



# FOSSIL REMAINS OF IPOLYTARNÓC

## The Prehistoric Pompei

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**Nemzeti Fejlesztési Ügynökség**

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*Befektetés a jövőbe*





Petrified footprint of a prehistoric mammalian predator



Ferenc Kubinyi



Antal Koch



András Tasnádi Kubacska

## The Story of Discovering the Fossil Remains

*The name of Ipolytarnóc became famous for the first time by a petrified tree that is almost 100 meters long, has a circumference of 8 meters and which was found in the surroundings of the settlement. The largest known petrified pine tree in the world was washed out from volcanic rock layers by creek Borókás. Residents of this area called it as the "Bench of Gyutyánkő" and the way it turned into stone was theme of legendary stories. This petrified, ancient pine tree was found to be interesting by Ferenc Kubinyi too, who was one of the founders of the Hungarian paleanthology. It was 1836 when he made scientific examinations for the first time in this area. In 1866, a protecting vault was raised above the most vulnerable part of the "stone-tree" which was the first building in the world that was built for protecting a fossil remain on the scene.*

Scientists of the Academy of Selmezbánya (now: Banská Štiavnica) discovered the footprint of ancient animals in 1900 and later a paleanthologist, Antal Koch who visited this caber uncovered the shark tooth-bearing beds in the nearby gullet. The fossil remains of Ipolytarnóc became inseparablbe from the name of András Tasnádi Kubacska who was the director-general of the National Museum of Natural Science and later director of the Museum of the Hungarian State Geological Institute. He was engaged in examinig and preserving this footprinted sandstone site in Ipolytarnóc for nearly 30 years from the '30s. The great hall that was built over the site in the Geological Study Trail was named after him.

Due to the explorations which started almost 200 years ago, Ipolytarnóc, this unique gem of our geological heritage is recorded as the richest footprint site of the Tertiary all over the world. This area is a protected site since 1944 and it was declared to be a part of the pan-European nature heritage in 1995.



Woodcut of a petrified pine tree. Made by Károly Markó Snr. (1840)

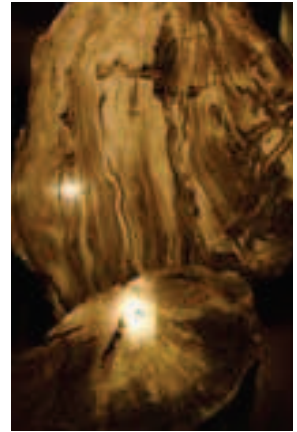




Geological study trail

## Geological Study Trail: The Ancient Pine Tree

*At the beginning of the Geological study trail, you can see the sediments that covered the bed of the tropical sea 24 million years ago. Shark teeth those were sold as petrified bird tongues for the tourists by the residents at the beginning of the 20th century were found in these sediments. Later during the researches, among the shark teeth, remains of rays, bony fishes and bones of crocodiles, dolphins and sea cows were found in the sedimentary rocks.*



Petrified pine tree

The middle part of the trail is ruled by the 21-27 million years old dry land layers, which served as home of tropical rainforests interweaved by dwarf palmettos (*Sabal minor*). The multilevelled flora was ruled by palms, magnolias and laurels accompanied by huge, outstanding pine trees. Due to natural conservating mechanisms the volcanic rocks of Ipolytarnóc hide a petrified forest, thus prints of plants and petrified tree trunks are quite frequent in this area.

The giant pine that spanned creek Borókás as a natural stonebridge was an organic part of the landscape for centuries. The huge silicified tree was a real giant of its own age topping 90 meters when it lived and had a circumference of 8 meters at the time it was found, so it became the biggest petrified member of the pine- family. Unfortunately a great part of it was carried away and got built into the houses of this area or gravestones, rock gardens, souvenirs were made of them, but later several pieces of it got into museums. Its death was caused by the rollig tuff flood of the volcanic catastrophe preserving it for succeeding generations. Three fairly big pieces of the gigantic sized sugar pines can be seen in their original position: the thicker remains of its trunk are preserved under protecting vault and the thinner branches in the main hall.

# Geological Study Trail: Traces of the Ancient World

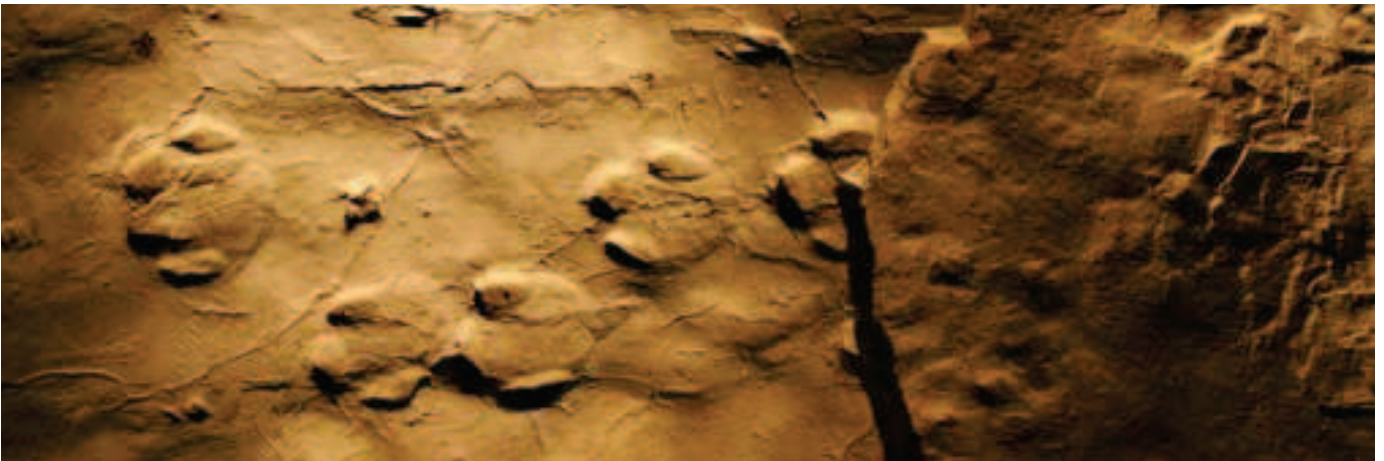


*Print of a laurel-leaf*

*Almost 17 million years ago in the region of Ipolytarnóc a subtropical jungle grew wild which was stocked with vegetal and animal kingdoms that became almost extinct and they are unknown these days. Later a powerful volcanic eruption demolished the prehistoric vegetation, but due to the special conserving circumstances and the volcanic ash that buried everything under itself, if we visit Ipolytarnóc today, petrified marks of those day's flora and fauna reveal themselves.*

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The ancient climate was characterized by an average temperature of 25°C and an annual precipitation of more than three thousand millimetres. The laurel flora mainly consisting of paleotropical elements is unfamiliar in the prehistoric European vegetation thus it represents a rainforest that was located on a plot of land, that earlier moved towards North between Africa and Europe. Due to all these the Natural Preserve of Ipolytarnóc opens up a unique vegetation which has an own specific name in the scientific literature (Florenkomplex Ipolytarnóc) and up to now more than 15 thousand leafprints of the fossil flora has been placed in museums.



*Footprint of an ancient rhinoceros*

Mainly at shallows and watering holes of the ancient surface, besides vegetal fossils you can find snapshots of outstanding value, marks of species of animals those became extinct long ago. Due to these Ipolytarnóc is one of the richest complex footprint site. During the exploring works of the path, winding along the banks of the prehistoric rivers, more than 3 thousand footprints of 11 species were identified, but beside the footprints of predatory animals, ancient rhinos, even-toed ungulates and birds, traces of animals those were resting and the ones those slipped in the mud or even ripples on the water and raindrops were the petrified into the warp. At the end of the trail, in the great hall which protects the footprint site the ancient world comes alive by way of a 3D animation.





Boulder Cliff study trail

## Rock Park and Boulder Cliff Study Trails

*A 700-meter-long track, the rock park path leads one from the visitor centre to the entrance of the geological study trail. On this trail every single step you make towards the entrance of the geological park brings you fifteen thousand years closer to the age of the 20-23 million-year-old rock layers. Labelled "witness-stones" from every 2 million years and rock samples of this area help you spin back the wheel of time to experience their age.*

The 4-kilometre-long Boulder Cliff study trail, which starts 100 metres away from the geological study trail, beside the upper car-park, passes by Botos-graben and ends at the visitor centre, leads its visitors along rock exposures, gullies, left stone-pits and ruins of farmsteads. Some parts of it, mainly the second one, are quite steep therefore one needs to be prepared for it but the experience after climbing is well worth trying.

**During your walk on the trails remember you are in a protected area. It is forbidden to collect natural values and to disturb formations!**



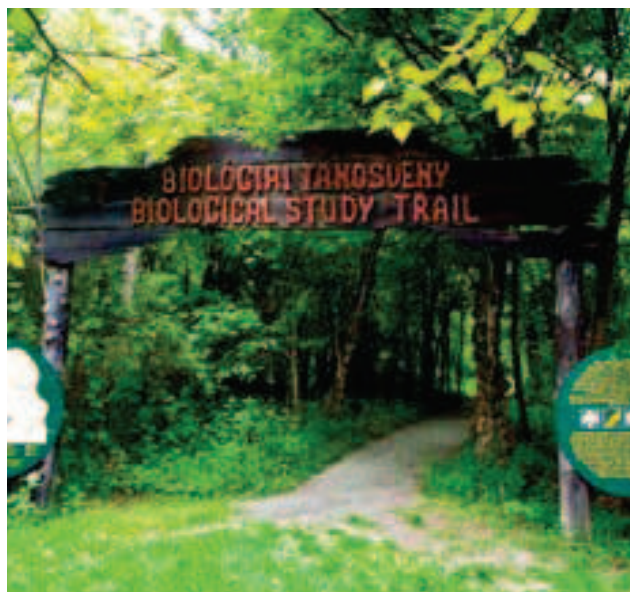
Rock Park study trail





## Title: Biological Study Trail

The originally indigenous oak forests of Ipolytarnóc were lumbered in the 18th century. After this some parts of it was under crop while the rest served as grazing lands. Towards the beginning of the 19th century a part of it was afforested with robinia- saplings (*Robinia pseudoacacia*) later black pines (*Pinus nigra*) and Scotch pines (*Pinus sylvestris*) some places oak trees were planted into the pasture lands. On those parts of the open country that was uncultivated a natural reforestation has started by juniper, hazel, birch, aspen and pine species. At more and more places, under the protecting microclimate of the shrubs regrowth of oak and Austrian oak can be found.



The entrance of the biological study trail



Wetland



Kingcup (*Caltha palustris*)

The silviculture of Ipolytarnóc is lead by the principles of the most minimal intervention and nature preservation but the facilitation of the headway of indigenous tree species is the long-distance aim. The biological walks which start at the entrance of the geological study trail and end at the Visitor Centre offer a pleasant relaxation while you can get know the flora and fauna of this area. The 2 and 4 kilometre-long forest-paths are varied by picnic areas, a look-out tower and memorial places of local quarrying.





8 million-year-old swamp cypresses

## Swamp Cypresses (*Taxodium distichum*)

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*In the summer of 2007 very rare prehistoric remains were found in the lignite mine of Bükkábrány: Miners found trunks of 15 swamp cypresses 60 metres under the earlier surface, during exploiting works. These trees which used to live at the shores of the Pannonian Sea, under subtropical circumstances, 8 million years ago, are unique because they were conserved in their original shape and texture by the humid sand they were burreid into. Such an old forest, in its original state has never been found before.*



preserved in their original wooden state

During rescue excavation it was a serious problem that there was no elaborated technology for either transporting or conserving these trunks. Professionals of the Bükk National Park, applied a new method that was never used before: on the spot by using high pressure air compressors they blew out the sand from the surface of the trees, then injected a glue-like material into the outer parts of the trees.

The turnks those had a height of 3-5 meters, a diameter of 2-3 meters and a weight of 7-13 tons, arrived in Ipolytarnóc in September 2007 on specials vehicles of conveyance. After getting to their final place a protecting building was built over them. The significance of these extraordinary findsaving and conservating works is increased by the worldwide unique and outstanding achievements of Hungarian scientists in conservating and preserving these fossil remains.



## Entrance to the Ancient Pine Tree – 4D cinema

Entrance to the Ancient Pine

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*In the first phase of the turistical developments in Ipolytarnóc, in 2006 a new Visitor Centre was built to the place of the former depreciated one, which offers the tourists who come here a unique sight in itself with its modern appearance and architectural solutions, harmoniously fitting into its environment. The lines of the visitor centre, symbolizing the gigantic tree-trunk and the terrain of the surroundings simultaneously represent long past and present. Its entrance -which stands for annual zones- can be approached through a bridge which spans over a pond. In the building you can find an exhibiton room, a gift shop, a conference hall and an information portal which can be used by the tourists themselves. All of them are destined for helping in substantial relaxation*



4D Cinema

In the visitor centre you can find the very popular cinema hall too where the 10-million-year old ancient world comes alive due to the world standard 4D technique, the so called motion controll. Motion controll amplifies the 3D stereoscopic movie with environmental effects. The chairs of the auditorium have the ability to move in 12 directions according to 6 axes. The actions of the movie are followed by them in a maximal delay of one hundred millisecs. Thus the cinema opens a timegate between the world of these days and the ancient world and visitors can practically become a part of the actions of the movie. This sensation is made more realistic by the stereoscopic sound-system.



## Restaurant, Playground, Arbour



*Playground with the arbour and the restaurant in the background*



*Skill games for the little ones and playful-humoured grown-ups*

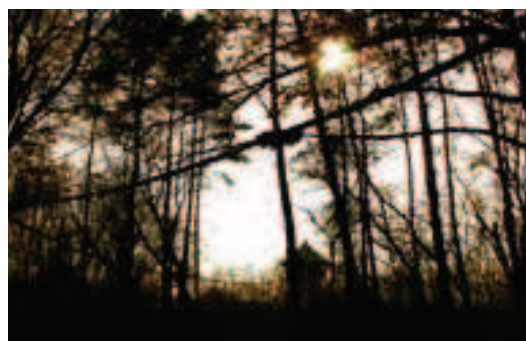


*In June 2010, as a part of the last stage of the touristical development of the Nature Preserve of the Fossil Remains of Ipolytarnóc, a restaurant and a summer-house was built in the surroundings of the visitor centre. The interior, the variety of foods and beverages satisfy every demand and visitors can refresh themselves sitting on the roof-terrace which is within easy reach of the foliage of the forest. Otherwise it is a speciality of the building that nature and environment preservational aspects were strictly taken into account in the phase of design: cooling and heating of the building is supplied by geothermal heat-pumps and solar collectors provide hot-water. Naturally, the restaurant is suitable for organization of different occasions.*



Right beside the restaurant a wooden-arbour and five roofless open-air fireplaces can be found, so if you are in the mood of cooking here, you can prepare and then eat your self-made meal out in nature. A playground is destined for helping relaxation of families with children. On the western side of the playground a children's sand pit and a crawling tunnel is waiting to be discovered by the most little ones, while spring-toys, see-saws, swings and slides belong to the empire of kindergarteners and small school children and there are skill games and a fortress waiting to be used by the older ones. The playground can be safely used by children with special educational needs or disabilities.





Foliage Promenade

## Novelties: Foliage Promenade

*As a new development of the Fossil Remains of Ipolytarnóc, a foliage promenade has been evolved between the entrance of the nature conservation area and the playground, which is a real delicacy for the lovers of adventures. The promenade which is almost 300 metres long and consists of suspension bridges, stretches in the foliage level of the trees 8-10 metres above ground. Due to this, in an exciting but safe way, visitors can get know the everyday life of the wildlife hiding in the foliage of the trees which otherwise could be rarely seen.*

At both ends of the promenade there are 15-meter-high wooden towers where you can enjoy the magnificent landscape that unfolds itself before you. From one of the towers a slide runs down to the sand pit of the playground – to children's greatest joy. Along the path under the promenade little ones can get know the living places of animals such as a bird's nest, a fox's earth or a bat's cave, in a size adjusted to them.





Japanese persimmon tree (*Diospyros kaki*)

## Novelties: Miocenic Forest

*In the hilly country, beside the road that goes from the new Visitor Centre to the entrance of the Geological Study Trail a new 2.5-hectar-sized arboretum is expecting its visitors hiding moory habitats and clearings, where you can get acquainted with the flora and the fauna of the miocenic age by the help of plants and reproductions of animals. Walking along the path spanning through foot bridges and cut up by picnic areas, among the plants which came from the Orient or the American continent you can find the lifelike statues of every miocenic animal, whose petrified footprints got identified in the clay of Ipolytarnóc.*



Swamp cypress early springtime



Ginkgo in autumn (*Ginkgo biloba*)

In the middle of the arboretum you can find a greenhouse which is architecturally showy and harmoniously fits its environment. Travellers can get know the characteristic plants of the Tertiary in it but due to the cooling of the climate got finally disappeared from the area and now they would not be able to survive the frosty months in wintertime. This greenhouse gives place to the early raising of the individuals of the plant species which can be found out of the building.





*Location of the Geopark ; The Slovakian Centre of the Geopark, Castle of Fülek*

## The Novohrad-Nógrád Geopark

*The idea of a common geopark which is able to introduce and manage geological exhibition places, other natural and built heritages those lay near to the boundry, first popped up in the professionals of the Bükk National Park and the Slovakian Cerova Vrchovina in the late '90s. In 2001, experts of both countries compiled a thematic geological path with help of the resources of the European Union, then in 2005 the Hungarian preparations for planning the Geopark of Nógrád started. As a continuation of this, in the beginnig of 2008 the Hungarian Geological Society checking up with Slovakian partner organizations completed the detailed inventory of values of the future geopark.*



*The Map of the Novohrad-Nógrád Geopark*

Due to several years' organized and co-ordinated professional work, the Novohrad-Nógrád Geopark -with one of its central scenes in Ipolytarnóc- became a member of the European Geopark Network on 27. March 2010. Then during the 4th Global Geopark Conference on 14. April 2010 in Malaysia, Hungarian and Slovakian experts received a document stating the membership of the Global Geopark Network as a sign of international acknowledgement.





*Castle of Somoskő*



The first Geopark of Hungary and Slovakia -which is the first geopark that spread over borders- means a major international success for the region, while this title is very difficult to get. It is connected to fulfilling of requirements in the fields of value-protection, preservation of traditions and regional development and almost one hundred candidates are still waiting for admission into the world-wide network of geoparks.

The frontier regional co-operation affects 5 micro-regions and 65 settlements on the Hungarian side, moreover 3 micro- regions and 30 settlements on the Slovakian side of the border. In the logo of the Novohrad- Nógrád Geopark you can see the castle of Somoskő. The country border of Trianon runs at the foot of the castle, which sometimes divides these two nations even today. In the picture it is symbolized by the brake of the semicircular labelling at the tip of the castle-tower. But the castle is a common strength being feed on the past, standing on a basalt cliff. Under it the stylized picture of the bent basalt columns can be seen, which are internationally famous and can be found at more sites in the neighbourhood.



*Basalt Organ Pipes of Somoskő*



Basalt cone of Ajnácskő



Common Kingfisher (*Alcedo atthis*)



Castle of Hollókő

## Values of the Geopark

*Wandering in the Geopark you can study the events of 200 million years: beginning from the clods of the Triassic through the 24 million-year-old neritic settlements you can get to the youngest formations of stone. Simultaneously, this is the land of extinct volcanos. In a comparatively small territory wide-ranging proofs of the volcanic activity are hidden in the silent rocks which is one of the internationally noted speciality of this area.*

Traces of destroying floods of riolitic pumice stone and underwater or overland andesitic composite volcanos can be found. You can discover a several kilometres long dike- network, but you can visit here one of the biggest basalt plateaus in Europe and a scenic sight which is the bent, regular bundles of rock columns that got formed during cooling of andesite and basalt rocks. All of them took form in the last 20 million years and they hide the memories of the creation of the Pannonian basin and the spectacular and various volcanic activity of the following ages.

Since the appearance of the human species geological shapes powerfully influenced the civilization that was being born in their surroundings. These got more and more entwined with each other in the course of time, since men more and more used and shaped their en-





*Rhyolitic tuff of Kazár*

vironment. The various geological construction resulted in an accentuated surface. Due to this inhabitants of small villages, nestling in hidden valleys, isolatedly created their unique, high-

wrought wear and they have been respectful for traditions for centuries. So it is not surprising that Hollókő which lays within the borders of Nógrád –Novograd Geopark was the first place in Hungary which was recognized as a part of the World Heritage in 1987. The border fortress system which was built onto the volcanic conduits in the middle-age is the main characteristic of the landscape, but cave-dwellings and churches hollowed out in the sedimental rock or the memories of mining are interesting examples of the coexistence of humans with environment.



*Great Crested Newt (Triturus cristatus)*



*River Ipoly*



*Cave-dwelling form the Middle-age in Szentkút*

Thus, beside Ipolytarnóc several significant geological objects, nature conservation areas and built heritages can be found within the geopark on both sides of the country borders. The area can be proud of its rich and valuable living-world, which is proved by the fact that a part of river Ipoly, which is the borderline between the two country, is a NATURA 2000 area which means a European protection.





## The Bükk National Park

*The Bükk Mountains in wintertime (photo: Viktos Kaposi)*

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*The Bükk National Park is the largest highland national park in the country with a territory exceeding 43000 hectares of which 11253 hectares are highly protected. During millions of years surface-forming forces created typical karst-plateaus, engulfments, caves, deep canyons and lofty cliffs. A variety of soil-types are connected to the various the rock layers. These figures of the surface offer such microclimatic circumstances under which species of Carpathian, mediterranean and highland land living world and even several relic species of earlier geological ages can be found.*

Lying between the Alföld and the Carpathians the Bükk mountain with its highest point at 960 metres gives home to a rich community of flora and fauna and forms a coincident zone, in terms of biogeography, between living worlds



*Szalajka-brook*





*Fallow Deer (Dama dama)*

of different type. The landscape is ruled by infinite woodlands offering a great opportunity to study the settlement by direction (from North to South) and height. The uniqueness of the environment is shown by the fact that some species, like fragrant cottage pink (*Dianthus plumarius*) live only in the Bükk, but other several special and rare species find their homes here.

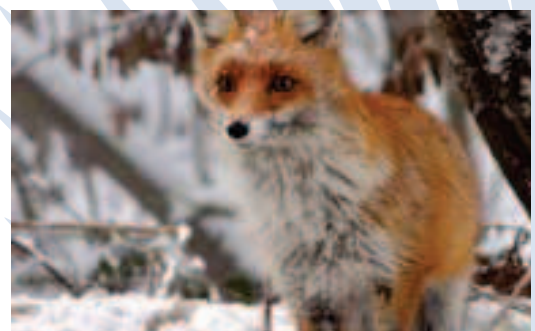
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*Forest in the Bükk Mountains  
(photo: Viktos Kaposi)*

For example the beech and oak woods which developed on the steep, northern, rocky, limestone slopes and aprons are highly protected. You can find several plant rarities and relic species of the ice-age here. Blue flowered northern dragonhead (*Dracocephalum ruyschiana*), Twoflower violet (*Viola biflora*), Alpine rock-cress (*Arabis alpina*), ascending saxifrage (*Saxifraga adscendens*), Varied moor-grass (*Sesleria varia*), alpine clematis (*Clematis alpina*). On the southern warmer slopes of the mountains, plants of warmer ages can be found like smoke tree (*Cotinus coggygria*) whose blood-red colored leaves set the mountain-sides on fire every autumn.

These days at least 22 thousand animal species can be found in the Bükk Mountains, so a very rich fauna is connected to the variable flora. Many vertebrates and invertebrates of it represent outstanding values from a scientific point of view as well. A unique, aboriginal subspecies of the winter moth (*Operophtera brumata*), that can be found in the sub-



*Red Fox (Vulpes vulpes)*





Map of the Bükk National Park

alpine- alpine zones of the neighbouring mountains, lives only in the rocky, cold, few-square-kilometre-sized area of the Leány-valley. The carefully watched ornithological rarity of the Bükk is the lanner while in rocky habitats and left quarries rock thrush (*Monticola saxatilis*) and stock owl (*Bubo bubo*) can be found. Among the outstanding zoological values of this area you can find endangered, diurnal birds of prey which need a special protection. These are: imperial eagle (*Aquila heliaca*), lesser spotted eagle (*Aquila pomarina*), western banded snake eagle (*Circaetus cinerascens*).

Geological, geomorphological and speleological are values to protect. Up to now, 853 caves have been explored in the mountains, 45 of them are highly protected. The István cave in Lillafüred is one of the most beautiful dripstone-karst galleries but animal rarities such as common bent-wing bat (*Miniopterus schreibersii*) are associated with the caves of the Bükk mountains. This bat breeds and winters in caves only and this species is threatened by extinction in many parts of Europe. The Bükk National Park can be proud of its archeological sites and several famous prehistoric man's caves are scientifically recorded. Some of these are: Suba-hole, Szeleta-cave and the Cave of Istállóskő where archeological finds of an outstanding significance were found.



Stag-beetle (*Lucanus cervus*) (photo: Viktos Kaposi)

In the recent years a cycle path network was constructed in the territory of the Bükk National Park and in Szilvásvárak bikes can be rented as well. In Lillafüred two turistical caves, in Szilvásvárak an exhibition and a study trail and the collection of peasant house in Oszlán presents the natural and cultural values of the national park. In the signed tourist-paths the whole territory of the national park can be freely visited, but accessing habitats of some animals can be restricted by the Directory of the Bükk National Park.



Red Deer (*Cervus elaphus*)





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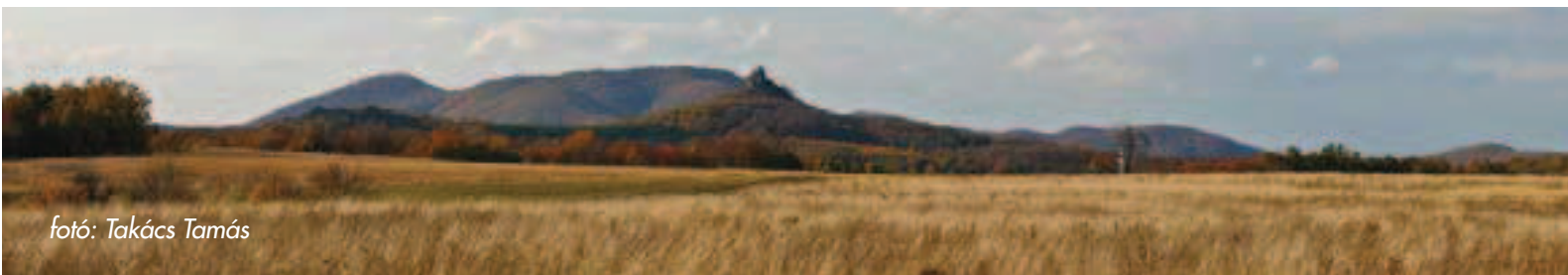
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- **Nógrád Museum of History**  
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- **Nógrád Museum of History – Division of Coal Mining**  
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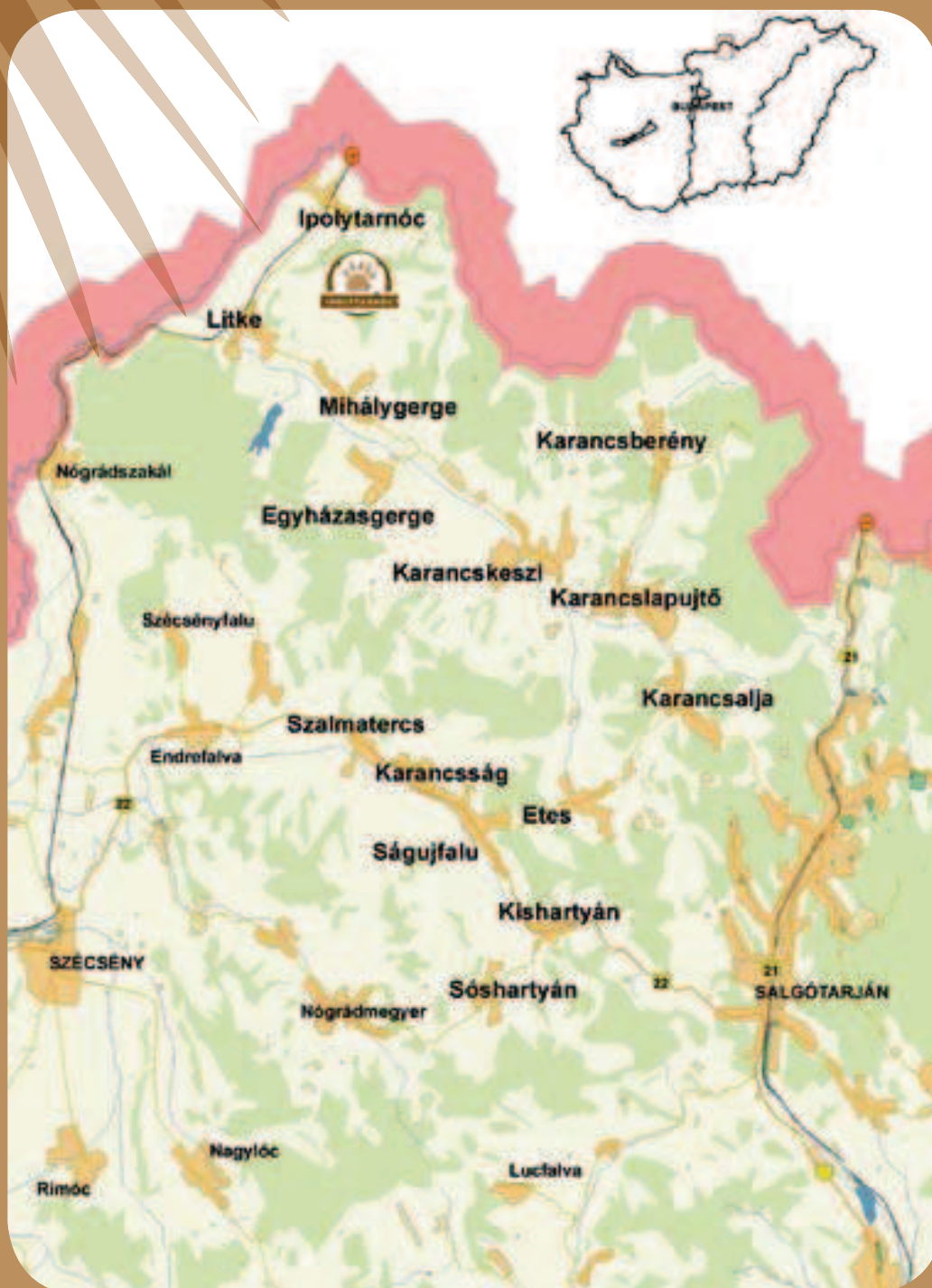
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# Fossil Remains of Ipolytarnóc Nature Reserve



Ipolytarnóc is the northernmost settlement in Nógrád county. It can be found 140 kilometres away from Budapest and 26 kilometres away from Salgótarján, which is the county seat. On public road you can reach Ipolytarnóc from different directions. From the East direction: from Losonc and from the South from Salgótarján or Szécsény, both via Litke. There is a daily regular bus connection between Ipolytarnóc and the county seat. This settlement is the last station on the Vác-Aszód-Balassagyarmat-Szécsény-Ipolytarnóc railway line.

**WGS: N48-13.932, E19-39.117**

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