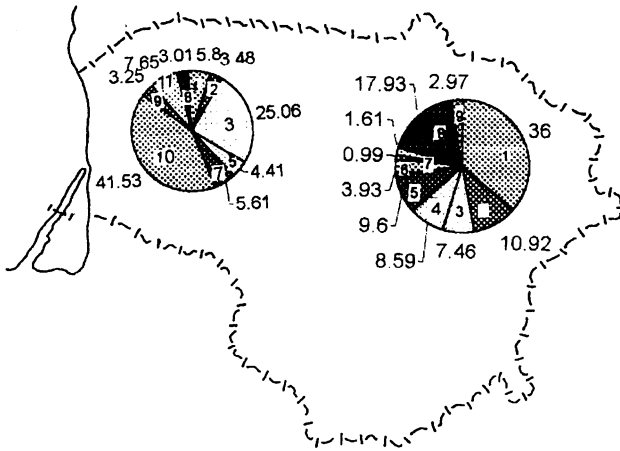
LINAS DAUGNORA and ALGIRDAS GIRININKAS

Over the past several decades, archaeologists have investigated numerous Neolithic and Bronze Age sites within the traditional Baltic culture area, an area delineated not only by historical and archaeological evidence, but by the presence of Baltic hydronyms. The well preserved organic deposits found at many of these traditional Baltic sites are of particular interest to us, because they allow the identification and quantification of faunal remains.

Three Early Neolithic settlements: Žemaitiškė 3B, Daktariškė 5, and Šventoji 4; six Middle Neolithic settlements: Kretuonas 1B, Šventoji 1B, Šventoji 2B, Šventoji 23, Šventoji 3B, and Šarnelė; seven Late Neolithic settlements: Žemaitiškė 1, Žemaitiškė 2, Kretuonas 1D, Kretuonas 1A, Šventoji 6, Duonkalnis and Daktariškė 5; and two Early Bronze Age settlements: Kretuono 1C, and the Narkūnai hill-fort, have been investigated in the Eastern and Western Baltic (Map 1). The Early Neolithic covers the second half of the Atlantic period, and the archaeological material suggests that a hunting-gathering way of life prevailed at this time. At Žemaitiškė 3B (the only known Early Neolithic site in Eastern Lithuania) bones of elk (*Alces alces*) and red deer (*Cervus elaphus*) make up 40.00% and 35.38% respectively of the total faunal sample. The remaining bones belong to wild boar (*Sus suis*), brown bear (*Ursus arctos*), and beaver (*Castor fiber*) (Daugnora and Girininkas 1996:143). The number of bone artefacts recovered at the Šventoji 4 settlement is illustrated in Chart 5 (Map 2).



Map 1. Archaeological monuments indicating the places from which the osteoarchaeological material has been taken: I. ○ Early Neolithic: 1. Žemaitiškė 3B, 2. Daktariškė 5th. II. △ Middle Neolithic: 3. Kretuonas 1B, 4. Šventoji 1B, 5. Šventoji 2B, 6. Šventoji 3rd, 7. Šventoji 23rd, 8. Šarnelė. III. □ the Late Neolithic Age: 9. Žemaitiškė 1st, 10. Žemaitiškė 2nd, 11. Kretuonas 1D, 12. Kretuonas 1A, 13. Šventoji 6th, 14. Duonkalnis, 15. Daktariškė 5th; IV. ◆ the Old Bronze Age: 16. Kretuonas 1C, 17. Narkūnai Didysis hill-fort 6th layer; V. ▲ the New Bronze Age: 18. Narkūnai Didysis hill-fort 5th and 4th layers, 19. Nevieriškė, 20. Šeimyniškeliai, 21. Kereliai, 22. Juodonys, 23. Sokiškiai, 24. Vosgėliai, 25. Mockūnai, 26. Veliuona



Map 2. Variety of wild species in the forests and variety of domestic animals in the East and West of Lithuania at the end of the Atlantic period (At2) and at the beginning of the Sub-Boreal period (Sb1): 1 - elk, 2 - red deer, 3 - wild boar, 4 - marten, 5 - domestic animals, 6 - roe deer, 7 - other animals, 8 - beaver, 9 - aurochs, 10 - seal

The inhabitants of East Lithuania produced artefacts out of antler (*Cervus elaphus*) and wild boar (*Sus suis*) canine teeth (two knives and an amulet). In East Latvia, on the other hand, people tended to produce tools out of elk antler (54.62%). For example, among 119 items identified at the Zvidzē settlement, 65 hoes were made of elk antler (Loze 1988:25-27).

The inhabitants of the Western Lithuanian Dakariškė 5 settlement (Daugnora, Girininkas 1996:22) often produced

tools of antler and bone. Thirty-three artefacts from the Šventoji 4 settlement were made using bone and antler from wild boar (*Sus suis*), dog (*Canis canis*), seal (*Phocidae*), elk (*Alces alces*) and red deer (*Cervus elaphus*) (Chart 3).

Bone and horn items are rather scarce at the above mentioned settlements, though the settlements of the neighbouring territories in Latvia and Estonia indicate that bone trimming workshops existed during this period. Such workshops have been found at Osovec 4 in Byelorussia (Zajkovskij 1985), and Narva1 in Estonia (Gurina 1967:166).

We have analysed all the osteological material from the Middle Neolithic settlements of Kretuonas 1B, Šventoji 1B, Šventoji 2B, Šventoji 23, Šventoji 3B and Šarnelė. Red deer (*Cervus elaphus*) were wide-spread in the mixed forests in Eastern Lithuania (Girininkas 1982) and the forests of the Königsberg area (Doluchanov, Levkovskaja and Timofeev 1975:82). Red deer prefer thin, mixed deciduous and coniferous forests with undergrowth (Paaver 1965:235-244). The differences in flora and fauna between Eastern and Western Lithuania were determined by the differences in soil and the different bedrock (Motūza, Girininkas 1989:3-13) in the two territories. These environmental differences are clearly indicated by the faunal remains from Kretuonas 1B. A total of 4046 bones belonging to 21 different animal species were recovered at the site (Daugnora and Girininkas 1995a:83-92). The total number of bones for each species is presented in diagrams from the 5 sites (Daugnora and Girininkas 1995b:43-51).

An analysis of the faunal material from the Middle Neolithic settlements in West Lithuania is presented by L. Daugnora and A. Girininkas in their recent book (Daugnora and Girininkas 1996:58). The data demonstrate that different animal species predominated in different settlements. Beaver and wild boar bones were identified at all of the Šventoji settlements: 1B, 2B, 3B, 23, and 26, while elk bones were identified at only four settlements. A surprisingly large number of

aurochs (*Bos primigenius*) bones were identified at Šventoji 23 and Šventoji 26, and a great number of seal (*Phocidae*) bones were found at Šventoji 2B.

Out of 80 bone and horn artefacts found at the Middle Neolithic settlement of Kretuonas 1B in East Lithuania, 32 items were identified (40%). Classification and other functional aspects of the tools have been presented in an article by L. Daugnora and A. Girininkas (Daugnora and Girininkas 1995a:83-92).

A small number of the artefacts from Šventoji 1B, 2B, 3B, and 23 (West Lithuania) belong to the Middle Neolithic. At Šventoji 1B and 2B we have identified one piece of elk antler and four elk teeth, and have also determined that some artefacts were made from elk front and hind leg bones. Out of the 20 bone and horn artefacts recovered from Šventoji 3, nine were identified as wild boar teeth (amulets), and three were produced using seal bones.

A small horn spade and a number of ritual sticks were made of elk antler. Some tools were made of red deer and roe deer metacarpals/metatarsals, others were made of aurochs tibia. Of a total of 46 artefacts found at Šventoji 23, 13 items were elk teeth made into amulets. Several fragments of both red deer and wild boar antler and tooth were also found there. Hunting was one of the prevailing activities during the Middle Neolithic. The osteoarchaeological material provides a vast amount of information concerning hunting activity. The bones of wild boar, aurochs, elk and beaver dominate at the West Lithuanian settlements. An analogous situation is documented for West and East Latvia (Vankina 1970:132; Loze 1988:113-114). In the Early Neolithic of East Lithuania and in the former territory of Prussia, on the other hand, red deer dominates all the faunal assemblages. In this region, hunting implements and various other tools were made of red deer bones (Rimantienė 1979:11; Timofeev 1980; Daugnora and Girininkas 1991; Daugnora and Girininkas 1994:13-28). It is interesting to note that the Balts mainly produced tools using the bones of the predominant game animals (compare the diagrams, reflecting the numbers of bones and artefacts in the eastern and western parts of Lithuania: Figures 1-4).

The first evidence for the initial phase of stock breeding and agriculture in East Lithuania came to light during recent investigations at Kretuonas 1B (Girininkas 1990:7-11; Daugnora and Girininkas 1994:13-28; Daugnora 1994:14-18; Daugnora 1992:11-15). The site produced the first known cattle, sheep/goat, horse and pig bones dating to the Middle Neolithic in Eastern Lithuania. These domestic animals comprised 6.84% of the total faunal sample. In comparison, the percentage of domestic animal bones from archaeological sites in Northern Byelorussia and the South Pskov district varies from 0.75% to 1.4% (Doluchanov and Mikljaev 1985:51-58). The development of stock breeding and agriculture in these areas likely resulted from the relationship between local groups and members of the Funnel-Beaker and Globular Amphora cultures.

During the Middle Neolithic, the inhabitants of West Lithuania adopted the main elements of agriculture. Hemp seeds were found at both Šventoji 3B and 23 (Rimantienė 1979:11). Neither seeds nor pollen evidence of the cultivated plants have been found in the eastern part of Lithuania at Middle Neolithic sites. The numbers of domestic animal bones found in Lithuania suggest that stock breeding and agriculture (substitution phase) were spreading more rapidly to West Lithuania than to East Lithuania (Daugnora and Girininkas 1995b:43-51).

Five Eastern Lithuanian settlements, the osteoarchaeological material of which dates to the Late Neolithic, are discussed in this article. They are: Žemaitiškė 1, Žemaitiškė

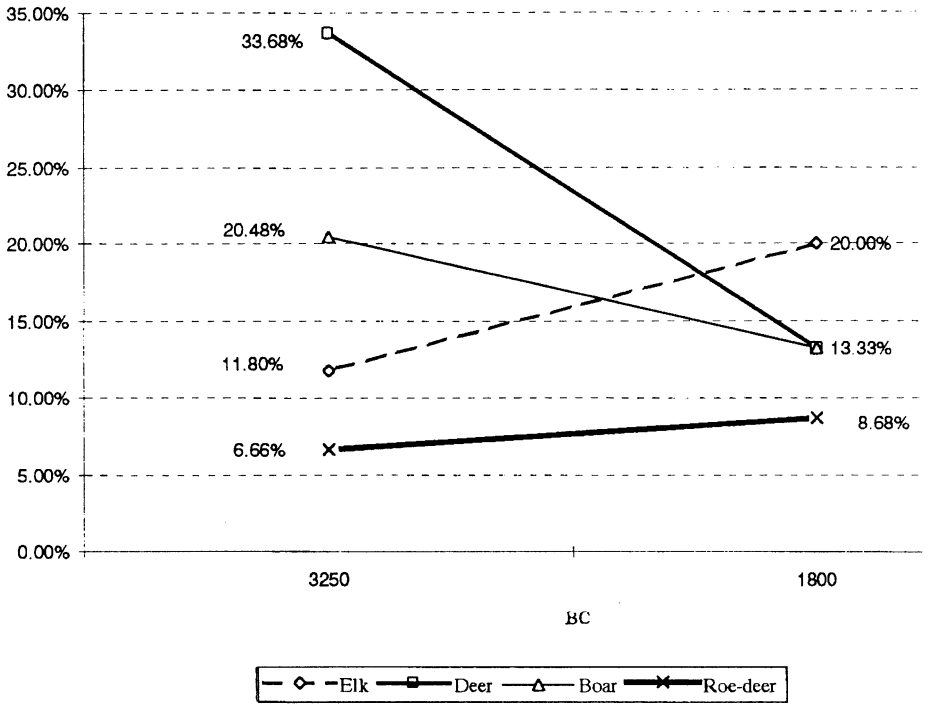


Fig. 1. The tools made of animals bones (percentage). West Lithuania

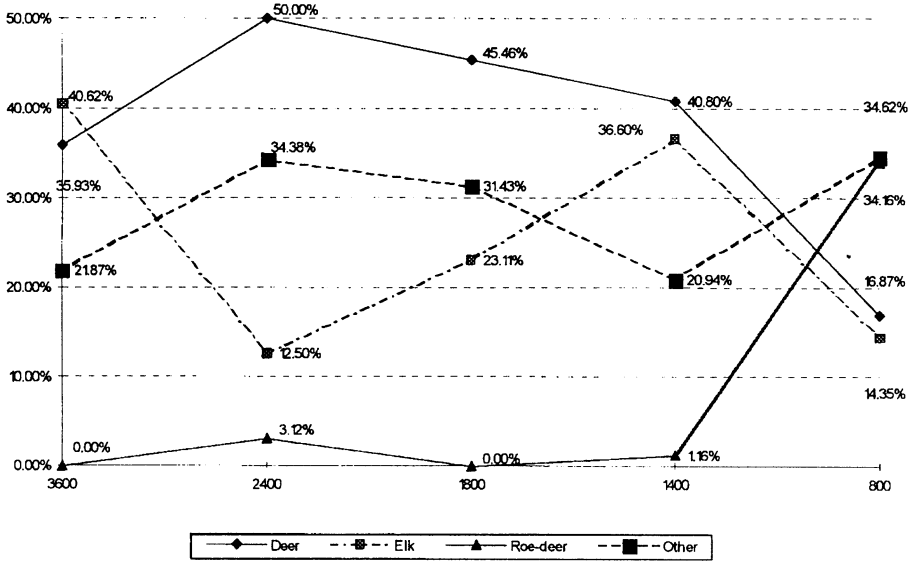


Fig. 2. The tools made of animals bones (percentage). East Lithuania

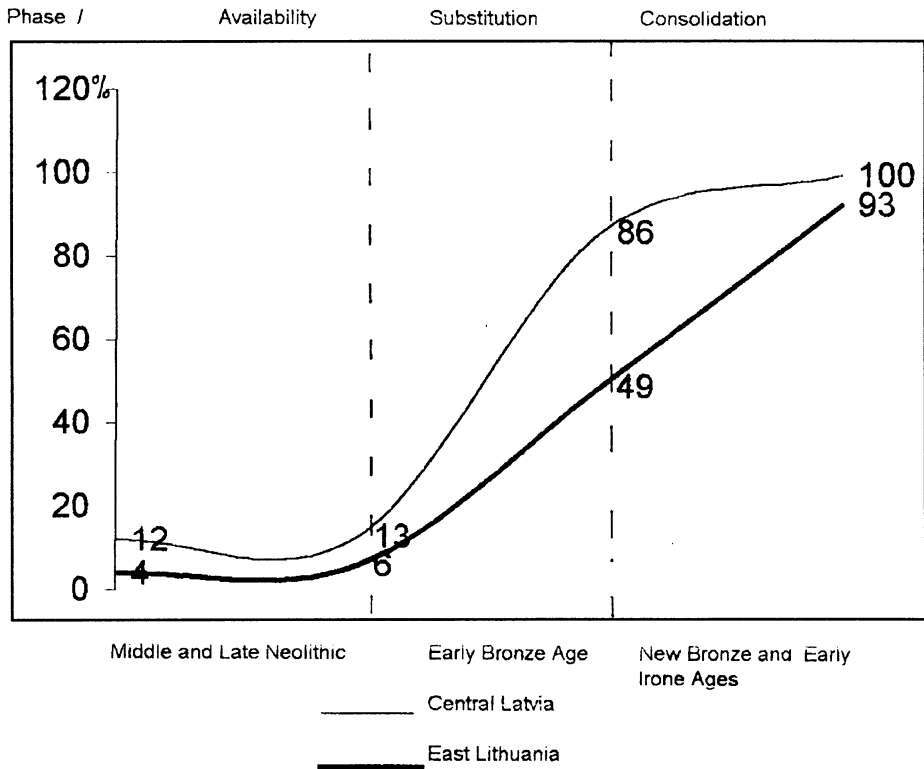


Fig. 3. Farming development in the Middle and Late Holocene in East Lithuania and in Central Latvia

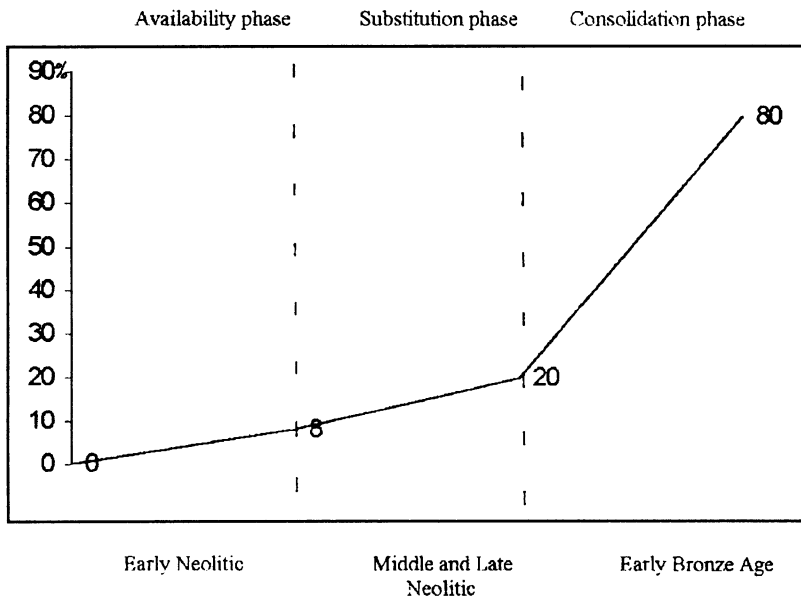
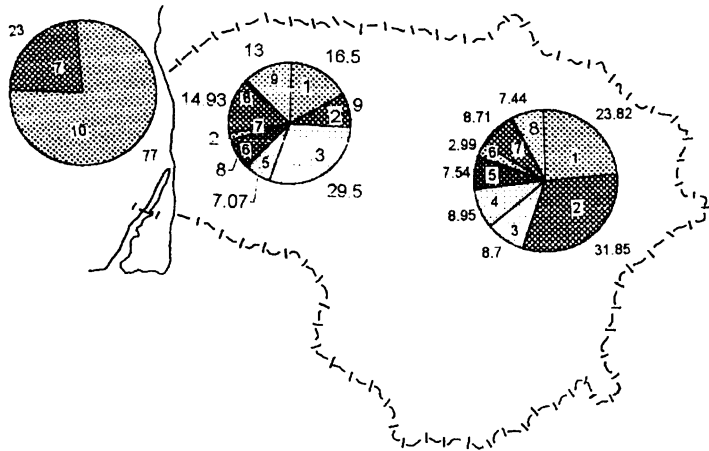


Fig. 4. Farming development in the Middle and Late Holocene in West Lithuania



Map 3. Variety of wild species in the forests and variety of domestic animals in the East and West of Lithuania in the second half of the Sub-Boreal (Sb2): 1 - elk, 2 - red deer, 3 - wild boar, 4 - marten, 5 - domestic animals, 6 - roe deer, 7 - other animals, 8 - beaver, 9 - aurochs, 10 - seal, 11 - bear

2, Žemaitiškė 3, Kretuonas 1A, and Kretuonas 1D. Three Late Neolithic settlements from West Lithuania are also discussed: Šventoji 6, Daktariškės 5, and Duonkalis.

The Late Neolithic covers the Sub-boreal period from Sb1 until Sb2 (Map 3). During the Sub-boreal, the amount of precipitation decreased by one third, though the temperature remained almost the same as during the Atlantic. This dry Sub-boreal period caused vegetation changes, in both the forests of East (Girininkas 1990:7-11) and West (Kabailienė 1959:477-505) Lithuania.

We have identified 192 bones from Kretuonas 1A, 15.62 % of which belong to domestic animals (cattle, pigs, and dogs), while the rest of the bones (84.37%) belong to seven wild species (Daugnora and Girininkas 1996:73).

The bones of thirteen animal species, fish vertebrae and bird bones were found at the site of Kretuonas 1D. Elk, wild boar, red deer, pine marten and beaver bones dominated the analysed material. The bones of the first four of these animals accounted for 81.39% (NISP=420) of the total sample of identified bones. Mandibles, teeth and phalanges together formed more than half (50.38%) of all identified bones. Cattle and horse bones from the site formed 3.10% and 0.58% of the faunal remains respectively.

Faunal material from Late Neolithic cultural layers of the settlements in West Lithuania differs from that found in the East Lithuanian settlements. For example, 431 bones or bone fragments belonging to 14 species were identified at Šventoji 6. The majority of the bones found at the settlement were seal and wild boar (66.59% of the total identified bone sample). Wild animals made up 95.57% of the assemblage, and domestic animals (dog) accounted for only 4.41% of the identified bones.

Twenty bones were identified at the Duonkalis site, 75 percent of which belonged to domestic animals (cattle, sheep, pig, horse and dog), while the rest belonged to red deer (10%), and hare (15%) (Danilčenko V. investigation) (Butrimas 1985:31).

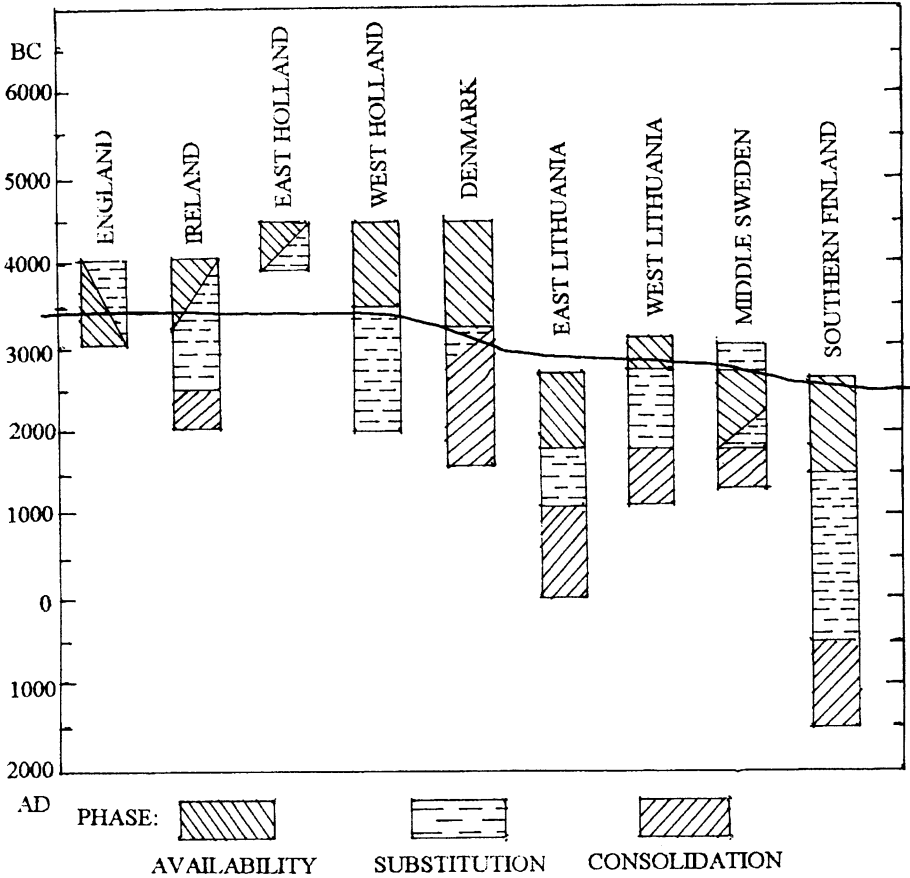


Fig. 5. Phases of farming development in Northern Europe: 1. Availability; 2. Substitution; 3. Consolidation

Among the animal remains from Daktariškė 5, 85.71% of the identified bones belong to game animals and 14.26% to domestic animals. Though the settlement is close to Biržulis lake, only three fish bones were found (two lower jaws and one vertebra). While no domestic animal bones (except for dog) were found at Šventoji 6 (Duoba and Daugnora 1994:24-28), all the other Late Neolithic settlements in West Lithuania have fairly large numbers of domestic animal bones.

The analysis of the artefacts and decorated pieces of bone and horn from Žemaitiškė 1 and 2 in East Lithuania is presented in an article by L. Daugnora and A. Girininkas (Daugnora and Girininkas 1995a:83-92). It is interesting to observe that 24.07% of these artefacts were made of antler, and 16.66% were made using metacarpals/metatarsals. The rest of the artefacts were produced from traditionally used skeletal parts: radius, ulna, tibia and canine tooth. A particularly interesting tool-type found at the settlement is called a "twaddler" (Daugnora and Girininkas 1995a:83-92). Similar twaddlers were found at Kretuonas 1B and Kretuonas 1C, dating to the Middle Neolithic and the Early Bronze Age.

Analysis of the artefacts from Kretuonas 1A, has revealed that small chisels were made of the plantar portion of elk tibiae, and an axe was made of elk antler. A bear canine with a hole in the root was probably used as an amulet. The inhabitants of the site also drilled holes in red deer permanent incisors in order to create amulets (two amulets). A single fox (*Vulpes vulpes*) canine was found with a drilled hole. Among the artefacts from Šventoji 6, Duonkalis, and Daktariškė 5 (Daugnora and Girininkas 1996), daggers were made of antler and roedeer metatarsals. Needles for making nets were made of seal bones.

The osteological data presented above lead us to conclude that farming intensified rather quickly in West Lithuania (Figure 7). The development of farming activities is also defined more precisely by the pollen data. Pollen of narrow-leaf plantain, sorrel, Chenopodiaceous and Umbelliferous plants were identified in cultural layers of Šventoji 6 and Šventoji 1A, Šventoji 2A, and Šarnelė in West Lithuania, dating between Sb1 and Sb2 of the Sub-boreal period. These “indicator species” are generally associated with the spreading of pastures and the development of farming (Kabailienė 1990:96-102).

In order to reveal the differences in the development of farming between East and West Lithuania, the availability model of the transition from foraging to farming has been applied. We have expanded and adapted this model, originally developed by M. Zvebil and P. Rowley-Conwy (1989:67-93), to suit the Lithuanian situation. The model has three developmental phases:

1. The Availability Phase, described by the following characteristics: the number of full-grown domestic animals does not exceed three to five percent; and the total amount of domestic animal bones does not exceed 5-10% of the identified bone; pollen remains (5%) of cultured plants are present in palynological diagrams. Tools were used in agriculture and live-stock breeding (15-20%).
2. The Substitution Phase: the amount of full-grown domestic animals does not exceed 10-25%; domestic animal bone makes up 25-50% of the total bone assemblage; large quantities of cultured plant pollen (15-20 %) are indicated by diagrams; such activities as weaving, spinning and leather dressing started to develop, together with farming and cattle breeding. Tools were used in agriculture and live-stock rearing (35%).
3. The Intensive Farming Development Phase (Consolidation Phase): full-grown domestic animals increase to 25-45%, and domestic animal bones increase to 70-95% of the faunal assemblage. Large quantities of cultured plant pollen (35-40%) are evidenced by diagrams. Tools were widely used in agriculture and live-stock breeding (40-45%). Bone and antler artefacts were gradually replaced by bronze and iron tools.

In the charts, we provide evidence that the inhabitants of West Lithuania during the Middle and Late Neolithic displayed the characteristics of the second phase, while the inhabitants of East Lithuania displayed those of the first phase.

The Early Bronze Age falls between Sb2c-d and Sb3a of the Sub-boreal, a period of warmer weather. There are two thoroughly investigated archaeological objects from this period: Kretuonas 1C (settlement) and Narkūnai Didysis (hill-fort). Palynological evidence from West Lithuania indicates that wheat and barley pollen were common, and the quantity of plants that tend to spread in cleared areas (heather, willow-herb) had increased. This proves that during the Early Bronze Age, agriculture

gradually became the leading activity in West Lithuania (Kabailienė 1990:96-102). However, pollen analyses from the cultural layers in East Lithuania at this time do not indicate any plants related to agricultural development (Maps 4-5).

The same species of animals have been discovered at Kretuonas 1C (the most thoroughly investigated site), as in all other early Bronze Age sites investigated to date (Daugnora and Girininkas 1995a:83-92). The majority of the assemblage consists of elk, red deer, beaver, and pine marten. Teeth and phalanges comprise 28.33% and 13.96% of all identified bones respectively. Mandibles make up 11.74%. Of all the identified animal bones from the site, 90.36% belong to wild animals and 9.60% to domestic animals.

Since there are no data on the quantity of bones dating to the Early Bronze Age in West Lithuania, we tried to fill in the gap with data accumulated by Latvian archaeologists. We have drawn on data from the lower layers of the Narkūnai, Kivutkalns and Vinakalns hill-fort sites (Daugnora, Girininkas 1996:143) as well as the identified bone material from occupied by East Balts (Demidovka castle hill) (Daugnora, Girininkas 1995:43-51) during the first half of the first millennium BC. The data indicate large numbers of domestic animals at the Latvian hill-forts (the number of individuals reaches 68.62%). Different trends in stock-breeding can also be distinguished in certain areas. For example, among the faunal remains from Narkūnai and Demidovka, pigs (*Sus suis*) are dominant, while among those from the Latvian hill-forts, cattle (*Bos bovis*) is the most common species. There is a great deal of variation in the representation of horse bones, they comprise only 3.4% of the identified faunal remains at Narkūnai, while at Demidovka they make up 21.50% of the identified bone (Daugnora, Girininkas 1996:143).

We believe that these differences were caused by differential economic development, trade relations and means of transportation in the two areas occupied by the Balts. In addition to the existing means of water transport, an increase in land transport was observed during the transition between the Early and New Bronze Ages. We have accumulated data suggesting that at the end of the Early Bronze Age, the number of artiodactyls started to decrease in the eastern part of Lithuania (Figure 6). At the same time, the number of domestic animal bones increases and the predominant agricultural systems appear to involve pig and cattle breeding (Daugnora, Girininkas 1995:43-51).

It is interesting to note that the quantity of fur-bearing animal bones discovered in Eastern Lithuania between the Middle Neolithic and the end of the Early Bronze Age remains nearly constant (16.43-18.81%: Figure 6). During the New Bronze Age (circa 800 BC), the quantity of fur-bearing animal bones dropped to 9.31%, half its former value. The number of fur-bearing animal bones remained stable at 7.9% from 100-200 AD (Luchtan 1986:3-17), though the variety of fur-bearing species was changing rapidly at this time. Our faunal investigations from Eastern Lithuania sites produce evidence of otter, beaver, pine marten, and polecat, while in West Lithuania only a few bones from the Mustelid family were found. We assume that the decrease in fur-bearing animals in the New Bronze Age was closely connected with the spread of cloth production. Cloth products were made from cultivated plants. Fabric imprints found on the surface of earthenware and on clay wheels made of day in the Baltic confirm this idea (Girininkas 1994:213).

With reference to the availability model, we suggest that in the Early Bronze Age the inhabitants of East Lithuania had reached the substitution phase, while

those of West Lithuania had reached the consolidation phase. We believe that the excavation of further sites in Western Lithuania and the study of their faunal material will make these conclusions more precise and accurate.

Cattle breeding finally became the main farming activity in East Lithuania in the New Bronze Age. Another activity, cereal agriculture, developed in the New Bronze Age and Early Iron Age (the earliest known cereal pollen in East Lithuania belongs to this period). We assume that the intensive development of farming occurred during the Early Bronze Age in Lithuania.

The phases of economic development observed in the Baltic territories at this time were (chronologically as well as developmentally) the most similar to the process of economic development observed in the Nordic countries.

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Gyvulininkystė baltų žemėse

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Santrauka

Apie gyvulininkystės ūkio raidą istorinėse baltų žemėse duomenų jau sukaupta pakankamai, tačiau dar ne iš visų priešistorės laikų vienodai. Šiame straipsnyje analizuojama archeologinė, osteologinė medžiaga bei palinologų duomenys yra susiję su gyvulininkyste nuo ankstyvojo neolito iki paskutiniųjų šimtmečių pr. Kr.

Gyvulininkystės ūkio raidą minėtuoju laikotarpiu galima suskirstyti į tris fazes: pradinę, plėtros ir intensyvaus ūkio. Rytinėse bei vakarinėse baltų žemėse ji turėjo savitumų: chronologinių, vystymosi spartos bei intensyvumo.

Gyvulininkystė rytinėse baltų žemėse pradėjo formuotis viduriniajame neolite. Jai postūmį, matyt, suteikė Piltuvėlinių taurių bei Rutulinių amforų kultūrų žmonės. Pradinėje gyvulininkystės ūkio fazėje (vidurinysis ir vėlyvasis neolitas) naminių gyvulių kaulai sudarė 6,8 proc. visų gyvenvietėse aptinkamų kaulų kiekio. Gyvenvietėse pasirodė titnaginių ašmenėlių, skirtų pjautuvams, plėtojosi su gyvulininkyste susiję amatai: audimas, verpimas, odos apdirbimas ir kt. Padaugėjo su šiais amatais susijusių įrankių. Sparčiausiai gyvulininkystė vystėsi plėtros fazėje (senajame žalvario amžiuje) – naminių gyvulių kiekis išaugo nuo 9,6 proc. iki 40 proc. tarp visų aptinkamų kaulų. Atitinkamai padaugėjo su gyvulininkyste susijusių įrankių. Rytinių baltų kraštuose vyraujančia pagrindine ūkio šaka gyvulininkystė tapo intensyvaus ūkio fazėje (naujajame žalvario amžiuje), kai naminių kaulų kiekis gyvenvietėse siekė daugiau kaip 70 proc. tarp visų aptinkamų kaulų.

Kiek skirtingai gyvulininkystė vystėsi vakarinių baltų žemėse. Manoma, kad jos pradžia (pradinė fazė) siekia ankstyvąjį neolitą. Tuo metu naminių gyvulių

kaulų kiekis gyvenvietėse siekė iki 8 proc. tarp visų aptiktų kaulų. Gyvulininkystės reikšmė pradėjo augti plėtros fazėje (viduriniajame ir vėlyvajame neolite), kai naminių kaulų kiekis jau siekė iki 20 proc. Vakariųjų baltų žemėse gyvulininkystės reikšmė išaugo intensyviau ūkio fazėje (senojo ir naujojo žalvario bei ankstyvojo geležies amžiais). Skirtingai nei rytinių baltų žemėse, čia gyvulininkystė tapo neatskiriama nuo žemdirbystės. Rytinių baltų žemėse gyvulininkystė vystėsi labiau atsietai nuo žemdirbystės, nes pastaroji ūkio šaka čia pradėjo plėtotis tik antrojoje naujojo žalvario amžiaus pusėje.

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