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DISCOPTYCHITES OENENSIS N. SP. AND THE ACCOMPANYING AMMONITE FAUNA FROM ANISIAN DEPOSITS IN BROTINJA, LIKA, CENTRAL CROATIA

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The Brotinja assemblage consists of a small ammonite fauna from Middle Triassic (Anisian) deposits. A number of taxa have been identified, including the following genera: *Discoptychites, Flexoptychites, Gymnites*, and *Arcestes (Proarcestes)*. To this Anisian assemblage, we can add a newly discovered species, *Discoptychites oenensis* n. sp. Results of the research at Brotinja significantly strengthen our understanding of the details of the complex tectonics of the region.

Key words: Amonite fauna, anisian, tectonics

U Brotinji prikupljena je manja fauna amonita u srednjetrijaskim aniziČkim naslagama.Određeno je nekoliko taksona rodova *Discoptychites, Flexoptychites, Gymnites* i *Arcestes (Proarcestes)*, a postavljena je i jedna nova vrsta - *Discoptychites oenensis* n. sp. Utvrđene su nove pojedinosti o geološkoj građi ovog područja sa složenim tektonskim odnosima.

Ključne riječi: fauna amonita, anizik, tektonika

INTRODUCTION

A small ammonite assemblage of Anisian age was discovered in Brotinja, a small karstic plateau rising from the canyon of the Una River, north of Srb in Lika. This locality is interesting, despite the poverty of its ammonite assemblage, because of the identification of a new species of ptychite, *Discoptychites oenensis* n. sp. The other associated taxa incontestably show an Anisian age for this part of the Middle Triassic at Brotinja. Analysis of the Brotinja assemblage, in conjuction with a detailed survey of the neighbouring regions, suggest a new interpretation of the complex tectonic history of the region.

Middle Triassic ammonites have been found, until now, in several localities near Brotinja. Ammonites predominate in faunas from Kunovac Spring (SALOPEK, 1914) and Pribudić (PRLJ & MUDRENOVIĆ, 1988) in Lika, and from Duler, Peći (TOULA, 1913), and Crkvina (ČELEBIĆ, 1964) in western Bosnia. These localities, and others Middle Triassic ammonite localities in Croatia (see Table 1), are impoverished in comparison to the well-known

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localities around Sarajevo (e.g. Han Bulog with 104 identified taxa, Haliluci with 195 identified taxa and others, HAUER, 1887), or that of Volujak Mountain in Herzegovina (147 identified taxa, KRAUS, 1914). All of the Mountain and Pribudić, followed by Kunovac Spring with mostly an Anisian fauna and forms from the Older Ladinian (Figure 1, Table 1). The Gregurić hill locality contains Ladinian deposits. Since Middle Triassic

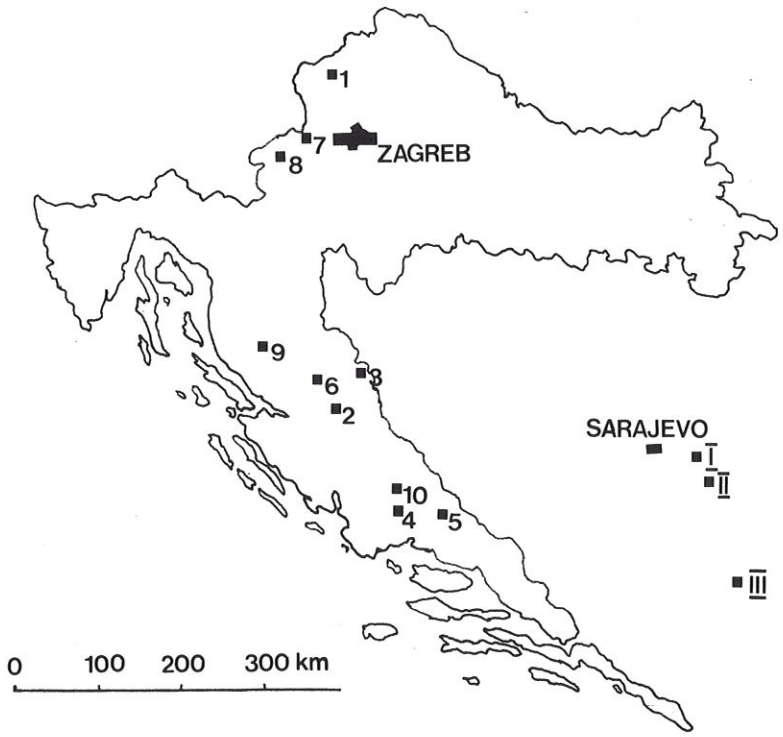

Fig. 1. Main localities of the Middle Triassic ammonites in Croatia (1-10):
Anisian:
1 = Kuna gora, 2=Pribudić, 3= Brotinja, 4 = Svilaja planina, 5 = Jabuka.
Anisian and the lower part of Ladinian:
6 = Kunovac vrelo.
Ladinian:
7 =Gregurić brijeg, 8 =Žumberak, 9=Donje Pazarište, 10 = Svilaja planina.
The most important localities of the Anisian ammonites from Dinarides:
I = Han Bulog, II = Haliluci, III = Volujak planina

presently confirmed species from this region are listed in Table 1, along with references to the relevant original works.

The most important localities of Anisian ammonites in Croatia are Kuna

ammonites in Croatia are still poorly known, each new locality is of interest. In the last several years new Anisian material has been collected in central Dalmatia, as well as in the foothills north of Knin. The Brotinja assemblage

substantially augments our knowledge of Middle Triassic ammonite faunas from Croatia. Collected and prepared Middle Triassic ammonites from Croatia, with the exception of specimens from Jabuka and Svilaja (see KERNER, 1906, 1908), are curated in the Croatian Natural History Museum in Zagreb.

SYSTEMATIC DESCRIPTION

Superfamily: Ptychitaceae, MOJSISOVICS, 1882
Family: Ptychitidae, MOJSISOVICS, 1882
Genus: *Discoptychites,* DIENER, 1916
Discoptychites oenensis n. sp.

Material: the holotype is a steinkern of a complete specimen. The paratype is a partially preserved shell, as well as several steinkern fragments.

Holotype: curated in the paleontological collections of the Croatian Natural History Museum, Zagreb (catalog number HPM-10415). It is illustrated in Plate I: Figures 1 and 2, Plate II: Figures 1 and 2, Plate III: Figure 1.

Origin of name: "Oenensis" is the adjective of the ancient name of the Una River (Oeneus).

Type locality: Karanovac spring, village of Brotinja, Lika, central Croatia.

Type stratum: the holotype was found isolated on the surface of a thin alluvial layer.

Underneath are Anisian carbonates and clastics. The deposits consist of the following: red, gray and black micrites with oncoids, layered cherts, lenses and thin layers of red sandstones and pelites, and greenish tuffs.

Diagnosis: The shell of this species is large, involuted, and discoidal. It has a smooth surface, a narrow ventral portion, and a thin umbilicus. Around the aperture, the shell widens and thickens. The suture is strongly developed and has three prominent saddles and lobes, as well as seven auxiliary structural elements, of which the first auxiliary saddle is characteristic of the species.

Description: The holotype is a partially damaged steinkern of a large ammonite shell. The shell is missing a small part of the ventral (external) side and part of the aperture. It is completely open on one side, so that the other, larger side is solidly embedded in sediment. The shell is involuted, and only the last whorl is exposed. It gradually widens and thickens so that it is thickest around the aperture. The ventral part is narrow, the outer edge is sharp, and in cross section it resembles a narrow ellipse. The surface of the shell is smooth. The umbilicus is relatively narrow, but incompletely exposed due to its impregnation by a compact chert. On the first third of the last whorl, corrosion has removed the outer wall of ammonite and one can easily see the structure of the suture line.

The suture line is very jagged (Plate III, Figure 2). A tall and wide saddle is prominent and variously delineated by numerous lateral folioles and deep lobes, most of which have asymmetric sides with convergent frills.

The external lobe (EL) is not sufficiently visible to allow description. One expects it to be short, shallow, and not very jagged. The external

saddle (ES) is very asymmetric. Its stem is strong, and short on the external side, where it is the most prominent lower foliole. The crown of its (ES) pillar is divided many times by deep lobules, while most of the folioles are located above the deep, first lateral lobe.

The first lateral saddle (LS_1) is highest element of the suture. Its stem is also strong, although thinner than that of the external saddle. Its apex is divided into two similar parts, although the sides of these parts are dissimilar due to strong folioles that are prominent on the external side. By analogy, the first lateral lobe (LI_1) is deepest at the suture line. It is wide, deep and extended dimeroidally. It is a little shallower and wider than the second lateral lobe (LI_2), the sides of which are similarly extended with many lobules on its flanks.

The most important structural elements are in the central portion of the suture. A second lateral saddle (LS_2) is prominent and has a relatively wide stem with many dissimilar folioles. The terminating end is bilaterally split into two dissimilar protuberances. The first auxiliary lobe (al_1) is shallow and symmetrical. Following it is the first auxiliary saddle (as_1), which one might eventually mark as the third lateral saddle (LS_3?). The first auxiliary saddle is diagnostic of the species and thus the most important of the structural elements. The saddle is solitary, narrow, and has on both sides three folioles. Its simple apex as high as the second lateral saddle. This structural element of the suture line has , to date, not been observed in any of the described ptychites.

The remaining parts of the auxiliary row are also clearly visible. The second auxiliary lobe (al_2) is quite wide, relatively deep, and extended with strong lateral grooves. The second auxiliary saddle (as_2) has a strong and wide stem divided into four parts. The third auxiliary saddle (as_3) has a strong stem in three parts, the fourth saddle (as_4) is just a simple protrusion, the fifth (as_5), is again bifurcated, the sixth (as_6) is small, and the seventh (as_7), on the umbilical seam, is hardly noticeable. In accordance with the above, the corresponding auxiliary lobes are, excepting the third (al_3), simple undeveloped grooves (al_4, al_5, al_6, and al_7). The row of saddles from LS_1 to the end of as_7 form an arc that gently descends to the umbilical edge.

The same series of structural elements of the sutural line is visible on the paratype (catalog number HPM-10416.2). On this, a partially preserved steinkern shell, corrosion has exposed the entire auxiliary row, and parts of the main elements of the suture (Plate IV, figure 1, 2).

Measurements were taken in the conventional manner, i. e.:
D= diameter,
H= whorl height at given; D, from umbilical seam to venter in plane of coiling,
W= whorl width at given D, perpendicular to plane of coiling,
U= umbilical width at given D.

Holotypus is measured at different D, at phragmocone (phrag.) and bodychamber (bodych.)

(in mm):	D	H	W	U
bodych	420,0	250,0	114,0	25,5
phrag.	292,0	148,0	85,0	18,5

Similarities and differences: The described specimen is most similar to the well-known species *Discoptychites megalodiscus* (BEYRICH), of which the dimensions of the largest examples approach those of our specimen.

Additionally, the surface of the shell of *D. megalodiscusis* is completely smooth, flattened, and the suture line is jagged.

However our specimen has a lager breadth in the terminal part of the shell and the structural elements of the suture are in many details different, especially in its auxiliary part.

These are also some similarities with *Ptychites gorjanović-krambergeri* SALOPEK, 1914, until now the largest known ptychite from Middle Triassic deposits in Croatia, as well as with *Ptychites princeps* MARTELLI, 1906, from the Middle Triassic Boljevići deposits in Montenegro. In both cases, the shell is smaller and the ventral part is round instead of narrow. Furthermore, there are very significant differences in the form of the suture line.

Differences can more or less also be seen with other large ptychites from various localities, e.g. *Ptychites sumitra* DIENER, 1895, from the Himalayan Triassic, well known species from the Mediterranean and alpine Triassic such as *Discoptychites reductus* (MOJSISOVICS, 1882), and *Discoptychites suttneri* (MOJSISOVICS, 1882).

Discoptychites reductus (MOJSISOVICS), 1882
Plate V, Figure 2.

1882. *Ptychites reductus*, MOJSISOVICS, p. 253, Plate 68.
1919. *Ptychites reductus.* SALOPEK, p. 170, Plate 7, Figure 1, Plate 8, Figure 1.
1988. *Discoptychites reductus.* PRLJ & MUDRENOVIĆ, p. 18, Plate 3, Figure 3.

One specimen of this large ptychite was discovered (catalog number HPM-10417.3). The specimen consists of a steinkern with a slightly damaged shell, which has a gentle, wide fold in front of the aperture.

It has a rounded external portion with a wide umbilicus and a characteristically thickened inner wall. The three main elements of the suture are quite prominent, while the auxiliary row is poorly developed. The external saddle (ES) and both lateral saddles (LS_1 and LS_2) are wide and expanded, while the corresponding lobes (EI, LI_1 and LI_2) have pronounced projections. These characteristics correspond to the description of MOJSISOVICS (1882) for this species, as with identified specimens from other localities.

Dimensions (in mm):
D=201.0, H=102.0, W=51,5, U=28,5
Age: Anisian

Distribution: Alps, Dinarides, Dobruđa, etc., localities around Sarajevo, Volujak (Gacko) in Herzegovina, Boljevići on the Montenegrin coast, and in Croatia, Kuna Mountain , Pribudić and now Brotinja.

Discoptychites cf. megalodiscus (BEYRICH), 1867.

1867. *Ammonites megalodiscus.* BEYRICH, p. 135, Plate 2.
1882. *Ptychites megalodiscus.* MOJSISOVICS, p. 253, Plate 77, Figure 1, Plate 78, Figures 1, 2.
1916. *Ptychites megalodiscus.* KRAUS, p.32.
1982. *Discoptychites megalodiscus.* MUDRENOVIĆ, p. 183.

The specimen consists of a steinkern with a complete specimen (catalog number HPM-10418.4).

The shell is large and involuted, with a narrow umbilicus. The ventral portion is narrow and has an open, and in part, well-preserved suture, although the surface is damaged due to an unknown cause.

The specimen is assigned to the well-known and widespread species *D. megalodiscus* on the basis of the following characteristics: shell shape, particularly the expanded and first lateral saddles, morphology of the corresponding lobes, and morphology of the auxiliary elements of the suture.

Dimensions (in mm):
D=224.5, H=134.5, W=42.0, U=12.0.
Age: Anisian

Distribution: Localities in the Alps, Han Bulog, Haliluci, and Palež in Bosnia, Volujak (Gacko) in Herzegovina, and so on. In Croatia this ptychite was previously unknown.

Genus: *Flexoptychites* SPATH, 1951

Flexoptychites flexuosus (MOJSISOVICS), *1882.*
Plate V, Figure 4.

1882. *Ptychites flexuosus.* MOJSISOVICS, p. 261, Plate 63, Figures 2-8.
1914. *Ptychites flexuosus.* SALOPEK, p.18.
1988. *Flexoptychites flexuosus.* PRLJ & MUDRENOVIĆ, p. 19, Plate 5, Figure 2 a-d.

This habitual Anisian species is also common in the Brotinja deposits, and is represented by numerous fragments and one well-preserved specimen (catalog number HPM- 10419.5). On the entirely flat shell are well-developed radial ridges oriented towards the front. The suture is clearly exposed. The first lateral saddle (LS_1) is prominent and the first lateral lobe (LI_1) is deeply grooved. The four auxilary of the suture descend from the second lateral saddle (LS_2) to the umbilical edge.

Dimensions (in mm):
D=79.0, H=44.5, W=18.5, U=11.2.
Age: Anisian

Distribution: Examples of this species have been found in many localities in the Alps, on Greenland, in Dobruđa, etc., and also in Han Bulog and other localities around Sarajevo, on Volujak (Gacko), Boljevića, and so on.

In Croatia is known from Kunovac Spring and Pribudić.

Flexoptychites cf. *acutus*
(MOJSISOVICS), 1882

1882. *Ptychites acutus.* MOJSISOVICS, p. 263, Plate 64, Figures 4a,b.
1914. *Ptychites acutus.* SALOPEK, p. 246.
1964. *Ptychites acutus.* ČELEBIĆ, p. 23, Plate 1, Figures 1a, 1b.
1988. *Flexoptychites acutus,* PRLJ & MUDRENOVIĆ, p. 20, Plate 5, Figure 1 a- d.

This species is represented by two complete specimens catalog numbers HPM-10420.6 and HPM - 10421.7).

The shells, on the surface of the steinkerns, display the ridges that are characteristic of this species.

Damage to the surface of the ammonites made the determination of the number and succession of ridges impossible, although the suture lines were clearly exposed. Three main lobes are prominent, the first auxiliary saddle (as 1) is well-developed, and the five-part auxiliary row extends down to the umbilical seam. On the basis of these characteristics, these specimens are closest to the widespread species *F. acutus.* although our specimens are larger than most examples of *F. acutus* from other localities.

		D	H	W	U
Dimensions (in mm):	1.	111.0	68.0	20.0	11.5
	2.	105.4	59.3	26.5(?)	13.2

Age: Anisian

Distribution: *F. acutus* is known from localities in the lower Alps, Greenland, around Sarajevo (Han Bulog, Haliluci, etc.), from Boljevići on the Montenegrin coast, and in Croatia from Kunovac Spring and Pribudić.

Family: *Arcestidae* MOJSISOVICS, 1875
Genus: *Arcestes* SUESS, 1865

Arcestes (Proarcestes) extralabiatus
(MOJSISOVICS), 1882
Plate V, Figure 3

1882. *Arcestes extralabiatus.* MOJSISOVICS, p. 154, Plate 46, Figures 1,2.
1904. *Arcestes extralabiatus.* MARTELLI, p.91, Plate 7, Figure 4a, b.
1882. *Proarcestes extralabiatus.* KRAUS. p.77
1882. *Arcestes (Proarcestes) extralabiatus.* MUDRENOVIĆ, p. 182.

Material consists of a steinkern with a complete and well-preserved shell (catalog number HPM-10422.8). This globose shell has well-developed labia on the posterior part and less-emphasized labia on the anterior part and in front of the aperture. The umbilicus is particularly narrow. The suture lines are well developed on the corroded portion of the shell. The saddles, five in the row, gradually decrease in size as they descend to the umbilical edge.

Dimensions (in mm):
D=81.5; H=52.0; W=47.6; U=7.4.
Age: Anisian

Distribution: This species in known from Anisian beds in the Alps and various Middle Triassic localities around the Mediterranean. It is also known from the region around Sarajevo in Bosnia, Volujak (Gacko), and Boljevići (Montenegrin coast), etc. This is its first discovery in Croatia.

Family: *Gymnitidae* WAAGEN 1895
Genus: *Gymnites* MOJSISOVICS, 1882

Gymnites cf. obliquus MOJSISOVICS, 1882
Plate V, Figure 1.

1882. *Gymnites obliquus.* MOJSISOVICS, p.236, Plate 61.
1911. *Gymnites obliquus.* SALOPEK, p.25.
1988. *Gymnites obliquus.* PRLJ & MUDRENOVIĆ, p. 21, Plate 2, Figure 2a-d.

One fragment has been found in Brotinja (catalog number HPM-10424.9). The specimen has characteristic radial ridges with nodes on the external side of the whorl. The suture is not visible, and thus a detailed identification is not possible. Considering the characteristics described above, however, it is most similar to the species G. obliquus.

Dimensions (in mm):
D=?(166.0); H=45.7; W=29.6.
Age: Anisian

Distribution: Alps, Greenland, Dinarides, and until now, only at Pribudić in Croatia.

THE STRUCTURAL GEOLOGY OF THE BROTINJA REGION

Many authors have written about the extremely complex geology in the region along the upper reaches of the Una River where Brotinja is located (e.g. HERAK, 1973, CHOROVICZ, 1977, BAHUN, 1985, and others). Recently completed field studies (ŠUŠNJARA et al., 1992) give important new details about the stratigraphic and tectonic relationships of Permian evaporites and clastics.

Veined evaporite, i.e. gypsum in the Brotinja region, is located at the level of the Una River and its tributary, the Jošava.

The Permian age of these evaporites hypothesized by HERAK (1973), has been confirmed by ŠIFTAR (1986) through the application of sulfur isotope analysis. Directly on the gypsum, which deepen beneath the surface, there is a transition to anhydrites. In parts, the contact is normal superposition, but in the majority of cases, the contact is along tectonic faults.

The anhydrites are followed by pelites, siltites, and sandstones. JELEN (from ŠUŠNJARA et al., 1992) concluded, on the basis of pollen analyses of identical clastic from the Novakovići locality (near Osredak), that these sediments were from Upper Permian. Partially preserved clastic and carbonate deposits of the Lower Triassic unconformably overlie these sediments, as already described by BAHUN (1985).

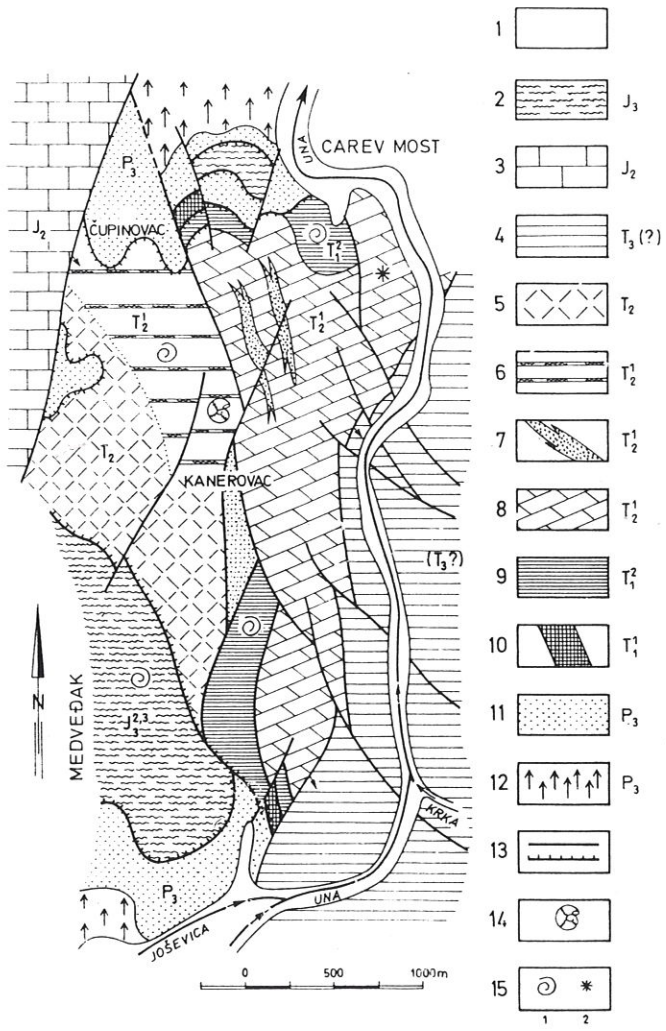

Fig. 2. The geologic map of the Brotinja area.

1 = Alluvium: sands, gravels, clays.
2 = Limestones and dolomites with the lens and the thin layers of chert. Lemeš deposits, Malm - J_3.
3 = Limestones and dolomites, Dogger - J_2.
4 = Dolomites, probably Upper Triassic - T_3 (?).
5 = Dolomites, Middle Triassic probably Ladinian - T_2^2 (?).
6 = Limestones and dolomites with the lens and thin beded chert, Anisian - T_2^1.
7 = Clastic sediments, Anisian -T_2^1.
8 = Dolomites, Anisian - T_2^1.
9 = Clayey limestones and dolomites, Campilian beds, Upper Scythian - T_1^2.
10 = Clastic sediments and carbonate sediments, Seiser beds, Lower Scythian - T_1^1.
11 = Clastic sediments, Upper Permian - P_3.
12 = Gypsum and anhydrite - Upper Permian - P_3.
13 = Fault: 1 - normal, 2- reverse.
14 = Ammonites locality.
15 = Fossils locality: 1 - macrofauna, 2 - microfossils

TABLE 1 Ammonite taxa of the Middle Triassic deposits of the main localites in Croatia determinated until now.

Familia / Genus Species	Anisian / Anizik					/ Ladinian / Ladinik				
	1	2	3	4	5	6	7	8	9	10
Sageceratidae										
Sageceras walteri MOJSISOVICS							+			
Noritidae										
Norites gondola MOJSISOVICS	+									
Acrochordiceratidae										
Acrochordiceras (A.) halili TOULA		+cf								
A. (Epiacrochordiceras) endoe(HAUER)	+cf.	+								
Ceratitidae										
Ceratites celtitiformis HAUER	+									
Kellnerites bispinosus licanus (SALOPEK)						+				
K. bosniensis (HAUER)						+				
K. samoborensis (SALOPEK)							+			
Bulogites multinodosus (HAUER)	+									
Halilucites haugi SALOPEK									+	
H. obliquus (HAUER)									+cf	
H. plicatus (HAUER)									+cf	
H. rusticus (HAUER)							+cf		aff	
H.zagorensis SALOPEK							+			
Balatonitidae										
Judicarites prezzanus (Mojsisovicz)	+aff									
Hungaritidae										
Hungarites mojsisovicsi ROTH							+aff			
Phylloclad iscites crassus (HAUTER)							+			
Aploccoceratidae										
Velebites dinaricus SALOPEK									+	
Arpaditidae										
Arpadites telleri MOJSISOVICS										+
Trachyceratidae										
Trachyceras (Protrachyceras) arhelaus LAUBE								+cf		+cf
T. (P.). curionii HAUER							+			
T. (P.) dorae SALOPEK							+ +			
T. (P.) ladini MOJSISOVICS									+aff	
T. (P.) margaritosum MOJSISOVICS							+aff			
T. (P.) pseudoarchelaus BOECKH							+			
T. (P.) recurbariense MOJSISOVICS							+aff			
T. (P.) vouki SALOPEK							+			
Anolcites arminae angusta SALOPEK							+			
A. furcosus MOJSISOVICS							+			
A. laczkoi DIENER							+			
A. laczkoi falcoidea SALOPEK							+			
A. richthofeni MOJSISOVICS							+cf			
Celtitidae										
Celtites intermedius HAUER	+									
Arcestidae										
Arcestes (Proarcestes) balfuori (OPPEL)		+								
A. P. boeckhi (MOJSISOVICS)		+				+aff	+cf			
A. P. bramentei (MOJSISOVICS)	+									
A. P. esinensis (MOJSISOVICS)								+		
A. P. extralabiatus (MOJSISOVICS)			+							
A. (P.) marchenanus (MOJSISOVICZ0							+cf			
A. (P.) ombonii TOMMASI							+			
A. (P.) pannonicus (MOJSISOVICS)						+cf	+aff			
A. (P.) quadrilabiatus (MOJSISOVICS)						+cf				
A. (P.) subtridentinus (MOJSISOVICS)						+aff	+			
A. (P.) trompanus (MOJSISOVICS)							+cf			
Cladiscitidae										
Hypocladiscites brancoi MOJSISOVICS	+						+			
Joannitidae										
Joannites tridentinus MOJSISOVICS							+aff			
Ptychitidae										
Ptychites eusomos BEYRICH		+				+aff				
P. everesti (OPPEL)	+cf									
P. gorjanovic-krambergeri SALOPEK						+				
P. gretae SALOPEK							+			
P. oppeli MOJSISOVICS	+cf	+		+						
P. opulentus MOJSISOVICS	+aff									

Familia / Genus Species	Anisian / Anizik 1	2	3	4	5	6	/ Ladinian / Ladinik 7	8	9	10
P. princeps MARTELLI		+								
P. profugus SALOPEK						+				
P. progressus MOJSISOVICS	+									
P. stachei MOJSISOVICS	+cf	+								
P. striatoplicatus HAUER	+									
Discoptychites domatus (HAUER)										
D. megalodiscus (BEYRICH)			+cf							
D. pauli (MOJSISOVICS	+									
D. reductus (MOJSISOVICS)	+	+	+							
D. suttneri (MOJSISOVICS)	+	+cf								
D. oenensis SAKAČ			+							
Flexoptychites acutus (MOJSISOVICS)		+	+cf	+cf	+	+				
F. angusteumbilicatus (BOECKH)							+cf			
F. flexuosus (MOJSISOVICS)		+	+	+	+	+		+		
F. gibbus (BENECKE)	+cf									
F. striatoplicatus (HAUER)	+									
F. stoliczkai (MOJSISOVICS)		+cf								
F. studeri (HAUER)	+	+			+					
F. uhligi (MOJSISOVICS)		+cf				+cf	+cf			
Sturia semiarata MOJSISOVICS	+aff						+			
S. sansovinii MOJSISOVICS	+						+			
Pinacoceratidae										
Parapinacoceras aspidoides (DIENER)							+			
P. damesi (MOJSISOVICS)						+aff	+			
Gymnitidae										
Gymnites bosnensis HAUER						+cf				
G. bosnensis nodosa SALOPEK							+	+cf		
G. credneri MOJSISOVICS							+			
G. humboldti MOJSISOVICS	+					+cf				
G. incultus MOJSISOVICS	+	+				+cf	+cf	+cf		
G. intermedius SALOPEK							+			
G. madjereki GORJANOVIĆ-KRAMB.	+									
G. obliquus (MOJSISOVICS)		+	+cf		+cf		+cf			
G. palmai (MOJSISOVICS)	+					+				
G. peciensis TOULA		+								
G. uhligi SALOPEK							+			
Japonites intermedius SALOPEK							+			
J. raphaeliszojae (TOMMASI)							+			
Ussuritidae										
Monophyllites sphaerophyllus (HAUER)	+	+								
M. wengensis KLIPSTEIN							+	+cf		
Leiophyllites suessi (MOJSISOVICS)	+			+						

Anisian: 1 = Kuna gora (GORJANOVIĆ-KRAMBERGER, 1896, SALOPEK, 1918B, 1919).
2 = Pribudić (PRLJ & MUDRENOVIĆ, 1988). 3 = Brotinja (SAKAČ, 1992).
4 = Svilaja planina (KERNER, 1908). 5 = Jabuka (KERNER, 1906).
Anisian and lower part of Ladinian: 6 = Kunovac vrelo (SALOPEK, 1914a, 1914b).
Ladinian: 7 = Gregurić brijeg (SALOPEK, 1912, 1936). 8 = Žumberak (SAKAČ, 1992).
9 = Donje Pazarište (SALOPEK, 1918a). 10 = Svilaja planina (KERNER, 1906).

These Seiser beds of the Lower Scythian have been heavily reduced by tectonic processes, and in two zones there are preserved pockets of Campilian beds from the Upper Scythian. The fauna from these deposits includes, along with the customary gastropod types "Turbo" and "Natiria", molluscs, e.g. "*Gervilleia*" *costata* Schlotheim, and an impoverished ammonite fauna with many representatives of the genera *Tirolites* and *Dinarites*.

The main part of Brotinja is built of Triassic carbonate deposits, such as dolomites and limestones with clastic lenses. BAHUN (1985) was the first to discover Middle Triassic microfossils in these deposits and determine their stratigraphic position. New discoveries of microfauna demonstrate the Anisian age of these deposits, and include the following forms: *Meandrospira dinarica* KOCHANSKY-DEVIDÉ & PANTIĆ, *Glomospira densa* (PANTIĆ), *Endothyranella cf. robusta* SALAJ (I. Gušić, personal communication, data in ŠUŠNJARA et al., 1992). The layers with Anisian ammonites are located in the Triassic complex in the middle part of Brotinja.

These layers consist of red, green, but mostly black limestones with a micritic structure, lenses of red and greenish pyroclastics, chert, and occurrences of marls and shales. The end of the succession is well-bedded, in parts laminated, but the nonfossiliferous dolomites have been heavily damaged by tectonic processes. These deposits are probably Middle Triassic in age.

There remains the unresolved question of the age the dolomites in the canyons of the Una and Krka Rivers.

These dolomites may be Upper Triassic in age, since this is the age of identical dolomites in the nearby village Lička Kaldrma, and in neighbouring regions.

Middle Jurassic limestones and dolomites are found west of Brotinja. Their contacts with Middle Triassic carbonates and Upper Permian clastics are along faults. At higher elevations, eg. on the slopes of Medvedak and at Carev Most, there are well-bedded limestones and chert bearing Malm Lemeš deposits.

The contacts between Permian, Triassic, and Jurassic deposits in Brotinja are mostly marked with faults.

Individual sediments, particularly clastics from the Permian, Lower Triassic, and Malm Lemeš deposits, have been particularly reduced and pulverized by tectonic forces. This is because the tectonic structure of Brotinja represents an eroded part of the overthrust. In the foundation are Permian evaporites and in parts, preserved clastics of the Upper Permian. Overlying them are tectonically overthrusted mixed clastics and carbonates from the Triassic and Malm. The Malm sediments, i.e. Lemeš deposits, are located in the primary position of the overthrust in its northern and southern parts. The eastern and western flanks of the Brotinja structure are cut by a deep north-south oriented fault.

CONCLUSION

The identified ptychite taxa, as well as the above forms of *Arcestes* and *Gymnites* are well-known Anisian ammonites in the above many other localities. Therefore, the ammonite fauna from Brotinja should also be Anisian in age, as is also suggested by the microfossils in this region. The discovery of this new Anisian ammonite locality in Brotinja shows that Middle Triassic ammonite faunas in Lika and the neighbouring regions of northern Dalmatia and western Bosnia still warrant further investigation. New research along these lines can give interesting results, as demonstrated by the discovery of the new species *Discoptychites oenensis n.* sp.

ACKNOWLEDGMENTS

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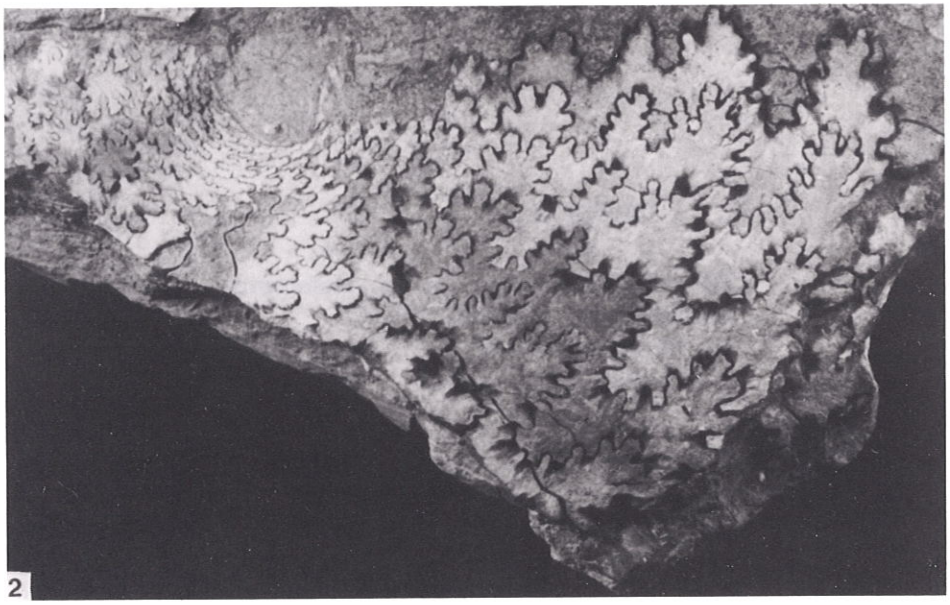
PLATE I

Discoptychites oenensis n. sp. Holotypus.
Brotinja, Lika, Anisian.
1 - Steinkern. 1/3.
2 - Detail of the steinkern with the suture. x 1,5.

PLATE I

1



2

PLATE II

Discoptychites oenensis n. sp. Holotypus.
Brotinja, Lika, Anisian.
1 - Cross-section x 1/2
2 - Ventral part. x 1/2

PLATE II

1

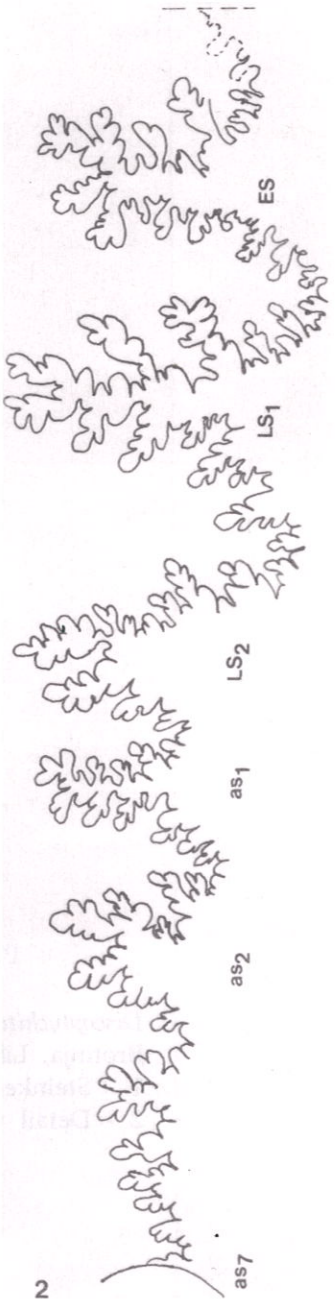
2

PLATE III

Discoptychites oenesis n. sp. Holotypus.
Brotinja, Lika, Anisian.
1 - Holotypus, detail with the suture. x 1,5.
2 - Complete suture reconstruction. x 1,8.

PLATE III

1

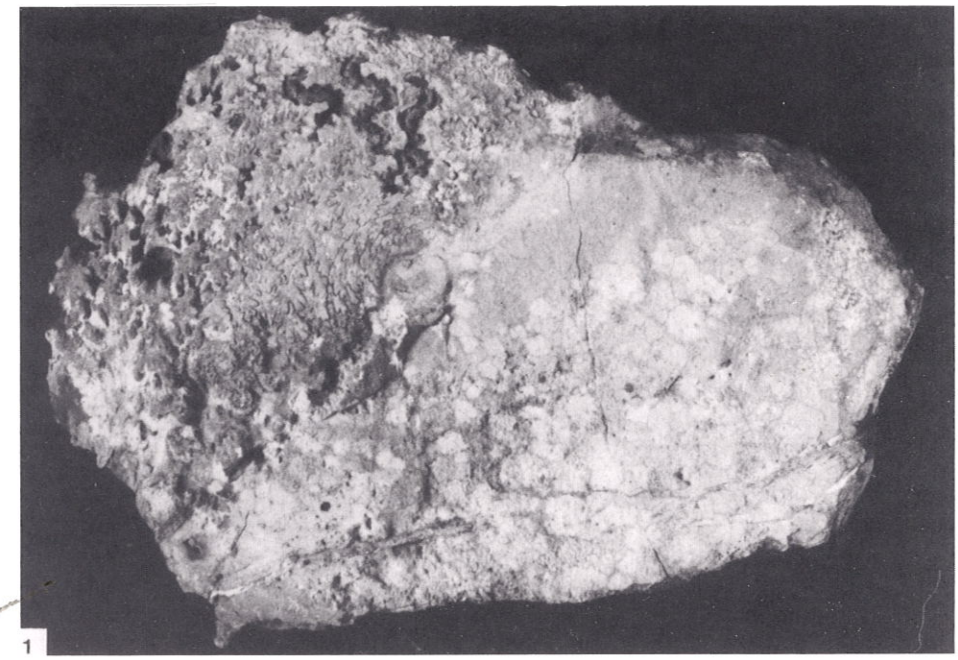


2

PLATE IV

Discoptychites oenensis n. sp. Paratypus.
Brotinja, Lika, Anisian.
1 - Steinkern, uncomplete specimen. x 1/3
2 - Detail with the suture. x 1,5.

PLATE IV



1

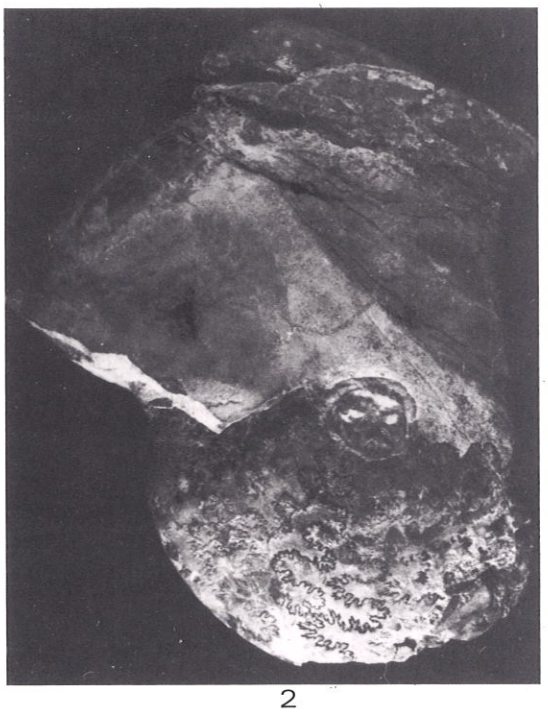
2

PLATE V

1 - *Gymnites cf. obliquus* (MOJSISOVICS). x 3/4
2 - *Discoptychites reductus* (MOJSISOVICS). x 1/2
3 - *Arcestes (Proarcestes) extralabiatus* (MOJSISOVICS) . x 1
4 - *Flexoptychites flexuosus* (MOJSISOVICS). x 1

PLATE V

1



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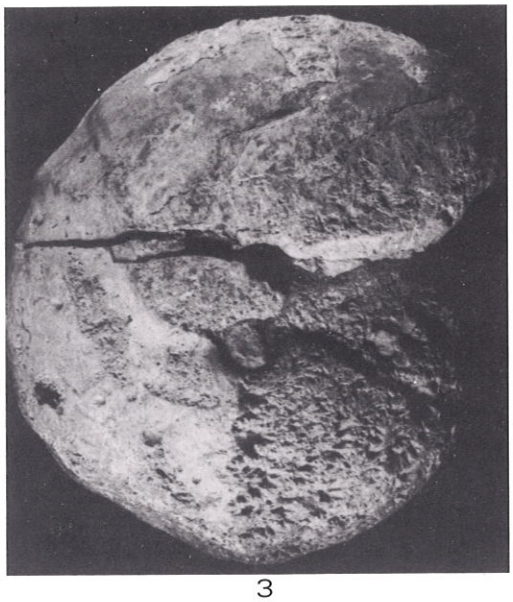

3

4