Archaeobotanical Sources in Investigating the Diet of Conquering Hungarians

Ferenc Gyulai

1. Introduction

In recent decades, interdisciplinary cooperation between various areas of research has produced new results in archaeology as well. Scientific methods applied during the course of archaeological excavations increase the amount of information and facilitate the clarification of lifeways pursued in ancient cultures. They also provide an opportunity for reconstructing the former environment of the excavated settlements.

Under the soil conditions prevailing Hungary, it is predominantly cereal grain and remains of weeds that may be found in quantities that provide a basis for meaningful conclusions. The known environmental requirements of cereals are of help in reconstructing agricultural knowledge and levels of plant cultivation characteristic of various archaeological periods and cultures.

Archaeobotany is a discipline concerned with the evaluation of seeds and fruit remains brought to light during the course of archaeological excavations. The research scope of this science includes the history of vegetation and plant cultivation. It observes the connection between humans and the plant world, as well as human economic activity. In addition to identifying the remains of cultigens, archaeobotany also documents the domestication of wild plant species and the distributions of agriculture and land cultivation. In addition, archaeobotany evaluates pictorial representations of plants and utilizes data on plants gathered by various branches of social sciences.

Archaeobotany is also a sub-discipline in botany. All basic elements of botany, such as morphology, systematics, anatomy and geobotany are

applied in the analysis of samples brought to light during the course of archaeological excavations. At the same time archaeobotany, being tightly linked with archaeology, bridges a gap between natural and economic/social sciences.

As opposed to palynology, the analysis of pollen remains, archaeobotany deals with macrofossilia (seeds and fruit), and concentrates on the study of plant materials deposited in the soil under human influence. It should be clear that excavated assemblages do not represent each and every species that were available in the natural vegetation. Sometimes even species characteristic of entire plant associations may be missing. In addition, various diasporae accumulated in the soil are preserved selectively relative to each other. It is above all the remains of species characteristic of past plowland associations that can be encountered in features (refuse layers and pits, cess-pits etc.) uncovered at archaeological sites. These include, for example, cereal grain and remains of the associated weed flora, and especially in the case of wells and canals, elements of the natural vegetation from the studied period. Most results in recent decades have been produced by pollen analysis. Today, however, the study of seeds and fruits has increasingly produced useful results.

Plant cultivation has been practiced in the Carpathian Basin for 8000 years.[1] The majority of cultigens entered the Carpathian Basin together with neolithic agriculturalists.[2] In terms of the plant species cultivated, however, no continuity can be observed between the sequence of archaeological periods until the Middle Ages (Table 1). This means that populations who moved into the Carpathian Basin brought their own selection of cultigens with them and carried on with their cultivation. Agriculture expanded at the expense of the natural vegetation. In addition to the way of life pursued by the inhabitants of the Carpathian Basin, the relationship between plant cultivation and natural flora was also defined by climatic conditions.

The importance of archaeobotanical studies of plant macrofossilia (seeds and fruits) becomes especially significant when no or minimal archaeological, written or iconographic evidence is available for the purposes of research. Plant cultivation by conquering Hungarians is such a topic. Prior to discussing this period, therefore, it is worth briefly summarizing the history of this long period in light of the hundred years of archaeobotanical investigations in Hungary.

---

[1] Hartyányi, Nováki and Patay 1967/68, Hartyányi and Nováki 1974.
[2] Füzes 1990.

2. Short history of cultivated plants in the Carpathian Basin

The domestication of plants started in Southwest Asia some 12,000-10,000 years ago. The beginnings in Europe date to approximately 8000-6000 years ago.[3] Domestication may be defined as human control over plants that may be considered useful from the viewpoint of society. The first domesticated forms of wheat and barley first occurred in the Near East about 8000-7000 years ago during the so-called Neolithic Revolution. People at that time acquired the most useful species by multiple selection from the wild populations of plants and animals.

Cultigens and domestic animals had already spread over to the Balkans by the end of the 6th millennium BC. Plant cultivation during the Körös-Starčevo culture (beginning around 6000 BC) is best characterized by the preponderance of chaffed wheat species (einkorn and emmer) as well as barley. The first agricultural population in Central Europe was that of the Linearband culture. Their most important domestic plants also included einkorn, emmer and barley. Archaeological finds from the tell settlements of the Middle Neolithic Tisza culture are indicative of a hard working population engaged in plowland cultivation of einkorn, emmer and two- as well as six-row barley as well as gardening (lentils, Indian pea, peas).

By the end of the Neolithic, the previously warm, humid climate free of extremes started to gradually deteriorate. A change occurred in the species composition of large oak mixed forests (oak, elm, lime, and ash with hazelnut in the bushy undergrowth) that had formed on the loessy soils of Central Europe perfectly suited for cultivation. Pollen analyses by Bálint Zólyomi of the sediment gathered in the Lake Balaton showed that the maximum of forest cover since 8200 BC occurred during this phase in the Carpathian Basin.[4] A process resulted in the opposite to this phenomenon around the beginning of the Copper Age (approximately 4700 BC) when new human populations moving into the Carpathian Basin satisfied their needs for arable land by large scale forest clearing.

Based on the distribution of ceramic styles it has been hypothesized that around 2900 BC (at the beginning of the Bronze Age in Hungary) pastoral steppe peoples arrived in the Carpathian Basin from the East. Meanwhile, people practicing land cultivation came from the south. Following the merger of these two different styles, the mobile pastoralism of the Copper and the Early Bronze Ages was replaced by sedentary

[3] Zohary and Hopf 1988.
[4] Zólyomi 1980.

agriculturalism by the Middle Bronze Age. This process may also have been stimulated by environmental change, that is, a climate that had become cooler and was characterized by increasing precipitation.[5]

Culture bearing strata recovered during the course of excavations became thicker than in previous periods, evidence of plant production is increasingly visible and pedological changes (in plowlands, storage pits etc.) can also be recorded. Crop cultivation that guaranteed stable subsistence lead to environmental change and a cultural environment emerged. The subsequent spread of metallurgy further accelerated this process. Under the influence of plant cultivation and animal keeping cultures natural vegetation was suppressed in the Great Hungarian Plain. As a result of decreasing precipitation beach forests declined. This decline was especially dramatic in the Tatar maple-oak associations on loess elevations of the forested peripheral zones and in the lily of the valley-oak associations growing on sandy plains. The amount of wood burnt up for the purposes of cremation should not be underestimated either. The natural vegetation remained unchanged only in areas permanently covered by water. The general reduction of vegetation that was largely brought about by anthropogenic influence resulted in an increase of wasteland areas.

Archaeobotanical finds from the settlement layers of stratified Middle Bronze Age sites is indicative of a high level of skills both in agriculture and animal husbandry. In addition to the cultivation of cereals and peas, inhabitants of these probably fortified settlements were also engaged in gathering wild fruits. Following sporadic occurrences during the Neolithic Period, it is at this time that millet becomes an important cereal grain. Cereal supplies were also complemented by seeds of various plants in the fat-hen genus. In addition to lentils and peas, legumes cultivated during the Early Bronze Age included new species such as chick peas, Indian pea, chickling vetch and fava beans. By this time, flax was not the only source of oil. Gold of pleasure was also cultivated.

Stratified tell settlements gradually ceased to exist in the wake of the Bronze Age, approximately around 1300 BC. The Tumulus culture reached the territory of present day Hungary from a western direction. They built fortified settlements on the higher points of the area. The emergence of this form of settlement as well as changes in the way of life may be related to increasing precipitation as well as fear of attacks by other peoples. According to the evidence of archaeobiological finds, in addition to the high

[5] Gyulai 1993.

level of animal husbandry, these people also practiced a similarly well developed form of plant cultivation.[6]

During the so-called Subatlantic phase, that lasted from the Iron Age (900 BC to 0) until the present, another climatic change followed. Greater extremes began to characterize the climate, whose continental character became somewhat more pronounced. In Hungary, the Early Iron Age is represented by the Hallstatt culture, while the La Téne culture appeared during the Late Iron Age. This latter may be associated with Celtic settlement in the Carpathian Basin. Archaeobotanical finds are relatively few from the Iron Age in Hungary.[7] In comparison to the Early Iron Age, the proportion between cereal grains cultivated during the La Téne Period changed. Common wheat assumed a leading role. Although einkorn also remained in cultivation, its significance decreased. The same holds true for barley. Millet occurs as well although sporadically. Flax served both as a source of fiber and oil. Of the garden plants, lentils, peas, poppies and cucumbers were cultivated. In this period, fruit remains are occasionally found which already show signs of being cultivars (plum, peach). Grapes are also present.

The Roman Period is characterized by the appearance of new plant cultivation equipment and technologies in the Carpathian Basin. Above all, however, it is the appearance and spread of previously unknown cultivars that is most characteristic of the Roman Period (in Pannonia c. 0 to c. 300/400 AD). The cultivation of cereals, legumes, grapes and fruits, as well as the keeping and even conscious breeding of animals are well known from classical Roman written sources (Columella, Cato, Pliny, Varro). This well developed agriculture merged with local indigenous traditions in Pannonia.

Chaffed species of wheat (einkorn and emmer), cultivated in earlier periods, occur but sporadically during this period. They were almost completely replaced by "naked" common wheat and its associate, dwarf wheat which required a significantly more sophisticated agricultural technology. Rye and millet also were found in significant quantities. Barley, however, is not particularly common. The most important legumes included peas, lentils and fava beans.

Today's cultivation of walnuts, plums, apricot, peach and grape is based on Roman foundations. Following the fall of the Roman Empire these fruits, imported by the Romans, survived within the area of Pannonia. Both archaeological and archaeobotanical evidence show that an unusually high

[6] Gyulai 1996a.
[7] Gyulai 1996b.

level of fruit and grapevine cultivation was pursued in the orchards and vineyards of 3rd-4th century AD Roman villas.

Thanks to the highly developed Roman trade network, one must also reckon in this period with remains of imported fruits such as figs, olives and dates.

In order to make their diets more varied and satisfy their daily requirements of vitamins, inhabitants of the Carpathian Basin also consumed wild fruits gathered in their natural environment.

In the animal stocks, primitive forms and highly improved breeds coexisted. The spread of imported breeds was greatly facilitated by the well developed road system and animal trading.

The first urban settlements in the area of modern day Hungary were established during the Roman Period. People were increasingly separated from their natural environment.

Archaeological sites from the areas that were separated from the Roman Empire by the Danubian *limes* are significantly poorer in botanical finds. Nevertheless, it may be clearly seen that the agriculture of peoples who lived in these regions was significantly poorer than that of the Roman province. No major changes had occurred in these latter areas since prehistoric times. Although detailed artifactual evidence is still scarce, it can already be seen that Sarmatians who chiefly settled east of the Tisza river, were a semi-nomadic people engaged in both animal keeping and land cultivation.

During the Migration Period (4th to 9th centuries) several groups passed through the Carpathian Basin. It has also been hypothesized that climatic motivations lay behind the great migration of these masses of peoples. Eastern immigrants who arrived in several waves brought with them agricultural practices typical of nomadic peoples (In addition to animal keeping, there is evidence that both Huns and Avars cultivated millet and barley as well). During the Migration Period, Roman agriculture was replaced by significantly more modest land cultivation practices. Although all cultigens known from earlier periods remained in cultivation, their importance seems to have decreased. Millet, a cereal typical of nomadic pastoral communities characterized by high mobility, assumed a leading role. Slavic communities in the western region of Transdanubia pursued a more sedentary form of agriculture.

Although the storms of the Migration Period caused significant damage to Roman-type villa farming, it survived in a fragmentary manner, and the continuity of expertise can be detected. This is easiest to observe in

the case of viniculture and fruit growing traditions which survived the troublesome centuries following the fall of the Roman Empire. It should not be considered surprising, therefore, that several finds of grape are known from the Migration Period.

According to the evidence from archaeological finds, the mundane artifacts of Avars and Slavs who lived in the Carpathian Basin became similar by the end of the Migration Period (9th century AD). Archaeobotanical finds are also characteristic of a sedentary population with homogeneous agricultural practices. On the basis of archaeobotanical evidence and archaeological artifacts related to land cultivation one may say that Hungarians conquering the Carpathian Basin encountered an impoverished group of pastoral agriculturalists whose plant cultivation traditions were mixed, and who lived a rather non-characteristic way of life.[8]

As far as the conquering Hungarians themselves were concerned, their economy may be best characterized as "semi-nomadic". This may equally include mobile pastoralism and a limited extent of tillage and plant cultivation.

In the beginning, the leading strata of Hungarian society must have practiced mobile pastoralism of a fundamentally Turkic character. One may presume that plant cultivation was the occupation assigned to common people who pursued a more sedentary way of life. There are very few seed remains directly relevant to the Period of the Hungarian Conquest. They include the grave finds of a high ranking conqueror discovered in the Zemplén region. This burial assemblage contained grain from millet as well. Knowing the eating habits of pastoral, semi-nomadic peoples this is not surprising, since millet is a fast growing cereal with a short reproduction cycle that does not need meticulous cultivation and is therefore a typical crop of mobile communities. Remains of textile found in the same grave show that our conquering ancestors not only knew fiber rich plants (flax, hemp and cotton) but were also familiar with their manufacture.

Although among the animal remains the bones of sheep and cattle, characteristic of mobile lifeways, dominate, this phenomenon does not contradict the possibility that conquering Hungarians arrived in the Carpathian Basin with considerable agricultural expertise that included plant cultivation. According to Bálint Zólyomi, pollen samples available for analysis from the Period of the Hungarian Conquest in the Balaton region contained increasing proportions of grains and seeds from plowland weeds,

[8] Györffy 1977.

a phenomenon that seems to be closely correlated with an increase in the number of settlements. Increasing settlement activity is also shown by the increasing presence of ruderalia and fat-hen in palynological samples. The contribution of birch pollen also became significant which may be related to the degradation of the natural flora brought about by progressive deforestation. The occurrences of all these phenomena are the direct consequence of forest clearing and the concomitant formation of secondary steppe habitats.

Agricultural development displays an undisturbed, straight trend of improvement between the Period of the Hungarian Conquest and the 12th-13th century. Although during the time the Hungarians settled the region, the undoubtedly strong influence of Moravian-Frankish agricultural knowledge should be reckoned with; this cannot be detected in the find material. On the other hand, one must hypothesize that Late Avar Period cultivation skills were incorporated into early Hungarian agricultural know-how. With the emergence of the feudal state, these skills (similarly to the peoples who embodied them) gradually merged. Various services, trading, foreign expertise and the centralization of royal power helped in the distribution of sowing material, plant cultivation skills and dynamically developing agricultural equipment in all parts of the country. The formation of latifundia, religious customs and the spread of literacy also played a vital role in this process.

Cereal finds from the excavations of 12th-13th century settlements in the Great Hungarian Plain start displaying species compositions similar to those of Transdanubian assemblages. That is, inhabitants of the Great Hungarian Plain had turned to sedentism as well by the 12th-13th century. The change of sowing materials, which had marked a qualitative leap in plant cultivation, had been largely accomplished by that time. The cultivation of common wheat and rye, cereals with high nutritional values, became widespread and commonplace. Millet assumed only secondary importance, although it remained in cultivation in Europe as a basic ingredient of *kasha* until modern times. Archaeobotanical assemblages from times following the Period of the Hungarian Conquest contain no oat grain, although it should not be ruled out that this cereal may have been known at that time. Even if oats were grown, however, it could not have been very significant. According to written documents, its significance increased only from the 13th century onwards.

Even if Roman knowledge of fruit and grape cultivation survived, they were quickly incorporated into the agricultural skills of Hungarians

who conquered the Carpathian Basin. The adoption of Christianity also favored the distribution of fruit cultivation and viniculture. Only a few centuries after the Period of the Hungarian Conquest, the earliest known documents written in Latin already give accounts of orchards and a flourishing viniculture.

The 14th-16th centuries marked a prosperous period in the development of Hungarian agriculture. The provisioning of developing urban centers created a demand for the cultivation of cereals, vegetables and fruits. It is at this time that meat and wine production also started supplying export markets.

Although cereal production had not yet grown to significant proportions during the 13th century, the quantities of barley, common wheat and rye produced were comparable. Dwarf wheat, six-row barley and oats were added to this list during the 15th-16th centuries. The combined cultivation of wheat and rye (*Triticum mixtum*, "double" grain or *abaydoc*) was already known during the Period of the Árpád Dynasty.

During the heyday of the Middle Ages, agricultural innovations (burrow plow, horse neck-harness, the three-field rotation system) and the secondary exploitation of several domestic animals for draught power became increasingly efficient. Extensive plowlands and pastures surrounded the ever-enlarging settlements with their frequently urban character.

The prosperity of cereal cultivation was brought to a halt by the Ottoman Turkish occupation of the Carpathian Basin. The country was divided into three regions, and incessant warfare did not favor agricultural activity. Areas were abandoned as fallowing increased and production became uneven. The cultivation of wheat and six row barley declined, and millet as well as oats, cereals with shorter reproduction cycles were more commonly grown. This shows that the cultivation of fast growing spring cereals was preferred since they required less work and could be more safely harvested. It is also possible that this trend was enhanced by higher taxes imposed on autumn cereals.

In spite of all the destruction that occurred during the 150 years of Ottoman Turkish occupation, agriculture may be considered to have been continuous during that period. All previously cultivated plants occur in archaeological samples. The number of species actually increased as a result of Turkish horticultural traditions. Numerous Balkanic cultigens were introduced into Hungary at that time. These included vegetables (e. g.

Smirna melons), fruits (e. g. Macaria pears) as well as decorative plants and flowers (e. g. tulips).[9]

3. Conditions preceding the Period of the Hungarian Conquest

Although the stormy times of the Migration Period seriously damaged villa-farming based on Roman tradition, some fragmentary knowledge originating from that tradition survived these tumultuous centuries. It is not surprising, therefore, that several Migration Period grape finds have been identified from the region of Lake Balaton. Grain from common wheat was found together with grape seeds in one of the graves of the 6th -7th century cemetery at Keszthely – Fenékpuszta. Another grave in the 9th century cemetery of Balatonszentgyörgy contained an apricot stone in addition to grape seeds. A piece of woody grape stem was identified among the wall remains of a burnt down house at the 9th century settlement of Főnyed – Szegerdő. The walnut shell recovered at the site of Keszthely – Halász-csárda also dates to the 9th century.

The most important archaeobotanical assemblage of the Late Migration Period in Hungary comes from the site of Fonyód Bélatelep.[10] According to radiocarbon dates this settlement may be dated to between the second half of the 7th and the end of the 9th century. Although it has not yet been possible to clarify the ethnic affiliations of the artifactual material, the archaeobotanical finds are given special significance by the fact that they form the largest such assemblage in Hungary, which is also extremely rich in species. On the basis of these finds it may be said that the inhabitants of this settlement were engaged in vigorous agricultural activity. They were not specialized in growing a single or only a few crops but cultivated a broad range of cereals (two- and six-row barley, common wheat, rye, oats), legumes (peas, lentils), fruits (apricot, peach, cherries and plum) as well as grape. This may be interpreted as a sign of a self-sufficient economy. The high number of weed species identified may also be connected with cereal cultivation. Medical plant must also have been cultivated. The seeds and fruits of plants that formed the original flora at the time were recovered as well. Studying these natural vegetation elements (areal types) it could be ascertained that the climate was somewhat warmer at the time when this settlement functioned.

[9] Rapaics 1940.
[10] Gyulai, Hertelendi and Szabó 1992.

Slavs are considered the most important ethnic group during the Migration Period of the Carpathian Basin both in terms of the size of their populations and their agricultural traditions.[11] According to currently held hypotheses they settled in the Carpathian Basin in three waves. The first of these arrived to Transdanubia, Transylvania and the Banat region during the third decade of the 6th century AD. The second wave coincided with the arrival of Avars, while the third Slavic immigration may have taken place around 680 AD. Slavic groups practicing both land cultivation and animal husbandry lived within the Avar Khanate. When that empire fell, the culturally and linguistically different Slavic group occupied a broad area up until the time of the Hungarian conquest. To date, the ethnic proportions between immigrants and local populations, as well as the possibly differential possession of agricultural knowledge and stocks remain unknown.

Following the 830's, significant concentrations of Christian Slavic populations lived in the southern areas of Somogy and Zala counties in the hilly, forested Balaton region.[12] The role of 9th century Slavs in the Carpathian Basin is far from being clarified. Artifactual materials from their settlements and cemeteries are not always sufficiently distinguishable from those of the Avar population. In fact, very often this does not even seem to be possible. Excavations in the Zalavár area have significantly contributed to increasing what we do know of early Slavic lifeways. It seems likely that the Slavs who inhabited this area practiced pasture rotation and plow agriculture. Although the evaluation of seeds and fruits recovered from this region has just begun, evidence for the cultivation of common wheat, rye and six-row barley could be established with great probability. Remains of fruit stones (peach and plum) indicate that this population was also familiar with the horti- as well as vinicultural heritage of the Roman Period. Undoubtedly, the achievements of antique agricultural traditions influenced Slavic land cultivation practices indirectly as well. Their agriculture also developed under stimuli by Avar and Bulgar-Turkic peoples and they had connections with Greek as well as Frankish-Bavarian sedentary agriculturalists and missionaries. Proof of their plow cultivation practices exists in the form of a symmetric iron share that was once part of a simple walking plow (*raló*).[13]

---

[11] Erdélyi 1982.
[12] Cs. Sós 1985, Vándor 1986, Müller 1989.
[13] Müller 1982.

4. Were conquering Hungarians nomads?

The general image of conquering Hungarians has been considerably modified under the influence of research results accumulated during recent decades. Even today, however, we are still haunted by the myth that the conquering Hungarians lead a "Turkic-style", equestrian pastoral nomadic way of life while the duty of land cultivation, alien to this culture, was delegated to the conquered peoples. However, linguistic evidence, the analysis of Byzantine and Arabic written sources as well as the modern excavations of settlements and cemeteries dated to the Period of the Hungarian Conquest have gradually modified our general view on the lives conquering Hungarians must have lead.

Preceding the Period of the Hungarian Conquest, Hungarians lived in the area of Levedia and were for at least three centuries exposed to the cultural tradition of the Saltovo-Mayack culture. This culture area was bordered by the upper reaches of the Don River to the north, the Caspian Sea and the Volga River to the east and the Crimea and Kuban to the south. Adjacent to this region to the west was the huge plain defined by the Doniec river and the Azov Sea. The Saltovo-Mayack culture cannot be associated with a single ethnic group but should rather be seen as a culture-historical trend. Based on the archaeological artifacts, and especially the botanical remains from the "Mayackoe Gorodische" (fort), the peoples of the Saltovo-Mayack culture were not nomads but practiced sedentary land cultivation.[14] The dominant political power behind the Saltovo-Mayack culture was the Khazar Khanate. Hungarians in this area lived in an economical-political alliance with the Khazar Khanate for a long time. Bulgar-Turkic peoples of the Khazar Khanate exerted a strong influence on the culture of ancient Hungarians. It was during this time period that Turkic loan-words relevant to farming entered the Hungarian language. They complemented and sometimes replaced words relevant to farming in the original Finno-Ugric vocabulary of Hungarians.

The most important Finno-Ugric words related to agriculture in Hungarian predating the Period of the Hungarian Conquest are as follows: *köles* (millet), *ed* (cereal), *kenyér* (meal, *kasha*), *fiu* (border, hedge), *csegely* (wedge-shaped plowland), *fürt* (bunch of grapes), *meggy* (sour cherry), *fű* (grass), *ág* (branch), *falu* (village), *ház* (house), *nyomat* (field pressing), *vág* (cut), *tér* (field?).[15]

[14] Füzes 1987.

[15] Gombocz 1960, Lak 1967-1978, Makkai 1980, Moór 1943.

Bulgar-Turkic loanwords preceding the Period of the Hungarian Conquest include *eke* (plow), *árpa* (barley), *búza* (wheat), *arat* (harvest), *sarló* (?, sickle), *boglya* (haystack), *gügyü* (handful of reed or straw), *tarló* (stubble), *őröl* (grind), *kölyü* (cereal grain mortar), *szór* (grain cleaning), *dara* (farina), *ocsú* (tailing), *gyümölcs* (fruit), *alma* (apple), *körte* (pear), *mogyoró* (hazel nut), *dió* (walnut), *kökény* (blackthorn), *som* (dogwood), *szőlő* (grape), *karó* (stick), *kocsány* (stem of fruit/flower), *szűr* (felt cloak), *bor* (wine), *borsó* (pea), *bors* (pepper), *kender* (hemp), *kóró* (weed stalk), *tiló* (swingler), *csepű* (tow), *orsó* (spindle), *torma* (horse-radish), *üröm* (wormwood), *kabak* (squash fruit), *komló* (hop), *csalán* (nettle), *gyom* (weed), *gyertyán* (hornbeam), *gyűrűfa* (ringwood), *kőris* (ash tree), *tátorján* (Tartarian sea-kale), *bojtorján* (burdock), *kalokány* (water-soldier), *katáng* (chicory), *gyopár* (cudweed), *gyékény* (reedmace), *kökörcsin* (wind-flower), *kikirics* (crocus), *káka* (club-rush).[16]

If the agriculture of the ethnically rather heterogeneous conquering Hungarians must be characterized in a single term, "semi-nomadic" seems to be the most appropriate adjective. This description can accommodate not only mobile animal keeping but a limited extent of land cultivation and agriculture as well.

In the beginning, conquering Hungarians occupied those areas of the Carpathian Basin which were most similar to their former habitation areas. These included sandy plains in the Nyirség region and between the Danube and Tisza Rivers. This territory also corresponds to the westernmost corner of their original natural environment, the parkland steppe region. Studying the geographical distribution patterns of burials from the Period of the Hungarian Conquest, Csanád Bálint made the following observation: While graves of the leading and middle strata of society were predominately located in the sandy regions of the Carpathian Basin, the burials of common people were concentrated in silty-loessy areas.[17] That is, the leaders of conquering Hungarians settled in the Nyírség region, the Mezőföld Plain and the sandy quarters of the Small Hungarian Plain because these were most similar to their ancient homeland (the transitional zone between the steppe and parkland steppe). This is where they could best carry on with their original pastoral and military-style way of life. Common people, on the other hand, preferred the silty-loessy, often forested floodplain areas on the left bank of the Tisza River (eastern Hungary) and areas in Transdanubia

[16] Gombocz 1960, Ligeti 1986, Moór 1943, Zichy 1923.
[17] Bálint 1980.

(western Hungary), since in addition to animal keeping, land cultivation could also be successfully practiced there.

During the Period of the Hungarian Conquest approximately 1/8 of historically defined Hungary was either temporarily or permanently covered by water. This area corresponds to one quarter of modern day Hungary. As a result of periodical flooding, the Tisza River and its tributaries were surrounded by swamps and marshland. Settlement was possible only on various elevations and the periphery of such wetland areas. The flora and fauna in waters, swamps and wet meadows served as a continuous source of food for both people and their livestock. Waves of inundation left behind fertile layers of mud on which rich pastures grew. These excellent grazing areas contributed to animal keeping. In addition, the climate was favorable in those days, since the so-called "small climatic optimum" between approximately 800 and 1200 was probably the warmest period within the last 2000 years. Although the climate began to grow increasingly humid around the year 1000, this trend became more pronounced only by the 13th century.[18]

5. Archaeobotanical finds from the Period of the Hungarian Conquest

Only a few seed remains indicative of plant cultivation are available from the Period of the Hungarian Conquest.[19] This in part may be explained by the fact that it is predominantly cemeteries that are known from the Period of the Hungarian Conquest, and burials are not the most typical features in which plant remains may be found. One of the few exceptions is represented by the grave of a conquering Hungarian of high social status in Zemplén which lies beyond the border of modern day Hungary. This burial contained grain from millet. Migration Period plant remains from the Great Hungarian Plain, as well as from the rest of Eastern Europe show that the most important cereal cultivated by nomadic and semi-nomadic peoples was millet, whose cultivation requires relatively little attention. Consequently, millet meal, that is *kasha*, must have been among the most important foods of these peoples.[20]

[18] Rácz 1993.
[19] Hartyányi, Nováki and Patay 1967/68.
[20] Wasylikowa et al. 1991.

To date, the only archaeobotanical assemblage connected to a settlement once inhabited by conquering Hungarians comes from Lébény – Billedomb, a site near the city of Győr in the Small Hungarian Plain of Western Hungary.[21] Lébény – Billedomb may be considered absolutely the earliest archaeobotanical material from the Period of the Hungarian Conquest (10th century). The entire site was systematically sampled for plant remains. During the course of fieldwork in 1993, considerable numbers of soil samples were gathered from settlement features associated with the conquering Hungarians.[22] The evaluation of this material, therefore, offers information of vital importance concerning agricultural practices characterizing the Period of the Hungarian Conquest. Since information on plant cultivation in this period was previously typified by unsubstantiated hypotheses or often contradicting opinions, the compositions of four archaeobotanical samples that represent the earliest period at the settlement are of outstanding significance. Considering the unusual importance of this find material, results from the recently completed analysis are presented here.

The preservation of carbonized seeds is good, each being coeval with the culture bearing layer in which they were found. The material is taxonomically rich even in comparison with earlier periods: the approximately 2,000 seeds recovered originate from 30 plant species.

Forms of chaffed wheat, so characteristic of prehistoric sites, have not been found at all. It seems that more improved forms of naked common wheat were cultivated at this site. In addition to grain from six-row barley, remains of the two-row and naked varieties of this species were also identified. Both millet and rye also occur. This latter may have been grown by itself, but the combined cultivation of wheat and rye ("double" grain or *abaydoc*) may also have been practiced. It is also possible that millet was sown as a second crop.

Sub-dividing the macrobotanical finds into anthropogenic categories, a picture of variable agricultural activity emerges. Inhabitants at this settlement were not specialized in growing a single or only a few crops but cultivated a broad range of cereals that included all the important species. It seems likely that six-row barley, which was represented by the greatest number of individual finds in the material, was grown as animal fodder. Millet, common wheat and rye, on the other hand, must indisputably have served as human food.

[21] Excavations directed by Miklós Takács, 1993.
[22] Miklós Takács, personal communication.

As a general observation, it is worth mentioning that a high level of cereal cultivation usually coincides with the cultivation of vegetables. This phenomenon is manifested at this site as well: In addition to cereal grain, peas were also identified.

Weed remains also confirm the cultivation of cultigens. The majority (7 species) in this group are spring cereal weeds or characteristic species of garden weed associations (*Polygeno-Chenopodietalia*). A smaller group (4 species) represent typical associations of autumn cereals or cereals in general (*Secalietea*).

Plant species representing the natural flora in these samples are indicative of a rich and variable environment. When species are grouped by their ecological preferences, a balance, even distribution may be observed. The reed association of marshland is represented by common bulrush. Vitamin-rich crab apple must have been gathered in nearby forests. Small, acorn-like seeds from wall germander are indicative of mixed and light, parkland-type forests. Seeds of creeping cinquefoil and cypress spurge must originate from meadows in the area. Arable land was expanded by deforestation. The presence of elderberry seeds may be explained with this activity.

Ruderalia (that is weed species resistant to trampling) are found in all areas exposed to human influences (ditches, roadsides, artificial slopes, fallows, the proximity of buildings, etc.). Soil in such areas tends to be unusually rich in nitrogen or may even have been manured. The presence of weed species from ruderalia (Chenopodietea) indicate significant human interference, i. e. the large size of the settlement. Species representing ruderalia in this find material include white melilot, knotgrass, creeping buttercup and wild mignonette. These plant remains indicate that the human habitation area was neither too humid nor too dry, that is, it represented an area of average cultivation capacity.

6. Archaeobotanical finds from times following the Period of the Hungarian Conquest

Somewhat more archaeobotanical finds are known from the 10th-11th centuries that followed the Period of the Hungarian Conquest.[23] Millet remains found in Kardoskút and Tiszaörvény also support the hypothesis that, possibly in a limited form, nomadic lifeways were maintained in the

[23] Hartyányi, Nováki and Patay 1967/68, Hartyányi and Nováki 1974.

Great Hungarian Plain even after the Period of the Hungarian Conquest. The plant remains recovered from houses and pits from the Period of the Árpád Dynasty excavated at the site of Endrőd, show that plowland cultivation also began that time. In addition, naked common wheat was cultivated, a form that requires more sophisticated agricultural technologies. The cultivation of chaffed einkorn, a typical bread cereal species from earlier periods, was in decline. Barley, on the other hand, remained important possibly as an animal fodder. On the basis of the number of grains recovered it may be concluded that the cultivation of rye was not yet significant at that time.

Archaeobotanical finds from Keszthely – Halászcsárda in Western Hungary and the 11th century site of Esztergom – Kovácsi in Northern Hungary are indicative of valuable cereal varieties characterized by a long growing season. These typically include common wheat and rye. These cereal species require a high level of agrarian technology and continuous care which can be guaranteed only by a sedentary way of life. In addition, the species compositions of cerealia recovered at these sites are identical to those observed at coeval sites in Western Europe. Archaeobotanical finds similar to the aforementioned plant remains were also found in centers that represent the consolidation of the feudal political order and economic system, such as the bailiff's castles of Sopron and Hont that represent an early phase of the Period of the Árpád Dynasty.[24]

Cereal finds from excavations on the Great Hungarian Plain (for example at Cegléd – Madarászhalom) show that approximately a hundred years later, during the 12th-13th century, the species composition of archaeobotanical samples from this area becomes increasingly similar to those studied in Transdanubia. This means that the change in sowing materials had taken place in this region as well. Moreover, from these observations one may conclude that sedentary lifeways were also adopted by the populations of the Great Hungarian Plain by the 12th-13th century. Common wheat and rye, cereal species that are characterized by a high nutritive value but also require continuous care assumed a leading role. Millet largely lost its importance, although it remained in cultivation as a secondarily-sown crop for *kasha* until modern times. Archaeobotanical assemblages from times following the Period of the Hungarian Conquest contain no oat grain. Nevertheless, on the basis of linguistic evidence, it should not be ruled out that this cereal may have been known at that time. Even if oats were grown, however, this cereal could not have been very significant. According to

[24] Hartyányi 1981/83.

written documents, its importance increased only from the 13th century onwards.

It is well known that a high level of cereal cultivation usually coincides with the cultivation of vegetables, including legumes with their high protein content. This highly developed horticulture is clearly illustrated by finds originating from the excavations carried out at the 9th-11th century settlement of Visegrád – Várkert dűlő which brought to light sherds from a bowl that contained a lentil brew mixed with chickling vetch. Lentil and pea seeds found at the Endrőd settlement and dated to the early phase of the Period of the Árpád Dynasty are also indicative of the local cultivaion of these plants.

Archaeobotanical evidence is available that the conquering Hungarians knew fiber crops and their uses as well. According to the results of fiber analyses, textile remains brought to light at the 10th century cemetery of Szabadkigyós – Pálliget were made from flax, hemp and cotton. Naturally, the places of cultivation as well as manufacture in this case remain unknown. Hemp was also one of the most important fibrous plants. Hoards of small, acorn-shaped hemp seeds came to light during the course of excavations carried out at the 9th-11th century settlement of Visegrád – Várkert dűlő and the Endrőd settlement dated to the early phase of the Period of the Árpád Dynasty.

It may be hypothesized that at the beginning of the Period of the Hungarian Conquest, newly arriving Hungarians cultivated seeds brought from the East. Once they had adopted sedentary agriculture, however, they may have turned to using sowing material acquired from local, sedentary populations or *hospes* land cultivators who settled the Carpathian Basin from the West.

It is not only the remains of cereal grain that can be identified during the course of archaeobotanical investigations, but seeds from the associated weed flora as well. Sporadically, vegetation elements of the coeval natural flora (*palaeo-biocoenosis* associations) may also be also encountered. The studies of such human induced *palaeo-biocoenoses* provide an opportunity to clarify the lifeways and agricultural knowledge of ancient cultures. Recently, reconstruction attempts concerning coeval environments have also gained momentum. *Thanatocoenology*, a discipline devoted to the analysis of ecological relations between archaeobotanical finds brought to light during the course of excavations, can be used in drawing conclusions concerning ancient biotopes, and reconstructing the flora and plant

associations. In short, it can be used in describing the botanical conditions in the environment of the archaeological site being studied.[25]

Evidence from plant finds show us that the life of plant cultivators during the Period of the Hungarian Conquest and the Period of the Árpád Dynasty was made hell by the multitudinous weeds. Cereal grain deposits found in houses and pits excavated by archaeologists usually contain cleaned and stored material that was in a state directly preceding consumption. Nevertheless, a surprisingly high proportion of such samples is made up of seeds from various weeds. Using coeval methods of cleaning, which must have been limited to tossing in the air, winnowing and perhaps hand separation, were obviously not sufficiently potent to remove these elements from cereal stocks. Seeds of corncockle are especially common. When ground into the flour, these seeds could cause serious poisoning. The seeds of other weeds may occur in smaller numbers, however, must occasionally have added up to significant quantities. These species include cleavers, rye brome, field cow-wheat, knotgrass, redshank, field bindweed, annual woundwort, spring wild-oat, and fat-hen. The presence of seeds representing these weeds reconfirms the local cultivation of autumn cereals, thereby providing important additional evidence for sedentary agriculture. Meanwhile, these weed seeds also show that harvesting was carried out by cutting the cereals close to the ground.

7. The earliest evidence for Hungarian fruit production and viniculture

Most terms related to viniculture and fruit cultivation in Hungarian are of Bulgar-Turkic origins.[26] These came into the Hungarian language during the time spent in contact with the Khazar Khanate. According to the most recent views, the viniculture of Hungarians had two different roots. Conquering Hungarians imported the knowledge of viniculture from the East which was complemented by Roman grape production in Pannonia.[27] It is possible that Hungarians first encountered this plant in their former habitation area in Levedia and in all probability cultivated grapes in Etelköz. This is indicated by the comment made by *Anonymus*, the notary of King Béla, who described how, within the framework of a pagan ritual, the

[25] Willerding 1986.
[26] Gombocz 1960.
[27] Füzes 1970, Füzes and Sági 1968, Sági and Füzes 1967.

military leaders of Hungarians sacrificed a fat horse on Tarcal hill and held a great feast ("*magnum aldamas fecerunt*"). Following the adoption of Christianity, both viniculture and fruit production started prospering and reached a high level never seen before. Only a century after the Period of the Hungarian Conquest, documents written already give accounts of orchards and a flourishing viniculture.

The first vineyards and orchards were adjacent to monasteries or early feudal latifundia. Since the hills and slopes best suited to grape cultivation were covered by woods at that time, the new vineyards were created predominantly in forest clearings. Having been guaranteed royal privileges, German, French and Italian hospes also settled in sparsely populated regions of the country. Similarly to ever expanding religious orders they not only brought expertise but also highly bred forms of grape from their own countries.

Early food production was largely limited to gathering wild fruits in the forests and preserving them for later consumption. Walnuts and wild sour cherry for example, grow easily in our woods without human intervention, similarly to crab apple or wild pear, blackthorn, hawthorn, wild strawberry, dogwood and hazelnut. This trend is also reflected in the early names of some coeval locations. Household-bound gardening that was connected to the establishment of orchards in peasant homes only started around the 13th century. Sporadic fruit finds from the Period of the Árpád Dynasty include a carbonized peach stone recovered from a grave near the Romanesque church of Esztergom – Kovácsi, and the small fragments of walnut shell found in one of the houses excavated at the 10th-11th century site of Keszthely – Halászcsárda. These prove that even if sporadically, more improved forms of fruits were also cultivated.

The occurrences of seeds from field bindweed found in one of the graves of the Kál cemetery, as well as the masses of spurge seeds identified in the sample (in the company of additional seeds from Saint John's-wort) found in another grave excavated in the cemetery of Hajdúdorog – Katidűlő, may be explained by mortuary rituals of the Period of the Hungarian Conquest. It is possible that these seeds were placed around the head of the deceased as a protection against Evil. Spurge, an herb known from ethnopharmacology accelerated digestion, while Saint John's-wort is known for its tranquilizing, digestive and wound-healing effects. Thus these archaeobotanical remains may be interpreted as a proof that Hungarians were familiar with medical plants as well.

In summary: Hungarian plant cultivation between the Period of the Hungarian Conquest and the 12th-13th century appears to have followed a straight, continuous trend, a development with no setbacks. Although it must have been strongly influenced by the plant cultivation skills of peoples who inhabited the Carpathian Basin prior to the Period of the Hungarian Conquest (Moravians and Franks), such an effect remains invisible. One should also reckon with the integration of Late Avar agriculture into their body of knowledge. This information, similarly to the peoples who mediated them to the Hungarians must have been rapidly turned into a homogeneous unit as a feudal state was established. This means that centralized royal power, the emergence of a latifundium system, the adoption of Christianity as a state religion and the spread of literacy ensured that both know-how imported from abroad as well as dynamically developing agricultural equipment were distributed even in the most remote parts of the country.

8. The aims and methods of studying food remains

Studying food remains can provide responses to a number of questions that could not be answered by other means of research. The identification of these finds is of help in the reconstruction of ancient cultures and the history of food habits and contributes to the elucidation of the long road that led to the production of pies and leavened bread, thereby enriching our knowledge of prehistoric gastronomic culture and food consumption habits.

Food remains may occur in and of themselves (for example flour and meal finds, pieces of bread) or in association with other archaeological artifacts (for example on the surface of metal objects or stuck to the inside of sherds). The analysis of stomach contents from mummies as well as moor and glacier victims, and scatological studies must also be mentioned here.[28]

It is only in recent decades that the application of highly developed methods of microscopy and technically advanced analytical procedures in chemistry have permitted the appropriately precise study of such occasionally recovered food remains. It is exactly the sporadic occurrence, specific character and the differential nature of these finds that, although ancient food materials carry a lot of information, no standardized methodology has yet been developed for the comprehensive body of examinations referred to as the analysis of food remains. In addition to food

[28] Richter 1988.

remains one must also reckon with the presence of dyes, drugs and poisons. The microscopic study of remains from soups and meals burnt onto the inner sides of vessels is most reminiscent of the work of criminologists and forensic experts.

Instrument aided analytical chemical investigations offer additional possibilities in the evaluation of food remains. Results of such studies permit conclusions concerning the composition of macro- and micro-elements in food remains. Such investigations reveal that some of the elements survive in the archaeological food remains. The partial presence or absence of mobil elements which may be easily washed away does not mean that these components were absent from the original food. It has not yet been possible, for example, to detect sodium in prehistoric food remains. This fact is more attributable to bleaching than to the actual lack of salt in the diet. Due to the aforementioned moderate carbonization caused by charring, only a limited group of compounds may be expected to survive. It is for this reason that prehistoric food remains usually do not contain starch, sugar and protein any more. On the other hand, free amino acids, cholesterol as well as fatty acids may sometimes be detected. Results of macroscopic, microscopic and analytical studies are of help in identifying the type of food and the ingredients used in it, as well as additives and modes of food preparation.

In spite of the fact that rapid burning leads to structural damage and lasting change in organic materials, it may also conserve certain features. Often nothing but the phytolith (small crystals of silicium dioxide) rich chaff remains survive for the purposes of microscopic studies.[29] If the material available for study is not completely carbonized, the burnt segment may be removed using a variety of chemical procedures. Thus certain intact tissues of the remaining parts may become available for microscopic studies. Naturally, the possibility of such analyses is always determined by the state of preservation. In order to make the phytolith rich plant tissue remains visible under a light microscope, embedding in a material with a high light refraction index must be applied.[30]

As a result of sophisticated microscopic investigations that require special chemical preparations, morphological details of plant remains (tissues, fragments of the plant vascular system, phytolith, pollens, sporae, hair, colors/pigments, cocon etc.) may become recognizable even after the

[29] Netolitzky 1926.
[30] Piperno 1987.

millennia spent in archaeological deposits.[31] The methodology of microscopic analysis of food remains recovered from the inside of sherds (traces of soups, meals and stews) may be compared to the scientific techniques used in criminal and forensic investigations.

Pioneering work by Netolitzky[32] in the microscopic evaluation of food remains deserves particular attention. It is precisely the specific nature of these procedures that they are being applied by only a few researchers. Results by Richter[33] and Schlichterle,[34] however, have already provided important insight into the consumption habits and gastronomic culture of prehistoric peoples.

Instrument aided analytical chemical investigations offer additional possibilities in the evaluation of food remains. Results of such investigation are indicative of the kind of food, ingredients used as well as additives and methods of preparation.

Already Maurizio[35] investigated the origins of flat breads recovered from prehistoric pile dwellings using the analysis of ash. However, it was only the procedure of modern analytical chemistry (atom emission and atom absorption spectrophotometry) which made the analysis of the main components and trace elements in food remains possible. Research in this direction showed that although part of the elements is preserved in archaeological food remains, several factors must also be taken into consideration.

Under the climatic conditions prevalent in the Carpathian Basin, food remains are usually preserved in a carbonized form, probably as a result of exposure to relatively mild heat in an anaerobic or at least oxygen poor environment.

Due to the moderate carbonization caused by charring, only a limited group of compounds may be expected to survive. It is for this reason that prehistoric food remains usually do not contain starch, sugar and protein any more. On the other hand, free amino acids, cholesterol as well as fatty acids may sometimes be detected.

The study of food remains poses a great challenge. During the course of such analysis botanical, chemical and gastronomic expertise are all

[31] Netolitzky 1926; Lochte 1951, 1954; Feindt 1989; Richter 1987; Gassner 1973, 1989; Mehlhorn and Piekarski 1989.
[32] Netolitzky 1927.
[33] Richter 1987, 1988.
[34] Schlichterle 1983.
[35] Maurizio 1916.

equally required. In contrast to recent food remains, the number of identifiable compounds is very small in archaeological food remains, which may chiefly be explained by the effects of heat and long deposition.[36] Starch may be interpreted as a polymer sugar, since starch may be transformed into sugar by hydrolysis. It loses water by a temperature of 190°C and turns brown. This is why it is not possible to detect starch and sugar exposed to effects of heat. Proteins are also easily denatured. At a temperature of 200-210°C the peptide bindings decompose and turn brownish-black. Thus, they can no longer be detected. The only exception is the group of free amino acids which are fairly resistant to both heat and chronological time. For example, it was possible to extract amino acids from the 50,000 years old bone remains of a woolly rhinoceros.[37] Moreover, amino acids also occurred in the apparently carbonized grain representing several archaeological periods in the Balaton Region.[38] Since amino acids decompose at different rates relative to each other, it is not possible to draw conclusions from their concentrations concerning their original proportions. heat resistant. Neither animal nor plant hormones therefore decompose very easily. Cholesterol, for example, can withstand a three hours long exposure to a heat of 250°C. Detecting cholesterol is very important, since on the basis of its analysis it may be decided whether certain food remains originate from plants or animals. In terms of detection, however, fats are most stable. Using the fatty acid tests developed in the Archaeochemical Laboratory of the Institute of Prehistory it is possible to simultaneously determine the origins and types of food remains.[39]

The differential decomposition times of various amino acids result in proportions between these compounds that change through time.[40] It is for this reason that it is not possible to draw conclusions from their mere presence concerning the type of protein, their original concentrations or proportions to each other. On the basis of the so-called amino acid racemization, however, it is possible to determine the age of organic materials.[41] Initial results show that amino acid racemization used in the

[36] Rottländer 1983a.
[37] János Csapó, personal communication.
[38] Gyulai 1996.
[39] Rottländer 1983b.
[40] Csapó, Tóth-Pósfai and Csapó-Kiss 1985.
[41] Rottländer 1983a; Csapó, Tóth-Pósfai and Csapó-Kiss 1986.

determination of chronological age of bones could also be applied for similar purposes in the evaluation of archaeobotanical finds.[42]

The gas-chromatographic analysis of fatty acids relatively insensitive to the influences of heat, is a suitable method in identifying the sources of organic materials of both plant and animal origins.[43]

9. Archaeological food remains in Hungary

As a result of the increasingly interdisciplinary character of recent archaeological investigations, some results of research into archaeological food remains can also be reported here.

Samples from the Middle Neolithic settlement of Tiszapolgár – Csőszhalom yield carbonized remains of *kasha*/bread.

Carbonized spots observed on the surfaces of sherds found at the Copper Age settlement of Zalaszentbalázs – Szőlőhegyi mező were studied both macro- and microscopically. These remains were identified as some sort of a *kasha*-type dish made from ground chaffed wheat. According to Anna Endrődi,[44] another fragment of carbonized food remains recovered from one of the features that had been excavated prior to the construction of the Rákospalota section of the M0 ringroad surrounding Budapest can also be dated to the Middle Copper Age on the basis of its artifactual context.

Carbonized fragments of food remains possibly originating from *kasha*/bread were recognized during the identification of archaeobotanical materials from the Middle Bronze Age settlement of Százhalombatta. Having water-sieved the samples taken from the floor level of a burnt down Ottomány culture house at the Bronze Age tell site of Túrkeve – Terehalom (1600 BC), carbonized remains of *kasha*/bread were discovered as well. The secrets of prehistoric housewives are revealed by a few solid pieces of food remains which were found in themselves (i. e. not burnt onto pottery fragments) during the course of excavations at the Late Bronze Age settlement of Gór – Kápolnahalom. They also seem to originate from *kasha*/bread.

Among the prehistoric food remains, the finds recovered from one of the refuse pits associated with the Late Bronze Age Tumulus culture (1200 BC) are undoubtedly of the greatest significance. In addition to the seeds of legumes that had been so popular during prehistoric times (pea, Indian pea,

[42] János Csapó, personal communication.
[43] Rottländer 1983; Rottländer and Schlichterle 1980.
[44] Anna Endrõdi, personal communication.

chickle vetch) the remains of millet *kasha* were also found. They consisted of a few, polished grains that had stuck together in lumps. Another mysterious, porous and hard, carbonized piece of some substance came to light at the same site. Following macro- and microscopic investigations as well as chemical analyses (the identification of macro- and micro elements, analyses of amino- and fatty acids) it was concluded that this fragment originated from a "cake", made with high quality flour, lard and eggs. Two thirds of the flour originated from millet, while one third was ground from chaffed wheat. This sponge-cake like delicacy was filled with strawberry jam, as was evidenced by the seeds found within the dough. This piece of fine pastry is one of the oldest of its kind in Europe and is an important memento of our cultural history. It offers us a glimpse of everyday life in prehistoric times and gives the long-forgotten past a human face.

During the course of the 1980 excavations at Keszthely – Fenékpuszta, a pit dated to the Celtic period yielded a 60 cm thick, black, ashy layer. The late István Takács, archaeozologist, gathered a significant number of animal bones as well as some 1/2 l of black, ashy sediment from this feature. The identification of animal remains was subsequently carried by László Bartosiewicz. Archaeozoological, macro- and microscopic investigations carried out in the Archaeological Institute of the Hungarian Academy of Sciences as well as chemical analyses (macro- and micro elements, amino acid and fatty acid analyses 1989/1990) performed in the Central Laboratory of the Faculty of Animal Sciences at the Pannon University of Kaposvár permit us to conclude that the blackish deposit full of fish bone were indeed the remains of food.

Finally, the first results of work carried out on an unparalleled assemblage deserve mention here. Carbonized fragments of some solid food (bread/*kasha*) originating from the settlement of Lébény – Billedomb, dated to the Period of the Hungarian Conquest, will contribute significant data to gastronomic history. These small, porous pieces apparently belong to each other and in all probability are fragments from organic material that occurred in major amounts. Similar remains are known from the settlement of Endrőd, dated to the early phase of the Period of the Árpád Dynasty and from another feature of the M0 ringroad on the border of Budapest. This latter sample was also dated to the Period of the Árpád Dynasty.

Literature

Anonymus 1977. *Gesta Hungarorum. Béla király jegyzőjének könyve a magyarok cselekedeteiről* (Book by the notary of King Béla on the deads of Hungarians). Facsimile, with Hungarian translation by D. Pais. Magyar Helikon, Budapest, 172 p.

Bálint, Cs. 1980. Természetföldrajzi tényezők a honfoglaló magyarok megtelepedésében (Factors of natural geography in the settlement of conquering Hungarians). *Ethnographia* 91: 35-51.

Cs. Sós, Á. 1985. *Zalavár középkorban* (Zalavár in the Middle Ages). Zalaegerszeg, 22 p.

Csapó, J., Tóth-Pósfai, I. and Csapó-Kiss, Zs. 1986. Optimization of hydrolysis at determination of amino acid content in food and feed products. *Acta Alimentaria* 15 (1): 3-21.

Erdélyi, I. 1982. Nomád népek – letelepült népek kapcsolatának és viszonyának problémája a Kárpát-medencében és Kelet-Európában (The problem of connections between nomads and sedentary peoples in the Carpathian Basin and Eastern Europe). *Veszprém Megyei Múzeumok Közleményei* 16.

Feindt, F. S. M. 1989. Organische Reste an einem Bronzeschwert aus Flintbek. Archäobotanik. *Dissertationes Botanicae* 133: 81-88.

Füzes, M. 1971. Régészeti növénytani megjegyzések Moór Elemér "A bor és szőlő" c. cikkéhez (Archaeobotanical notes to the article "Wine and grape" by Elemér Moór). *Veszprém Megyei Múzeumok Közleményei* 10: 115-126.

Füzes, M. 1987. Majackoje vára (Szovjetúnió) feltárásának archaeobotaniakai tanulságai (Archaeobotanical conclusions of the excavations at the fort of Mayackoe [Soviet Union]). Paper read at the Day of Public Collections in Zala County, 15. 10. 1987.

Füzes, M. 1990. A földmivelés kezdeti szakaszának (neolitikum és rézkor) növényleletei Magyarországon. Archaeobotanikai vázlat (Plant remains from the early phase of plant cultivation - Neolithic and Copper Age - in Hungary. An archaeobotanical outline). *Tapolcai Városi Múz. Közl.* 1: 139-238.

Füzes, M. and Sági, K. 1968. A balatoni szőlőkultúra pannon gyökerei (The Pannonian roots of viniculture in the Balaton region). *Filológiai Közlöny* 14: 347-363.

Gassner, G. 1973. *Mikroskopische Untersuchung pflanzlicher Lebensmittel.* Gustav Fischer Verlag, Stuttgart, 396 p.

Gassner, G. 1989. *Mikroskopische Untersuchung pflanzlicher Lebensmittel.* Gustav Fischer Verlag, Stuttgart, 412 p.

Gombocz, Z. 1960. Honfoglalás elötti bolgár-török jövevényszavaink (Bulgar-Turkic loanwords predating the Hungarian Conquest). *Nyelvtudományi Értekezések* 24.

Györffy, I. 1977. *István király és műve* (King István and his work). Budapest.

Gyulai, F. 1993. *Environment and Agriculture in Bronze Age Hungary.* Budapest: Archaeolingua, Series Minor 4, 59 p.

Gyulai, F. 1995. The analytical study of carbonized grain remains from the Lake Balaton region (Hungary). *Annali di Botanica* (Roma) 53: 251-260.

Gyulai, F. 1996a. Balatonmagyaród - Hídvégpuszta késö bronzkori település növényleletei és élelmiszermaradványai (Archaeobotanical finds and food remains from the Late Bronze Age settlement of Balatonmagyaród – Hídvégpuszta). *Zalai Múzeumok* 1996: 169-195.

Gyulai, F. 1996b. Umwelt und Pflanzenbau in Transdanubien während der Urnenfelder-, Hallstatt- und Latènekultur. In E. Jerem and A. Lippert eds.: *Die Osthallstattkultur.* Archaeolingua, Budapest: 29.

Gyulai, F. Hertelendi, E. and Szabó, I. 1992. Plant remains from the early medieval lakeshore settlement Fonyód – Bélatelep (Lake Balaton, Hungary) with especial emphasis on the history of fruit cultivation in Pannonia. *Vegetation History and Archaeobotany* 1: 177-184.

Hartyányi, B. P. 1981/83. Kora-Árpád-korból származó búza a Hont-i ispánsági várból (Early Árpád Period wheat from the bailiff's castle in Hont). *Magyar Mezőgazdasági Múzeum Közleményei* 1981/83: 95-113.

Hartyányi, B. P., Nováki, Gy. and Patay, A. 1967/68. Növényi mag- és termésleletek Magyarországon az újkökortól a XVIII. századig (Plant seed and fruit remains from Hungary between the Neolithic and the 18th century) I. *Magyar Mezőgazdasági Múzeum Közleményei* 1967/68: 5-85.

Hartyányi, B. P. and Nováki, Gy. 1974. Növényi mag- és termésleletek Magyarországon az újkökortól a XVIII. századig (Plant seed and fruit remains from Hungary between the Neolithic and the 18th century) II. *Magyar Mezőgazdasági Múzeum Közleményei* 1974: 23-73.

Lakó, Gy. 1967-1978. *A magyar szókészlet finnugor elemei* I. Budapest 1967, II. Budapest 1971, III. Budapest 1978.

Ligeti, L. 1986. *A magyar nyelv török kapcsolatai a honfoglalás előtt és az Árpád-korban* (The Turkic connections of the Hungarian language and before the Hungarian conquest and during the Árpád Period). Budapest.

Lochte TH. 1951. *Grundriss der Entwicklung des menschlichen Haares. Beiträge zur Haut-, Haar- und Fellkunde 5*, Frankfurt, 144 p.

Lochte TH. 1954. *Tafeln zur Haarkunde. Beiträge zur Haut-, Haar- und Fellkunde 6*, Frankfurt, 82 p.

Makkai, L. 1980. Az őshazából az újhazába (From the ancient homeland to the new homeland). In P. Hanák ed.: *Hogyan éltek elődeink?* (How did our predecessors live?). Budapest: 7-21.

Maurizio, A., 1916. Botanisch-chemische Untersuchungen zur Getreidenahrung der Pfahlbauer. *Anzeiger für Schweizerische Altertumsfunde* 18: 183-185.

Moór, E. 1943. A magyar őstörténet fő problémái (The chief problems of Hungarian ancient history). *Szegedi Múzeumi Kiadványok* I/12.

Mehlhorn, H. and Piekarski, G. 1989. *Grundriss der Parasitenkunde.* Stuttgart, 407 p.

Müller, R. 1982. A mezőgazdasági vaseszközök fejlődése Magyarországon a késővaskortól a törökkor végéig 1-2. *Zalai Gyűjtemény* 19, 930 p.

Müller, R. 1989. *Sieben Jahrtausende am Balaton.* Mannheim, 126 p.

Netolitzky, F. 1926. *Anatomie der Angiospermen-Samen.* Berlin, 364 p.

Netolitzky, F. 1927. Arbeitsmethoden zur mikroskopischen Untersuchung verkohlter Körper. *Mikrokosmos* 20: 178-183.

Piperno, D. R. 1987. *Phytolith Analysis*. Academic Press, Inc. London, 66 p.

Rácz, L. 1993. Éghajlati változások a középkori és kora újkori Európában (Climatic changes in medieval and early modern Europe). In A. R. Várkonyi and L. Kósa eds.: *Európa híres kertje* (Europe's famous garden). Budapest: 67-86.

Rapaics, R. 1940. *A magyar gyümölcs* (The Hungarian fruit). Budapest: Magyar Királyi Természettudományi Társulat Kiadóvállalata.

Richter, B. 1987. Mikroskopische Untersuchungen an Speiseresten. In P. J. Suter ed.: *Zürich Kleiner Hafner. Tauchgrabungen 1981-1984*. Zürcher Denkmalpflege, Monografien 3: 180-184.

Richter, B. 1988. Mikroskopische Analyse vorgeschichtlicher Nahrungsreste. *Mikrokosmos* 77/4: 112-116.

Rottländer, R. C. A. 1983. Chemische Analyse prähistorischer Gefässinhalte. In: *Enzyklopädie Naturwissenschaft und Technik*: 72-80.

Rottländer, R. C. A. and Schlichtherle, H., 1980, Gefässinhalte. Ein kurz kommentierte Bibliographie. Naturwissenschaftliche Beiträge zur Archäologie. *Archaeo-Physika* 7: 61-70.

Sági, K. and Füzes, M. 1967. Régészeti és archaeobotaniai adatok a pannóniai kontinuitás kérdéséhez (Archaeological and archaeobotanical data to the question of continuity in Pannonia). *Agrártörténeti Szemle* 9: 79-97.

Schlichterle, H. 1983. Mikroskopische Untersuchungen an neolitischen Gefässinhalten aus Hornstaad, Yverdon und Burgäschisee-Süd. In: *Naturwissenschaftliche Untersuchungen zur Ermittlung Prähistorische Nahrungsmittel*. Ein Symposionsbericht. Archaeologica Venatoria: 39-55.

Vándor, L. ed.: *Régészeti kutatások a Kis-Balaton térségében* (Archaeological research in the Kis-Balaton region). Zalaegerszeg, 37 p.

Wasylikova, K., Circiumaru, M., Hajnalová, E., Hartyányi, B. P., Paskevich, G. A. and Yanushevich, Z. V.: East-Central Europe. In K. E. Behre ed.: *Progress in Old World Palaeoethnobotany*. Rotterdam: 207-239.

Willerding, U. 1986. Landwirtschaftliche Produktionstrukturen im Mittelalter. In B. Hermann ed.: *Mensch und Umwelt im Mittelalter*. Stuttgart: 245-255.

Zichy, I. 1923. A magyarság őstörténete és műveltsége a honfoglalásig (The ancient history and culture of Hungarians until the Hungarian conquest). *A Magyar Nyelvtudomány Kézikönyve* I/5. Budapest.

Zohary, D. and Hopf, M., 1988, *Domestication of Plants in the Old World*. Oxford, 249 p.

Zólyomi, B., 1980, Landwirtschaftliche Kultur und Wandlung der Vegetation im Holozän am Balaton. *Phytocoenologia* 7: 121-126.

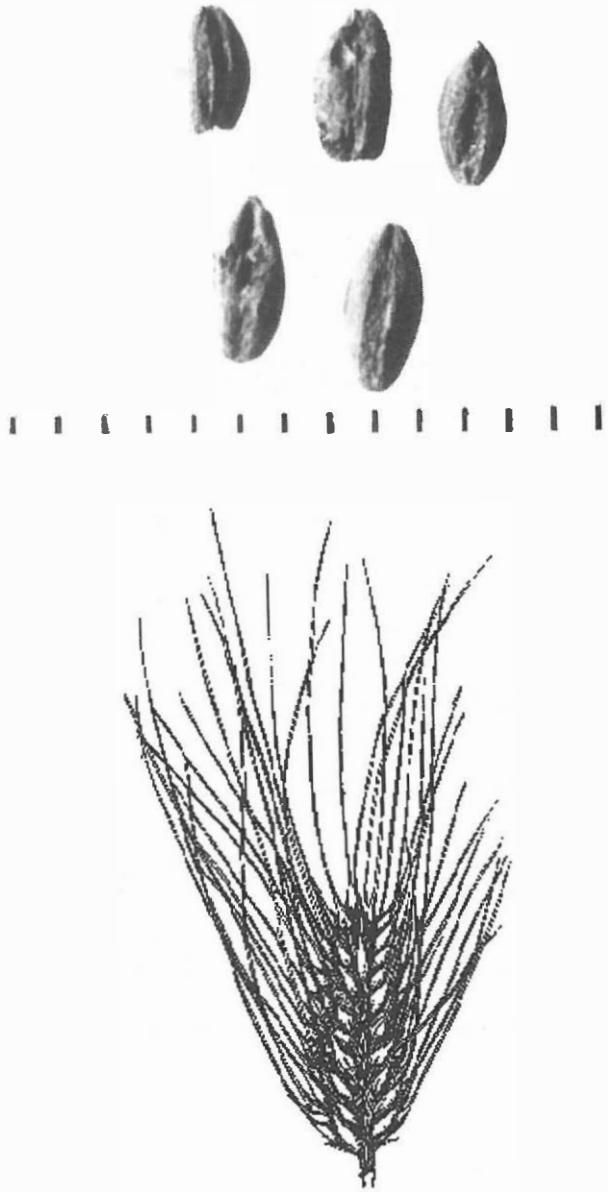

Fig. 1 a, b: *Hordeum vulgare subsp. hexastichum* (six-rowed barley)
Lébény-Billedomb, 10th-11th century

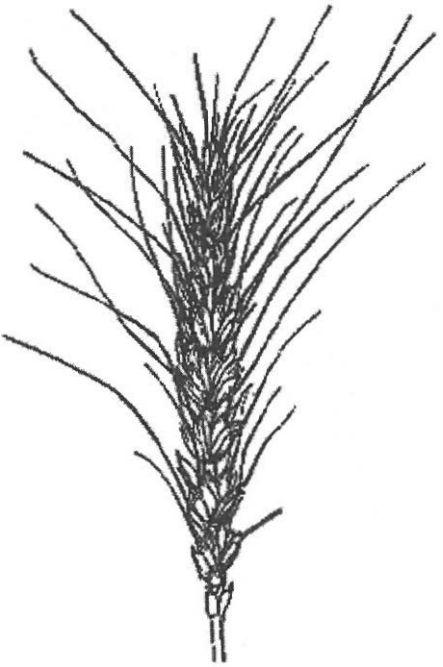

Fig. 2 a, b: *Triticum aestivum subsp. vulgare* (common wheat)
Lébény-Billedomb, 10th-11th century

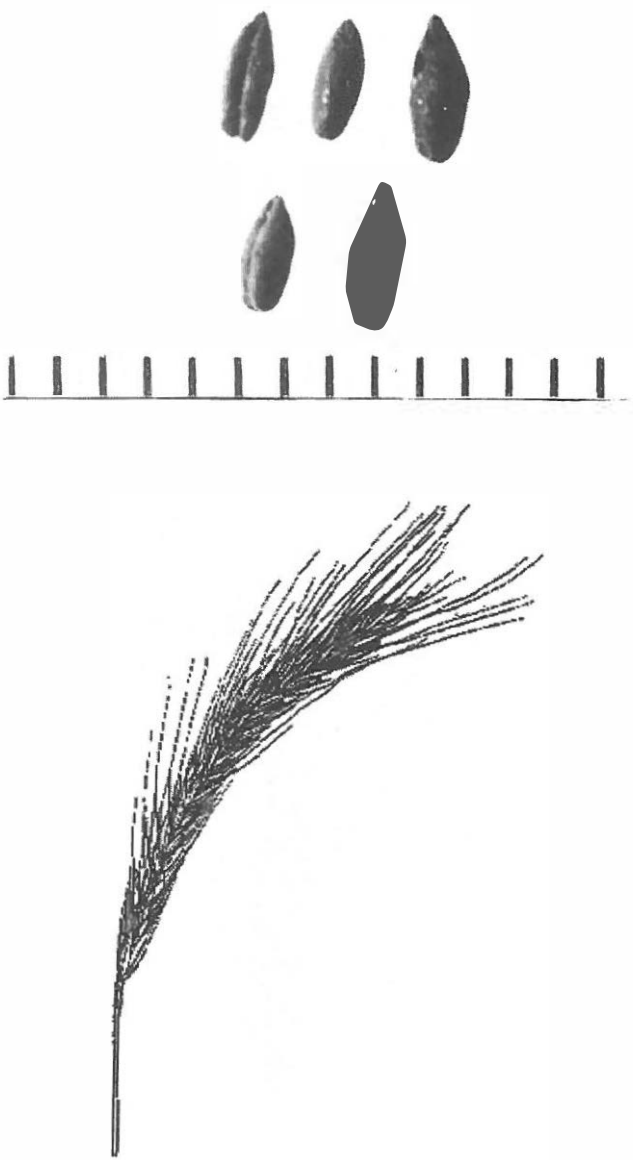

Fig. 3 a, b: *Secale cereale* (rye)
Lébény-Billedomb, 10th-11th century

Fig. 4 a,b: *Chenopodium album* (white goosefoot)
Lébény-Billedomb, 10th-11th century

Fig. 5 a, b: *Fallopia convolvulus* (black bindweed)
Lébény-Billedomb, 10th-11th century

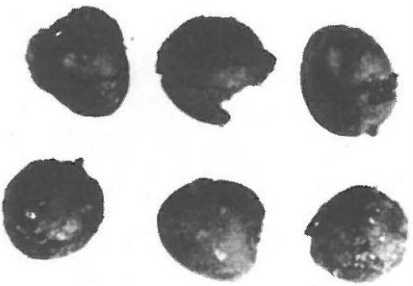

Fig. 6 a, b: *Panicum miliaceum* (true millet)
Lébény-Billedomb, 10th-11th century

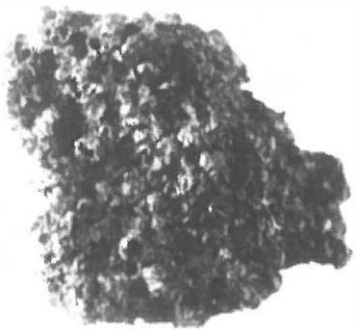

Fig. 7: Bread- or gruelfragment
Lébény-Billedomb, 10th-11th century

Tender Meat under the Saddle

Customs of Eating, Drinking and Hospitality among Conquering Hungarians and Nomadic Peoples

MEDIUM AEVUM QUOTIDIANUM

HERAUSGEGEBEN VON GERHARD JARITZ

SONDERBAND VII

=

STAMRA

(Studia archaeologica
mediae recentisque aevorum
Universitatis Scientiarum
de Rolando Eötvös nominatae)

EDITED BY JÓZSEF LASZLOVSZKY

VOLUME II

Tender Meat under the Saddle

Customs of Eating, Drinking and Hospitality among Conquering Hungarians and Nomadic Peoples

In Memory of
Gyula László
(1910 – 1998)

Edited by József Laszlovszky

Krems 1998

The articles have been part of a conference organized by the College of Commerce, Catering and Tourism, the Society of Old-Hungarian Culture, and the Department of Medieval and Postmedieval Archaeology, Eötvös Loránd University, Budapest (October 10-11, 1996).

Translated from Hungarian
by Alice M. Choyke and László Bartosiewicz

Cover illustration: The seven chiefs of the Hungarians (detail),
J. Thuróczi, *Chronica Hungarorum*, Brünn 1486.

– ISBN 3-90 1094 10 5

Herausgeber: Medium Aevum Quotidianum. Gesellschaft zur Erforschung der materiellen Kultur des Mittelalters, Körnermarkt 13, A – 3500 Krems, Österreich. – Druck: KOPITU Ges. m. b. H., Wiedner Hauptstraße 8 – 10, A –1050 Wien.

Table of Contents

Preface

1996 was the year of millecentennial celebrations of the Hungarian conquest. Many scholarly conferences and popular programmes were organised for this occasion. The theme of this volume was the topic of a programme organised by the College of Commerce, Catering and Tourism, The Society for Old-Hungarian Culture and by the Department of Medieval and Postmedieval Archaeology, Eötvös Loránd University, Budapest. The first part of the programme was the conference on the archaeological, historical and natural scientific researches on the customs of food consumption of the Hungarian conquest period. These papers are representing a new approach as well an upswing in the study of every day life and material culture. Thus, the study of archaeological food remains and the research on the culture of conquest period Hungarians were relevant contributions for the organisers to the 1996 millecentenary celebrations in Hungary. The conference was not only limited to the 9^{th}-10^{th} century conquering Hungarians, but also was concerned with the pastoral nomads from the Migration period and the Middle Ages.[1]

The scholarly programme of the conference was followed by an exhibition on the archaeological food remains and finds, on the objects of nomadic peoples from early modern period and on modern art objects inspired by these ancient cultures.

The most exotic part of the programme was the dinner organised by the college. This was an attempt to help this institution to create standards for historical tourism and experimental programmes. The special feature of this dinner was the cooperation between scholars of historical studies and specialists of catering and tourism. Particular attention was paid to the authenticity of ingredients (known from historical sources and

[1] The first version of some of the papers presented at this conference was published in Hungarian. *"Nyereg alatt puhítjuk". Vendéglátási és étkezési szokások a honfoglaló magyaroknál és a rokon kultúrájú lovasnépeknél.* Szerk. Laszlovszky, J. Ómagyar Kultúra 10 (1997) különszám. = Tudományos Közlemények II. Kereskedelmi, Vendéglátóipari és Idegenforgalmi Föiskola, Budapest 1997.

archaeological evidence), while the modes of preparation and serving were obviously suited to modern equipment, conditions and contemporary tastes. We regarded this experiment as an important step in the cooparation between scholars and specialists of historical tourism, since dilettant reconstructions of conquest period every day life were also present in the programmes of 1996.

The title of this volume refers to that strange ancient, but often present day, understanding of the customs of „barbars" or nomadic peoples which has also influenced scholarly studies for a long time. Ammianus Marcellinus from the 4th century wrote: „the Huns ... eat meat from all sorts of animals, which they place on their horse's back under their thighs thereby making it tender and warm." A part of this observation is interesting for the ancient history of food consumption or animal husbandry, either reflecting the practice that horsemen took some sort of dried meat with them on long rides, or recording another practice to cure the horses' back with pieces of raw meat. The other part of this sentence is just an example for the topoi of „civilised people" as they misinterpreted some customs of the „barbars".

We dedicate this volume to the memory of Gyula László, professor of archaeology, who was the most important figure in Hungarian archaeology to introduce a new approach: to see the people and their life in the archaeological finds and objects. His pioneer work *The Life of the Conquering Hungarian People* is regarded by the authors of this volume as a standard for those who want to reconstruct the past.

József Laszlovszky