

ARCHAEOGEOLOGICAL OBSERVATIONS OF THE CISTERCIAN MONASTERY OF EGRES AND ROYAL CEMETERY

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(Abstract)

The Cistercian monastery of Egres (Igrış, Romania), founded by Béla III, in the Mureș valley, was a place of outstanding importance in Hungarian history. The remains of the three-nave basilica and monastery, identified in 2013, have been uncovered below the surface since 2016 thanks to excavations carried out in cooperation between Hungarian and Romanian archaeologists. Using the malacological material, we have reconstructed the natural environment in the bend of the Mureș. By examining the stone material of the masonry and small architecture, we determined the original natural deposits of the rocks by means of petrological, micropaleontological and geochemical analyses. The masonry is composed of 90% Late Cretaceous Milovian sandstone (Bosez Sandstone Formation), the rest of the rocks being Middle and Late Miocene limestone, Middle Miocene andesite, Middle Pleistocene limestone and Late Pleistocene travertine. The rocks in the Mureș valley were transported by barges on the Mureș to Egres. The decorative stones of the small architecture (altars, gateways, tombs) are the Middle Jurassic limestone ('red marble') of the Middle Jurassic age (Tölgyháti Limestone Formation) from the Gerecse Mountains in Tardos and the white, pale grey marble quarried in the Precambrian metamorphic zone of the Southern Carpathians around Bucova and Zeicani. The mass grave from the mongol invasion period yielded, in addition to the uniquely beautiful red marble statue fragments, extremely rare fragments of an ornately cut Fatimid rock crystal chalice. The rock crystals were quarried in Madagascar from Precambrian pegmatite in the Sahtanay Valley and then transported by sea in long-distance trade across the Red Sea and in caravans to Cairo to the rock crystal cutting masters. From there it may have been brought to Egres, probably as a gift. It is also possible that this rare object may have been a royal gift, possibly in connection with the Fifth Crusade with Andrew II, and that it may have been brought to the monastery, which was richly endowed by the royal family, according to sources. The fine marble carvings, red marble statuary fragments of unparalleled beauty and pieces of the Fatimida chalice are important art historical artefacts from one of the most brilliant periods of the Hungarian Middle Ages.

1. Brief history of the monastery

The Cistercian monastery of the Blessed Virgin of Egres (Igrış, Timiș County, Romania), on the banks of the Mureș, founded by King Béla III in 1179, played a prominent role in Hungarian history. King Imre granted the Cistercians of Egres the right to transport and sell salt on the Mureș, and Andrew II granted them the village Monora (Manarade) near the salt deposits of Ocna Sibiului¹. The flourishing monastery

soon became a place of authenticity and founded a number of filiates. Andrew II and his second wife, Jolanta Courtenay, were particularly fond of the Cistercians of Egres (the mother monastery of the Cistercians was founded on the estate of Jolanta Courtenay's father, the Count of Pontigny), and the royal couple chose the monastery of Egres as their final resting place. In 1241 the abbey was besieged by the Tatars². Béla IV fortified the monastery, which the castellan successfully defended from the attack of the Cumans. From the beginning of the 16th century, due to the increasing frequency of Turkish attacks, the monks left and the monastery was converted into a fortress. In 1551, Mehmet beylerbey captured it and carried away part of the walls to fortify the castle of Csanád. For nearly a century and a half, the Banat was

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¹ Bósz 1911, 45–48.

² Szabó 1861, 43–44.

under Turkish rule and Egres, along with many settlements, got close to being deserted³. In the 18th century, stone was taken from the ruins for the construction of the Orthodox Church of St. Archangel in the village and for the reconstruction of the Church of St. Gellért in Csanád, the rest was carried away by the villagers, some stone carvings being preserved by Count Szapáry in the park of his castle in Sânpetru Mare⁴.

2. Archaeological research

At the end of the 19th century there was still a ruined wall in the middle of the village⁵. In 2013, the Pázmány Péter Catholic University and the National Museum of Banat in Timișoara launched a joint research programme to identify and excavate the monastery. In the summer of 2013, dr. Gábor Bertók (Pázmány Péter Catholic University) used ground penetrating radar to locate the site of the three-nave church⁷. A total of 69 pieces of the former stone material of the monastery were identified in the Local History Museum in the village of Egres and in the collection of Petru Ofar until 2013⁸. From 2016, the excavation of the area based on the ground-penetrating radar survey started under the leadership of dr. Daniela Tănase (National Museum of Banat in Timisoara) and dr. Balázs Major (PPKE) with the participation of students of the Archaeology Department of PPKE and archaeology students and colleagues from Romania⁹. The excavations have clarified the stratigraphy of the site, from the Bronze Age to the modern period, with the extracting of the monastery's stone material. Apart from scattered finds, no archaeological features from the prehistoric period have been found. The earliest features in the area are the small, single-nave parish church and its associated cemetery, which date from the early Arpadian Age. The 18 × 7,5 m church, built of brick on yellow tamped clay as a waterproofing

layer, had a small square tower on the west side with an arched sanctuary enclosure on the east. This church was extensively demolished during the construction of the abbey's three-nave basilica and the foundation of the late medieval cemetery tombs. The layout of the monastery church, which served as a royal burial place, has been almost completely clarified, although the whole of the large three-nave building has not been excavated. The church, which measures about 56 × 18 metres, was originally built with a vaulted sanctuary, the angular sanctuary typical for Cistercian architecture probably being formed during the rebuilding after the Tatar invasion. The identification of the northern wall of the abbey and the excavation of more than 400 medieval graves completed the archaeological research up to 2021¹⁰. The stone material that was processed and evaluated formed part of the Cistercian abbey church, with most of the valuable pieces being found in the open section at the entrance and around the sanctuary (*Fig. 1*). The red marble carvings were mainly concentrated around the sanctuary. In addition to more than fifty skeletons from the mass grave from the mongol invasion period (*Fig. 2*), horse bones, weapons, wooden doors and numerous decorative architectural elements (*Fig. 3*) were recovered¹¹. The red marble may have been fragments of a finely polished male head (*Fig. 4*), and fragments of columns from the tombs of Andrew II and Jolanta Courtenay. In the mass tomb, small fragments of a Fatimid rock-crystal chalice (*Fig. 5*) were found as an extremely outstanding rarity¹². In 2021, a fragment of white marble inscribed with an inscription (*Fig. 7*) and red marble incrustated with white marble (*Fig. 8*) were found at the church gate.

3. Natural environment

In the alluvial plain, from the *Mindel* period (Middle Pleistocene 0.6-0.4 million years) to the Early Holocene, the lower course of the Mureș gradually followed the northward migration of the Tisza north-westwards¹³. The alluvial cones of the Ancient Mureș were formed in the Early and Middle Pleistocene, the alluvial cones of the Mureș in the Late Pleistocene¹⁴. Between the Tisza and Mureș rivers, the Pleistocene residual level of

³ Diamond 2018, 9–10.

⁴ Bósz 1911, 43, Fig. II; 48, Fig. III.

⁵ Molnár 1870, 86; Rómer 1870, 58; Henszelmann 1871, 36–37.

⁶ Heitelné Móró 2000a, 593–636; Heitelné Móró 2000b, 272–275; Florea 2009, 271.

⁷ Tănase *et alii* 2017.

⁸ Solt 2013.

⁹ dr. Péter Langó, dr. András Végh, dr. Tibor Rác, dr. Gábor Bertók and Róbert Lóki participated in the work on behalf of PPKE. Zsuzsanna Kopeczny from the Banat Museum in Timisoara assisted in the excavation. We are grateful to Ștefan Popa, anthropologist, for his contribution to the cemetery excavation and to Gergely Buzás for his advice as a consultant.

¹⁰ Tănase 2016; Tănase 2018; Tănase 2020; Tănase-Major 2020.

¹¹ Tănase 2018, 314, Fig. 3–7.

¹² Tănase 2023, 57.

¹³ Andó 1993, 3.

¹⁴ Molnár 2007, 29–30.

Szeged-Öthalom is similar to that of Egres¹⁵. The monastery was built on a small terrace of the old Mureş river in the northern part of the village, on a flat oval hill at an altitude of 100.4 m–100.7 m above sea level. In the Middle Ages, the monastery was naturally protected by the Mureş river to the north and the east and the Mureş stream to the south. During the excavations, fragments of pottery of the Mureş culture were found in the black soil under the debris of the buildings¹⁶. In the excavation section, ochre yellow, slightly clayey sand settles under the black organic matter-rich, greasy, clayey soil. The foundation trenches of the monastery's foundation walls were dug into this slightly impermeable layer, which was also compacted. The yellow, clayey sand, often mixed with small pebbles of less than 1 mm, is very rich in snail shells, but no organic remains were found in the sample, apart from the molar tooth of an Apodemus mouse, and no plant fragments were found. All the fragments of snail shells were sharp-edged, not abraded, and therefore represent the remains of locally living organisms, rather than transported ones. Most of the Gastropoda are mud-dwelling; the majority of them are larger benthic snails (*Planorbis corneus*, *Stagnicola palustris*, *Bithynia tentaculata*). The mussel *Pisidium obtusale* lives in forested swamps in still or slightly moving water, 14 species of snails prefer still water and 18 terrestrial species are also typical of wet environments. Only *Granaria frumentum* prefers dry, sandy environments¹⁷. The Mollusca fauna reconstruct shallow water, marshy environment with small raised dry depressions surrounded by gallery forest on the river side. The snail *Valvata macrostoma* and *Gyraulus riparius* are common late Holocene relict species. *Valvata macrostoma* and *Bithynia transylvanica* suggest that the faunal assemblage is more related to the Transylvanian faunal province than to the lowland one.

Species list: *Valvata cristata*, *Valvata macrostoma* (= *V. pulchella*), *Bithynia transylvanica* (= *B. troscheli*) – common, *Carychium minimum*, *Stagnicola palustris* – massive, *Radix* sp. (cf. *auricularia*), *Planorbis corneus*, *Planorbis planorbis* – common, *Anisus spirorbis*, *Anisus septemgyratus*, *Armiger crista* (= *Gyraulus crista*), *Gyraulus riparius*, *Bathyomphalus contorts*, *Segmentina nitida*, *Oxyloma elegans* – common, *Succinella oblonga*, *Vertigo pygmaea*, *Vertigo antivertigo*, *Pupilla muscorum*, *Granaria frumentum*, *Chondrula tridens*, *Vallonia costata*, *Vallonia pulchella*, *Alinda biplicata*, *Punctum pygmaeum*,

Zonitoides nitidus, *Nesovitrea hammonis*, *Deroceras/ Limax* spp, *Pseudotrachia rubiginosa*, *Trochulus hispidus* (= *Trichia hispida*), *Cepaea* cf. *hortensis*, *Pisidium obtusale* – common.

4. Stone use and origin of rocks

There are no natural rock outcrops within 60 km of Egres, so the stone needed to build the monastery had to be transported from a great distance. During the excavations, small rock samples were collected for petrologic analysis. Most of the block stones and larger architectural elements were carved from the yellowish, greyish-coloured, hard, siliceous-bonded, fine- and coarse-grained sandstone (Fig. 9). This distinctive rock is a premier building stone, formerly known as “Carpathian sandstone”, later as “Milovian sandstone” and more recently as “Bozes sandstone” (Bozes Sandstone Formation), formed in the Late Cretaceous¹⁸. It is a flysch-type sediment consisting of metamorphic rocks eroded from higher ground and cemented hard by silicic acid solutions¹⁹, similar to grauwacke in the Alps²⁰. The sandstone was deposited in the Western Carpathians (Munții Apuseni) from Radna to Alba Iulia in the Mureş Valley in the Campanian basin of the Late Cretaceous, 83–88 million years ago²¹. The sandstone of Bose was used for the construction of the Cistercian church of Kerc (Cârța, Sibiu County), the filiate of Egres, the Benedictine monastery at Frumuşeni (Arad County) (*Bizere*)²², the Franciscan church of Szeged²³ and throughout the XIth–XIVth century churches and monasteries in many places in the Southern Great Plain (Csolt, Ellés, Hódmezővásárhely, Csomorkány, Kutaspusztá, Szermonostor, etc.)²⁴.

The stone floor of the main nave of the basilica of Egres monastery is a slabbed and polished, pale drapp limestone, which, according to the rich microfauna: *Heterolepa dutemplei* D'ORB, *Textularia pala* CZJZEK, *Textularia gramen* D'ORB, *Cibicides* sp, *Melonis* sp, *Globigerinoides* sp. (Fig. 10), formed in the shallow sea of the Middle Miocene, Badenian basement (16–12.8

¹⁵ Krolopp *et alii* 1995, 309–361.

¹⁶ Tănase-Major 2020, 449.

¹⁷ Welter-Schultes 2012, 1–674.

¹⁸ Lóczy 1889, 36–37; Schafarik 1904, 17, 19, 21, 140, 143; Codrăcea – Răileanu 1961, 103–120; Bălc *et alii* 2012, 23–32.

¹⁹ Săndulescu – Dimitrescu 2004, 8–13.

²⁰ Schuller *et alii* 2009, 135–142.

²¹ Lóczy 1889, 36–37.

²² Bajnóczi *et alii* 2015, 266–267; Burnichiou 2015, 249–267.

²³ Székely – Czank 2014, 19.

²⁴ Bozóki 1998, 40–41; Juhász 1973, 117–120; Kelemen *et alii* 2012, 88–89; B. Nagy – Tóth 2020.

million years)²⁵. The hard limestone occurs around Geoagiu (Hunedoara County)²⁶, but is also found towards Lăpugiu (Hunedoara County). The white, yellowish, ooidal limestones²⁷ of the brackish, low salinity sea of the Late Miocene Sarmatian Age (12–10 million years) are well carved. But, as observed on the stone material of Cârța²⁸, it dusts over time in the open air, so it was used in the interiors of Egres monastery. The Sarmatian limestones are found around Șoimoș castle în Lipova (Arad County), Bârzava (Arad County) and Hărău (Hunedoara County). The Miliolina limestone, rich in monoplasts, was also used for the Franciscan church in Szeged²⁹. Andesite were used at the excavated external and internal foundations of the southern side wall of the basilica and the already destroyed supporting columns of the sanctuary. In thin slices, the hyalopilitic-pilotaxitic fabric of the parent material contains typical twinned plagioclase porphyritic crystals, sometimes zoned in appearance, and holocrystalline pyroxene, more sparsely olivine. Melt droplets with grain sizes barely exceeding lapilli size and plagioclase fragments from explosions are embedded in the host material (Fig. 11). These volcanics can be identified by their characteristics with the Middle Miocene biotite amphibolite deposits of 12.1 million years old occurring around Deva (Hunedoara County)³⁰.

Large stone slabs were carved from white, hard travertine of Lower and Middle Pleistocene age, 2.4–0.4 million years old. Smaller carvings and decorative elements were made from the Late Pleistocene travertine of 0.4–0.01 million year old. Travertine is found around Geoagiu and Geoagiu Băi (Hunedoara County). The well-known Agnus Dei relief in the Dömötör tower in Szeged was also carved from travertine³¹. The Romans were very fond of white and hard travertine for their constructions; it was also used in the Roman baths of Călan (Hunedoara County)³². Since the quarries were quite close to the Mureș, heavy stone loads were transported by barges and rafts on the river³³ to Egres, since the Cistercians of Egres also had salt barges to transport salt cubes to the salt warehouse

in Szeged. Boat nails, the so-called “sintels” (Fig. 12) found during the excavation, which were specially shaped, large-headed and two-pointed, held the ships’ moorings together. The rocks of the Mureș valley were also used in many of the Arpadian Age constructions in the lowlands³⁴. The mortar and chalky binder of the masonry contains, in addition to pebbles and andesite fragments, mainly light-coloured limestone fragments. The microscopic age-marking fossils of *Glomospirella cf. elbursorum* BJÖRNIMAN, *Meandrospira dinarica* KOCHANSKY-DEVEDE et PANTIC, *Meandrospira Insolita* (HO), *Glomospirella tenuifusulata* (HO), *Glomospirella sinensis* HO, *Glomospira sp.*, *Glomospirella sp.*, *Miliolidae*, *Erlandia*, *Ostracoda* (Fig. 13) indicate that the Middle Triassic was formed in the Anisian (241–239 million years). The Tethys Sea is characteristic of the infralittoral carbonate platform³⁵. The Triassic limestones and dolomitic limestones occur in the Zarand Mountains around Galșa (Arad County)³⁶ and further away around Căprioara (Arad County)³⁷ and in the Codru Moma Mountains near Beliu (Arad County)³⁸.

5. Marble

A few fragments of white, pale grey, polished marble slabs (Fig. 7), sometimes with details of inscriptions, were found in the rubble of the basilica doorway wall, which may have decorated the facade above the entrance. Nine small samples of the marbles were collected for rock analysis. Preliminary results of cathodic-luminescence (CL), X-ray fluorescence (XRD) and stable-isotope analyses indicate that most of the marbles originate from the Precambrian metamorphic zone of the Southern Carpathians, around Bucova (Caraș-Severin County) and Zeicani (Hunedoara County), but some were probably imported from the Mediterranean region³⁹. Further material investigations are on-going. The raw material for the marble mosaics of the Benedictine monastery of Bizere also comes from the marble quarries of Bucova and Zeicani⁴⁰. Examining the origin of 119 marbles from the Province of Dacia, 67 come from Bucova and 36 are imports from Greece (Naxos, Paros, Thassos) and Asia Minor (Afyon, Marmara,

²⁵ Steininger 1998, 325.

²⁶ Pálffy 1909, 82–83.

²⁷ Silye 2010, 195.

²⁸ Mihăilă et alii 2012, 80–81.

²⁹ Szónoky 2001, 18–19.

³⁰ Pécskay 2012.

³¹ Szónoky 2001, 19.

³² Fodor et alii 1982, 243, 251–252, Figure 1.

³³ Czeglédi 1969, 537–556.

³⁴ Kelemen 2010, 5–6.

³⁵ Oraveczné 1987

³⁶ Lóczy 1884, 44–45, 51.

³⁷ Salaj et alii, 1988, 395–402.

³⁸ Pethő 1894, 56.

³⁹ Bajnóczy 2023, 18.

⁴⁰ Bajnóczy et alii 2015, 271–272.

Usak)⁴¹. Opinions on the marble slabs of the Cistercian basilica of Egres were brought from nearby Cenad from the ruins of the Roman castrum that once guarded an important crossing of the Mures⁴². Among the Arpadian Age churches and monasteries of the Southern Great Plain, fragments of pale grey marble were found at Csongrád-Ellés monastery (Csongrád County)⁴³, grey marble at Bugac Pétermonostor (Bács-Kiskun County), and white marble at Csolt monastery (Békés County) and Kutaspuszta (Mileševo, Serbia)⁴⁴.

6. Red marble (red limestone with a medium to high density)

During the excavations, fragments of carved and polished red marble decorative elements (columns, flatstone, polished square floor slabs) were found belonging to the elaborate small architecture of the once richly decorated altars, gates and tombs. Among them, fragments of beautifully sculpted and polished sculptures stand out, such as the extremely delicate sculpted male head found in a mass grave from the Mongol invasion period⁴⁵. Thin sections of rock samples taken from red marble fragments have yielded juvenile Ammonites, Crinoidea (sea lily) remains and a rich microfauna (*Spirulina sp.*, *Lenticulina sp.*, *Nodosaria sp.*, *Ramulina sp.*, *Textularia sp.*, *Globothaete sp.*, *Cadosina sp.*). The distinctive bioclastic packstone sediment was formed in the pelagic zone of the Neotethys Sea in the Toarci-Bath of the Middle Jurassic. Based on the important index fossils found in the samples, the abundant, small-sized *Bositra* shells (Fig. 14), the rock is typical of the *Tölgyháti Limestone Formation*, which occurs over a large area around Tardos, Lábatlan (Komárom-Esztergom County) in the Gerecse Mountains in Hungary⁴⁶. In addition to the *Bositra*, isotopic analyses confirmed that the red marbles of Egres were mined from Tardos⁴⁷. The Middle Jurassic age red limestone of Gerecse has a particular beauty, unique colour shades, and when polished, it is highly decorative and its prestigious use makes it sort of a red marble in the art-historical sense⁴⁸.

The mining of the red limestone of Gerecse began at the beginning of the Arpadian Age,

and the quarries near Tardos were given to the Esztergom bishopric by King Imre (1196–1204). The “lapicida” and the “marmorario” stone-carving workshops, founded for the mining of the spectacular red limestone, were used to supply the decoration of the most important constructions⁴⁹. The raw material for the red marble polished floor tiles of the Benedictine monastery of the village of Szépfalu (Bizere) in the Mureş valley, according to the bositraca found in them, also comes from Tardos⁵⁰. The red marbles found in the excavations of Dégse, Ellésmonostor and Szermonostor in the Southern Hungarian Plain are also from Tardos⁵¹, confirmed by isotopic analysis⁵². Hungarian red marble was also used to decorate the monasteries of Heiligenkreutz and Laxenberg (Austria) instead of the famous red marble of Adnet in Austria⁵³. Hungarian craftsmen made the canopy tomb of King Casimir the Great in the cathedral of St. Stanislo and St. Vencel in Wawel in Krakow⁵⁴, the cathedral of Zagreb (Croatia) and many others, where they used the Hungarian red marble from Tardos. The red limestone from the quarries in Tardos was loaded onto stone barges in nearby Süttő, then sailed down the Danube in a cart to Kalocsa (Bács-Kiskun County) (where major construction work was also underway in the cathedral), to the Tisza, and then sailed down the river to Szeged. In 1217, King Andrew gave the red marble mines to Miklós Csák, who, after extending the 12th century Benedictine monastery of the St. Cross in Szentkereszt (Vértesszentkereszt, Esztergom-Komárom County), richly decorated the church of St. Cross, which had been acquired by the Cistercians, with red marble from Tardos. Miklós Csák, who was the *comes of Csanád* between 1222–1224⁵⁵, had good relations with the Cistercian abbot of Egres.

In the Carpathian Basin in many places (Gerecse, Bakony, Villányi, in the Tatras, Pieniny, etc.) there is a Jurassic red limestone, the so-called “ammonitico rosso”. The closest to Egres is in the Codru-Moma mountains, on the border of Moneasa (Arad County), whose red limestone is mixed with black limestone, and whose typical macro-relics are Brachiopods, Crinoids instead of Ammonitic. Mining only started in the 19th

⁴¹ Müller *et alii* 2012, 110–115.

⁴² Juhász 1930, 29.

⁴³ Szónoky 2001, 19.

⁴⁴ B. Nagy – Tóth 2020.

⁴⁵ Végh – Sági 2023; Fig. 4.

⁴⁶ Zsiborás 2020, 162; Császár *et alii* 1998, 417–420.

⁴⁷ Lővei *et alii* 2024, 152.

⁴⁸ Lővei 1992, 3–28.

⁴⁹ Takács 2018, 31, 55–56.

⁵⁰ Bajnóczi *et alii* 2015, 270–271.

⁵¹ Szónoky 2001, 20, Fig. 4–5.

⁵² Kelemen *et alii* 2012, 89.

⁵³ Pintér-Bajnóczi 2014, 187–196.

⁵⁴ Sadraei 2001.

⁵⁵ Bácsatyai 2015, 17.

century⁵⁶. Geological mapping for the construction of the Iron Gate in the Locva and Banatului mountains around Svinița (Mehedinți County) revealed Jurassic red limestone rich in Ammonites⁵⁷. It is unlikely that they were transported from such a distance to Egres by land or upstream on the Danube.

7. Fatimid rock-crystal chalice efforts

Extremely important finds are the finely patterned crystal fragments, which are the surviving fragments of a magnificent Fatimid rock crystal ewer⁵⁸. One of the fragments shows the faceted figure of a male cheetah (*Acionyx jubatus*), while the fragment from the neck of the chalice has a fringe of faceted dots and “X” motifs running around it. (Fig. 15) Two rock-crystal fragments were found in the mass grave from the Mongol invasion period, three from the rubble. The Fatimid rock-crystal cups, jugs and bottles – richly decorated with geometric motifs, floral ornaments and animals (lion, panther, cheetah, gazelle, mountain ram, eagle, hawk, falcon, duck, etc.) and elaborately polished –, dated from the 10th–11th century during the Fatimid Caliphate in Cairo, are the unparalleled masterpieces of highly skilled crystal engravers and cutters⁵⁹. The Fatimid sultans of Cairo’s prestigious collection of rock crystal ornaments was largely destroyed, leaving the few remaining rock crystal chalices, jugs and pitchers as the most valuable masterpieces of the museums and collections. In the Fatimid Empire, pure quartz crystals were found in abundance among the larger quartz crystals in the pegmatite at the granite of the Egyptian Cordilleras of the Sinai Peninsula and the eastern coast of Egypt. In those days, the famous rock crystals of the Alps could not have reached the Fatimid Cairo, but the largest, water-clear, mineral-, liquid- and gas-free, inclusion-free rock crystals are found in Madagascar. Arab traders had already been transporting various valuable products (gemstones, spices) from the ‘islands of the moon’, and once the Muslims invaded and Islamised Madagascar in the 11th century, the exploitation of the area accelerated. Precambrian (500 million years old) pegmatites from the Sahtanay valley on the island were used to extract the magnificent, capital, inclusion-free rock crystals, which were transported by ship to the Red Sea

ports with other valuable goods by means of the long-distance trade that had been established, and then, together with the treasures of Africa (gold, pearls, ivory, spices, etc.), the raw rock crystals from Madagascar were transported by caravans to Cairo⁶⁰. In the Comoros, an archaeological excavation at the port of Dembeni revealed a rock crystal processing workshop⁷⁹, where large quantities of rock crystal shards were found⁶¹. Here, mostly the inclusions were gently chipped off and the large crystal was carefully packaged to avoid damage and cracking of the crystal’s water-clear core during the often stormy voyages.

Pilgrims visiting holy places from the Holy Land and those returning from the Crusades brought back small relics and souvenir for their loved ones and churches⁶². The Fatimid rock crystal ornaments were among the most valuable treasures of the Arabs and could only be accessed by a particularly prestigious person. King Andrew II, as leader of the Fifth Crusade, brought home some important relics from the Holy Land, which he donated to churches and monasteries. He may have received a small Fatimid rock-crystal chalice as a gift during his pilgrimage, which he presumably donated to the Cistercian Abbey of the Blessed Virgin of Egres after the death of his beloved second wife, Jolanta Courtenay, who was to be laid to rest here.

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⁵⁶ Pálffy 1913, 98–99; Géczy 2006, 216–217; Papp 1905, 60.

⁵⁷ Gonda 1892, 264; Kudernatsch 1852.

⁵⁸ Fig. 5, Fig. 15; Tănase 2023.

⁵⁹ Avionan 1994; 72–82; Contadini 2010.

⁶⁰ Rakotoarison 1983.

⁶¹ Pradines 2013.

⁶² Gyürky 1986; Nagy 2016, 105.

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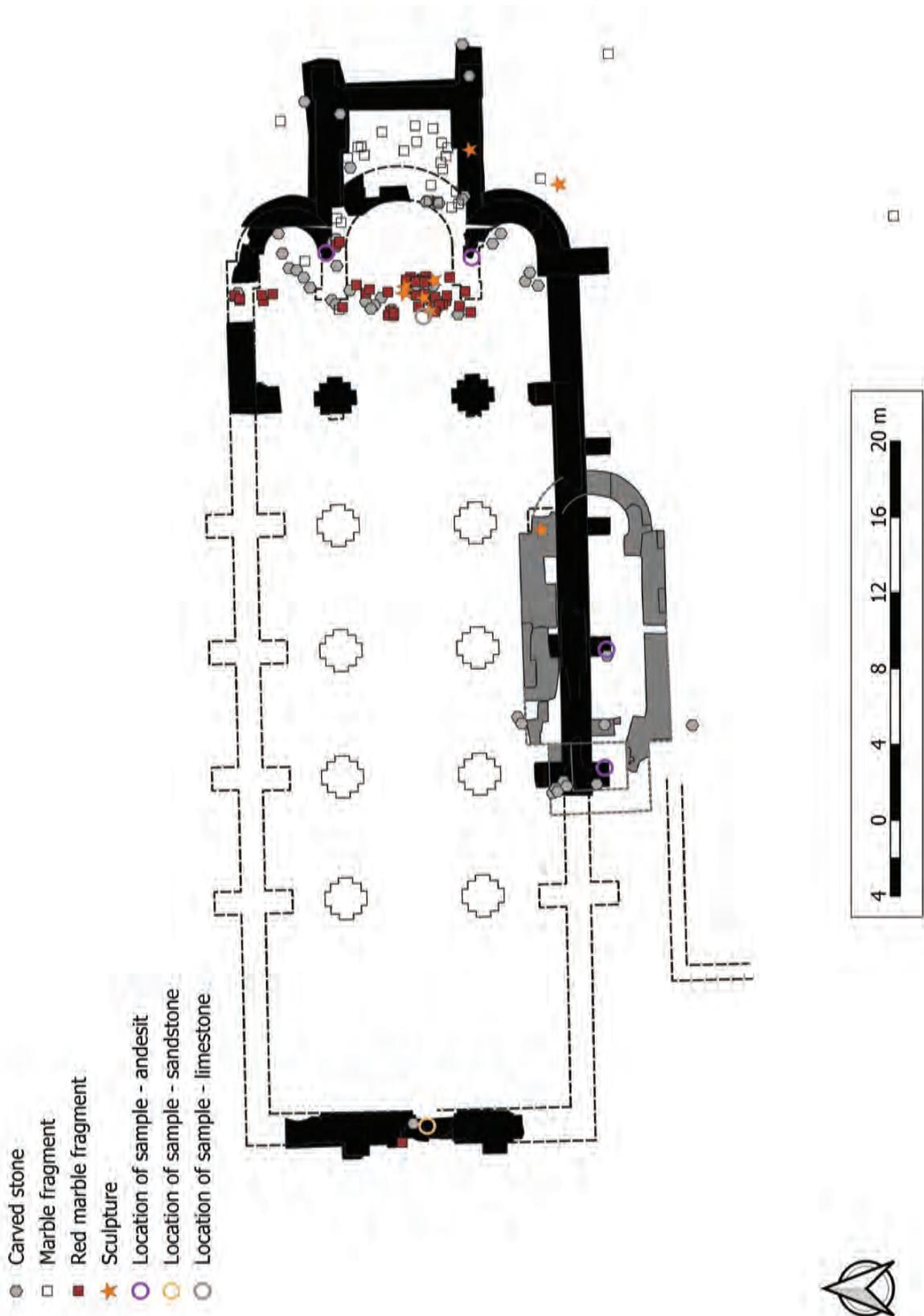
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1. The excavated rock material – overview (Map: Róbert Lóki)



2. Mass grave from the Mongol invasion period



3. Stone carvings at the bottom of the mass grave



4. Sculpture fragment, middle Jurassic red limestone "red marble"



5. Fragment of a Fatimid rock crystal chalice (Photo: Milan Şepetan)



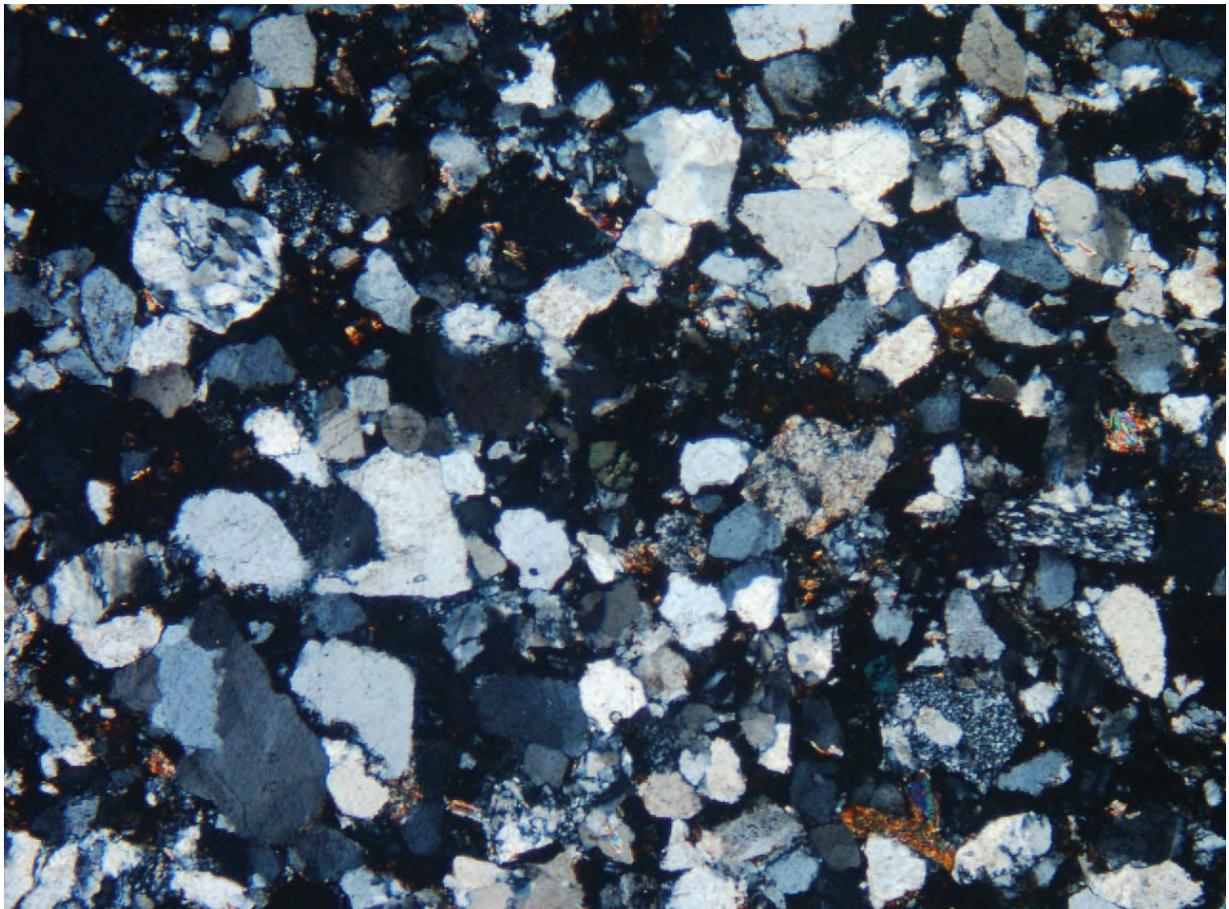
6. Bases of the tombs of Andrew II and Jolanta Courtenay



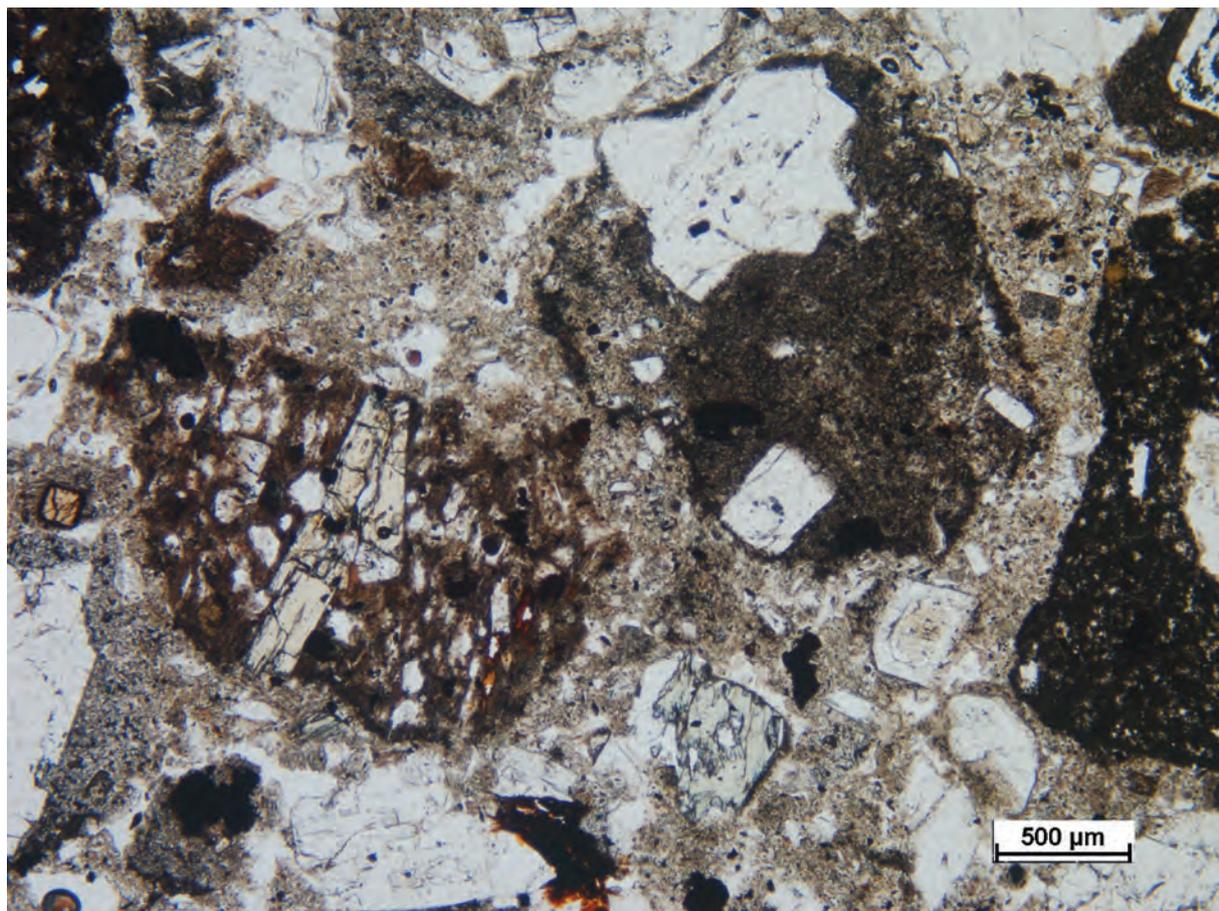
7. White marble inscription fragment



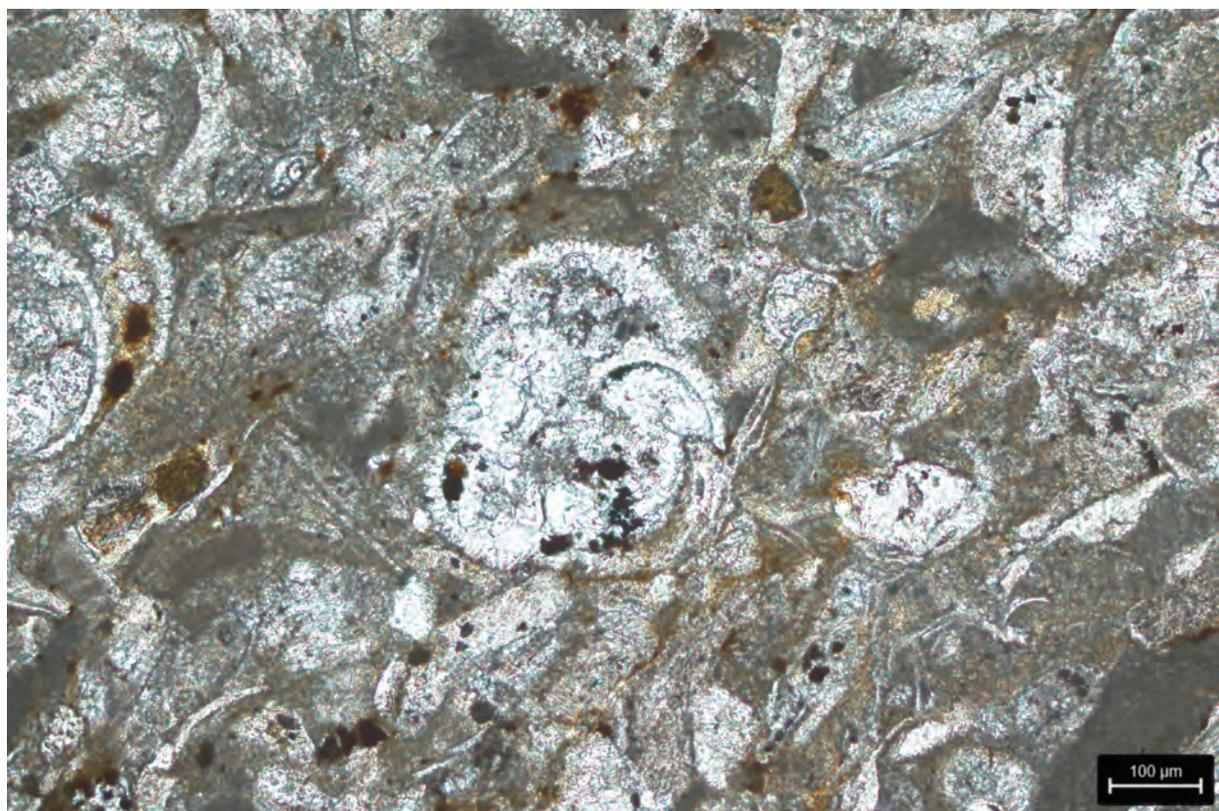
8. Red marble incrustated with white marble



9. Late cretaceous Milovian polymict sandstone



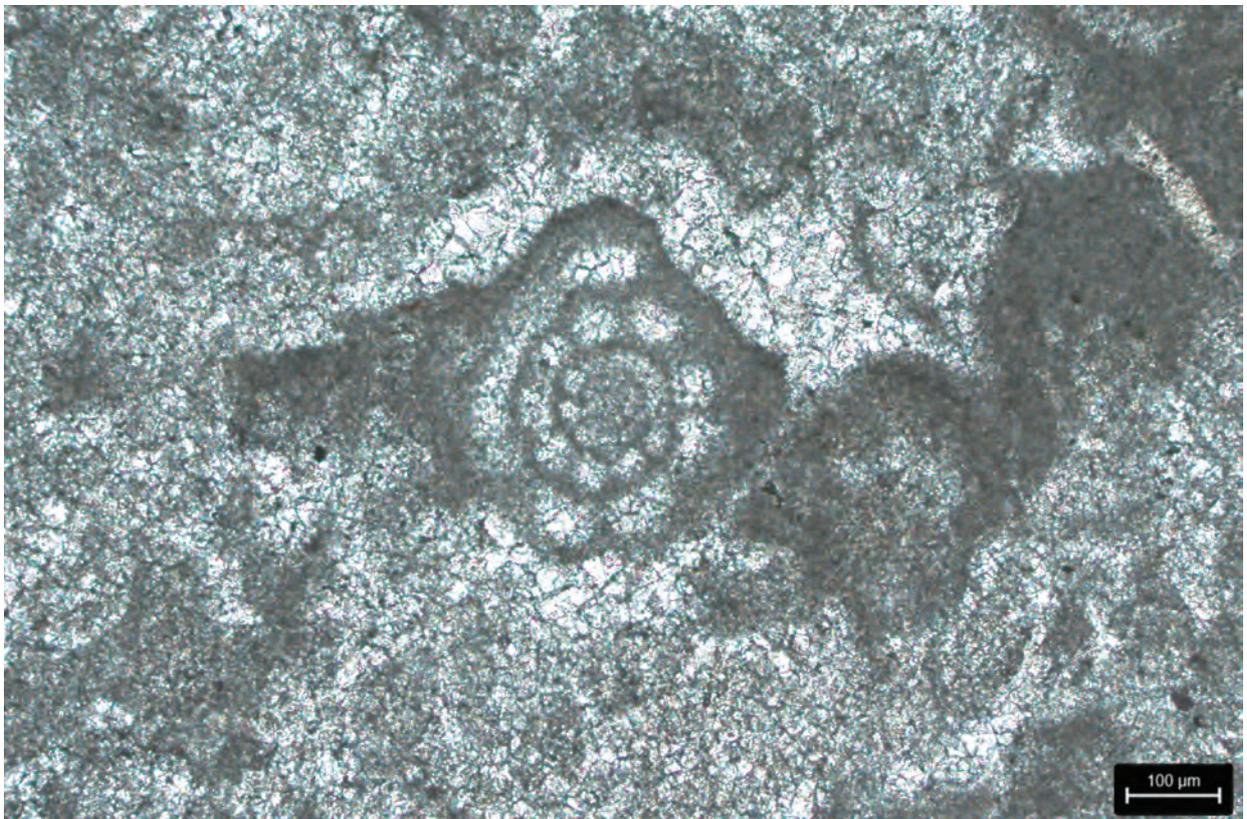
10. A-C9/4 thin slices of *Globigerinoides* (plankton foraminifera), Middle Miocene



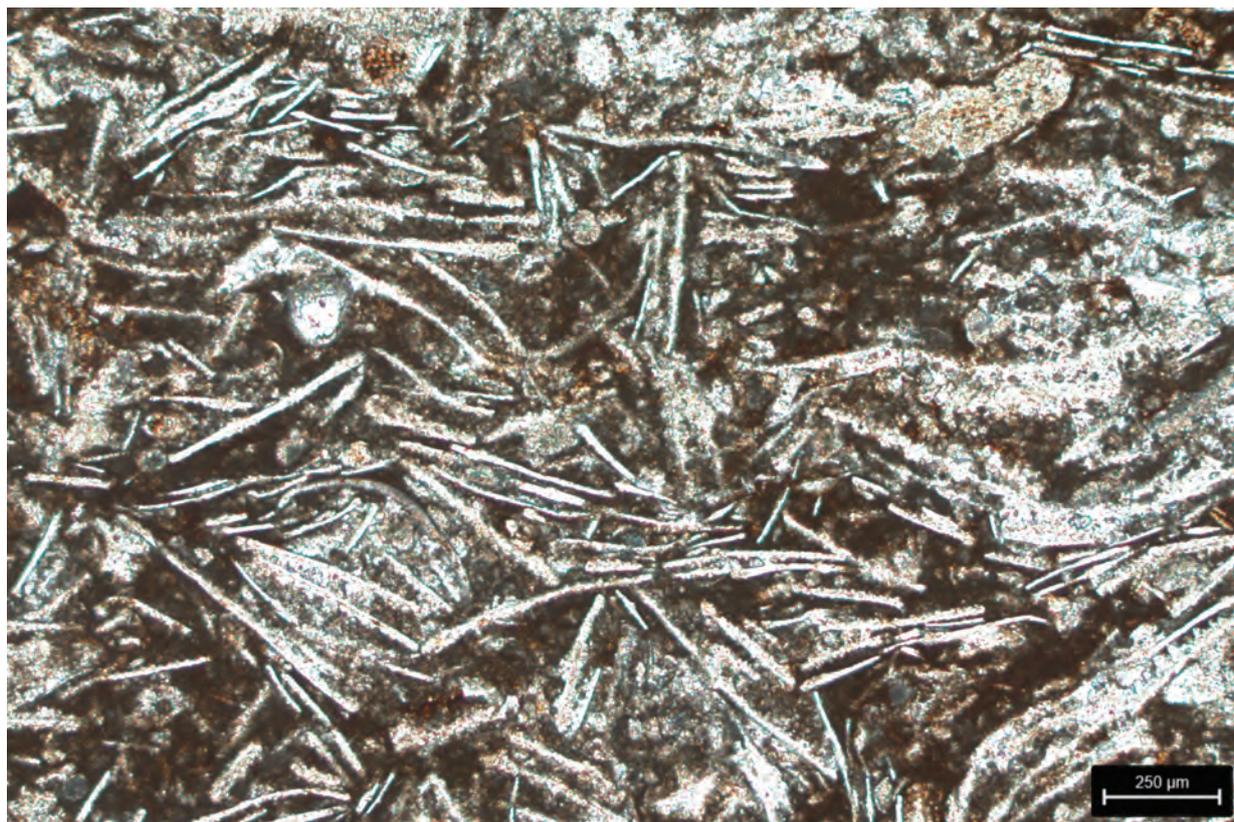
11. Miocene lapilis andesitetuff agglomerate



12. *Sintel.* (Nail of strake)



13. *Thin siltstone A-C9/E4, Meandrospira (foraminifera), Middle Triassic*



14. *Bositra* shells, Middle Jurassic, Tölgyháti Limestone Formation, Gerecse Mountains



15. Cheetah on the chalice of the Fatimida rock crystal (Photo: Milan Şepeţan)