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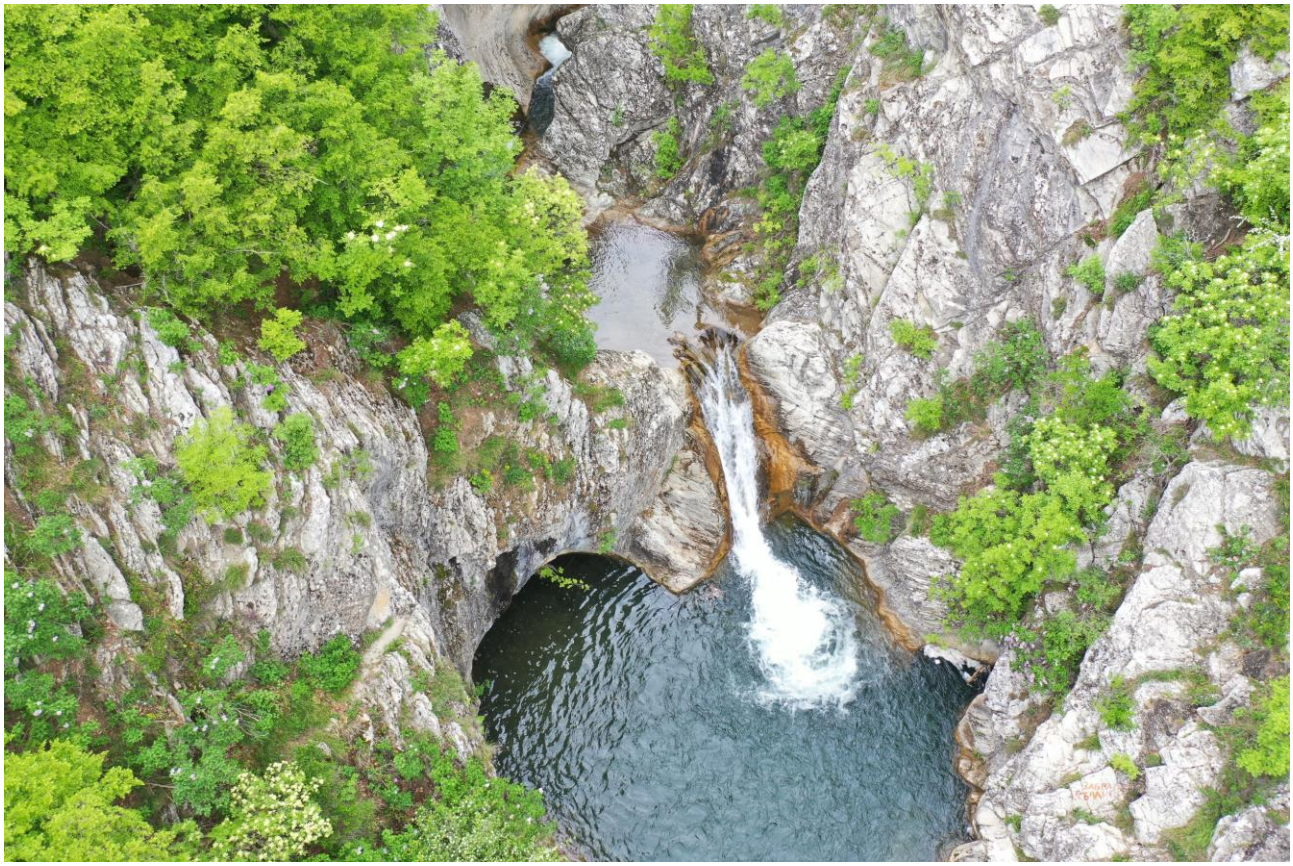
ГЕОПАРК ИЗТОЧЕН БАЛКАН

EAST BALKAN GEOPARK

Dimitar Sinnyovsky



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Association for Preservation of the Bulgarian Geodiversity
European Agricultural Fund for Development of Rural Regions

EAST BALKAN GEOPARK

Dimitar Sinnyovsky

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CONTENT

1. Concept 3
2. Key geotops 5
   - 2.1. „Prikazna“ Cave 5
   - 2.2. Zlosten 5
   - 2.3. Urushki rocks-Talim tash-Chobra tash complex 9
   - 2.4. Fossil deposit of corals and hydrozoans 9
   - 2.5. “Orlitsa“ Rock 12
   - 2.6. „Sini Vir“ Waterfall 14
   - 2.7. Orbitolina deposit 14
   - 2.8. Geotop „Izvorite“ (“Kotelka”) 17
   - 2.9. „Belemnitico rosso“ 19
   - 2.10. Demirkapiya-Vida-Korenik complex 22

References 24

Title page: “Sini Vir” Waterfall at Medven village, Kotel Municipality

Back page: The Stone guard of Ivaylo's warriors in the Demirkapiya Pass

1. Concept

According to the principle of “thematic geodiversity” (Sinnyovsky et al., 2019), the main theme of each Geopark defines its identity, and secondary themes complement its geodiversity. The project to develop a Geopark on the territory of the Eastern Balkan includes the municipalities of Kotel and Sliven. The focus of the Geopark on the territory of Kotel municipality is the karst landscape - caves, rock ranges, karst springs and waterfalls, 28 of which are included in the Register of Natural Landmarks, supplemented by 3 protected areas and 2 reserves (Синьовски, Стоилов, 2021). Geotopes with scientific and historical value for Bulgarian geology are also of particular priority - fossil deposits (Синьовски, Стоилов, 2022), remarkable facial horizons (Синьовски, Вангелов, 2022), olistoliths and olistostromes, tectonic phenomena, geological cycles and events.

The management body of the Geopark is a legally recognized governing body represented by the Local Initiative Group, which is housed in the renovated building of the Tourist Information Center (Fig. 1-1a). It has an established management infrastructure, qualified staff and adequate financial support, within which the current guide was developed.

In Kotel and around Kotel, everything is history - from Khan Krum's victory over Emperor Nicephorus in 811, Ivailo's pogrom over the Byzantines in the Demirkapiya pass in 1279, and all the way to the end of the Renaissance. However, the town has two geotopes of cultural and spiritual value, whose direct relationship with geology adds geoheritage value as well. These are the medieval Orthodox churches "St. Peter and Pavel" and "St. Trinity". The first one (fig. 1-1b,c) was built in 1836 on the site of an older orthodox church, in which priest Stoiko Vladoslavov wrote the first copy of the Istoria Slavyanobulgarskaya, brought here in 1765 by Paisii Hilendarski himself (fig. 1-1d). It was designed by an Italian architect, so it has the appearance of a Catholic church. The second temple was built in 1871 after a sultan's decree obtained by Gavril Krastevich (Fig. 1-1e). What they have in common are the sandstone building blocks with which their walls are built. It was assumed that the building blocks were from the Eocene sandstones near the village of Kipilovo, formed 40-50 million years ago. However, on the southern wall of the "St. Trinity" church, an ammonite imprint was found, determined by prof. K. Stoykova as a representative of the genus *Hamites* (Fig. 1-1f), which existed in the Middle Cretaceous (Aptian-Cenomanian). Apart from it, the walls also contain imprints of the typical Cenomanian clam *Exogyra columba* (Fig. 1-1g), and many trace fossils (Fig. 1-1h). The fossils, structure and color of the rocks pointed us to an old quarry on the north-eastern slope of the "Komincheto” (“Chimney") hill, where scattered blocks from their mining and processing are still available. They were formed 95-100 million years ago in the coastal zone of the Cenomanian Sea, inhabited by the emblematic of Kotel large foraminifera *Orbitolina concava*.

Geological phenomena are grouped into several "clusters" with similar geoconservation characteristics and common access. The most accessible are the geotopes from the Kotel Group, which are within the town of Kotel and its nearby surroundings: the Kotelka karst spring (Izvorite park), the fossil sites, the olistoliths, the Natural history museum with the new geological exposition and the medieval churches built with blocks from Cenomanian sandstones. Another group of geotopes are the caves, west of Kotel town, along the Sukhoika river valley: "Dryanovska", "Duhloto", "Prikazna", "Billernika", "Bloody Puddle", "Lucifer" and "Orlova Cave".

The Medven karst unites several karst phenomena - the “Orlitsa” rock ridge, the “Sini Vir” waterfall, the Medven springs and the caves "Lednitsa", "Tsarevets", "Chernite Izvori", "Maarata" and "Malkata Maara". “Orlitsa“ has had the status of a natural landmark since 1968, but in 1984 the surrounding area with an area of 566.5 ha was declared a reserve with a recommendation to expand it to the areas of Zlosten and Ali Baba. In 2007, the buffer zone was recategorized into a protected zone "Medven Karst".

Another cluster of geotopes is the "Zlosten" protected area, which is a dizzying karst chasm with many caves, including Rakovski's cave, "Akademik", "Misty", "Horror of treasure hunters", "Subatta", "Forty troughs" and karst caves springs in Kayadere. The rock phenomena north of the Kotel can be combined in a separate cluster - Yurushka wall, Voynishki kamak (Talim-tash), Chobra-tash, the cave "Lednika" with the Roman clay and the Varbishka ridge, on which Upper Cretaceous-Paleocene limestones of the Kailaka Formation overlie the Eocene sandstones of the Dvoynitsa Formation.

Fig.1-1: a, *The building of the Local Initiative Group, which houses the management of the "East Balkan" Geopark;* ***b,c,*** *The Orthodox Church "St. St. Peter and Paul";* ***d,*** *The commemorative plaque for the first copy of "Istoria Slavyanobulgarskaya";* ***e,*** *The Orthodox Church "St. Trinity';* ***f-h,*** *Fossil imprints on the south wall of "St. Trinity" temple: f-Ammonite imprint of Mid Cretaceous genus Hamites, g-Cenomanian clam Exogyra columba, h-trace fossils.*

The Kipilovo Group of geotopes consists of a variety of sites - from predominantly landscape sites such as "Kersenlika" in the maintained "Ardachlaka" Reserve, to cultural and historical ones, such as "Borinata" with the late antique Kipilovo mudflats and the medieval Kharsovgrad. The remaining geotopes are the Eocene rocks with nummulites near the village of Kipilovo and the mapped caves in the picturesque Boazdere Pass - "St. 40 Martyrs", "Big Spring" and "Goat's Cave".

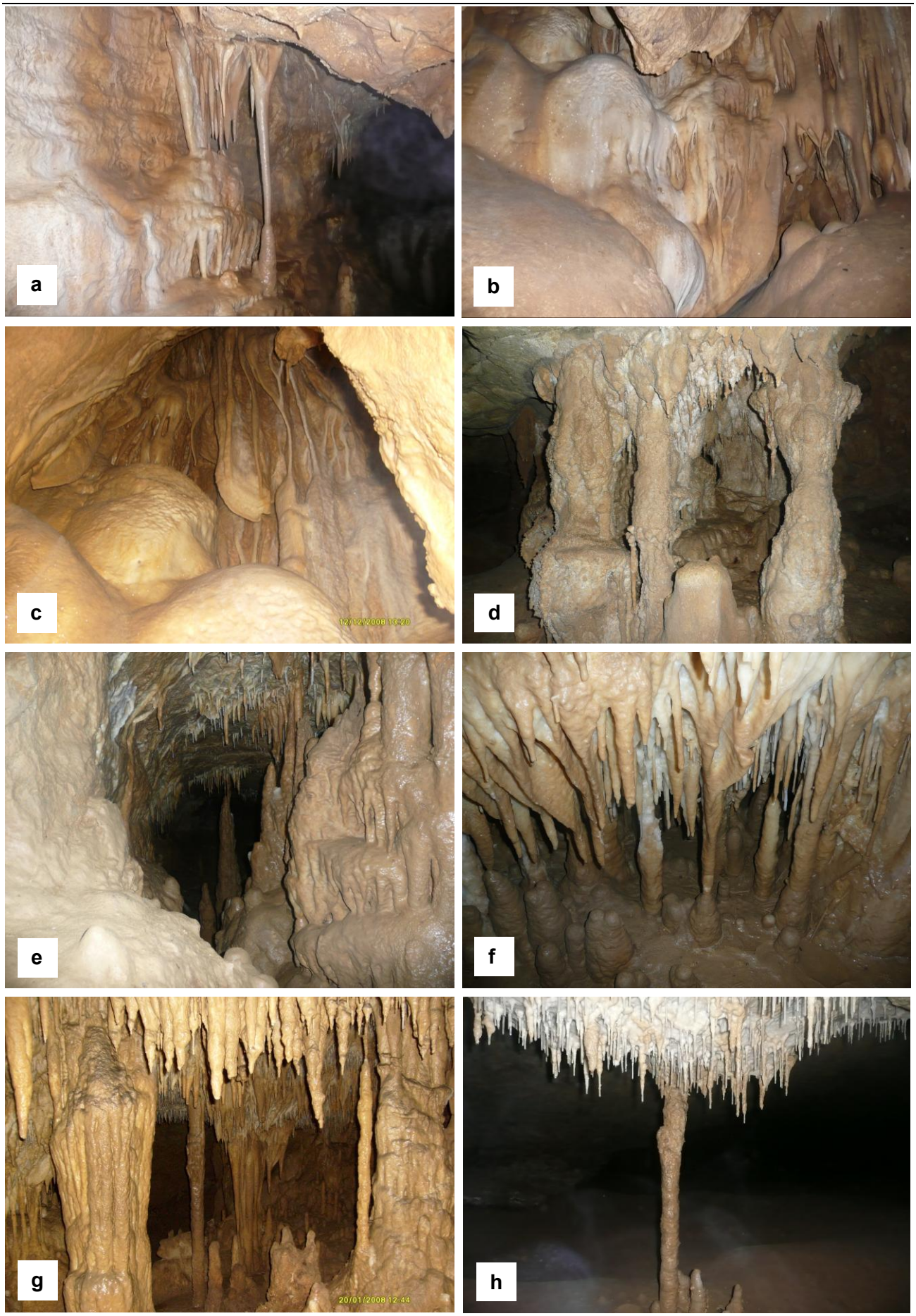
Geotourism, as a key element in the strategy of the future Geopark, includes the connection of geology with the rich cultural and spiritual heritage of the area. In the 18th and 19th centuries, Kotel was an important cultural and educational center with developed craftsmanship. A number of Bulgarian revivalists were born here - Petar Beron, Georgi Sava Rakovski, Sofronii Vrachanski and others. The Renaissance architecture and historical sites have made it a preferred tourist destination. The architectural reserve "Zheravna", where Yordan Yovkov's native house is, and Medven with Zahari Stoyanov's native house are also tourist villages. The lifestyle and traditions of the Karakachan minority, the annual festivals of local crafts and the festival of folk costumes, representing a permanent cultural heritage, shape the original identity of the Geopark as a unity between geodiversity, centuries-old history and indigenous culture.

The study of geodiversity in the Kotel municipality led to the identification of over 50 geotopes, documented according to the geomorphosite description methodology applied in the Rila Geopark (Sinnyovsky et al., 2020). The addition of the “Blue Stones” Natural Park and another 10-15 geotopes in the Sliven Balkan will close the main theme and will complement the geodiversity with mineral springs, igneous and volcanic rocks. The inextricable connection between natural, cultural and spiritual heritage in the area is an excellent prerequisite for the development of a modern Geopark, which, after meeting the necessary conditions, will be completely prepared for a successful application for membership in the UNESCO Global Geopark.

2. Key geotopes

2.1. "Prikazna” (“Fairy Tale") Cave is undoubtedly the most impressive natural landmark on the territory of the Kotel municipality. It is extremely beautiful and of high aesthetic value - a remarkable karst phenomenon carved out in the Upper Cretaceous limestones of the Mezdra Formation as a result of their dissolution by surface and underground waters. The cave has the status of a natural landmark according to Order 3702/29.12.1972 of the Ministry of Forestry and Forest Industry, under No. 154 in the Register of Protected Areas and Protected Zones in Bulgaria. "Prikazna" is a multi-storey branched horizontal cave with well-explored galleries with a total length of 4782 m, an elevation of 37 m and an elevation of entrance 745 m, the sixth longest cave in Bulgaria. It has beautiful sand halls, meandering halls and deep wells. The throat at the entrance is very narrow, and a metal grate is placed over the entrance of the cave, since the first 8-10 m are vertical. Then there is a spacious sand hall called "Sahara" and numerous branches filled with amazingly beautiful cave formations (Fig. 2-1a-h). Such a beautiful cave within the Geopark is a gift from nature. On his first visit to the area in 1890, the famous Viennese professor Franz Tula called it "the most beautiful stalactite cave in the Balkans" (Toula, 1890). This remote in time, independent European assessment is much more important than any scientific (methodical) assessment and is the basis of the concept of the "East Balkan" Geopark. Its adaptation for tourist purposes with easy access to the entrance, adequate lighting and safety equipment for visitors will make it the pearl of the future Geopark, is the core around which the overall concept for the conservation and promotion of the natural and cultural heritage of the area will be developed.

2.2. Zlosten is a geotope with aesthetic and ecological value - a karst chasm formed in the Upper Cretaceous-Paleocene limestones along the northern edge of the Kotel Balkan as a result of the erosion activity of the waters of the Zlosten River (Kayadere), a right tributary of the Golyama Kamchia River (Fig. 2-2a, b). Within the protected territory there is a remarkable cave complex of mapped caves included in the Register of Natural Landmarks: Rakovski Cave, "Akademik", "Subatta", "Forty Troughs" and "Maglivata". The "Zlosten" karst with an area of 358 ha has been declared a natural landmark by order of the Committee for the Protection of the Natural Environment No. 132/22.02.1985, code 477 in the Register of Protected Areas and Protected Zones in Bulgaria. The geotope covers the remarkable rocky ridge and the dizzying chasm formed in the strong limestones of the Mezdra and Kailaka Formations along the northern edge of the Kotel Balkan (Fig. 2-2c,d).



Фиг. 2-1: a-h *– Cave formations in Prikazna Cave (Photo courtesy: Zheyno Kutsarov)*

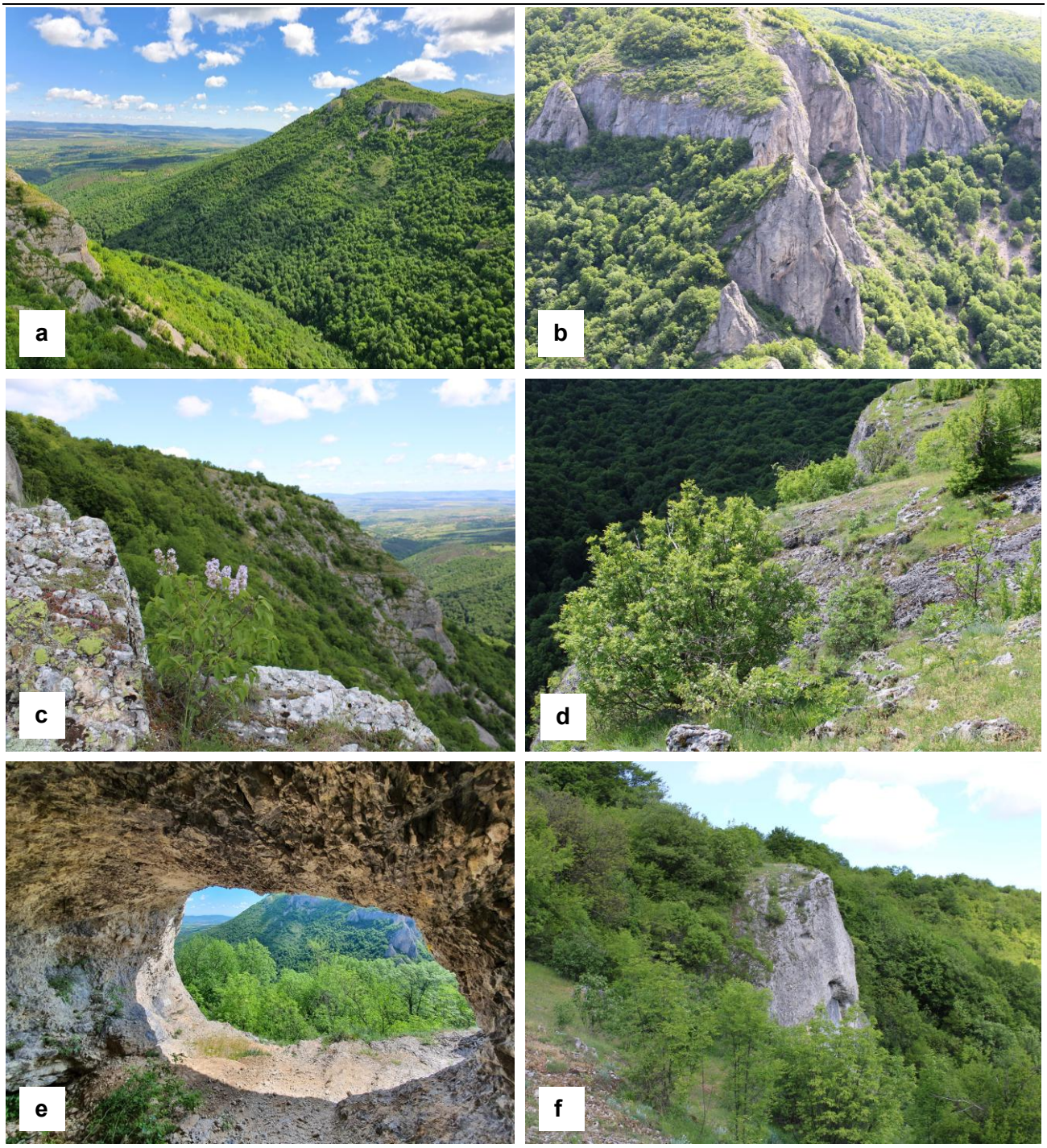


***Fig. 2-2: a**, The rock crown made of the limestones of the Mezdra and Kailaka Formations is divided by the valley of the Kayadere river into a western and an eastern part; **b,** The eastern slope of the rock ridge; **c,** The western slope of the rock ridge; **d,** The western edge of the dizzying karst chasm "Zlosten"; **e,** A rock niche in the limestones of the Mezdra Formation, confused with the Rakovski's cave; **f,** The rock under which the rock niche is located.*

To the east of Zlosten, the edge is separated into a single hill called Sakar Balkan. There is a rock niche on the western slope of Zlosten that has been confusingly identified with Rakovski's cave (Fig. 2-2e,f). Geotope illustrates the high recreational potential of the impressive karst landscape, which, with appropriate promotion and construction of tourist infrastructure, can become an object of special tourist interest. For this purpose, at least two geotrail should be developed: from the Kotel Pass and from the village of Yablanovo with signposts and information panels about the formation of the karst gap. The remarkable cave complex, the cold karst springs and the beautiful mountain landscape offer great conditions for recreation and mountain tourism.

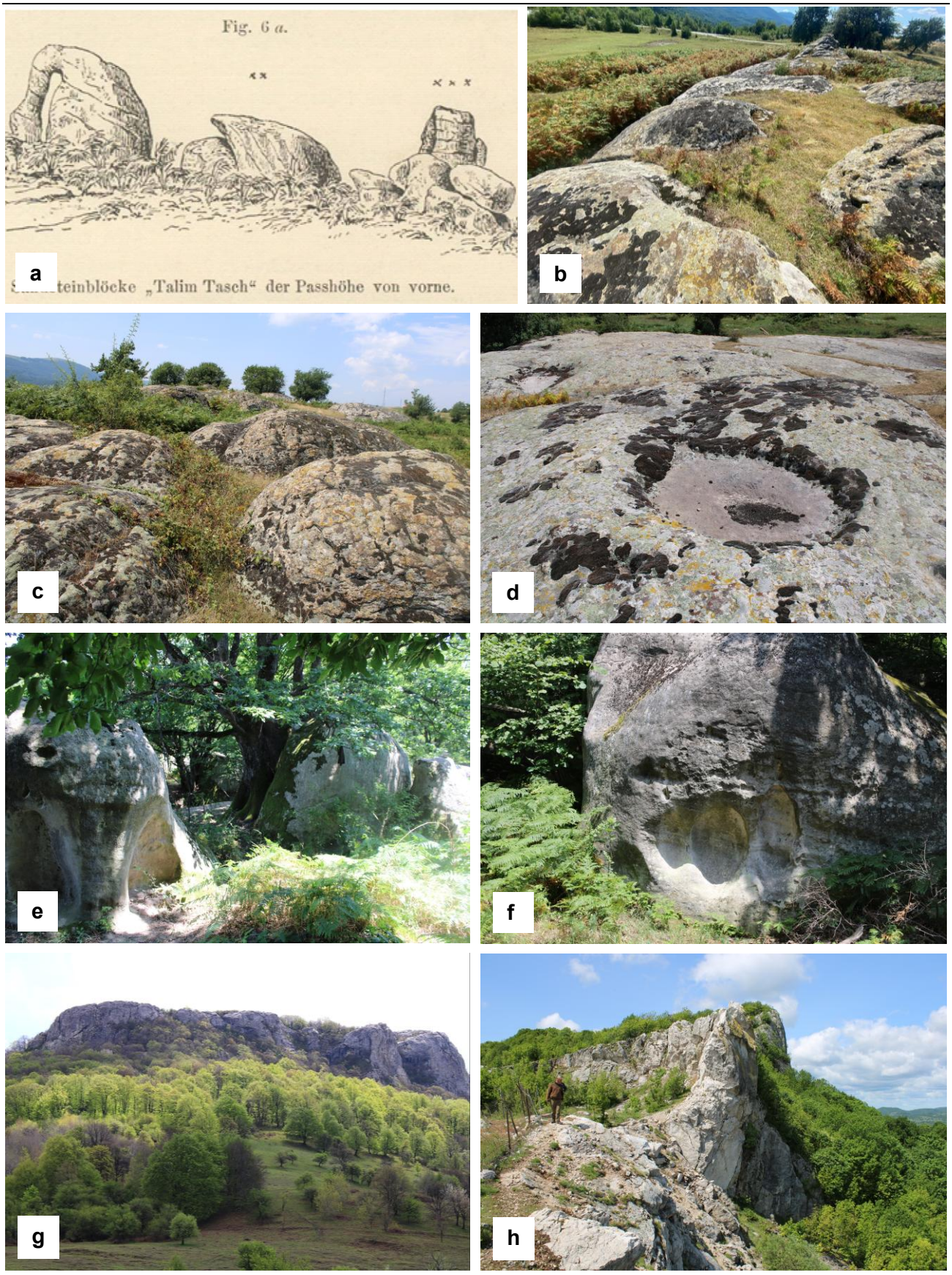


***Fig. 2-3: a**, Sketch of the Talim-Tash rock domes by Franz Toula (1890); **b,c**, The rock domes formed among the Eocene sandstones of the Dvoinitsa Formation; **d,** Natural negative forms of weathering on the rock domes in Talim-Tash geotope, interpreted as "sacrificial baths"; **e,f** Natural weathering niches in the rock domes in "Chobra-Tash" geotope interpreted as attributes of Thracian sanctuaries; **g,h** The rock range "Urushki rocks" built of the Paleocene limestones of the Kailaka Formation.*

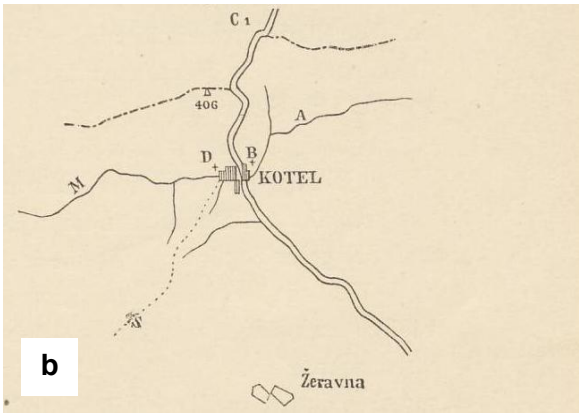
The development of bicycle trails, as part of a complete circular cycle route within the Geopark, can further increase the recreational potential of the geotope, which is located 10 km NE of the Kotel. It can be reached on a dirt road with an offroad vehicle. Access from the north from the villages of Filaretovo, Malko selo and Yablanovo is possible on a dirt road to the foot of the rock ridge or on foot along Kayadere.

2.3. Urushki rocks-Talim Tash-Chobra Tash complex is located 5 km north of the town of Kotel on the road to Omurtag town, where the Eocene sandstones of the Dvoynitsa Formation are exposed (Fig. 2-3a,b), forming impressive rock domes and rock niches known as "Talim-Tash" and "Chobra-Tash" . They were first described and sketched by the Viennese professor Franz Tula (Toula, 1890) (Fig. 2-3c). "Talim-Tash" geotope is also known as "Soldier's Stone", as it was a training ground for Turkish soldiers before the Liberation. The round recesses in some of the domes are considered to be "sacrificial tubs" (fig. 2-3d) and together with the side niches in "Chobra-Tash" (Fig. 2-3e,f) are perceived as remains of a Thracian sanctuary. Usually, such erosional forms are identified with people, animals and mythical creatures. At “Chobra-Tash”, there is indeed a man-made dome that could be interpreted as an altar, but most of the rock niches are natural weathering forms characteristic of Dvoinitsa Formation sandstones throughout the Eastern Balkan. The rock domes of “Talim-Tash” are geological phenomena of local significance. To the south of this place, there is a wonderful view of the Urushki rocks - a rock crown of Maastrichtian-Paleocene limestones, dragged along the Varbitsa Thrust on the Eocene sandstones of the Dvoinitsa Formation. Due to their higher stability, the limestones form a rock crown that extends for tens of kilometers along the northern edge of the Kotel Balkan (Fig. 2-3g,h).

This geotope was declared a natural landmark by Order No. 995/21.04.1971 of the Ministry of Forestry and Forest Industry, SG No. 43/1971, code 197 in the State Register of Natural Landmarks. The afforestation and improvement of this place, the marking of a tourist trail to the adjacent naturally forested geological phenomenon "Chobra-Tash" and a geotrail to the Urushka Wall would make it a site of national tourist importance.

2.4. Fossil deposit of corals and hydrozoans near the town of Kotel is named after the professor from the Vienna Polytechnics Franz Tula (Franz von Toula, 20.12.1845-03.01.1920) (Figs. 2-4a,c), who made a huge contribution to the Bulgarian geology. He began his career at the Vienna Polytechnics as an assistant to another explorer of the Bulgarian lands, Ferdinand von Hochstetter. With his routes through our lands in the seventies and eighties of the 19th century, he laid the foundations of Bulgarian geology. In 1875, he undertook route geological surveys in the Western Balkans, during which he determined several species of Carboniferous ferns and lepidophytes in the "Zelenigrad" coal mine near Belogradchik, and on the way to Vidin he established Triassic brachiopods, mussels and crinoids. These geotopes are of historical value for Bulgarian science as the first fossil deposits in Bulgaria, and the fossils found in these outcrops have been published and illustrated in the scientific journals of the Austrian Academy of Sciences (Toula, 1877, table III, IV).

The fossil deposit of corals and heterastrids is located in the area of Garnyovitsa, north-east end of the town of Kotel (Fig. 2-4b,d). It is in a huge block of beige Upper Triassic marls, on the order of hundreds of meters, embedded in the Middle Jurassic turbidites of the Kotlen Formation (Figs. 2-4a,b). In this place (Figs. 2-4e,f) in August 1888, Franz Tula found the first fossils - corals and hydrozoans that inhabited the Late Triassic sea more than 220 million years ago. At first, he considered the globular hydrozoa to be Cretaceous *Parkeria* and accepted Neocomianian age for these rocks (Toula, 1890). Later, however, he provided the hydrozoa to his colleague at the Vienna Academy of Sciences, Gustav Steinmann, who identified them as Triassic heterastrids (Steinmann, 1893). These are colonial hydrozoans called "drifters" because they roll freely along the bottom. Members of the genus *Heterastridium* are among the key fossils for Mesozoic stratigraphy used to correlate Late Triassic rocks on a global scale. The site is of historical value for Bulgarian science and can be considered a key geotope in the "East Balkan" Geopark. Colonial (Figs. 2-4g,h) and single (Figs. 2-4i,j) corals, and poorly preserved heterastrids (Fig. 2-4j) were collected from this geotope. Well-preserved specimens from the locality are kept in the Museum of Geology and Paleontology of the University of Mining and Geology "St. Ivan Rilski" (Fig. 2-4k-m). Two of the colonial corals described and named by Toula at Kotel in his late 19th-century survey (Toula, 1890, Taf. VI) were also found in the present study of the site (Figs. 2-4g,h). They are cataloged and exhibited in the geological collection of the Natural History Museum in Kotel.



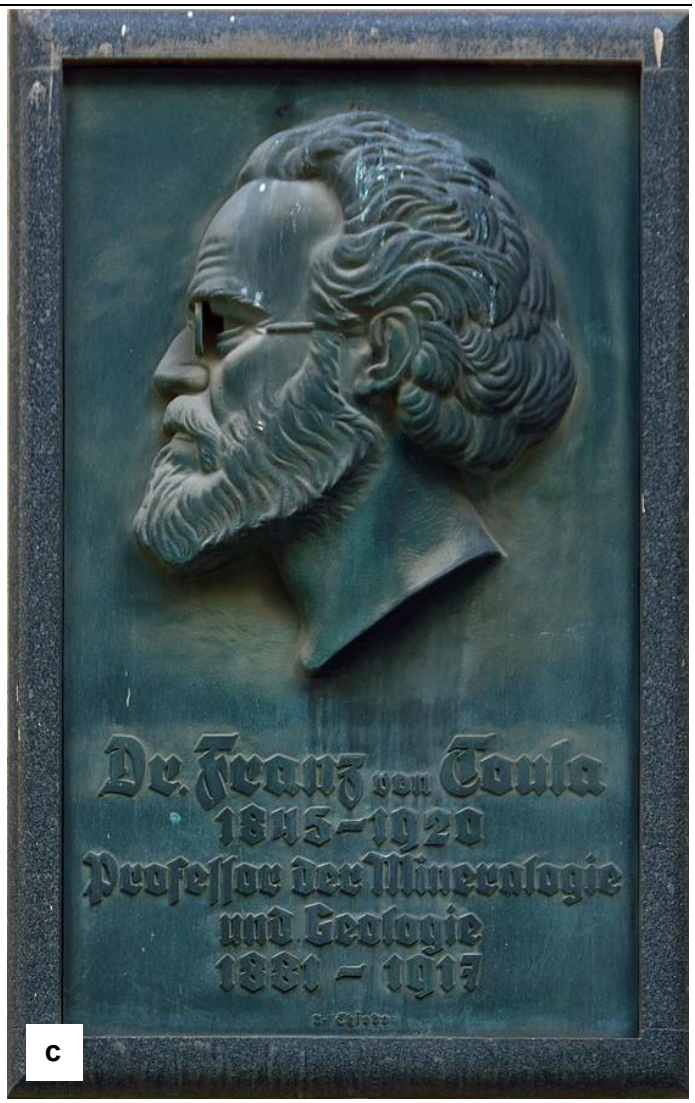


***Fig. 2-4**: **a,** Franz von Toula (20.12.1845-03.01.1920) professor of mineralogy and geology at the Technical University of Vienna (Technische Hochschule Wien 1881-1917); **b,** sketch of the outcrops in the vicinity of the town of Kotel visited by Toula (1890), the fossil locality is marked "B"; **c,** bas-relief of Prof. Franz von Toula in the courtyard of the Vienna Technical University; **d,** Garnyovitsa - the hill at the foot of which in August 1888 Toula found the first fossils in the vicinity of Kotel; **e**, The outcrop of the huge olistolith of Triassic marls at the end of "Iglika" street.*

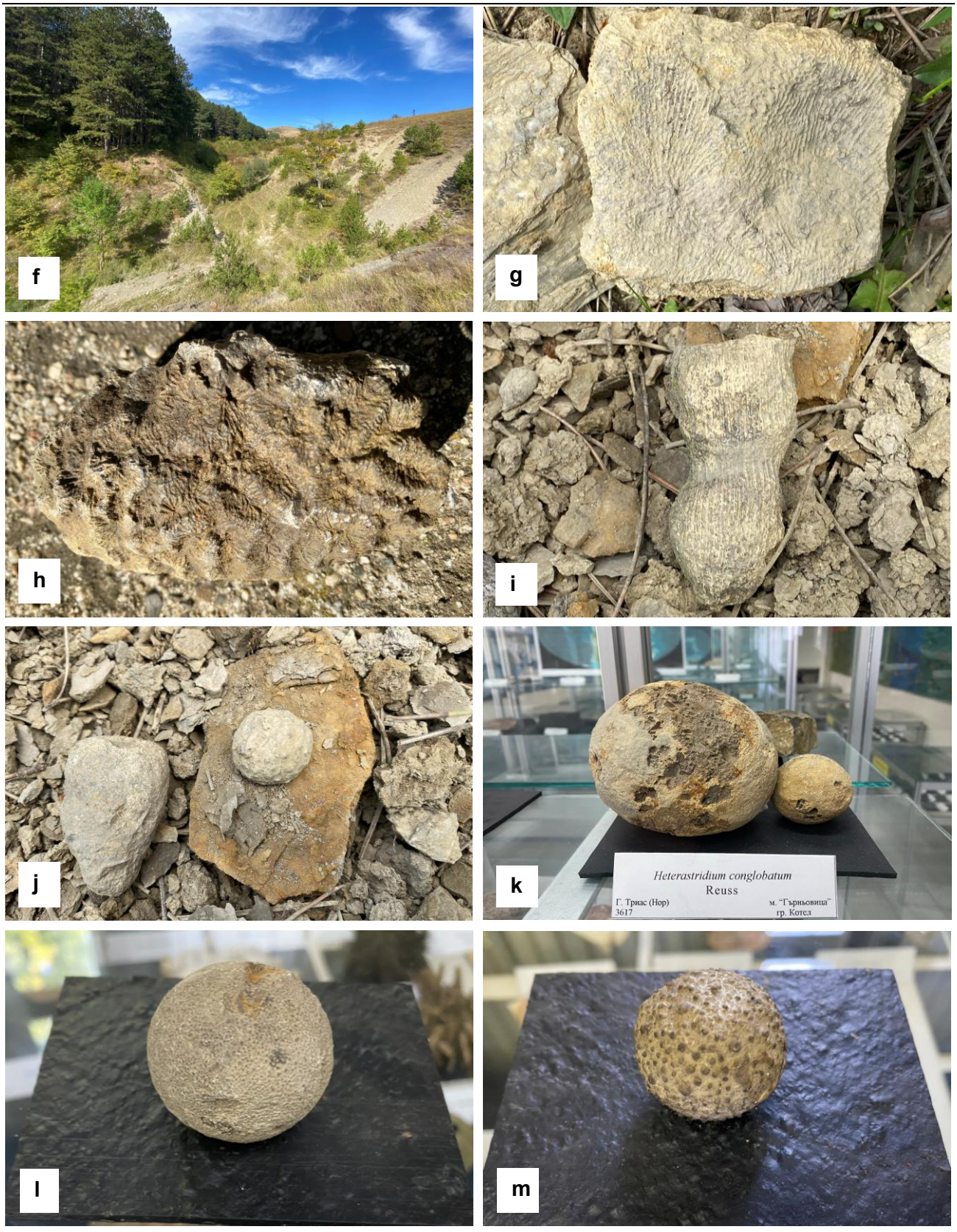


Fig. 2-4 continuation: f, *Outcrop of the Upper Triassic olistolith on the eastern slope of Garnyovitsa hill;* ***g,*** *Fragment of a hexacoral colony of the species Astraeomorpha koteli Toula, 1890, determined and named by Franz Tula of the town of Kotel;* ***h,*** *Whole hexacoral colony of the species Latimaeandra koteli Toula, 1890, determined and named by Franz Tula of the town of Kotel;* ***i,*** *Single hexacoral;* ***j,*** *Single hexacoral (left) and Heterastridium sp. (right);* ***k-m,*** *Heterastrids from the Franz Tula site preserved in the Museum of Geology and Paleontology of the University of Mining and Geology "St. Ivan Rilski": f-Heterastridium conglobatum Reuss, g-Heterastridium monticularium Dunc., h-Heterastridium intermedium.*

2.5. "Orlitsa" rock is a geotope of aesthetic and ecological value, geomorphological class, representing a high rock escarpment on the western slope of the hill of the same name with the highest elevation Orlitsa (917.1) (Fig. 2-5a). The rock is built of Upper Cretaceous limestones of the Vetrila Formation as a result of erosion activity of the Black River, a left tributary of the Medven River. The reserve of the same name "Orlitsa" with an area of 566.5 ha was declared by order No. 791/10.08.1984 of the Committee for the Protection of the Natural Environment, SG No. 71/1984, code 41 in the Register of Protected Territories and Protected Zones in Bulgaria, category "Reserves", but the "Orlitsa" rock itself was declared a natural landmark as early as 1968. The geotope is entirely among the limestones of the Vetrila Formation exposed in the Kotel Unit of the East Balkan Structural Zone.

Toula (1890) first noted several key geotopes in the Kotel area, including "Talim-Tash", "Kotelka" ("The Springs"), *"the most beautiful cave in the Balkans"* ("Pikazna"), Razboyna and Demirkapiya, west of Orlitsa . Zlatarski (1905, 1910) referred to the limestone zones north and south of Kotel to the southern Senonian type and called the southern zone near Demirkapiya *"variegated marly limestones".* Kossmat (in Kockel, 1927) calls them *"ringing calcareous marls"* and refers them to the Upper Senonian. The Kotel-born Bulgarian geologist prof. Бакалов (1942) called them *"thick-plate marly limestones"* and, based on globigerinas and inoceramids, determined their age as late Senonian or even Maastrichtian. Kanchev (1964) described them as dense, strong, calcareous marls and flint marls and referred them to the Upper Senonian too. The rocks are defined as low-density carbonate turbidites. They are thin-bedded to thick-bedded, and in places the base of the turbidite rhythms is made up of calcareous sandstones and even unsorted fine-grained conglomerates. On the Map of Bulgaria at a scale 1:100 000, map sheet Nova Zagora (Цанков et al., 1995) they are designated as the “Vetrila Formation”, a name introduced by Ст. Бончев (1927) with the rang of a formal unit pointed out by Паскалев (1983).

The Vetrila Formation (Upper Campanian-Maastrichtian) is represented by thin-bedded limestones (Figs. 2-5b-d) demonstrating turbidite attributes (Fig. 2-5e,f). They are distinguished by the abundant presence of flint concretions arranged in layers (Fig. 2-5g) or chaotically. This formation abounds in synsedimentary folds, making it difficult to accurately determine the thickness between 250 and 600 m.

The access to “Orlitsa” rock and the reserve in general is difficult. The hill can be reached by a road with a crushed stone surface from the village of Medven to the "Tsarevets" forest post, which branches off to the left from the road to the village of Sadovo. Just after 6 km at Susenov mound (682.5) there is a fork to the left along a dirt road to the Zvanilitsa hill (829.4), which ends after 3 km at the foot of the Orlitsa rock (Fig. 2-5a). In the vicinity of the reserve there are a number of natural attractions such as the Medven springs, the Black and White springs, the Medven waterfalls, the Sini Vir waterfall, the caves "Maarata", "Malkata Maara", "Lednitsa" and "Tsarevets", most of which are included in the Register of the natural landmarks. In 1984, the buffer zone of the reserve was recategorized into a protected area under the name "Medven Karst" with the recommendation that it be expanded, including the protected area "Zlosten" and "Ali Baba" area on the eastern continuation of the rock crown.

There is no evidence of cultural and historical landmarks, except for the old Roman road that ran between Orlitsa and Tsarevets, and north of Zvanilitsa went down the ravine to the Black River. The "Orlitsa" reserve is included in many tourist routes and is suitable for visiting almost all year round. The numerous natural attractions and protected areas in the reserve are complemented by objects of spiritual, revival and ancestral value. The development of geotrails based on the existing tourist eco-trails, the installation of information panels with data on the extremely interesting geological structure of the area and the possibility of observing interesting plant species such as Reichenbach's iris (*Iris reichenbachii* Heuff.) (fig. 2-5h), multi-colored milkweed (*Euphorbia polychroma* L.) (Fig. 2-5i), common buttercup (*Ranunculus acris*) and many others, will turn the reserve and its surroundings into a key cluster of geotopes in the “East Balkan” Geopark.

The Medven and Kotel karsts with their numerous caves and beautiful mountain landscapes are nationally significant tourist sites. According to the methodology for determining the geoconservation value of geotopes in park environment, the "Orlitsa" reserve has the quality of a geosite of national importance. It is an important element in the overall concept of the Geopark, reflecting its main theme - the impressive mountain landscapes and karst terrains predetermined by the diverse and complicated geological structure of the Kotel Balkan.

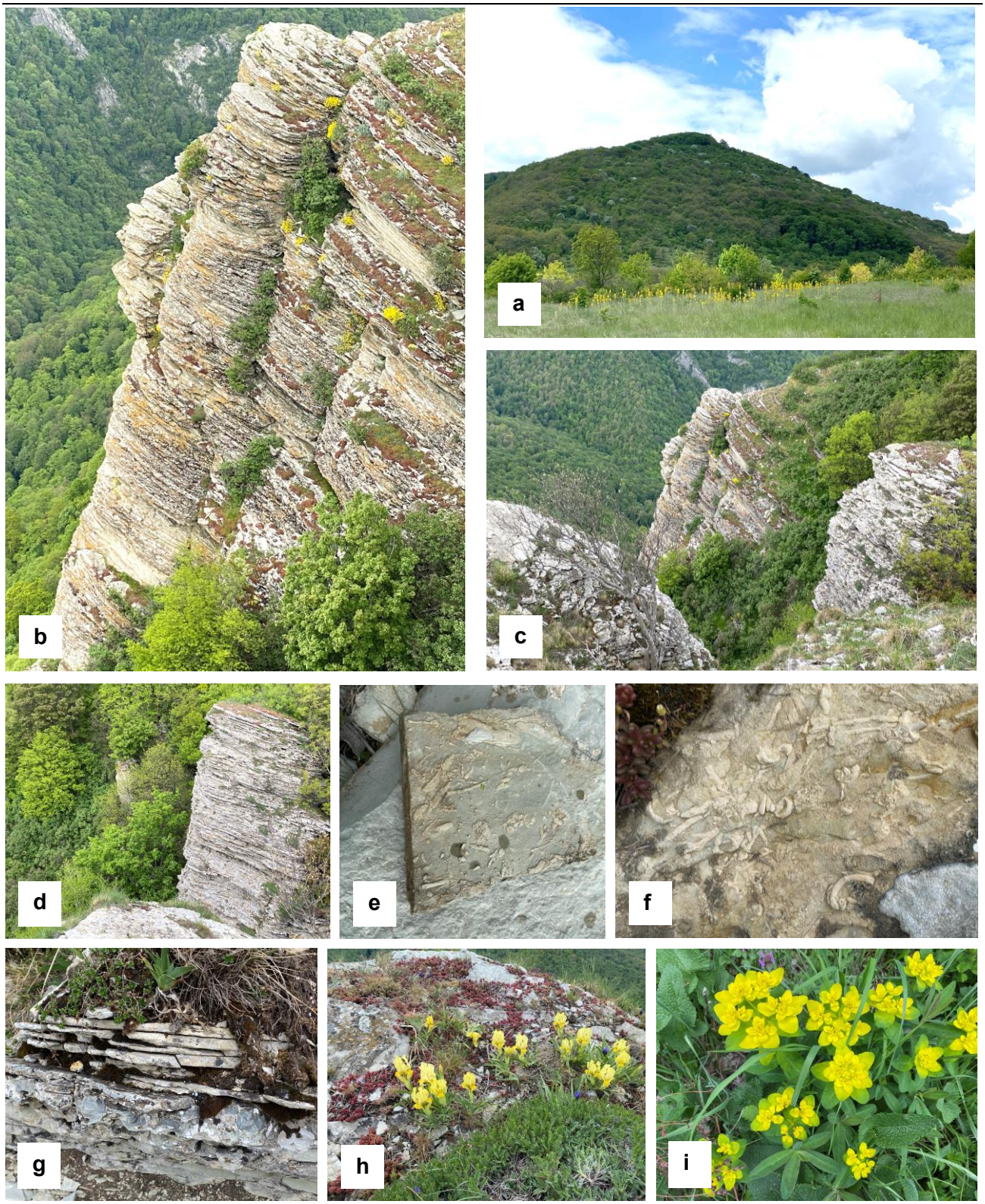


Fig. 2-5: a, *View of the "Orlitsa" hill (917.1) from the east;* ***b,*** *The impressive rock escarpment "Orlitsa" with a height of more than 100 m on the western slope of the elevation built of thin-bedded limestones of the Vetrila Formation;* ***c,d,*** *Thin-bedded limestones of the Vetrila Formation have features of carbonate turbidites;* ***e,*** *Bioglyphs and mechanoglyphs on the lower bedding surface of a limestone layer from the Vetrila Formation;* ***f,*** *Bioturbated lower bedding surface;* ***g,*** *Layered flint concretions among the thin-bedded limestones of the Vetrila Formation;* ***h,i,*** *Representatives of biodiversity in the "Orlitsa" nature reserve: h-Reichenbach's iris (Iris reichenbachii Heuff.), i- Euphorbia epithymoides L.*

2.6. „Sini Vir“ Waterfall is one of the most popular natural landmarks in the area, declared by Order No. 1573/02.09.1968 of the Ministry of Forestry and Forest Industry, State Gazette No. 33/1969, registered under No. 222 in the Register of Protected Areas and Protected Zones in Bulgaria. It is formed in the rocks of the Vetrila Formation, made up of alternating thin- to thick-bedded bioclastic and micritic limestones and marls, which are distinguished by the presence of cherty concretions or interlayers between the beds. The rocks are defined as carbonate, low-density turbidites. In the region of the karst gorge, the layers are vertical, and the river flow is oriented across them (Fig. 2-6a), which favors the formation of waterfalls. In fact, the geotope is a cascade of waterfalls in a short karst gorge in the riverbed of the Medven river, which begins and ends with 3-4 m high waterfalls. It is 50-60 m long and 15-20 m deep (Fig. 2-6b). The first waterfall, "The Jumps", is at the beginning of the gorge and remains hidden from visitors (Fig. 2-6c). Several more waterfalls follow (Fig. 2-6d) before the last "Sini vir” (“Blue Pool") at its end, where it forms a small pool from which its name originates (Figs. 2-6e,f). It is not high in itself, but the overall landscape with the narrow karst gorge, the blue pool below it and the beautiful centuries-old beech forest give this place a fabulous beauty and an extremely high tourist potential.

The narrow karst gorge is the result of the continuous efforts of the Medven river to equalize the level of its mountain course in the narrows between Pleshivitsa and Orlitsa, where the raging current forms a series of mountain waterfalls, with that of the Medven field, where the river calmly continues its way to Luda Kamchia River. This took at least a million years, and at the place of the gorge there probably existed a 20-25 m high raging mountain waterfall. Over time, the waters of the river have gradually cut into the limestones of the Vetrila Formation, forming a narrow gorge, and only a few small waterfalls remain from the high waterfall.

The "Sini vir" waterfall is close to the "Orlitsa" reserve, which is of national fame. However, it, in itself, is also quite famous and many visitors learn about the reserve precisely after visiting the waterfall, which is located 2 km north of the village of Medven and is easily accessible along the eco-path along the river (Fig. 2-6g). There are many houses in the Revival style in the village of Medven, among which is the birthplace of Zahari Stoyanov (Fig. 2-6h).

2.7. Orbitolina deposit in the "Three Winds" locality (Fig. 2-7a) is a geotope of scientific value, paleontological class: a deposit of well-preserved representatives of the Cretaceous foraminiferal genus *Orbitolina concava* (Lamarck, 1816), the type species of the genus *Orbitolina* d'Orbigny, 1850.

Foraminifera are unicellular organisms that typically build microscopically sized shells. Orbitolines are representatives of the so-called "large foraminifera", which have multi-chambered shells with "giant" sizes for unicellular organisms reaching up to 10-12 cm in diameter, with the shape of a concave underneath “Chinese hat” with a perfectly round rim, and a sharp tip (Figs. 2-7b-e). They lived individually without forming colonies. They had tentacles (pseudopods) with which they could move for short distances along the bottom. They are benthic (bottom) organisms, most of which are attached to the bottom and fed on unicellular algae and other food particles in seawater. Their abundance in the outcrops of the Cenomanian rocks in Kotel area characterizes them as an inexhaustible source of fossil material, allowing them to be collected by visitors to Geopark.

Orbitolines are an emblematic fossil for the Kotel Balkan, first described by Toula (1890) during his routes in the vicinity of Kotel. They existed between 120 and 90 million years ago during the Barremian, Aptian and Albian ages of the Early Cretaceous and the Cenomanian age of the Late Cretaceous. According to most studies from 19th century until now, *Orbitolina concava* (Lamarck, 1816) is an index fossil for the Cenomanian stage of the Upper Cretaceous. These orbitolines occur abundantly also in the Cenomanian sediments of the Mediterranean type Upper Cretaceous in southern Bulgaria, where they indicate a warm tropical climate. They inhabited the coastal zone of the Tethys Ocean, remnants of which are the Mediterranean Sea, the Black Sea and the Caspian Sea. In the middle of the Cretaceous, global cooling began, ending the "great summer" that lasted more than 100 million years during the Jurassic and Early Cretaceous. Back then, Earth's climate was so warm that there were no ice caps at the poles, and the global sea level was 200 m higher than now. Thus, the littoral beach of the warm Cenomanian Sea around Kotel town (Fig. 2-7f) was massively populated with orbitolines, which, according to Бакалов (1942), *"literally fill the rock in some places"*.

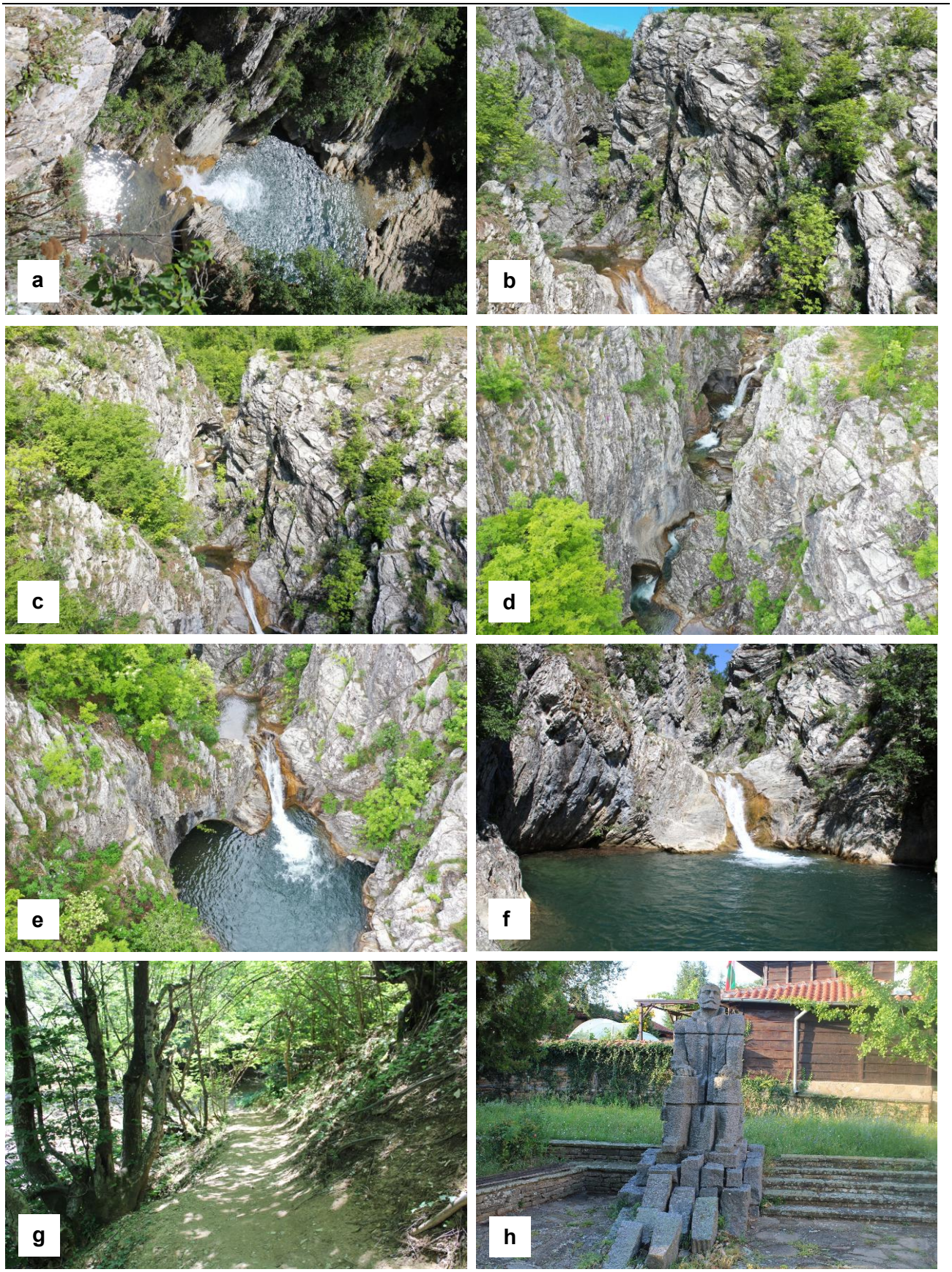
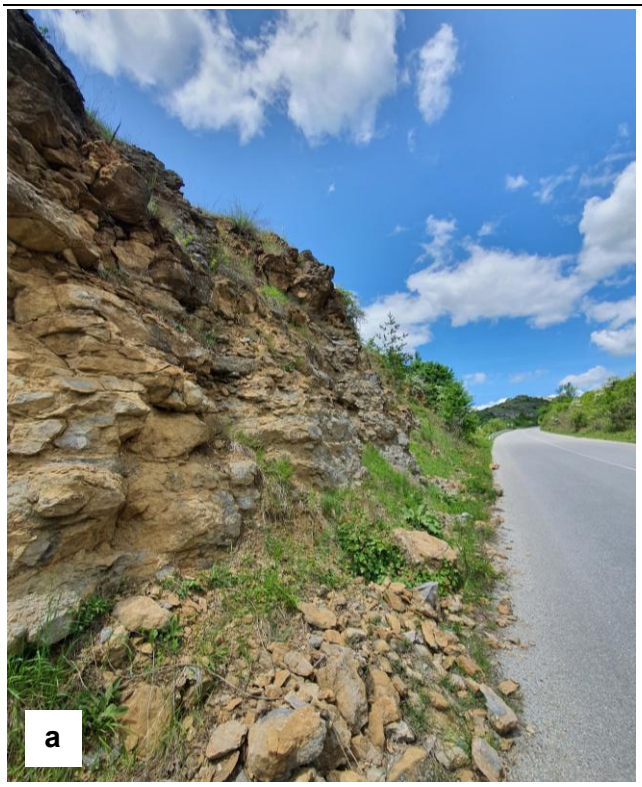
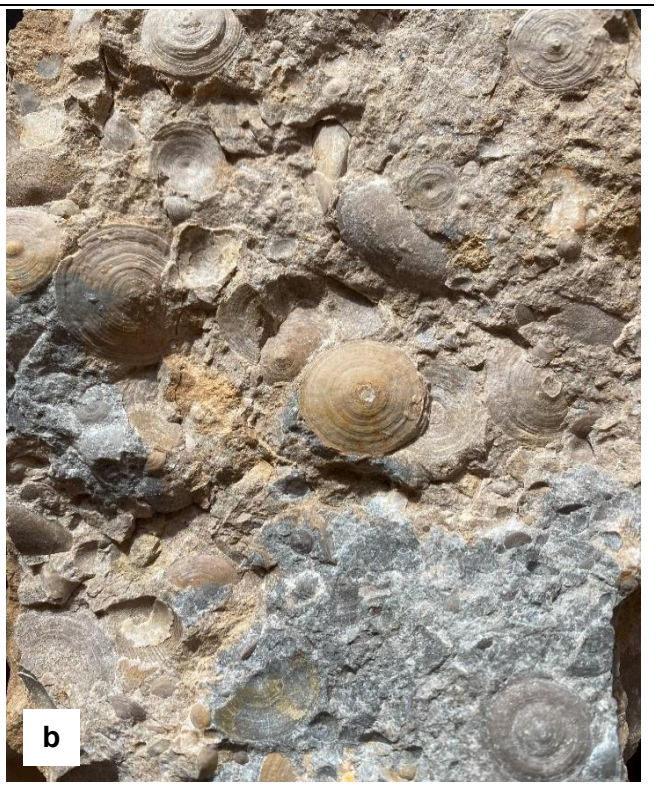
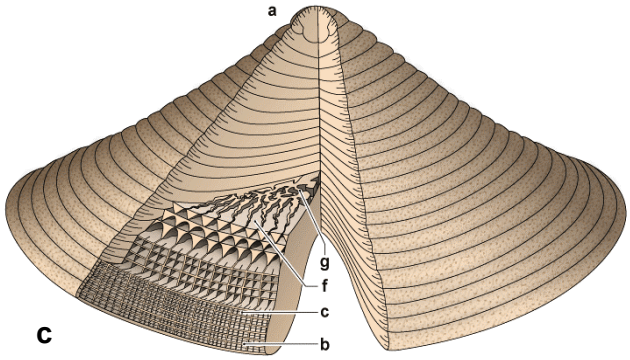


Fig. 2-6: a, *The strata of the Vetrila Formation across the course of the river;* ***b,*** *The narrow gorge of Medvenska river;* ***c,*** *The first waterfall "The Jumps";* ***d,*** *Cascade of waterfalls;* ***e,f,*** *"Sini vir" waterfall;* ***g,*** *Eco-trail to the waterfall;* ***h,*** *The monument of Zahari Stoyanov in the village of Medven.*







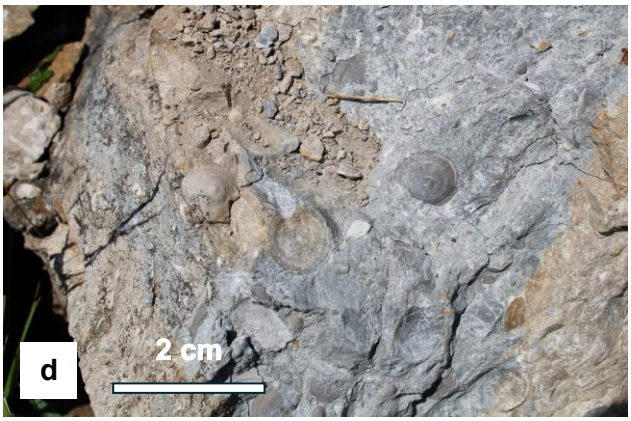


Fig. 2-7: a, *Geosite „Three winds“ near the road to Omurtag town;* ***b,d,e*** *Fossilized shells of Orbitolina concava Lamarck, 1816 in Cenomanian sandstones in the locality “Three winds”;* ***c,*** *Cross section of the shell of Genus Orbitolina (after Mathieu et al. 2011): apex (a), axial (b) and radial (c) peripheral partitions, continuation of the radial partitions (f) in toller and wave shaped lamellae; inner zone (g) where the radial partitions are joined;* ***f,*** *Nearshore environment in the Tethys Sea during the Cenomanian age around Kotel town.*

2.8. Geotop „Izvorite“ (“Kotelka”) is an emblematic geotope for the town of Kotel with the status of a natural landmark according to order 995/21.04.1971 of the Ministry of Forestry and Forest Industry, SG No. 41/1971, code 198 in the Register of Protected Territories and Protected Zones in Bulgaria. It is located in the renovated park "Izvorite" in the northwestern part of the town of Kotel.

This karst spring is a system of jumped, overflowing into each other karst vessels, one of which is "hidden" inside the rock, and the other one is an open lake, which is the head of the karst spring (Figs. 2-8a,b). These jumped vessels are abundantly filled with water and have a large flow during the intense spring inflow from their adjacent karst system. Цанков (1940) considers the highly fractured Upper Cretaceous limestones as *"massive reservoir for water, which, filling its cracks in depth, eventually overflows at the border between the limestone and the underlying clay conglomerate of Mesozoic strata in the form of gushing springs".*

Access to the inner lake is through the entrance to the "Izvorite" cave (Fig. 2-8c). "Izvorite" Park has been transformed into an attractive place for recreation against the background of the picturesque karst terrain (Figs. 2-8d,e). It naturally and imperceptibly passes into the centuries-old beech forests in the vicinity of the town of Kotel. Here is the alley of the revivalists, on which the names of dozens of Kotel residents who contributed to the Bulgarian revival are immortalized: Captain Georgi Mamarchev, Georgi S. Rakovski, Sofroniy Vrachanski, Neofit Bozveli, Dr. Petar Beron, Gavril Krastevich, Stefan Bogoridi and many others (Fig. 2-8f). Every summer at the end of July, the Festival of Ethnicities, Bagras and the Kotel Carpet takes place here, where the four main ethnic groups in the town demonstrate their customs and costumes: Bulgarians (Fig. 5-10g), Turks (Fig. 5-10h), Gypsies (Fig. 2-8i) and Karakachans (Fig. 2-8j). This place also houses one of the largest natural history museums in the country with over 30,000 prepared specimens of the local flora and fauna, which also exhibited a rich collection of rocks and fossils illustrating the geological structure of the area (Fig. 2-8k). The park is the beginning of several eco-trails to the nearest natural attractions around the town: Orlova Skala and the caves "Prikazna", "Orlovata Cave", "Bilernik" and "Malak Bilernik".

Geotop "The Springs" (Fig. 2-8l) is of local importance, but as a natural landmark emblematic of Kotel, which gave the town’s name, it can be evaluated in itself as an important element in the overall concept of Geopark "East Balkan" reflecting the main theme of the Geopark – the impressive karst landscape defining the diverse geological structure of the Kotel Balkan.

Fig. 2-8: a,b *Karst springs – "Izvorite"; **c,** "Izvorite" cave - the entrance to the inner lake; **d,e,** "Izvorite" Park; **f,** Alley of the Revivalists; **g-j,** The Festival of Ethnicities, Colors and the Kotel Carpet: g-Bulgarian village; h-Turkish village; i-Gypsy katun; j-Karakachan village; **k**-Natural History Museum; **l,** The Springs from the top.*

2.9. „Belemnitico rosso“ is a Lower Jurassic facies in the East Balkan represented by red limestones with brachiopods, crinoids and belemnites, which occur as olistoliths among the shales of the Kotel Olistostrome Formation. Tchoumatchenko (1988) was the first to draw an analogy between the abundance of belemnites in these limestones with the abundance of ammonites in the world-famous Tethyan "ammonitico rosso" facies: *"They contain many belemnites, which can serve as a diagnostic marker for this type of sediments, as ammonites for the facies "ammonitic rosso".* For the designation of this remarkable facies, Dian Vangelov (Синьовски, Вангелов, 2022) proposed the term "belemnitico rosso".

Toula (1890) was the first to describe these rocks in the Garnyovitsa area. The mixture of Triassic, Jurassic and Cretaceous rocks in the area has for many years puzzled geologists, who explained it with intensive tectonic movements. It was only in the middle of the last century that Kanchev (Енчева, Кънчев, 1962) indicated fossil landslides as the cause of the rock melange. The huge blocks of older rocks have been excavated from the steep southern coast of the Middle Jurassic Sea called "Zlatarski's Ridge" (Чумаченко, Чернявска, 1989) (Fig. 2-9a). It was built of Upper Triassic "heterastridium horizon" and Lower Jurassic "Belemnitico rosso" horizon (Fig. 2-9b). The host Middle Jurassic turbidites were united by Начев et al. (1967) into the Kotel Olistostrome Formation of Aalenian-Bathonian age (Чумаченко, Чернявска, 1989), and the red limestones are dated as Liasic (Late Sinemourian-Late Pliensbachian Tchoumatchenko, 1988). The last author describes several olistoliths in the localities of Garnyovitsa, Cherkovishte and Buykov dol, from which he collected over 150 fossil belemnites, brachiopods and crinoids, handed over under the current project for storage in the Museum of Natural History of the town of Kotel. The outcrops of these rocks are fossil deposits of belemnites (Figs. 2-9c-e), brachiopods (Figs. 2-9f,g), crinoids (Fig. 2-9h), and even ammonites (Fig. 2-9i) with high scientific and educational value. In previous works, the red rocks are defined as limestones or marls, but a large part of them are calcareous sandstones (calcarenites) and were used as building slabs in the past (Figs. 2-9j,k). Along with the Cenomanian sandstones, which are the source for building stones for the two medieval churches "St. St. Peter and Pavel" and "St. Trinity", they are the most used building material for walls and fences in the town.

"Belemnitico rosso" represents a perfect, easily distinguishable bio-lithostratigraphic facies. The close analogy with the internationally established "ammonitico rosso" facies makes it promising for adoption by geological professionals. Its discoveries in the area of the town of Kotel have a huge interpretive potential and through Geopark the new term can also gain international fame. At a certain point, the roles may be reversed and the term, which has already gained popularity in scientific circles, may function as a means of globally promoting the Geopark where it was first described.

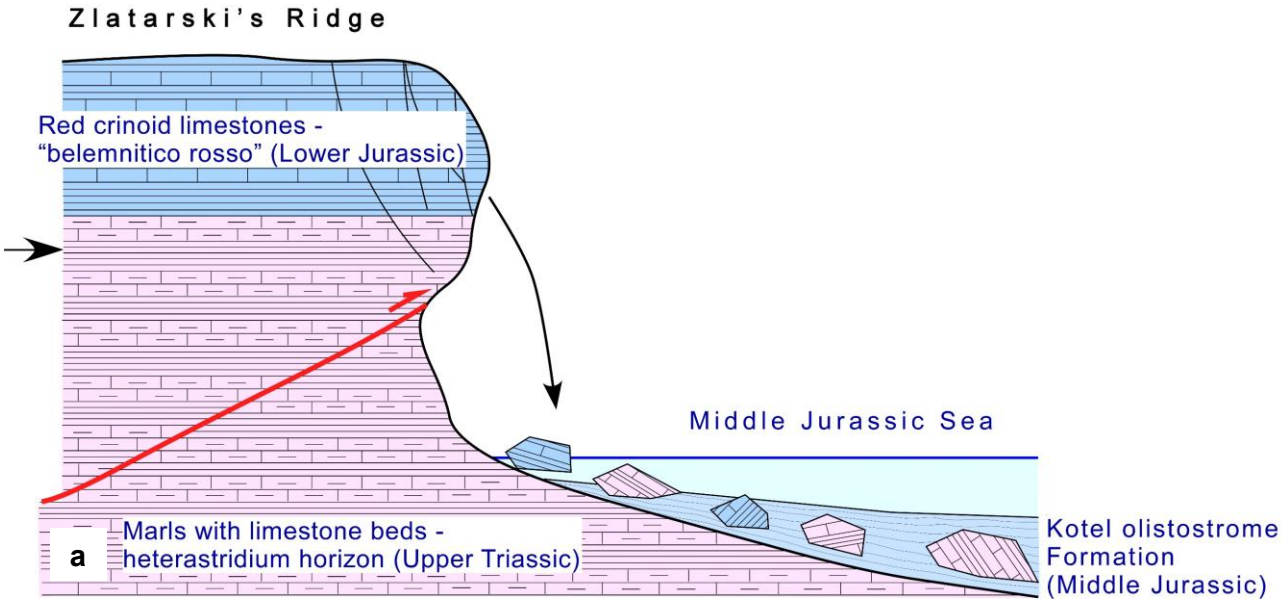
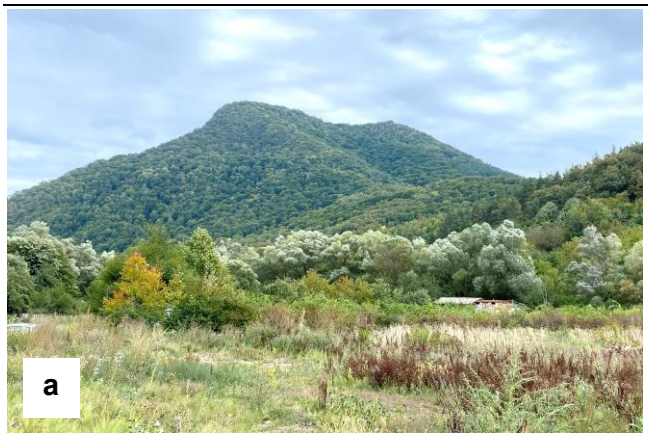


Fig. 2-9: a-b *Paleoenvironment in the Kotel Balkan during the Middle Jurassic: giant blocks of Upper Triassic (Heterastridium horizon) and Lower Jurassic ("belemnitico rosso") rocks fall along a sloping fault into the Middle Jurassic Sea;* ***c-e,*** *"Belemnitico rosso" with belemnite rostra;* ***f-g****, "Belemnitico rosso" - brachiopod limestone built into the walls of some houses in Kotel;* ***h****, "Belemnitico rosso" -crinoid limestone;* ***i,*** *"Belemnitico rosso" with an ammonite mould;* ***j,*** *Massive wall made of fence blocks of "belemnitico rosso";* ***k,*** *Wall with decorative elements of "belemnitico rosso".*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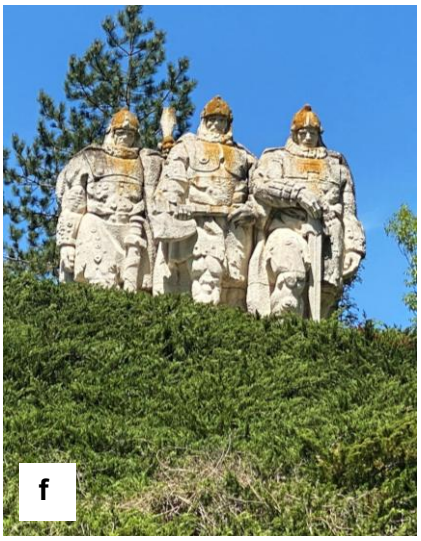
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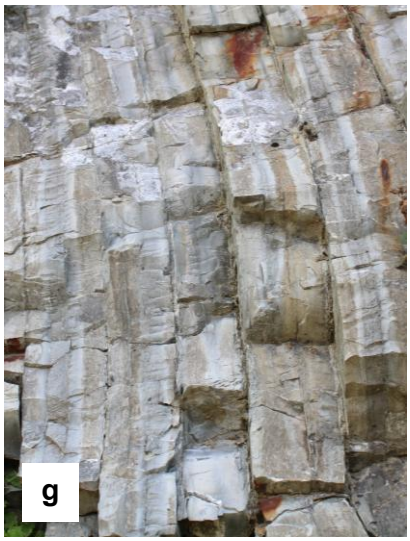
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ТУК НА СЕДЕМНАДЕСЕТИ ЮЛИ
ХИЛЯДА ДЕВЕТ СТА И ОСЕМДЕСЕТА ГОДИНА
БОДЪТ НА СЕЛСКОТО ВЪСТАНИЕ
ИВАЙЛО
-БЪЛГАРСКИЯТ ЦАР,
РАЗБИ ВИЗАНТИЙСКИТЕ
НАШЕСТВЕНИЦИ НАЧЕЛО С МУРИН...
СМЕЛИТЕ БИТКИ НА ИВАЙЛО ИЗЛИЗАХА
СПОЛУЧЛИВИ И СИЛНИ ВОЙСКИ СЕ
БОЯХА ОТ СРЕЩА С НЕГО
ЛЕТОПИСЕЦ
ГЕОРХИ ПАХИМЕР
h


i

***Fig. 2-10: a,b** – Vida Peak with the "Diavena" fortress is a naturally inaccessible elevation, which during the Middle Ages served as protection from Byzantine invasions; **c,** Exposure of Triassic limestone on the right bank of the Kotlenska River in the "Korenik" area; **d,** The old Roman road through the Korenik area in the Wetrila limestone on the southern slope of Vida; **e,** Demirkapiya Pass ("Iron Gate"); **f,** The Stone Guard of Ivaylo's Warriors; **g,** Vertical layers of the limestones of the Vetrila Formation; **h,i,** Memory of the battle in 1279, when Ivaylo's warriors defeated a 10,000 strong Byzantine army led by the general Murin.*

2.10. Demirkapiya-Vida-Korenik complex is a set of geomorphological, ecological and historical sites included in the Register of Protected Territories and Protected Areas in Bulgaria. The narrowest part of the Kotel Pass known as “Demirkapiya” or “Iron Gate”, located 4.5 km southeast of the town of Kotel on the road to the Thrace highway. To the west of it rises the Vida height with the “Diavena” fortress, and to the south is the “Korenik” protected area.

In geological terms, the earliest data on the area belong to Toula (1890), who described the rocks in the *"rocky Demir Kapu gorge"* as light gray, dense calcareous marls, called by Ст. Бончев (1927) *"Vetrila marls"* and later united in the Vetrila Formation, whose rank was indicated by Паскалев (1983). A more detailed literature review and description of these rocks is provided in chapter 2.5.

The "Vida" mount is a rocky peak among the Vetrila limestones (Figs. 2-10a,b), on which ruins of the ancient fortress "Diavena" have been preserved. The site has the status of a protected area with an area of 2.0 ha according to Order No. 311/31.03.2003 of the Ministry of Environment and Water, State Gazette No. 42/2003, code 215 in the Register of Protected Territories and Protected Zones in Bulgaria, category of protected areas.

Along the southern slope of "Vida" lies the "Korenik" area. It is a geotope with scientific and ecological value, class geomorphological - a romantic valley among an ancient beech forest in a terrain with olistoliths of Triassic and Jurassic rocks (Fig. 2-10c) among the limestones of the Vetrila Formation, where the old Roman road passes (Fig. 2-10d). The site has the status of a protected area with an area of 0.1 ha according to Order No. 308/31.03.2003 of the Ministry of Environment and Water, State Gazette No. 42/2003, code 213 in the Register of Protected Territories and Protected Zones in Bulgaria, category of protected areas. In addition to their high ecological value, the Demirkapiya Pass, the Vida Peak and the Korenik area, where the old road through the Kotel Pass passed, are natural strategic places with important defensive functions in Antiquity and the Middle Ages.

The narrow rocky gorge "Demirkapiya" ("Iron Gate") is a geotope with aesthetic and historical value (Figs. 2-10e,f). This is the narrowest part of the Kotel Pass carved by the Kotlenska River in the Vetrila limestones (Fig. 2-10g) between the peaks "Vida" (861.4) from the west and "Momina Mogila" (952.3) from the east. It has the status of a protected area with an area of 0.1 ha according to Order No. 311/31.03.2003 of the Ministry of Environment and Waters, State Gazette No. 42/2003, code 215 in the Register of Protected Territories and Protected Zones in Bulgaria, category of protected areas.

Along the northeastern slope of Vida peak to the riverbed, a late antique and medieval partition wall, built for protection from the north with a thickness of 1.5 m, descends. 50 m west of the road, there are ruins of the wall, in which there was a portal through which a passage regime was carried out. East of the gate there are remains of a semicircular tower, brought out 4 m in front of the front of the wall. East of the tower, ruins of a small building have been preserved. In this part, the wall is 2.5 m thick and is built of flat pieces of limestone of the Vetrila Formation, bonded with red mortar. In addition to its high ecological value, this area has preserved deep traces of the earliest history of the Bulgarian State. According to the Byzantine chronicles of Theophanes the Confessor, the Stara Planina passes in the area played an important role in the military operations between Bulgaria and Byzantium at the beginning of the 9th century. Northwest of "Vida" is the deep Greek (Grushki) Valley, where the Kotel Pass actually passed during the Middle Ages. It is mentioned in the work of Бакалов (1942) as one of the places where, according to tradition, the troops of Khan Krum defeated those of Nikephorus in 811.

The background to this battle relates to the failed punitive campaign of Nikephoros against Bulgaria in 807, in response to which in 809 Krum captured Serdica. In 811, Nikephoros gathered a large elite army and undertook a new campaign against Bulgaria. Krum judged that he could not oppose such an army and offered peace, but according to Theophanes' chronicles, Nikephoros, blinded by his own malice and the suggestions of his advisors, refused. Krum left the capital Pliska, and the Byzantines easily captured it, plundering, burning

and killing the civilian population. Nikephoros planned to triumphantly pass through Moesia, but his advisors convinced him to return to Constantinople by withdrawing his army through the passes of Stara Planina, as the Byzantines had not yet faced the regular Bulgarian army. At dawn on July 26, 811 Krum's troops surrounded the main forces of the Byzantines in the neighboring Varbitsa Pass, defeated the army and killed the emperor. It is assumed that in "Grushki dol" north of "Vida" another large detachment of the Byzantine army was defeated, and Nikephoros was beheaded in the area of Mira, east of Kotel.

The so-called "Hambarli inscription" testifies to Krum's military exploits, found by the Shkorpil brothers next to the village fountain in the village of Hambarli (Malomirovo, Elhovo region) and transferred to the Varna Archaeological Museum, where it is kept to this day. After a new victory on June 22, 813, in the Battle of Versinikia (Melnitsa village, Elhovo region), Krum conquered Adrianople and all of Thrace, and in July 813 he was already at the gates of Constantinople. A week after the coronation of Leo V the Armenian, Krum made a proposal for peace negotiations, which was accepted by arranging a meeting on the shore of the Golden Horn in front of the walls of Constantinople without guards and without weapons. At the meeting, an assassination attempt was made against Krum and his companions, but he managed to escape. Angered by the Roman treachery, the Bulgarian ruler embarked on a punitive campaign and burned down all the churches, monasteries and fortresses around the Roman capital, the Sea of Marmara and all of Adrianople. He returned to Bulgaria and began preparations for the capture of Constantinople. Unfortunately, on April 13, 814, Krum the Terrible died of a stroke near the village of Malomirovo near Elhovo, where the military camp of the Bulgarian army was established.

In 1279 in "Demirkapiya" another historical battle for the Bulgarian State took place, the memory of which has been preserved to these days (Fig. 2-1h,i). Here Ivaylo's approximately 5 000-strong army defeated an army twice as numerous led by the Byzantine commander Murin, which on its way to the capital Tarnovo besieged the fortress of Diavena with a garrison of no more than 1000 people. After this battle Ivaylo became famous for his cruelty, having killed all the prisoners. Although it may seem cruel, this was the only way out for the Bulgarians, who did not have the opportunity to guard and feed the captured soldiers, who outnumbered the Bulgarian army.

This complex of geotopes is an example of an incredible combination of geological, ecological and cultural-historical heritage: from the complex geological structure, through the exceptionally beautiful natural landscape characteristic of the surroundings of Kotel and Zheravna to some of the most important battles for the defense of the First and Second Bulgarian States. To the east of "Vida", "Demirkapiya" and "Korenik" is the nature reserve "Orlitsa" and the Medve Karst, which include a number of caves listed as natural landmarks in the Register of Protected Territories and Protected Areas in Bulgaria: "Lednitsa", "Maarata", "Malkata Maara", "Tsarevets", "Chernite Izvori", "Medveni Izvori", the waterfall "Sini Vir" and others.

According to the methodology for determining the geoconservation value of geotopes in park environment, the geotopes "Iron Gate" and "Vida" are sites of national historical significance and, together with the "Orlitsa" reserve, the caves and other natural landmarks in the area, are an important element of the overall concept of the "East Balkan" Geopark, reflecting the relationships between geology and the cultural-historical heritage of the area.

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