

**SENONIJSKE KOLONIJSKE KORALE
IZ BIOLITITNEGA KOMPLEKSA
V OREŠJU NA MEDVEDNICI**

(S 4 SLIKAMI V BESEDILU IN 16 TABLAMI V PRILOGI)

**SENONIAN COLONIAL CORALS FROM THE BIOLITHITE
COMPLEX OF OREŠJE ON MT MEDVEDNICA
(NW YUGOSLAVIA)**

(WITH 4 FIGURES IN TEXT AND 16 PLATES IN ANNEX)

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SPREJETO NA SEJI
RAZREDA ZA PRIRODOSLOVNE VEDE
SLOVENSKE AKADEMIJE ZNANOSTI IN UMETNOSTI
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Abstract

UDC 563.63(116.333.3)(497.13)

Senonian colonial corals from the biolithite complex of Orešje on MT Medvednica (NW Yugoslavia)

The biostratigraphical and sedimentological features of the biolithite complex of Orešje are given, from which the coral fauna is determined. 19 species are systematically described. They belong to 15 genera. The Santonian-Campanian age of the locality is stated.

Izvleček

UDK 563.63(116.333.3)(497.13)

Senonijske kolonijske korale iz biolititnega kompleksa v Orešju na Medvednici

Podane so biostratigrafske in sedimentološke značilnosti biolititnega kompleksa pri Orešju, od koder so paleontološko obdelane korale. Opisanih je 19 vrst, ki pripadajo 15 rodovom. Določena je santonijsko-kampanijska starost nahajališča.

Izvod

UDK 563.63(116.333.3)(497.13)

Senonski kolonijski koralji iz biolititskog kompleksa u Orešju na Medvednici

Prikazana su biostratigrafska i sedimentološka obilježja biolititskog kompleksa kod Orešja, odakle su paleontološko obrađeni koralji. Određenih je 19 vrsta koralja koje obuhvaćaju 15 rodova. Utvrđena starost nalazišta je santon-kampan.

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UVOD

Biolititni kompleks, iz katerega izhajajo obdelane korale, leži na skrajnem severovzhodnem robu Medvednice, v dolini potoka Šum pri vasi Donje Orešje, severno od Zeline (sl. 1 in 2).

Od prvotnega biolititnega kompleksa je danes ohranjen in dostopen samo del. Vse drugo je ali denudirano ali pa prekrito s transgresivnimi miocenskimi sedimenti. Ohranjeni del kompleksa ima v sredini, kjer so razvite grebenske plasti, debelino ca 70 m. Spodnji del kompleksa, v katerem se pojavljajo koralne bioherme, je predstavljen na litostratigrafskem stolpcu (sl. 3).

Edino na zahodu, v dolini potoka Šum, je razgaljen lateralni prehod biolititnega kompleksa v bazenske sedimente tipa »Scaglia« (glej geološko skico na sl. 3).

Apnence iz biolititnega kompleksa že dalj časa izkoriščajo v tamkajšnjem kamnolomu. V opuščenih delih kamnoloma so bili snemani detajlni stratimetrični profili, ki bodo predmet posebne razprave. V teh profilih je zbran bogat paleontološki material, med katerim je tudi zbirka koral, ki je obdelana v pričujoči razpravi. Največ koral je zbranih na desni strani potoka. Na litostratigrafskem stolpcu (sl. 3) so to enote 3, 5, 7 in 11.

Del opisanih koral sta zbrala prof. DONATA DEVIDÉ-NEDĚLA (vzorci z oznako N) in dipl. inž. VLADIMIR ZEBEC (vzorec Z—1), za kar se jima avtorja najpriščneje zahvaljujeva. Te korale izhajajo iz opuščenega dela kamnoloma na levi strani potoka in so nadaljevanje koralnih in rudistnih bioherm, ki so predstavljene na stratigrafskem stolpcu. Največji del teh plasti je bil uničen z eksploatacijo kamnoloma.

Zbranih je bilo čez 50 primerkov koral. Vse razen enega so kolonijske. Določenih je 19 vrst, ki pripadajo 15 rodovom. Večina najdenih koralnih vrst je santonijsko-kampanijske starosti. To starost grebena v Orešju potrjuje tudi spremljajoča favna rudistov, foraminifer in nanoplanktona.

Zbirka obdelanih koral je shranjena v Geološko-paleontološkem zavodu Prirodoslovno-matematične fakultete Univerze v Zagrebu.

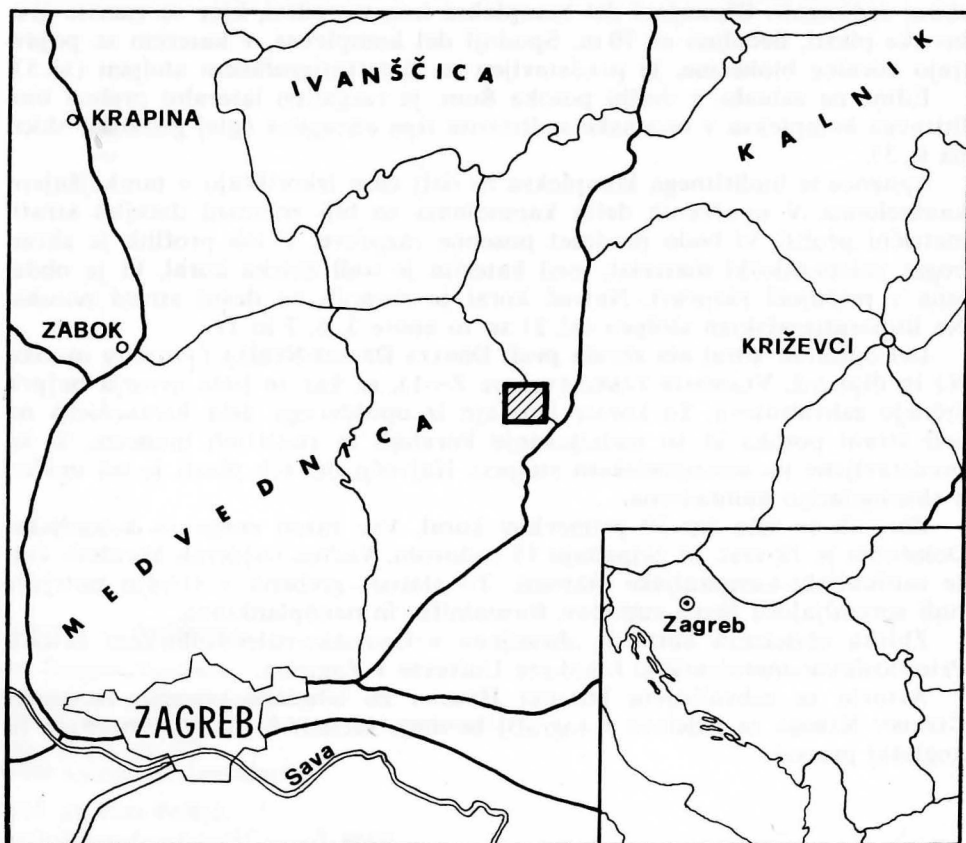
Avtorja se zahvalujeta MILOJKI HUZZAN za tehnično opremo razprave, CARMEN NAROBÈ za izdelavo fotografij in mag. MILENI MILOJEVIĆ-SHEPPARD za angleški prevod.

BIOSTRATIGRAFSKA I SEDIMENTOLOŠKA OBILJEŽJA BIOLITITSKOG KOMPLEKSA DONJE OREŠJE

(ANTE POLŠAK)

Pod biolititskim kompleksom podrazumjevamo biolititski greben i naslage u prigrebenskim zonama (zagrebenska zona — »Back reef« i predgrebenska zona — »Fore reef«) čija je geneza usko povezana s grebenom. U te naslage prvenstveno spadaju nesortirane prigrebenske breče (»Reef talus«) i različite vrste detritičnih, pretežno bioklastičnih vapnenaca. Biolititski greben izgrađen je od biolitita (FOLK 1959; 1962) tj. autohtonih vapnenaca, koji su nastali od skeleta organizama, u »poziciji rasta« (»Growth position«). Klasično ime za biolitite je »grebenski vapnenac«.

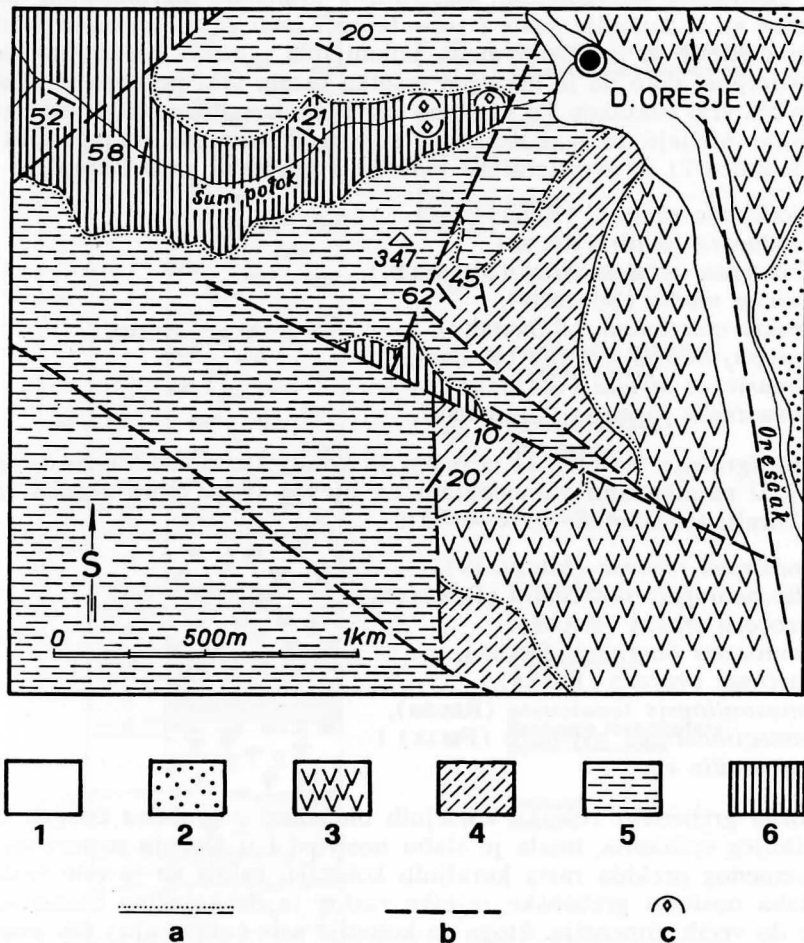
U Donjem Orešju sačuvani su u većoj ili manjoj mjeri svi dijelovi biolititskog kompleksa. Sačuvan je biolititski greben, zatim u maloj mjeri kla-



Sl. 1. Smeštajna karta. Kosom šraflurom označeno je područje geološke karte sa sl. 2

Fig. 1. Situation map. Hatched area represents the geological map, shown in Fig. 2

stični i karbonatni sedimenti zagrebenske zone i kompletni facijesi predgrebenske zone i to: prigrebenska breča i detritični vapnenci. Detritični vapnenci lateralno postupno prelaze u bazenske pelagičke naslage tipa »Scaglia«. Vrlo je značajno da je svim nabrojenim facijesima paleontološki dobro dokumentirana istovremenost, tj. pripadnost rasponu santon-donji kampan. Ta pripadnost temelji se na determinaciji više različitih grupa fosila, koje su u posebnom radu detaljnije prikazali POLŠAK, A., DEVIDÉ-NEDÉLA, D., TURNŠEK, D., GUŠIĆ, I. i BENIĆ, J., (1978) i POLŠAK, A. (1978).



Sl. 2. Geološka karta okolice Donjeg Orešja (prema: BASCH, O. i K. ŠIKIĆ 1975).

1 Holocen; 2 Pleistocen; 3 Donji pont; 4 Panon; 5 Torton; 6 Senon; a Transgresivna granica; b Rasjed; c Kamenolom s nalazištima koralja

Fig. 2. Geological map of the surroundings of Donje Orešje.

1 Holocene; 2 Pleistocene; 3 Lower Pontian; 4 Pannonian; 5 Tortonian; 6 Senonian; a Transgressive boundary; b Fault; c Quarry with localities of Corals

Biolititski greben

Biolititski greben Donjeg Orešja pripada tipu »barijernih grebena«, za koje je karakteristično da su duguljastog oblika i od kopna su odijeljeni lagunom.

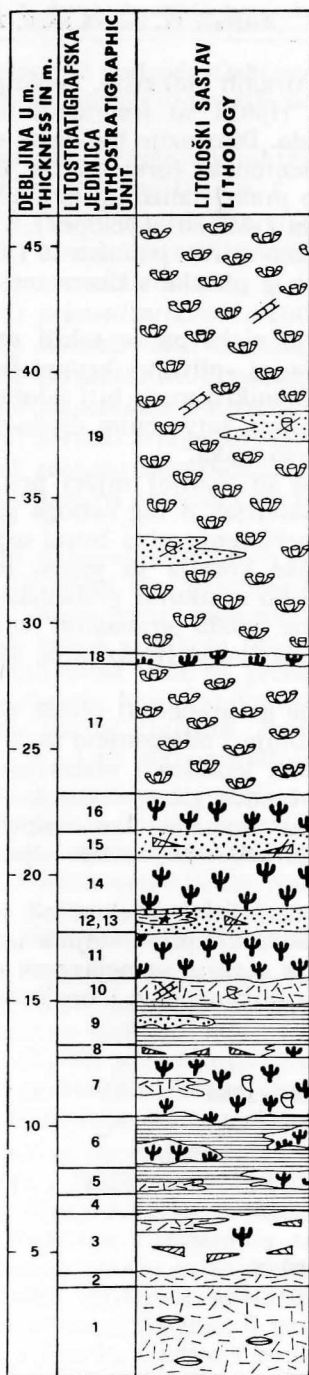
Donji dio grebena izgrađen je najvećim dijelom od nekoliko prostranih koraljnih biohermi kojima se debljina pretežno kreće od 2—3 m. (sl. 3, stratigrafska jedinica 7, 11, 14, 16). Manje koraljne bioherme javljaju se i u zagrebenskoj zoni gdje su uložene u lapore (strat. jedinice 5 i 6). Koraljne bioherme sastoje se od kolonija masivnih i granastih hermatipnih koralja. Mjestimice su te kolonije guste i zbite tvoreći tako gustu grebensku rešetku. Znatnim dijelom su međutim među kolonijama i među koralitima zaostale brojne šupljine, tako da je koraljna rešetka ostala vrlo porozna i rahla. Epibiont je bio vrlo oskudan. To su slabo razvijene koralinaceje i rijetki briozoi. Tu i tamo javljaju se i pojedinačni rudisti iz familije Hippuritidae (strat. jedinica 7). Iz stratigrafske jedinice 7 određeni su ovi koralji:

Plocladocora simonyi (REUSS),
Plocladocora tenuis (REUSS),
Actinastraea octolamellosa (MICHELIN),
Astraraea media (SOWERBY),
Astinacis martiniana (d'ORBIGNY),
Mycetophylliopsis antiqua (REUSS),
Columastraea striata (GOLDFUSS),
Columastraea formosa (GOLDFUSS).

Iz stratigrafske jedinice 11 određen je koralj *Dermosmiliopsis tenuicosta* (REUSS). U napuštenom kamenolomu na lijevoj strani šum potoka sabrani su ovi koralji (oznake: Z—1, N—1—9):

Actinastraea ramosa (MICHELIN),
Phyllocoeniopsis pediculata (DESHAYES),
Pleurocora crassa (REUSS),
Thamnoseris hoernesi (REUSS),
Synastraea procera (REUSS),
Dermosmiliopsis tenuicosta (REUSS),
Columactinastraea pygmaea (FELIX) i
Ellipsosmilia sp.

Porozna grebenska rešetka koraljnih biohermi u grebenu Donjeg Orešja, bez obilnijeg epibionta, imala je slabu nosivost i u slučaju usporenog rasta ili povremenog prekida rasta koraljnih kolonija, valovi su je vrlo brzo razarali. Slaba nosivost grebenske rešetke razlog je da koraljne bioherme nisu narasle do većih dimenzija. Stoga se kolonije sele (migriraju) čas ovamo — čas onamo i razvijaju se često na podlozi od zbitog i bolje nosivog grebenskog pijeska. Rezultat tih promjena je prstolika izmjena biohermi i bioklastičnog vapnenca. Donji dio bioherme, zbog svoje težine, često je nepravilno utisnut u bioklastični vapnenac. Bioklastični vapnenac naščesće se taloži između koraljnih biohermi i predstavlja litificirani grebenski pijesak. Dobri primjeri za to su osobito stratigrafska jedinica: 10, 12, 13, i 15. Vapnenac se



LEGENDA LEGEND



Biolititski vapnenac
(bioherme i biostrome)
Biolithite (bioherms and biostromes)



Kalkarenit i biokalkarenit
Calcarenite and biocalcarenite



Blomikrit
Blomicrite



Lapor
Marl



Kolonija rudista
Rudist colony



Pojedinačni rudisti
Individual rudists



Kolonija koralja
Coral colony



Nerineidae



Crinoidea



Corallinaceae



Bentoske foraminifere
Benthic foraminifera



Bioklasti
Bioclasts

Sl. 3. Litostratigrafski stup
Fig. 3. Lithostratigraphic column

sastoji pretežno od gusto pakiranih, slabo sortiranih bioklasta. To su najčešće fragmenti koralja, školjkaša, gastropoda, a rijetki su fragmenti hidrozoa, bodlje ježinaca i komadi crvenih algi i krinoida. Dimenzije bioklasta najčešće se kreću od 1—3 mm. Rijetko se javljaju i bentonske foraminifere. Bioklasti su često izbušeni. Dosta često imaju potpuno prekrystaliziranu stijenku, tako da im oblik označava samo mikritska ovojnica (»Micrit envelope«). Vezivo je najčešće kalkarenitsko, a rjeđe izrazito sparitsko (strat. jedinica 10 i 13). Ovakav vapnenac taložen je u području grebenskog plicaka s dosta intenzivnim djelovanjem valova.

U pojedinim fazama energija vode je vrlo niska pa se taloži vapnenac, koji se sastoji od guste mikritske osnove u kojoj »plivaju« krupni fragmenti grebenotvoraca (strat. jedinice 12 i 15). Takav mikrit može biti taložen i unutar koraljnih kolonija i to osobito u unutrašnjim, zatvorenim dijelovima grebenskog plicaka, gdje je energija vode bila vrlo niska.

Tijekom rasta grebena stalno je u većoj ili manjoj mjeri pritjecao iz zagrebenke zone glinovito-siltski klastični materijal. S tog razloga grebenski plicak je bio vrlo često onečišćen. Manja onečišćenja nisu bitno usporavala rast koraljnih biocenoza. Brzim rastom čaške koralja su stalno uspjevale nadvisiti taloženi mulj. Taj glinoviti mulj taložio se unutar grebenske rešetke ispunjavajući kadkada u potpunosti šupljine među granastim koralitima. Takve granaste kolonije bile su filter za zaustavljanje finoizrnatog klastičnog materijala.

Jači prodor klastičnog materijala iz lagune na grebenski plicak rezultirao je privremenim prekidom rasta koraljnih kolonija i odlaganjem sloja siltskog lapora. Takav primjer predstavlja stratigrafska jedinica 9 sastavljena od lapora. Taj lapor se sastoji od nerazmuljenih čestica gline, zatim kvarca, muskovita i feldspata, a rijetko dolaze i zeleni turmalin, kromspinel, epidot i cirkon. U ovome laporu zapažene su bioturbacije nastale djelovanjem muljojeda.

Gornji dio grebenske jezgre izgrađen je najvećim dijelom od rudistnih biohermi (stratigrafske jedinice 17, 19). Njihova ukupna debljina iznosi oko 25 m. Rudistne biocenoze u ovim biohermama sastoje se uglavnom od predstavnika familije *Hippuritidae*. Svojim dimenzijama i brojnošću ističe se osobito podrod *Vaccinites*.

Određene su ove vrste:

Hippurites (Vaccinites) inaequicostatus MÜNSTER

H. (V.) giganteus d'HOMBRES-FIRMAS

H. (V.) vredenburgi KÜHN

H. (V.) oppeli santoniensis KÜHN

H. (V.) atheniensis K TENAS

H. (V.) salcatus DEFRANCE

H. (V.) cornuvaccinum cornuvaccinum BRONN

H. (V.) cornuvaccinum gaudryi MUNIER-CHALMAS

H. (V.) archiaci MUNIER-CALMAS

H. (V.) carinthiacus REDLICH

Od nabrojanih vrsta najčešća je *H. (V.) inaequicostatus*, a slijedi je *H. (V.) giganteus*.

Predstavnici podroda *Orbignya* su kadkada razvijeni u gustim kolonijama, no uvijek su manjih dimenzija od vakcinita. Određene su ove vrste:

Hippurites (Orbignya) nabresinensis FUTTERER

H. (O.) matheroni DOUVILLÉ

H. (O.) crassicosatus DOUVILLÉ

H. (O.) toucasianus d'ORBIGNY

H. (O.) carezi DOUVILLÉ

H. (O.) praesulcatissimus TOUCAS

H. (O.) sulcatissimus DOUVILLÉ

H. (O.) variabilis MUNIER-CHALMAS

H. (O.) sulcatoides DOUVILLÉ

H. (O.) socialis irregularis DOUVILLÉ

H. (O.) striatus DEFANCE

H. (O.) heberti MUNIER-CHALMAS

Rudisti iz familije Radiolitidae i Caprinidae se samo iznimno javljaju. Utvrđeni su *Radiolites mammillaris* MATHERON, *Biradiolites martellii* (PARONA), *Sauvagesia maneghiniana* (PIRONA) i *Plagioptychus paradoxus* MATHERON. Uzrok rijetkom pojavljivanju rudista iz ove dvije familije je bila česta onečišćenost vode na grebenskom plićaku glinovitim i silitskim klastičnim materijalom, koji nije dopuštao bujniji razvoj ovih rudista s kompaktnom površinom gornje ljuštore. Perforirana gornja ljuštura rudista iz familije Hippuritidae najvjerojatnije je služila kao filter u onečišćenoj vodi.

Od nabrojenih vrsta rudista najveći dio dolazi na dosadašnjim nalazištima u rasponu santon-donji kampan, dok su neke do sada nađene samo u santonu, a neke samo u kampanu (KÜHN 1932, KAUMANN 1962, POLŠAK 1967). Cjelokupna navedena asocijacija rudista pripada 5. cenozeni (santon-donji kampan) prema biostratigrafskoj podjeli u Vanjskim Dinaridima (POLŠAK 1965, POLŠAK & MANUŽIĆ 1969, SLIŠKOVIĆ 1971).

Samo rijetko u rudistnim biohermama javljaju se i hermatipni koralji. Manje kolonije masivnih ili pak granastih koralja prirasle su kadkada na donje ljuštore rudista. Jači razvoj koralja bio je jedino između rudistnih biohermi 17 i 19, gdje je razvijena lećasta koraljna bioherma. Zbog oskudnog epibionta grebenska rešetka, izgrađena pretežno od rudistnih kolonija, ostajala je neispunjena »sustanarima« i prema tome, poput sača, vrlo porozna.

Šupljine među rudistima su rijeđe ispunjene grebenskim pijeskom (kalkarenitom), a češće mikritom i glinovitim materijalom donešenim iz zagreben-ske zone. Samo za vrijeme usporenog rasta rudista dolazi do intenzivnijeg trošenja biohermi i odlaganja znatnije količine grebenskog pijeska koji je u litificiranom stanju sačuvan kao leće kalkarenita. Taj kalkarenit je sastavljen pretežno od dosta gusto pakiranih bioklasta grebenskih organizama. Rijeđe su prisutni fragmenti gastropoda, alga dazikladaceja, bentoske foraminifere, a sasvim rijetko i bodlje iregularnih ježinaca. Oskudni cement sastoji se od mikrita, što ukazuje na relativno nisku energiju vode u zaštićenim dijelovima grebenskog plićaka.

Sedimenti zagrebenske zone

Sedimenti taloženi u zagrebenskoj zoni su u biolititskom kompleksu Donje Orešje sačuvani u maloj mjeri. To su sedimenti distalnog dijela lagune s niskom energijom vode. Ovamo se mogu ubrojiti stratigrafske jedinice 1—6 na stratigrafskom stupu (sl. 3). Najstariji je kalkarenit sa slabo sačuvanim bentoskim foraminiferama. Dio kalkarenita je bituminozan što ukazuje na zaštićenu i dijelom reduktivnu sredinu. Na tome slijedi cca 2—3 m. debela biostroma sastavljena od gusto poredanih kućica gastropoda *Nerinea*. Kućice su povezane oskudnim kalkarenitskim vezivom. Određene vrste *Nerinea* (*Simplioptyxis*) *nobilis* (MÜNSTER) i *N. (S.) buchi* (KEFERSTEIN) dolaze na do sada poznatim nalazištima u rasponu konijak-santon, a vrsta *N. (S.) ampla* (MÜNSTER) značajna je za santon (TIEDT 1958). Prema tome može se držati da ova biostroma pripada santonu. Cijele i dobro sačuvane kućice ukazuju na sredinu s relativno slabom energijom vode. Samo iznimno ovdje se javljaju i male kolonije masivnih koralja.

Na nerinejskoj biostromi slijede 3—4 m debele naslage sitnozrnog lapora u kojem se nalaze uložene koraljne bioherme oblika manjih leća. Određene su ove vrste koralja: *Neocoeniopsis lepida* (REUSS), *Elasmophyllia deformis* (REUSS) i *Pleurocora haueri* MILNE-EDWARDS et HAIME.

Sedimenti predgrebenske zone

U predgrebensku zonu uvrštavamo užu ili širi morski pojas, koji započinje neposredno kod čela grebena i širi se prema otvorenom moru. Za ovu zonu karakteristični su sedimenti, koji pokazuju znatni utjecaj grebena, tj. koji sadrže znatniju količinu bioklastičnog detritusa s grebena.

Prigrebenska breča

Neposredno uz vanjsku padinu grebena (»Reef flank«) taloži se nesortirana, gruboklastična prigrebenska breča, koja nastaje intenzivnim razaranjem čela grebena valovima i strujama, koji dolaze sa otvorenog mora. Kod biolititskog kompleksa Donje Orešje ta breča je razvijena neposredno uz naslage prikazane na sl. 3. Sastoji se od fragmenata grebenotvoraca (koralji i rudisti) i krupnih fragmenata kalkarenita taloženog u području grebenskog plicaka. Fragmenti su najčešće krupniji od 10 cm. Ovi krupni fragmenti pomiješani su sa sitnijim u kaotičnu masu. U oskudnom vezivu dolazi kalkarenitski materijal pomiješan s velikim postotkom glinovito-siltskog materijala crne boje. Za ovakav gruboklastični i nesortirani sediment EMBRY & KLOVAN (1971) su u svojoj dopuni klasifikacije, koju je dao DUNHAM (1962), uveli naziv »rudstone«.

Prigrebenski detritični vapnenci

Prigrebenski detritični vapnenci javljaju se u biolititskom kompleksu Donje Orešje nešto zapadnije od grebena (sl. 3) i lateralno se nastavljaju na opisane prigrebenske breče.

To su pretežno kalkarenitski i kalcilutitski vapnenci u izmjeni. Kalkareniti su najčešće sitnozrni, s dobro sortiranim i gusto pakiranim alokemima, tako da se najčešće međusobno podupiru (»packstone«). U tako gusto pakiranom kalkarenitu cement je dijelom sparitski. Među alokemima pretežu subangularni bioklasti s grebena, i to fragmenti rudista, koralja i drugih organizama. Intraklasti su rijetki i pretežno su to čestice biomikritskog sedimenta. Rijetko dolaze i bentoske foraminifere. Najčešće među njima su *Anomalinidae*. Određene su vrste *Gavelinella lorneiana* (d'ORBIGNY) i *Goupillaudina daugini* MARIE, značajne za senon, *Monouxia*, sp. i *Rotaliidae*, koje su također karakteristične za senon.

Rjeđe se u ovom slijedu javljaju krupnozrnati kalkareniti u kojima dolaze i čestice ruditskih dimenzija. Najčešće su to bioklasti rudista a dolaze i rijetki fragmenti koralja i koralinaceja. U ovakvim krupnozrnastim kalkarenitima alokemi su nesortirani i angularni i »plivaju« u obilnom mikritskom matriksu koji sadrži brojne oligosteginide.

Opisane izrazite kalkarenitske stijene izmijenjuju se s stijenama kalcilutitskog tipa. To su biomikritski vapnenci kod kojih je u gustoj mikritskoj osnovi pomiješana samo mala količina najsitnijih bioklasta s grebena. Sreću se i manje leće i proslojci rožnjaka. U mikritskoj osnovi česti su pelagički mikrofosili. Među mikrofosilima najčešće su oligosteginide. Određene su ove vrste:

Calcisphaerula innominata BONET

C. innominata lata ADAMS, KHALILI & KHOSROVI SAID

Stomiosphaera sphaerica (KAUFMANN)

Pithonella ovalis (KAUFMANN)

P. perlonga ANDRI

Cadosina cf. fusca (WANNER)

C. cf. semiradiata WANNER

Osim oligosteginida dolaze i globigerinaceje, rijetke i dosta slabo sačuvane globotrunkane, spikule spužvi i prekrizalizirane radiolarije, što sve ukazuje na znatni utjecaj pelagijala. Određene su ove vrste globotrunkana:

Globotruncana lapparenti tricarinata (QUEREAU)

G. lapparenti bulloides VOGLER

G. lapparenti inflata BOLLI

G. globigerinoides BROTZEN

G. fornicata PLUMMER

Sve su navedene globotrunkane senonske, ali nije utvrđen niti jedan oblik značajan za gornji senon. Na osnovu do sada utvrđenih vertikalnih rasprostranjenosti u preparatima određenih vrsta i podvrsta globotrunkana u području Mediteranske geosinklinale može se zaključiti, da se radi o donjosenonskoj, najvjerojatnije santonskoj starosti vapnenaca.

Lapor s nanofosilima

Na grebenskim i prigrebenskim naslagama leži sloj lapora debljine cca 2 m. Ovaj lapor ukazuje na naglu promjenu sedimentacijskih uslova i prestanak grebenskog režima u biolititskom kompleksu Donje Orešje. Tada prodire veća

količina glinovitog i siltskog materijala iz lagune i taloži se po cijelom grebenskom plićaku i zalazi u predgrebensku zonu.

U ovome laporu utvrđena je dosta bogata zajednica nanoplanktona. To pokazuje da se ta stijena taložila u okolišu karakterističnom za predgrebensku zonu s intenzivnim utjecajem pelagijala. Određene su ove vrste nanofosila:

Cretarhabdus ingens (GORKA)
Cribrosphaerella ehrenbergi ARHANGELSKY
Micula surophora (GARDET)
Eiffellithus turriseiffeli (DEFLANDRE)
Eiffellithus eximius (STOVER)
Broinsonia parca (STRADNER)
Prediscosphaera spinosa (BRAMLETTE & MARTINI)
Watznaueria barnesae (BLACK)

Prisustvo vrste *Broinsonia parka*, koja dolazi u kampanu i mastrihtu, te vrste *Eiffellithus eximius*, koja ne zalazi u mastriht (THIERSTEIN 1976) navode na zaključak da analizirani lapor pripada kampanu.

Bazenski sedimenti

Prigrebenski detritični vapnenci lateralno postupno prelaze u tanko uslojene i pločaste vapnence sive boje s malim lećama rožnjaka. Po glavnim obilježima ove stijene pripadaju tzv. »Scaglia-naslagama«. Naslage takvog tipa dobro su otkrivene na lijevoj strani Šum potoka, u krajnjem zapadnom dijelu kame-noloma.

Ove naslage nastale su taloženjem mutnim ili turbiditnim s strujama i manjim dijelom taloženjem autohtonog pelagičkog sedimenta. Slijed se sastoji pretežno od brojnih »minijaturnih« podrezanih turbiditskih sekvenci čija se debljina najčešće kreće od 5–10 cm. Najčešće su sekvence Td-e, a dolaze i rijetke presječene sekvence Ta-c i Ta-d (po shemi koju je dao BOUMA 1962.). Razvijeno je nekoliko debelih slojeva debljine (cca 1–1,5 m) s izrazitim graduiranim intervalom »a«. Taj interval se sastoji pretežno od fragmentata grebenotvoraca ruditskih dimenzija, koje mogu iznositi po nekoliko centimetara. Krupni bioklasti »plivaju« u sitnozrnatom kalkarenitskom detritusu pomiješanom s mikritskim muljem. Među bioklastima dominiraju fragmenti rudista iz familije Hippuritidae. Rijetko dolaze i fragmenti koralja i sasvim rijetko fragmenti koralinaceja (*Archaeolithothamnium*). U gornjim dijelovima graduiranih slojeva često su inkluzije biomikritskog oligosteginidskog mulja. Relativno velika količina bioklastičnog materijala u graduiranim intervalima ukazuje na povremeni jači donos detritusa s grebena i njegov transport turbiditskim strujama prema centru bazena.

U višim intervalima, »b«, »c« i »d« grebenski detritus postaje sve sitniji i rjeđi. U završnom intervalu »e« grebenski detritus potpuno nedostaje. Taj interval sastoji se od fosilifernog mikrita i biomikrita u kojem dolaze isključivo pelagički fosili. Najbrojnije su globotrunkane od kojih su determinirane ove vrste:

Globotruncana fornicata PLUMMER
Globotruncana lapparenti tricarinata (QUEREAU)
Globotruncana lapparenti lapparenti BROTZEN
Globotruncana lapparenti bulloides VOGLER
Globotruncana arca (CUSHMAN)
Globotruncana conica WHITE
Globotruncana elevata BROTZEN
Globotruncana rosetta CARSEY
Globotruncana angusticoronata GANDOLFI
Globotruncana lapparenti coronata BOLLI
Globotruncana calciformis (de LAPPARENT)

Navedena zajednica globotruncana utvrđuje pripadnost ovih bazenskih naslaga kampanu i to vrlo vjerojatno donjem kampanu.

KORALNA FAVNA (DRAGICA TURNŠEK)

SISTEMATSKI OPIS KORALNIH VRST

Classis: ANTHOZOA EHRENBURG 1834
 Ordo: SCLERACTINIA BOURNE 1900
 Subordo: ARCHAEOCAENIINA ALLOITEAU 1952
 Familia: ACTINASTRAEIDAE ALLOITEAU 1952

Genus: *Actinastraea* d'ORBIGNY 1849

✓ *Actinastraea ramosa* (MICHELIN 1847),

Tab. 1, sl. 1—3

- ✓ 1847 *Astrea ramosa*. MICHELIN: n. v.
- ✓ 1854 *Astrocoenia ramosa*. REUSS: 96, Taf. 8, Fig. 10, Taf. 14, Fig. 14
- 1898 *Astrocoenia ramosa*. FELIX: 249—251, Taf. 11, Fig. 2
- 1903 *Astrocoenia ramosa*. FELIX: 312—314, Textfig. 56—57
- 1914 *Astrocoenia ramosa*. FELIX: 235—236, p. p.
- 1936 *Astrocoenia ramosa*. HACKEMESSER: 69
- 1939 *Astrocoenia ramosa*. MILOVANOVIĆ: 114
- 1954 *Astrocoenia ramosa*. KOLOSVÁRY: 110—111, Tab. 12, Fig. 15—16, Tab. 13, Fig. 1—4
- ✓ 1954 *Actinastraea ramosa*. ALLOITEAU: 53—55, Pl. 4, Fig. 3, Pl. 8, Fig. 3
- 1974 *Actinastraea ramosa*. L. et M. BEAUVAIS: 484

Opis: Kolonija je cerioidna in raste v obliki različno velikih vej in paličic. Koralliti so v preseku poligonalni. Septa so oktamerna, v dveh ciklih. Kolumela je stiliformna. Mikrostruktura ni ohranjena.

Dimenzije: premer koralitov 1—1,2 mm, septa 16.

Primerjava: Vrsto je natančno opisal in revidiral ALLOITEAU (1954: 53—55, 59). Ugotovil je, da se SOWERBY-jeva in MICHELIN-ova primerka, imenovana *Astrea ramosa*, ne ujemata. Ker je MICHELIN vrsto opisal in fotografiral, je njegov primerek ALLOITEAU imenoval za holotip te vrste. SOWERBY-jev primerek, ki je bil pomanjkljivo opisan, je ALLOITEAU natančno obdelal in ga preimenoval v *Actinastraea sowerbyi*. Razlika med obema vrstama, to je med *A. ramosa* in *A. sowerbyi*, je v glavnem v velikosti koralitov: *A. ramosa* ima premer 1—1,25 mm, *A. sowerbyi* 2 mm (glej ALLOITEAU-jevo razpredelnico 1954: 59). K vrsti *A. sowerbyi* je ALLOITEAU priključil tudi REUSS-ove primerke iz Gosaua, imenovane *Astrocoenia ramosa*. Toda ugotovila sem, da imajo ti primerki premer koralitov 1—1,2 mm. Enako veliki so primerki našega materiala z Medvednice. Zato oboje priključujem vrsti *A. ramosa* (MICHELIN).

Razširjenost: Zgornji santonij južne Francije, santonij Gosaua v Avstriji, santonij-kampanij Madžarske, (?) cenomanij Grčije, kampanij Vrbovačke reke v Srbiji.

Novo nahajališče: Orešje (vzorec Z—1), santonij-kampanij.

Actinastraea octolamellosa (MICHELIN 1846)

Tab. 2, sl. 1—3

✓ 1846 *Astrea octolamellosa*. MICHELIN: n. v.

✓ 1850 *Astrocoenia reticulata*. d'ORBIGNY: 205

1854 *Astrocoenia reticulata*. REUSS: 95—96, Taf. 14, Fig. 13

1954 *Actinastraea octolamellosa*. ALLOITEAU: 49—52, Pl. 3, Fig. 6, Pl. 8, Fig. 1, Textfig. 8

1974 *Actinastraea octolamellosa*. L. et M. BEAUVAIS: 484

Opis: Cerioidna kolonija ima obliko valjastih gomoljev ali nepravilnih vejic, dolgih 3 cm, s premerom 1 cm. Koraliti so poligonalni, povezani s septotekalno steno. Čaše so globoke. Septa so oktamerna, v treh ciklih. Prvi cikel je dolg, tretji pa se pojavlja le v steni v obliki kost. Kolumela je stiliformna, nekoliko dvignjena v čaši.

Dimenzije: premer koralitov 1,5—2 mm, septa 16 + S 3.

Primerjava: GOLDFUSS je pod imenom *Astrea reticulata* opisal več primerkov, od katerih imajo nekateri oktamerno število sept in ne heksamerno. Te je ALLOITEAU (1954) priključil MICHELIN-ovi vrsti *Astrea octolamellosa* oziroma rodu *Actinastraea*. Naši primerki se ujemajo z ALLOITEAU-jevimi opisi. Tudi REUSS-ovi (1854) primerki imajo oktamerni sistem sept, zato spadajo k vrsti *octolamellosa* in ne *reticulata*.

Razširjenost: zgornji santonij južne Francije, santonij Gosaua v Avstriji.

Novo nahajališče: Orešje (O—7—1 B, O—7—1 C), santonij-kampanij.

Genus: *Columactinastraea* ALLOITEAU 1952

ALLOITEAU loči rod *Columactinastraea* od *Actinastraea* po spongiozni kolumeli, od *Stephanocoenia* pa po večjih sklerodermilih v skeletu (ALLOITEAU 1952: 603; 1957: Fig. 4, 11, 18, 19).

Columactinastraea pygmaea (FELIX 1903)

Tab. 3, sl. 1—4

✓ 1903 b *Astrocoenia pygmaea*. FELIX: 54, Taf. 3, Fig. 4—51914 *Astrocoenia pygmaea*. FELIX: 2351954 *Actinastraea pygmaea*. ALLOITEAU: 52—53, Pl. 4, Fig. 6, Pl. 8, Fig. 21975 *Actinastraea pygmaea*. BEAUVAIS et al.: 44—45, Pl. 4, Fig. 1 a—b

Opis: Masivna cerioidna kolonija ima obliko gomoljev ali nepravilnih vejic, velikosti 2—3 cm. Koralliti so v prečnem preseku poligonalni. Loči jih septotekalna stena, mestoma tudi ozka kostatna stena. Septalni aparat je oktameren, z dvema stalnima cikloma, tako da je sept vedno 16. Kolumela je spongiozno papilozna. Osrednji okroglasti stebriček se povezuje s pali, ki so videti kot aksialne odebelitve sept prvega reda. Lateralna stran sept je nazobčana. Endoteka je iz vezikularnih disepimentov. Mikrostruktura ni ohranjena.

Dimenzije:

	Orešje	FELIX
premer koralitov (d)	1—1,5 mm	1—1,5 mm
število sept (s)	16	16

Primerjava: FELIX (1903 b: 54) omenja pri vrsti *Astrocoenia pygmaea* kolumelo, ki je podobna »spongiozni kolumeli vrste *A. konincki*«. Pravi, da je sestavljena iz več paličic in ne iz enega stebrička. Tak opis ustreza kolumeli, kakršna je značilna za rod *Columactinastraea*. Tega opisa ALLOITEAU ni upošteval in je vrsto *pygmaea* priključil k rodu *Actinastraea* (ALLOITEAU 1954: 52—53). Naš primerek iz Orešja povsem ustreza FELIX-ovim primerkom, ki spadajo v rod *Columactinastraea*.

Razširjenost: santonij in kampanij južne Francije in kampanij Portugalske.

Novo nahajališče: Orešje (N—8 A), santonij-kampanij.

Subordo: FAVIINA VAUGHAN et WELLS 1943

Familia: COLUMASTRAEIDAE ALLOITEAU 1952

Genus: *Columastraea* d'ORBIGNY 1849

Rod *Columastraea* se loči od *Actinastraea* po tem, da ima pale in peritoko. ALLOITEAU ga je na podlagi te druge lastnosti uvrstil med favine, v svojo novo družino *Columastraeidae* (ALLOITEAU 1957: 57—58). Naziv *Columnastraea*, ki se pojavlja v literaturi, je pisna napaka in je nedvomno sinonim rodu *Columastraea*.

✓ *Columastraea formosa* (GOLDFUSS 1826)

Tab. 4, sl. 3

- ✓ 1826 *Astrea formosa*. GOLDFUSS: 111, Taf. 38, Fig. 9
 ✓ 1854 *Stephanocoenia formosa*. REUSS: 97—98, Taf. 8, Fig. 7—9
 1898 *Stephanocoenia formosa*. FELIX: 252—254, Taf. 11, Fig. 4
 1914 *Stephanocoenia formosa*. FELIX: 237
 1954 *Stephanocoenia formosa*. KOLOSVÁRY: 112, Tab. 13, Fig. 8—9
 1957 (*Columastrea*) *formosa*. ALLOITEAU: 58
 ✓ 1974 *Columactinastraea formosa*. L. et M. BEAUVAIS: 484

Opis: Masivna plokoidna kolonija je gomoljaste ali valjaste oblike. Koraliti so okroglasti, povezani s septotekalno steno in ozko kostatno periteko. Septa so razvita v oktamernem sistemu, v dveh ciklih. Kolumela je stiliformna, obdana s pali, ki stoje ob aksialnih koncih sept prvega reda. Lateralna stran sept je nazobčana. Endoteka je iz vezikularnih diseptimentov. Mikrostruktura ni ohranjena.

Dimenzije:

	Orešje	REUSS	FELIX
premer koralitov (d)	1,5—2,5 mm	2—2,5 mm	1,5—2,5 mm
razdalja centrov (c—c)	2—3 mm	—	—
število sept	16	16	16

Primerjava: GOLDFUSS-ovo vrsto *Astrea formosa* so poznejši raziskovalci (REUSS 1854, FELIX 1898) uvrstili v rod *Stephanocoenia*, ki je terciarni rod. ALLOITEAU (1957: 58) je pri ponovnem študiju originalnega materiala ugotovil, da kredne oblike, ki so bile pripisane rodu *Stephanocoenia*, spadajo deloma v rod *Columastraea*, deloma v rod *Columactinastraea*, ker imajo drugačno mikrostrukturo. Poleg tega ima vrsta *formosa* plokoidne koralite in nedvomno sodi v rod *Columastraea*. Že FELIX je pri opisu vrste *S. formosa* omenil, da je ta vrsta podobna vrsti *Columastraea striata*, od katere se loči le po številu sept. L. in M. BEAUVAIS (1974) sta vrsto *formosa* pripisala rodu *Columactinastraea*, verjetno pomotoma, zaradi podobnosti v imenih rodov.

Razširjenost: Santonij Gosau v Avstriji, santonij južne Francije, santonij-kampanij Madžarske.

Novo nahajališče: Orešje (O—7—2B), santonij-kampanij.

✓ *Columastraea striata* (GOLDFUSS 1826)

Tab. 4, sl. 1—2

- ✓ 1826 *Astrea striata*. GOLDFUSS: 111, Taf. 38, Fig. 11
 1854 *Columnastraea striata*. REUSS: 98, Taf. 14, Fig. 1—2
 1898 *Columastraea striata*. FELIX: 245—255, Taf. 11, Fig. 3
 1914 *Columnastraea striata*. FELIX: 238—239

1952 *Columastraea striata*. ALLOITEAU: 626—627, Pl. 2, Fig. 7, Textfig. 77

1954 *Columnastraea striata*. KOLOSVÁRY: 112—113, Tab. 13, Fig. 10—11, Tab. 14, Fig. 1

1956 *Columastraea striata*. WELLS: F 371, Textfig. 262, 5

1957 *Columastrea striata*. ALLOITEAU: 57—58

1974 *Columastraea striata*. L. et M. BEAUVAIS: 484

Opis: Masivna plokoidna kolonija je gomoljaste ali skorjaste oblike. Koraliti so okroglasti, povezani z ozko kostatno periteko. Čaše so dvignjene iznad baze. Septa so vedno v heksamernem sistemu, v treh ciklih. Kolumela je stiliformna, obdana s pali. Endoteka je iz tankih vezikularnih disepimentov.

Dimenzije:

	Orešje	REUSS	FELIX	KOLOSVÁRY
premer koralitov (d)	2—3 mm	2,5—3,5 mm	2,5—4 mm	2—3 mm
število sept (s)	24	24	24	24

Primerjava: Naši primerki imajo stalno število sept, to je 24, kar je značilno za vrsto *striata*, medtem ko so koraliti nekoliko manjši, kot so avstrijski. Po velikosti koralitov so naši primerki bliže vrsti *C. formosa*, vendar ima ta 16 sept, to je oktamerni sistem.

Razširjenost: Santonij Gosaua, santonij južne Francije, santonij-kampanij Madžarske.

Novo nahajališče: Orešje (O—7—2 A), santonij-kampanij.

Familia: PLACOSMILIIDAE ALLOITEAU 1952

Genus: *Elasmophyllia* d'ACHIARDI 1875

Elasmophyllia deformis (REUSS 1854)

Tab. 5, sl. 1—2

1854 *Thecosmilia deformis*. REUSS: 103, Taf. 5, Fig. 10—12

1903 *Elasmophyllia deformis*. FELIX: 244—245, Textfig. 25

1914 *Elasmophyllia deformis*. FELIX: 162

1930 *Elasmophyllia deformis*. OPPENHEIM: 290—293, Taf. 31, Fig. 6—7, Taf. 32, Fig. 6—12

1943 *Elasmophyllia deformis*. VAUGHAN et WELLS: Pl. 25, Fig. 11

Opis: Faceloidna kolonija je visoka do 14 cm. Koraliti so v preseku okroglasti, kadar so monocentrični. Po delitvi navadno ostanejo dva ali trije skupaj in dobe nepravilno obliko. Septa so razvita v 4—5 ciklih, so kompaktna, enako debela in skoraj enako dolga. Kolumela je zelo tanka, podolgovata, v naših primerkih prekrizalizirana. Endoteka je bogata, tabulatna. Mikrostruktura ni ohranjena.

Dimenzije: premer koralitov (d) 5—16 mm, sept (s) ca 70.

Primerjava: REUSS-ov original ima zelo slabo razvito kolumelo, podobno kot naši primerki. Zato je po mojem mnenju OPPENHEIM (1930: 290) neupravičeno prištel k tej vrsti primerke *Stenogyra sinuosa* FELIX, ki jih odlikuje močna lamelarna kolumela.

Razširjenost: Senonij Gosaua v Avstriji.

Novo nahajališče: Orešje (O—5—3 B), santonij-kampanij.

Familia: MUSSIDAE ORTMAN 1870 em. VAUGHAN et WELLS 1943

Genus: *Mycetophylliopsis* OPPENHEIM 1930

Mycetophylliopsis antiqua (REUSS 1854)

Tab. 5, sl. 3—4

1854 *Mycetophyllia antiqua*. REUSS: 104—105, Taf. 23, Fig. 9

1903 *Mycetophyllia antiqua*. FELIX: 273—274

1930 *Mycetophylliopsis antiqua*. OPPENHEIM: 378—379, Taf. 16, Fig. 4—4 a

1957 *Mycetophylliopsis antiqua*. ALLOITEAU: 262—263

Opis: Masivna kolonija ima serialne koralite, med katerimi ni stene, septa so deloma strnjena, deloma prekinjena. Razvita so v dveh do treh cikli. Prvi cikel je izredno debel, med dvema debelima septoma so ena do tri tanjša in krajša septa mlajših ciklov. Kolumele ni; endoteka je iz tankih vezikularnih in tabulantnih disepimentov. Mikrostruktura v naših primerkih ni ohranjena. ALLOITEAU ugotavlja v tem rodu montlivaltidno mikrostrukturo.

Dimenzije:

	Orešje	REUSS	OPPENHEIM
velikost kolonije	90 × 50 × 50 mm	—	90 × 68 × 52 mm
septa (s)	5—7/5 mm	8/5 mm	2—3 cikli

Primerjava: Naš primerek se povsem ujema z vzorci iz primarnega avstrijskega nahajališča. Septa so mestoma nekoliko redkejša, toda pri razvitem tretjem ciklu se tudi gostota sept ujema z REUSS-ovimi primerki.

ALLOITEAU (1952) in WELLS (1956) uvrščata ta rod v družino Montlivaltidae na podlagi mikrostrukture. Toda endoteka iz tankih vezikularnih in tabulatnih disepimentov nikakor ni montlivaltidna, zato je uvrstitev v to družino nesprejemljiva. Po OPPENHEIM-u uvrščam rod *Mycetophylliopsis* v družino Mussidae, kamor spada tudi podoben rod *Mycetophyllia*.

Razširjenost: Senonij Gosaua, od koder so znani doslej le trije primerki.

Novo nahajališče: Orešje (O—7—1 L), santonij-kampanij.

Familia: MONTLIVALTIIDAE DIETRICH 1926

Genus: *Ellipsosmilia* d'ORBIGNY 1849

Ellipsosmilia sp.

Tab. 6, sl. 1—3

Opis: Solitarna korala ima obliko rahlo ukrivljenega sploščenega roga. Čaša je ovalna. Septa so razvita v več ciklih. Prvi je debel, drugi skoraj enako dolg, toda tanjši, tretji pa je za polovico krajši od prvega. Kolumele ni. Fosula je podolgovata. Septa se prosto končajo v praznem aksialnem prostoru, le nekatera se nekoliko upognejo. Endoteka je iz tankih tabulatnih in daljših disepimentov. Stena je nepopolna, paratekalna. Mikrostruktura je slabo ohranjena, mestoma se vidijo enostavne trabekule.

Dimenzije: Velikost koraluma $70 \times 50 \times 30$ mm, sept je 85.

Primerjava: V septalni in endotekalni strukturi je primerek popolnoma enak rodu *Montlivaltia*. Mikrostruktura pa je drugačna: ne iz divergentnih trabekul, ampak iz enostavnih. Ta značilnost uvršča naš primerek v rod *Ellipsosmilia*. Od tipične cenomanijske vrste *E. cornucopiae* (ALLOITEAU 1952: 612—613, Textfig. 58) se loči po velikosti koraluma in številu sept. Na voljo imam samo en primerek, zato nove vrste ne morem postaviti.

Novo nahajališče: Orešje (N—7), santonij-kampanij.

Familia: HELIASTRAEIDAE ALLOITEAU 1957

Genus: *Procladocora* ALLOITEAU 1952

Procladocora simonyi (REUSS 1854)

Tab. 7, sl. 1—7

1976 *Procladocora simonyi*. TURNŠEK et BUSER: 56, Tab. 11, sl. 1—2

Opis: Opis in sistematsko problematiko rodu sem podala pri obravnavi koral iz zgornjekredne breče v Sloveniji (TURNŠEK et BUSER 1976). Primerki iz Orešja so številne, faceloidno-dendroidne kolonije, ki imajo kompaktna septa in trabekularno kolumelo. V nekaterih primerkih je osrednji del koralitov zdrobljen.

Dimenzije so iste kot pri slovenskih primerkih: premer koralitov (d) 6—10 mm, sept (s) je okrog 50.

Novo nahajališče: Orešje (O—7—1/A, E, F, K, J), santonij-kampanij.

Procladocora tenuis (REUSS 1854)

Tab. 8, sl. 1—9

1854 *Cladocora tenuis*. REUSS: 112, Taf. 6, Fig. 24—25

1854 *Cladocora manipolata*. REUSS: 111—112, Taf. 6, Fig. 22—23

1903 *Cladocora tenuis*. FELIX: 265—266

1914 *Cladocora tenuis*. FELIX: 171

1974 *Procladocora tenuis*. L. et M. BEAUVAIS: 485

Opis: Dendroidno faceloidna kolonija ima več ali manj koralitov, ki brstijo pod ostrim kotom (ca 45°). V preseku so okroglasti do ovalni. Septa so kompaktna, razvita v treh do štirih ciklih. Prvih 6 do 12 sept je dolgih, zadnji cikel pa je za polovico krajši od prvega. Septa so neravna, aksialni robovi so odebeljeni, mestoma nosijo podaljške, ki tvorijo parietalno kolumelo. Lateralna stran sept je nazobčana. Stena je septoparatekalna, precej debela. Endoteka je iz pogostnih tabulatnih in daljših disepimentov. Mikrostruktura je zelo slabo ohranjena. Mestoma so vidni temnejši centri sept, kar bi lahko bile enostavne trabekule. V našem vzorcu O—7—1 R so aksialni konci sept precej prelomljeni.

Dimenzije:

	Orešje	REUSS	FELIX	<i>P. simonyi</i>
premer koralitov (d)	3—5(7) mm	3—4 mm	3—4 mm	5—8 mm
število sept (s)	24—48	24—28	24—36	48

Primerjava: Naši primerki so po velikosti koralitov in številu sept na skrajnem zgornjem robu vrste *P. tenuis* in se že približujejo vrsti *P. simonyi*. ALLOITEAU (1957: 196) meni, da vrsta *P. tenuis* pripada rodu *Gonio-cora*, vendar ima ta stiliformno kolumelo.

Razširjenost: Santonij Gosaua in zgornji santonij južne Francije.

Novo nahajališče: Orešje (O—7—1 R, O—7—4 B), santonij-kampanij.

Genus: *Phyllocoeniopsis* ALLOITEAU 1957

ALLOITEAU (1957: 127) je osnoval rod *Phyllocoeniopsis* na podlagi vrste *Astrea cribraria* MICHELIN 1841. Strukturne značilnosti rodu in njegovo primerjavo z drugimi podobnimi masivno-plokoidnimi oblikami je podal v istem delu na razpredelnici na strani 136. V ta rod uvršča tudi nekatere vrste, ki so bile prej pripisane rodu *Phyllocoenia*. Od tega rodu loči *Phyllocoeniopsis* tudi po vezikularni, tabulatni endoteki in bolj zobčastih lateralnih septih.

✓ *Phyllocoeniopsis pediculata* (DESHAYES 1831)

Tab. 9, sl. 2—5

✓ 1831 *Astrea pediculata*. DESHAYES: n. v.

1850 *Phyllocoenia pediculata*. d'ORBIGNY: 204

1903 *Phyllocoenia pediculata*. FELIX: 289—290, Taf. 20, Fig. 6

1914 *Phyllocoenia pediculata*. FELIX: 158

1957 *Phyllocoenia pediculata*. ŞURARU: 292

✓ 1957 *Phyllocoeniopsis pediculata*. ALLOITEAU: 127

Opis: Masivna plokoidna kolonija je velika 150 × 120 × 120 mm in je največja v zbirki iz Orešja. Čaše so okrogle na površini izbočene, v masivnem delu kolonije pa povezane s kostatno periteko. Septa so kompaktna, razvita

v dekamernem sistemu in v treh ciklih. Prvi in drugi cikel sept sta dolga, tretji pa zelo kratek. V aksialnem delu koralita so septa mestoma vijugasta, odebeljena, podobno kot pri nekaterih vrstah rodu *Pleurocora*. Trabekularni podaljški tvorijo parietalno kolumelarno strukturo. Lateralna stran sept nosi trnke. Stena je paratekalna, mestoma septotekalna. Endoteka je iz tabulatnih in vezikularnih disepimentov.

Dimenzije:

	Orešje	FELIX
premer koralitov (d)	4—6 mm	4—8 mm
razdalja med centri (c—c)	6—10 mm	—
število sept (s)	40 (10 + 10 + 20)	30—48

Primerjava: Naš primerek smo lahko primerjali s FELIX-ovim materialom iz Gosaua, s katerim se povsem ujema. Po okroglih časih in tabulatno-vezikularni endoteki spada v rod *Phyllocoeniopsis*.

Razširjenost: Santonij Gosau v Avstriji, santonij južne Francije, santonij in kampanij Romunije.

Novo nahajališče: Orešje (N—1), santonij-kampanij.

Phyllocoeniopsis sp.

Tab. 9, sl. 1

Vzorec N—8 B je masivno plokoidna kolonija, velika približno $60 \times 60 \times 50$ mm. Koraliti so okroglasti do nepravilni, nekoliko manjši kot pri prej opisani vrsti, in nekoliko gostejši. Število sept je okrog 20, vendar nejasno, da vrste ne morem določiti.

Genus: *Neocoenia* HACKEMESSER 1936

HACKEMESSER postavlja svoj novi rod *Neocoenia* blizu rodovom *Phyllocoenia*, *Leptastraea* in *Ulastraea*. Od njih ga loči po ožji periteki in papilozno mrežasti kolumeli. Zelo podobno označuje svoj novi rod *Neocoeniopsis* tudi ALLOITEAU (1957: 127), katerega pa loči od *Neocoenia* po pojavu redkih sinaptikul v steni.

Neocoenia lepida (REUSS 1854)

Tab. 10, sl. 1—3

✓ 1854 *Astraea lepida*. REUSS: 114, Taf. 12, Fig. 1—2

✓ 1890 *Phyllocoenia lepida*. FRECH: 28, Taf. 8, Fig. 15

1903 *Phyllocoenia lepida*. FELIX: 293

1913 *Phyllocoenia lepida*. FELIX: 100—101

1914 *Phyllocoenia lepida*. FELIX: 157

? 1936 *Phyllocoenia lepida*. HACKEMESSER: 19

- 1939 *Orbicella lepida*. MILOVANOVIĆ: 114
 1954 *Phyllocoenia* cf. *lepida*. KOLOSVÁRY: 76—77, Tab. 4, Fig. 4
 1957 *Phyllocoenia lepida*. ŞURARU: 292
 1957 *Neocoeniopsis lepida*. ALLOITEAU: 127
 1974 *Neocoeniopsis lepida*. L. et M. BEAUVAIS: 485

Opis: Masivna kolonija ima na površini izbočene koralite, ki so v preseku ovalni do okrogli. Povezani so s periteko, ki je različno široka. Mestoma je med koraliti samo stena. Septa so kompaktna, razvita v treh ciklih, od katerih so mlajši vedno krajši in tanjši. Tako si na zunanji strani izmenično slede debelejša in tanjša septa. Lateralna stran sept je nazobčana. Na aksialni strani pa so mestoma odebeljena, mestoma imajo trabekularne podaljške, ki tvorijo parietalno papilozno kolumelo. Na nekaterih nivojih pa teh podaljškov ni ter je aksialni prostor prazen. Endoteka je redka, tabulatna, omejena le na periferni in peritekalni prostor. Stena je paratekalna. Mikrostruktura ni ohranjena.

Dimenzije:

	Orešje	REUSS	FELIX
premer koralitov (d)	3—4 mm	3,5—4 mm	3,5 mm
razdalja med centri (c—c)	3—5 mm		
število sept (s)	24—36	24—30	24—32

Primerjava: Vrsto »*Phyllocoenia*« *lepida* je ALLOITEAU (1957: 128) uvrstil v svoj novi rod *Neocoeniopsis*. Vendar naš primerek, ki se povsem ujema z REUSS-ovim originalom, nima sinaptikul, zato ga uvrščam v rod *Neocoenia*.

Razširjenost: Santonij Gosaua, (?) santonij Francije, (?) cenomanij Grčije (verjetno druga vrsta, ima d 2—3 mm) in Libanona, santonij-kampanij Madžarske in Romunije ter kampanij Vrbovačke reke v Srbiji.

Novo nahajališče: Orešje (O—5—3 A), santonij-kampanij.

Subordo: FUNGIINA DUNCAN 1884

Familia: HAPLARAETIDAE VAUGHAN et WELLS 1943

Genus: *Pleurocora* MILNE-EDWARDS et HAIME 1848

Prvega opisa rodu nimam. Toda ista avtorja leta 1850, str. XXXVIII podajata glavne značilnosti. Rod *Pleurocora* označujeta kot subdendroidno kolonijo, ki je blizu rodu *Cladocora*, loči pa se po krajših koralitih in debelejši steni ter je blizu rodovoma *Dendrophyllia* in *Oculina*. Omenjata tudi pale. OPPENHEIM omenja pri tem rodu nepravilna in vijugasta septa v aksialnem delu. ALLOITEAU (1952) in WELLS (1956) rod priznavata in ga postavljata v sistem z rodом *Procladocora* v družino *Heliastreaeidae*.

Naši primerki kažejo vse omenjene lastnosti, vendar tu ne gre za pale, pač pa za delno perforirana septa v aksialnem delu. Zato rod *Pleurocora* uvrščam v podred Fungiina, v družino Haplaraeidae.

Pleurocora haueri MILNE-EDWARDS et HAIME 1848

Tab. 11, sl. 1—3

1848 *Pleurocora haueri*. MILNE-EDWARDS et HAIME: n. v.1854 *Pleurocora rudis*. REUSS: 113, Pl. 11, Fig. 13—15non 1854 *Pleurocora haueri*. REUSS: 112—113, Pl. 6, Fig. 26—271903 *Pleurocora haueri*. FELIX: 167—1681914 *Pleurocora haueri*. FELIX: 1721930 *Pleurocora haueri*. OPPENHEIM: 367—369, (?)Taf. 38, Fig. 1—4✓ 1957 *Haplohelix rudis*. ALLOITEAU: 189, 196

Opis: Dendroidna kolonija, ki ima različno razvejane, kratke koralite. V preseku so koraliti okrogli. Stena je zunaj bolj ali manj rebrasta, to je kostatna. Septa so na periferiji kompaktna, v aksialnem delu nekaterih koralitov perforirana, razvita pa v treh do štirih ciklih. Na lateralni strani imajo zobce, na aksialni pa odebelitve in podaljške, ki tvorijo spongiozno in deloma papilozno kolumelo. Endoteka je iz perifernih tabulatnih disepimentov. V nekaterih koralitih naših vzorcev je aksialni del pretrt ali prekrizaliziran, tako da eni koraliti dajo popolnoma drugačen videz kot drugi. Mikrostruktura ni ohranjena.

Dimenzije:

	Orešje	REUSS
premer koralitov (d)	7—10 mm	9—10 mm
število sept (s)	ca 32	24—32

Primerjava: Avtorja opisujeta vrsto *Pleurocora haueri* kot subdendroidno kolonijo. REUSS-ov primerek vrste *P. haueri* pa je masivna plokoidna kolonija, zato ne spada k tej vrsti. Za vrsto *rudis*, ki je dendroidna, REUSS pravi, da ima papilozno kolumelo, kar lahko ustreza perforiranim septom v aksialnem delu. ALLOITEAU je mnenja, da spada *P. haueri* (= *P. rudis*) v rod *Haplohelix*, toda ta rod je prav tako masivna kolonija.

Razširjenost: Senonij Gosaua v Avstriji in santonij južne Francije. ANGELIS d'OSSAT (1905) omenja to vrsto v urgoniju Katalonije v Španiji, vendar brez slike in opisa ter primerjava ni možna.

Novo nahajališče: Orešje (O—5—3 C, O—5—3 D), ter Samoborska gora (SG—1), santonij-kampanij.

Pleurocora crassa (REUSS 1854)

Tab. 12, sl. 1—5

✓ 1854 *Aplophyllia crassa*. REUSS: 105—106, Taf. 11, Fig. 7—9✓ 1903 *Dendrosmilia crassa*. FELIX: 282—284, Taf. 17, Fig. 13, Textfig. 451914 *Dendrosmilia crassa*. FELIX: 150

Opis: Dendroidna kolonija, pri kateri koraliti brstijo pod različnim ostrim kotom. V prečnem preseku so okrogli do ovalni. Imajo debelo septotekalno steno. Septa so kompaktna na periferni strani in perforirana na notranji strani. Navzven se podaljšujejo v koste. Razvita so v štirih ciklih. 32 jih sega v notranjost, kjer s trabekularnimi podaljški tvorijo parietalno kolumelo. Lateralna stran sept je nazobčana. Endoteka je tabulatna. Mikrostruktura ni ohranjena.

Dimenzije:

	Orešje	REUSS	FELIX
premer koralitov (d)	(3)5—7 mm	(8)12—18 mm	(3)5—7(16) mm
število sept (s)	32—48	48—50	24—60

Primerjava: FELIX (1903) je pravilno domneval, da REUSS-ovi primerki vrste »*Aplophyllia*« *crassa* ne sodijo v ta stilinidni rod. Pripisal jih je rodu *Dendrosmilia*. Vendar je ALLOITEAU (1957: 198) ugotovil, da tudi v *Dendrosmilia* ne spada. Pri preučitvi naših primerkov sem ugotovila, da se popolnoma ujemajo z REUSS-ovimi originali in da po vseh strukturnih značilnostih spadajo v rod *Pleurocora*. Že REUSS je enega svojih primerkov v zbirki označil z imenom *Pleurocora* sp. Vrsta *crassa* se loči od *haueri* po debelejši steni in nekoliko manjših koralitih, ki so tudi nekoliko redkejši.

Razširjenost: Senonij Gosaua, kjer je zelo redka.

Novo nahajališče: Orešje (N—3), santonij-kampanij.

Genus: *Astraraea* FELIX 1900
Astraraea media (SOWERBY 1832)

Tab. 13, sl. 3—5

1832 *Astrea media*. SOWERBY: n. v.

1854 *Thamnastraea media*. REUSS: 119, Taf. 19, Fig. 3—4

1903 *Astraraea media*. FELIX: 187—188

1914 *Astraraea media*. FELIX: 205

1930 *Astraraea media*. OPPENHEIM: 42—45, Taf. 10, Fig. 7; Taf. 11, Fig. 5—6

1939 *Astraraea media*. ALLOITEAU: 4

1939 *Astraraea media*. MILOVANOVIĆ: 114

1974 *Astraraea media*. L. et M. BEAUVAIS: 484

Opis: Masivna kolonija je gomoljaste oblike, velika $3 \times 2 \times 1$ cm. Koraliti so tamnasterioidni, vendar mestoma ločeni tudi z ožjo ali širšo periteko. Na površini so čaše poglobljene, v prerezu poligonalne do okroglaste. Septa so perforirana. Razvita so v treh do štirih ciklih, lateralno nazobčana. V aksialnem delu imajo trabekularne podaljške, ki tvorijo parietalno kolumelo. Endoteko sestavljajo sinaptikule in redki disepimenti. Medkoralitna ali peritekalna struktura je nepravilna. Mikrostruktura ni ohranjena.

Dimenzije:

	Orešje	REUSS	FELIX	OPPENHEIM
premer koralitov (d)	4—6 mm	5—8 mm	4—6 mm	4—6 mm
število sept (s)	30—36	36—48(60)	48—60	28—35

Primerjava: Po precej močni spongiozni kolumeli se opisani primerek približuje vrsti *A. columellata* (OPPENHEIM 1930: 46—50), ki pa ima večje koralite. Vrsta *A. corbarica* (ALLOITEAU 1939: 19—20) ima enako velike koralite, toda septa so številnejša (48—50). Ker REUSS in FELIX omenjata pri vrsti *A. media* tudi do 60 sept, je možno, da je *A. corbarica* mlajši sinonim vrste *A. media*, ali pa vsi primerki z več septi spadajo k vrsti *A. corbarica*.

Razširjenost: Santonij Gosaua, kjer je zelo pogostna, santonij južne Francije in Anatolije. L in M. BEAUVAIS (1974) jo omenjata tudi v santoniju Katalonije. V Jugoslaviji je znana iz kampanija Vrbovačke reke v Srbiji.

Novo nahajališče: Orešje (O—7—1 D, O—7—4 A), santonij-kampanij.

Genus: *Thamnoseris* ÉTALLON 1858

✓ *Thamnoseris hoernesii* (REUSS 1854)

Tab.13, sl. 1—2

✓ 1854 *Prionastraea Hörnesii*. REUSS: 115, Taf. 13, Fig. 7—8

✓ 1857 *Isastraea Hoernesii*. MILNE-EDWARDS et HAIME: 530

1873 *Isastraea conf. Hörnesii*. STOLICZKA: 37, Pl. 7, Fig. 9

1903 *Isastraea Hörnesii*. FELIX: 272—273, Taf. 25, Fig. 6, Textfig. 36

? 1909 *Isastraea Hörnesii*. PREVER: 95—96, Tav. 7, Fig. 7, 7 a

1914 *Isastraea Hoernesii*. FELIX: 104, 175

✓ 1957 *Brachyseris hörnesii*: ALLOITEAU: 103

Opis: Cerioidna kolonija je gomoljaste in skorjaste oblike, velika $40 \times 50 \times 60$ mm. Koraliti so poligonalni do nepravilni, povezani direktno s tenko nepopolno parasinaptikularno steno. Septa so perforirana, razvita v treh do štirih ciklih. Zadnja dva cikla sta neenakomerno razvita in nepopolna, tako da je vseh sept lahko okoli 30 do 48. Kolumela je parietalna, sestavljena iz trabekularnih podaljškov sept. Endoteka je iz sinaptikul in vezikularnih disepimentov.

Dimenzije:

	Orešje	REUSS	FELIX	STOLICZKA
premer koralitov (d)	4—7 mm	5—9	do 8 mm	6—7 in več mm
število sept (s)	30—48	48	do 48	—

Primerjava: ALLOITEAU je REUSS-ovo vrsto »*Isastraea*« *hoernesii* predlagal za uvrstitev v svoj novi rod *Brachyseris*. O tem rodu in njegovi reviziji sem že pisala (TURNŠEK et BUSER 1976), kjer ga postavljam za mlajši sinonim rodu *Thamnoseris*. Naša primerka se ujemata z REUSS-ovimi originali.

Razširjenost: Senonij Gosaua in Indije ter (?) cenomanij Italije (PREVER 1909) in (?) Srbije (MAKSIMOVIĆ et MARKOVIĆ 1953).

Novo nahajališče: Orešje (N—4, N—9 A) santonij-kampanij.

Familia: DERMOSMILIIDAE Koby 1889

Genus: *Dermosmiliopsis* ALLOITEAU 1957

Kratek opis rodu je ALLOITEAU (1952: 671) dopolnil s sliko holotipa tipične vrste *D. orbignyi* (1957: Pl. 4, Fig. 6), zato je rod veljaven. Od podobnega rodu *Dermosmilia* ga loči po revnejši endoteki in bolj perforiranih septih. Podoben je REUSS-ov rod *Brachyphyllia*, ki je masiven s plokoidnimi koraliti na površini. Rod *Dermosmiliopsis* pa je faceloidna kolonija.

Dermosmiliopsis tenuicosta (REUSS 1854)

Tab. 14, sl. 1—5

1854 *Rhabdophyllia tenuicosta*. p.p. REUSS: 105, Taf. 6, Fig. 19—21, non Taf. 6, Fig. 18

non 1903 *Stenosmilia tenuicosta*. FELIX: 303—305, Taf. 22, Fig. 11, Textfig. 52

non 1961 *Stenosmilia tenuicosta*. ŠURARU: 655—666, Pl. 1, Fig. 3

1930 *Stenosmilia* (?) *tenuicosta*. OPPENHEIM: 434, Taf. 42, Fig. 8—9

? 1974 *Barysmiila tenuicosta*. L. et M. BEAUVAIS: 484

Opis: Faceloidna kolonija je velika $90 \times 90 \times 40$ mm. Koraliti brstijo pod ostrim kotom, ekstrakalikalno, v več smereh. V preseku so okrogli do rahlo ovalni. Septa so številna, tenka, razvita v petih ciklih, perforirana. Poroznost je močnejša pri mlajših ciklih in v aksialnih delih koralitov. Lateralna stran sept ima številne odebelitve in trnke. Aksialni podaljški sept tvorijo parietalno kolumelo. Endoteka je iz sinaptikul in zelo tankih dolgih disepimentov. Mikrostruktura ni ohranjena.

Dimenzije:

	Orešje	REUSS
premer koralitov (d)	4—9 mm	5—9 mm
število sept (s)	ca 90	96 (24 v centru)

Primerjava: REUSS je pri opisu vrste omenil velikost koralitov 5—9 mm. Na tabli 6, sl. 18 pa so veliko večji koraliti, zato ta primerjek verjetno spada k vrsti *D. orbignyi*, ki se loči prav po večjih koralitih.

REUSS je svojo vrsto *tenuicosta* pripisal rodu *Rhabdophyllia*, za katerega so značilne masivno plokoidne kolonije. Vrsta *tenuicosta* pa ima faceloidno kolonijo. FELIX je vrsto pripisal rodu *Stenosmilia*, vendar pri svojih primerkih omenja izrazito lamelarno kolumelo, medtem ko REUSS za vrsto *tenuicosta* pravi, da ima parietalno kolumelo, sestavljeno iz podaljškov sept. Zato FELIX-ovi primerki ne spadajo k tej vrsti, vsekakor pa k rodu *Stenosmilia*.

Vse strukturne značilnosti REUSS-ove vrste *tenuicosta* in naših primerkov se ujemajo z značilnostmi rodu *Dermosmiliopsis*, zato vrsto *tenuicosta* pripisujem temu rodu. Od tipične vrste *D. orbignyi* se loči po manjših koralitih.

Razširjenost: Santonij Gosaua, santonij v Corbières v južni Franciji.

Novo nahajališče: Orešje (J—1, N—6, N—10), santonij-kampanij.

Dermosmiliopsis orbignyi ALLOITEAU 1957

Tab. 15, sl. 1—7

1854 *Rhabdophyllia tenuicosta*. REUSS: Taf. 6, Fig. 18

1952 *Dermosmiliopsis Orbignyi* ALL. 1950. ALLOITEAU: 671. nom. nud.

1957 *Dermosmiliopsis Orbignyi* nov. gen. nov. sp. ALLOITEAU: Pl. 4, Fig. 6 a—b

Opis: Faceloidna kolonija ima vzporedne, precej debele koralite. Septa so perforirana, razvita v petih ciklih. Endoteka je iz sinaptikul in tankih disepimentov. Kolumela je parietalno papilozna. Perforiranost sept je močnejša pri mlajših ciklih. Mikrostruktura ni ohranjena.

Dimenzije:

	Orešje	ALLOITEAU (po fotogr.)
premer koralitov (d)	10—25 mm	15—17 mm
število sept (s)	ca 100	ca 100

Primerjava: ALLOITEAU je leta 1952 (671) imenoval novo vrsto *D. orbignyi* in ji dal letnico 1950. Leta 1957 (Pl. 4, Fig. 6) je isto vrsto označil kot nov rod in novo vrsto in dodal fotografije. Zato menim, da je prava letnica vrste 1957, prejšnje so nomina nuda. Opis vrste je sicer pomanjkljiv, vendar s fotografijami in karakterističnimi strukturnimi lastnostmi rodu lahko naše primerke popolnoma uskladimo z ALLOITEAU-jevo vrsto.

Razširjenost: Zgornji santonij Sougraigne v južni Franciji. Če sem prištejemo še REUSS-ov primerek, tudi v senoniju Gosaua.

Novo nahajališče: Orešje (O—11—1 B, N—5), santonij-kampanij.

Familia: SYNASTRAEIDAE ALLOITEAU 1952

Genus: *Synastraea* MILNE-EDWARDS et HAIME 1848

Synastraea procera (REUSS 1854)

1854 *Thamnastraea procera*. REUSS: 120, Taf. 5, Fig. 1—2

1903 *Thamnastraea procera*. FELIX: 230

1930 *Synastraea procera*. OPPENHEIM: 159—161, Taf. 28, Fig. 5—5 a, Taf. 33, Fig. 6

1939 *Synastraea procera*. ALLOITEAU: 4

1954 *Thamnastraea procera*. KOLOSVÁRY: 92, Tab. 3, Fig. 11, Tab. 8, Fig. 2—5, Tab. 14, Fig. 3, Tab. 15, Fig. 4

1974 *Synastraea procera*. L. et M. BEAUVAIS: 485

Opis: Tamnasterioidna kolonija je skorjaste oblike, velika 50×20 mm. Septa so močno perforirana, konfluentna, razvita v 3—4 ciklih. Kolumela je parietalna, endoteka je iz sinaptikul.

Dimenzije:

	Orešje	REUSS	FELIX	OPPENHEIM
premer koralitov (d)	4—6 mm	5—8 mm	5—11 mm	—
število sept (s)	32—36	32—38 (24—30)	36—43	30—50

Primerjava: Število sept avtorji zelo različno navajajo. REUSS jih v tekstu omenja 24—30, na fotografijah njegovih primerkov pa lahko naštejemo 32—38, mestoma celo do 50 sept. Naknadno je tako različno število sept ugotovil tudi OPPENHEIM. Naš primerek je nekoliko manjši, vendar ga še moremo šteti v variacijsko širino omenjene vrste.

Razširjenost: Santonij Gosaua, santonij južne Francije, santonij-kampanij Madžarske.

Novo nahajališče: Orešje (N—4) je sprijet skupaj z vrsto *Thamno-seris hoernesi* v istem kosu. Santonij-kampanij.

Familia: ACTINACIDIDAE VAUGHAN et WELLS 1943

Genus: *Actinacis* d'ORBIGNY 1849

✓ *Actinacis martiniana* d'ORBIGNY 1849

Tab. 16, sl. 1—4

1968 *Actinacis martiniana*. TURNŠEK 1968: 362, Tab. 9, sl. 3

Opis: Vrsto sem opisala leta 1968. Primerek iz Orešja se povsem ujema z dosedanjimi opisi.

Dimenzije:

	Orešje	REUSS	TURNŠEK	GERTH <i>A. sumatrensis</i>
premer koralitov (d)	1,5—2 mm	1,5 mm	1,9—2 mm	1,5 mm
razdalja centrov (c—c)	3 mm	3—4 mm	2—3 mm	3 mm
število sept (s)	22—24	24	24	18—20

Primerjava: Razdalje med centri čaš so pri jugoslovanskih primerkih malenkost manjše kot pri prej opisanih primerkih. S to lastnostjo se približujejo vrsti *A. sumatrensis* toda ta vrsta ima manjše število sept (glej TURNŠEK 1968).

Razširjenost: Senonij Gosaua, santonij južne Francije, maastrichtij Kosjerića v Srbiji.

Novo nahajališče: Orešje (O—7—1 G), santonij-kampanij.

STRATIGRAFSKA PRIMERJAVA KORALNIH VRST

Vrste, ki so najdene v Orešju na Medvednici, so bile doslej znane iz nahajališč v Gosauu v Avstriji (16 istih vrst), v raznih nahajališčih južne Francije (14 istih vrst), na Madžarskem (5 vrst), v Romuniji (3 vrste). Po ena vrsta je znana na Portugalskem in celo v Indiji. V Jugoslaviji so bile doslej omenjene 4 iste kolonijske vrste koral v Srbiji in ena v Sloveniji (glej sl. 4).

Korale z območja Gosau je REUSS (1854) uvrščal v turonij in senonij. Že FELIX (1903; 1914) jih je omejil na senonij. L. in M. BEAUVAIS (1974) pa na podlagi novih raziskav veliko koralnih vrst iz Gosaua uvrščata v santonij in deloma kampanij. Pravita, da v maastrichtiju korale povsod močno naza-dujejo.

Zgornjekredna nahajališča koral v južni Franciji so stratigrafsko natanč-neje razčlenjena. Vse vrste, ki smo jih našli v Orešju, so v Franciji iz santonija, ena sega še v kampanij (glej ALLOITEAU 1954; 1957, L. et M. BEAUVAIS 1974).

Madžarska nahajališča daje KOLOSVÁRY (1954) v senonij s pripombo, da sodijo v njegov srednji del (santonij-kampanij) in ne segajo v maastrichtij. Tudi v Romuniji so koralne vrste najdene v santoniju in kampaniju (ŞURARU 1957; 1961), na Portugalskem v kampaniju (FELIX 1930 b), vrsta iz Indije pa je omenjena v nerazčlenjenem senoniju, podobno kot nekatere vrste iz Gosaua.

V Jugoslaviji so bile doslej znane kolonijske korale iz Vrbovačke reke, ki jih MILOVANOVIĆ (1939) uvršča v kampanij. Ena vrsta pa je najdena v maastrichtiju Kosjerića (TURNŠEK 1968). Obe nahajališči sta v Srbiji. Iz Slovenije je doslej znana ena vrsta iz senonijske breče na Banjski planoti (TURNŠEK et BUSER 1976).

Iz vseh primerjav vidimo, da so korale iz Orešja santonijsko-kampanijske starosti. Tako korale v celoti potrjujejo santonijsko-kampanijsko starost gre-bena v Orešju, kakršna je bila določena tudi na podlagi rudistov, foraminifer in nanoplanktona (glej POLŠAK et al. 1978).

Paleoekološki pogoji so podani v prvem poglavju o biostratigrafski označ-bi nahajališča. Korale so kolonijske, razen enega samega primerka. Večina primerkov so masivne kolonije, le nekatere so vejnate. Vse so grebenotvorne ali hermatipne. Pojav takih koral potrjuje, da gre za pravo grebenko tvorbo, le majhne dimenzije kolonij kažejo na slabše pogoje rasti kot na primer v zgornji juri. Polomljene vejice koral in pretrti notranji deli sept govore o nemirnem okolju v času rasti. Slabše pogoje za rast grebenov v zgornji kredi L. et M. BEAUVAIS (1974) razlagata tudi s povečano količino terigenega materiala, ki je zaviral rast koralnih kolonij.

V Jugoslaviji je doslej omenjeno podobno nahajališče kolonijskih seno-nijskih koral v Vrbovački reki v Srbiji. Verjetno predstavljata obe območji enak tip sedimentacijskega prostora.

Vrsta - Species	Orešje	Razširjenost-Distribution				
	santonij - Santonian- kampanij Campanian	koniacij Coniacian	santonij Santonian	kampanij Campanian	maastrichtij Maastrichtian	senonij Senonian
<i>Actinastraea ramosa</i>	Z-1		Fr, Go, H	H, Sr		
<i>Actinastraea octolamellosa</i>	O-7-1 B,C		Fr, Go			
<i>Columactinastraea pygmaea</i>	N-8A		Fr	Fr, Port		
<i>Columastraea formosa</i>	O-7-2 B		Fr, Go, H	H		
<i>Columastraea striata</i>	O-7-2 A		Fr, Go, H	H		
<i>Elasmophyllia deformis</i>	O-5-3 B					Go
<i>Mycetophylliopsis antiqua</i>	O-7-1 L					Go
<i>Ellipsosmilia</i> sp.	N-7					
<i>Procladocora simonyi</i>	O-7-1 A, E, F, K, J					
<i>Procladocora tenuis</i>	O-7-1 R O-7-4 B		Fr, Go			Sl, Go
<i>Phyllocoeniopsis pediculata</i>	N-1		Fr, Ro	Ro		Go
<i>Phyllocoeniopsis</i> sp.	N-8B					
<i>Neocoenia lepida</i>	O-5-3 A		Fr, Go, Ro, H	Ro, Sr, H		
<i>Pleurocora haueri</i>	O-5-3 C, D SG-1		Fr			Go
<i>Pleurocora crassa</i>	N-3					Go
<i>Astraraea media</i>	O-7-1 D O-7-4 A		Ro, Fr, Go	Sr		
<i>Thamnoseris hoernesii</i>	N-4, N-9A					Go, Ind
<i>Dermosmiliopsis tenuicosta</i>	J-1 N-10, N-6		Fr, Go			
<i>Dermosmiliopsis orbigny</i>	O-11-1 B N-5		Fr			
<i>Synastraea procera</i>	N-4		Fr, Go, H	H		
<i>Actinacis martiniana</i>	O-7-1 G		Fr		Sr	Go

Sl. 4. Razpredelnica: Primerjava stratigrafske in regionalne razširjenosti opisanih koralnih vrst.

Kratice: Go = Gosau, Fr = Francija, H = Madžarska, Port. = Portugalska, Ro = Romunija, Ind = Indija, Sr = Srbija, Sl = Slovenija

Fig. 4. Table: The comparison of the stratigraphical and regional distribution of the described coral species.

Abbreviations: Go = Gosau, Fr = France, H = Hungary, Port = Portugal, Ro = Romania, Ind = India, Sr = Serbia, Sl = Slovenia

SUMMARY

**SENONIAN COLONIAL CORALS FROM THE BIOLITHITE COMPLEX
OF OREŠJE ON MT MEDVEDNICA (NW YUGOSLAVIA)**

INTRODUCTION

The coral bearing biolithite complex is situated at the extreme NE edge of Mt. Medvednica, in the valley of the Šum stream near the Donje Orešje village, north of Zelina (Figs. 1 and 2).

Today only a part of the original biolithite complex is preserved and accessible. The rest has been either denuded or else covered by transgressive Miocene sediments. The preserved part of the complex has in its centre, where the reef deposits are developed, a thickness of approximately 70 metres. The lower part of this complex, in which the coral bioherms occur, is shown in the lithostratigraphic column (Fig. 3).

Only in the west, in the valley of the Šum stream is the lateral transition of the biolithite complex into basin sediments of the "Scaglia" type exposed (see the geological sketch in Fig. 3).

Limestones from the biolithite complex have been quarried there for a long time. Detailed stratimetric profiles, which are to be the subject of a special paper, were recorded in the abandoned parts of the quarry. These profiles contained abundant palaeontological material, including the collection of corals which have been dealt with in the present study. The majority of corals were collected on the right-hand-side of the stream. These are stratigraphic units 3, 5, 7, and 11 in the lithostratigraphic column (Fig. 3).

Some of the corals presented were collected by Prof. DONATA DEVIDÉ-NEDÉLA (specimens marked N) and VLADIMIR ZEBEC, B. Sa., (specimen Z—1), to whom the authors extend their most grateful thanks. These corals come from the abandoned part of the quarry on the left-hand-side of the stream and are a continuation of the coral and rudist bioherms shown in the lithostratigraphic column. Most of these deposits, however, have been destroyed owing to exploitation of the quarry.

A total of over 50 specimens of corals were collected. All except one were of the colony-forming type. Nineteen species belonging to sixteen genera were determined. In the case of two specimens only genus was determined. The majority of the coral species found are of Santonian-Campanian age. This age of the reef in Orešje is further confirmed by other accompanying fauna of rudists, foraminifers and calcareous nannoplankton.

The collection of the corals examined is kept at the Geological-Paleontological Institute, Faculty for Natural Sciences and Mathematics, University of Zagreb.

The authors would like to express their sincere thanks to Acad. Prof. I. RAKOVEC for reading the text through. Our thanks go to MILOJKA HUŽJAN for preparing the fossils and for the making of drawings, diagrams, and tables, to CARMEN NAROBÉ for her photographic work, and to MILENA MILOJEVIĆ-SHEPPARD, M. A., for providing the English translation.

THE BIOSTRATIGRAPHICAL AND SEDIMENTOLOGICAL FEATURES OF THE BIOLITHITE COMPLEX OF DONJE OREŠJE

(ANTE POLŠAK)

The term biolithite complex is understood to refer to the biolithite reef and the deposits in the backreef and forereef areas, whose genesis is closely related to the reef (POLŠAK 1978).

The biolithite reef

The Donje Orešje biolithite reef belongs to the barrier reef type, it is oblong in shape and separated from the land by a lagoon.

The lower part of the reef is built up mainly from a few coral bioherms (Fig. 3, stratigraphic units 7, 11, 14, 16). Smaller coral bioherms appear also in the sediments of the backreef area (stratigraphic units 5 and 6). The coral bioherms consist of colonies of massive and ramified hermatypic corals. The epibiont was extremely poor. It includes rare Corallinaceae, Bryozoa and Hydrozoa. For a list of the corals determined see the Croatian text, page 162.

Reef sand, which in its lithified state has the features of a bioclastic calcarenite, is accumulated between the bioherms (stratigraphic units 10 and 13). The bioclasts are poorly sorted and densely packed. They include fragments of corals, bivalves, gastropods and, rarely, fragments of hydrozoans, corallinaceans, crinoids, the echinoid spines, and benthic foraminifers. Sparry cement, which points to a high water energy in the reef flat, occurs quite frequently.

In individual, protected parts of the reef flat the water energy was, from time to time, very low. Here are accumulated limestones with a micritic matrix in which large fragments of the reef builders are dispersed (stratigraphic units 12 and 15).

During the growth of the reef clayey-silty sediments, was constantly impouring, to a greater or lesser extent, from the backreef area. For this reason the reef-flat was often contaminated. Minor contamination did not essentially hinder the growth of coral colonies. Owing to their fast growth, the calices of the corals managed to keep above the level of the deposited mud. This clayey mud was deposited within the reef-framework, sometimes filling up entirely the spaces between the ramified corallites. Such ramified colonies were a filter for the blocking of fine grained clastic material. Considerable influx of clastic material from the lagoon onto the reef-flat resulted in a temporary interruption in the growth of coral colonies and the deposition of a layer of silty marl. Stratigraphic unit 9, which is built up of marl, provides an example of such a case.

The upper part of the reef is built up of rudist bioherms (stratigraphic units 18 and 19). An abundant assemblage of rudists, which indicates the stratigraphic range Santonian-Lower Campanian (see p. 33), has been determined. Representatives of the family Hippuritidae predominate, whereas Radiolitidae and Caprinidae are very rare. The perforated upper valve of hippuritids most likely served as a filter in the contaminated water, which made possible the flourishing development of this group in

relatively unfavourable conditions. The epibiont in the rudist bioherms was very poor, too, so that the reef-framework was highly porous and at the front of the reef waves quickly destroyed it. The spaces in the reef-framework were later filled up with bioclastic calcarenite, biomicrite, and frequently with clayey material carried over from the backreef area, too.

Backreef sediments

Here can be included stratigraphic units 1—6 on the stratigraphic column (Fig. 3), which consist of sediments of the distal part of the lagoon, where the water energy is low. A biostrome, 2—3 m thick, is built up of the densely spaced shells of *Nerinea* (*Simploptyxis*) *nobilis* (MÜNSTER) and *N.* (S.) *buchi* (KEFERSTEIN), known from Coniacian-Santonian deposits, and the species *N.* (S.) *ampla* (MÜNSTER), which is characteristic for the Santonian (THIED 1958).

The Nerineid biostrome is covered by a 3—4 m thick marl deposits, which contain lense-shaped bioherms with the corals *Neocoeniopsis lepida* (REUSS), *Elasmophyllia deformis* (REUSS) and *Pleurocora haueri* MILNE-EDWARDS et HAIME.

Forereef sediments

In the forereef area, in the immediate vicinity of the reef flank, there occur deposits of unsorted coarse-grained perireef breccia (rudstone), consisting of fragments of corals and rudists and fragments of calcarenite, deposited in the reef-flat area. The matrix is calcarenite, partly mixed with a clayey-silty sediments.

Laterally, the perireef breccia (rudstone) gradually passes into detritic limestone, which consists of an alternation of calcarenite and calcilutite. The calcarenite is most frequently fine-grained with well sorted and densely packed allochems (packstones). Sparry cement is quite frequently present. Among the allochems subangular bioclasts from the reef, i. e. fragments of rudists and corals, predominate. Particles of biomicrite form fairly rare intraclasts. Benthic foraminifers are rare, too. The following species have been determined: *Gavelinella lorneiana* (d'ORBIGNY) and *Goupilaudina daugini* MARIE, which are characteristic for the Senonian, and *Monouxia* sp. and *Rotaliidae*.

Much less frequent are coarse-grained calcarenites. This limestone consists of angular and unsorted reef bioclasts, which are most often dispersed in a micritic matrix, rich in the *Oligosteginidae*.

Predominant among calcilutites are biomicrites in whose dense micritic matrix only an insignificant quantity of the smallest bioclasts from the reef occur. Small lenses of cherts are encountered, too. A number of species of *Oligosteginidae* have been determined from these limestones, as well as a Lower Senonian assemblage of globotruncanids (see p. 143), which indicates considerable influence of the pelagic sea in this part of the forereef area.

Marl with nanofossils

An approximately 2 m thick layer of marl lies on the top of the reef and near-reef deposits, indicating the end of the reef growth at Donje Orešje. The marl contains an assemblage of calcareous nannoplankton characteristic for the Campanian (see p. 144).

Basin sediments

Laterally, the near-reef detritic limestones gradually pass into thin-layered and platy gray limestones with lenses of cherts. According to the main features, these rocks belong to the so-called Scaglia deposits.

These deposits were formed by turbidity currents and, to a lesser extent, by the deposition of autochthonous pelagic sediment. "Miniature" sequences of a thickness of 5—10 cm predominate. Td-e sequences are the most frequent but rarely truncated. Te-c and Te-d sequences (according to the scheme given by BOUMA 1962) occur, too. A few thick layers with a marked, graded "a" interval are developed. In this interval there predominate large fragments of rudists, which are followed by fragments of corals and, extremely rarely, the remains of Corallinaceae (*Archaeolithothamnium*). This interval corresponds to a temporarily heavier influx of detritus from the reef. Apart from bioclasts, inclusions of oligosteginid biomicrite are fairly frequent.

In the higher intervals "b", "c" and "d" the reef detritus particles become increasingly smaller and sparser. In the final "e" interval the reef detritus completely disappears. This is fossiliferous micrite and biomicrite in which exclusively pelagic fossils ("pelagic rain") occur. An assemblage of globotruncanids has been determined (see p. 145), which indicates that the basin deposits belong to the Santonian and most likely to the Lower Campanian.

CORAL FAUNA

DRAGICA TURNŠEK

In the English translation of the description of the species the synonymy and comparison of dimensions have been left out. These details are given in the Slovene text.

Abbreviations: d = diameter of calice, c—c = distance between the centres of corallites, s = number of septa!

A SYSTEMATIC DESCRIPTION OF THE CORAL SPECIES

Genus: *Actinastraea* d'ORBIGNY 1849

Actinastraea ramosa (MICHELIN 1847)

Pl. 1, Figs. 1—3

Description: A cerioid colony is growing in the shape of branches and little rods. The corallites are polygonal in cross-section. The septa are octomeral and arranged in two cycles. The columella is styliform.

Dimensions: The diameter of corallite is 1—1,2 mm, number of Septa is 16.

Comparison: The species has been thoroughly described by ALLOITEAU (1954: 53—55, 59). He found that SOWERBY's and MICHELIN's specimens of *Astrea ramosa* were not identical. MICHELIN's specimen is the holotype of *Actinastraea ramosa*, whereas SOWERBY's specimen was named *Actinastraea sowerbyi* (see ALLOITEAU's table 1954: 59). *A. ramosa* has a diameter of corallites 1—1,2 mm, *A. sowerbyi* 2 mm. ALLOITEAU ascribed to *A. sowerbyi* REUSS' specimens from Gosau, previously named *A. ramosa*, too. But these specimens have a diameter of 1—1,2 mm, and the specimens from Medvednica 1—1,2 mm, so I ascribe both of them to the species *A. ramosa* (MICHELIN), in sensu ALLOITEAU's revision.

Distribution: Upper Santonian of Southern France, Santonian of Gosau, and (?) Cenomanian of Greece.

New locality: Orešje (Z—1), Santonian-Campanian.

Actinastraea octolamellosa (MICHELIN 1846)

Pl. 2, Figs. 1—3

Description: A cerioid colony has the shape of a bulb or irregular branches, 3 cm long, and 1 cm wide. The corallites are polygonal and joined with a rough-grained costate wall. The calices are deep. The septa are octomeral and developed in three cycles. The columella is styliform and somewhat raised in the calice.

Dimensions: $d = 1,5—2$ mm, $s = 16 + S 3$.

Comparison: GOLDFUSS described the species *Astrea reticulata* some specimens of which have an octomeral septal system and not a hexameral one. ALLOITEAU (1954: 49—52) separated these specimens from *reticulata* and ascribed them to MICHELIN's species *A. octolamellosa*. REUSS' specimens, too, have an octomeral system and belong to this species.

Distribution: Upper Santonian of Southern France, Santonian of Gosau.

New locality: Orešje (O—7—1 B, O—7—1 C), Santonian-Campanian.

Genus: *Columactinastraea* ALLOITEAU 1952

ALLOITEAU (1952: 603; 1957: Fig. 4, 11, 18, 19) distinguished *Columactinastraea* from *Actinastraea* by its spongy columella, and from *Stephanocoenia* by its larger sclerodermites.

Columactinastraea pygmaea (FELIX 1903)

Pl. 3, Figs. 1—4

Description: A cerioid colony, which has the shape of a bulb or irregular branches, 2—3 cm in size. The corallites are polygonal and separated by a septotheca or in some places by a costate theca. The septa are octomeral with two constant cycles. The columella is spongy papillous. There are laterally dentations, and vesicular dissepiments. The microstructure is not preserved.

Dimensions: $d = 1\text{--}1,5\text{ mm}$, $s = 16$.

Comparison: In his description of the species *A. pygmaea* FELIX (1903 b: 54) mentioned a columella similar to the "spongy columella of *A. konincki*". It consists of more pillars joined spongy. This description fits in with the columella of the genus *Columactinastraea*. Unfortunately ALLOITEAU (1954: 52—53) did not take into account this description and ascribed FELIX' species to the genus *Actinastraea*. The specimen from Orešje can be identified with the FELIX' species.

Distribution: Santonian and Campanian of Southern France and Campanian of Portugal.

New locality: Orešje (N—8 A), Santonian-Campanian.

Genus: *Columastraea* d'ORBIGNY 1849

The genus *Columastraea* can be distinguished from *Actinastraea* in its having pali and a perithecal structure. It is ascribed to the family *Columastraecidae* ALLOITEAU (see ALLOITEAU 1957: 57—58). The name *Columnastraea* is a type mistake and is a synonymus of *Columastraea*.

Columastraea formosa (GOLDFUSS 1826)

Pl. 4, Fig. 3

Description: A plocoid, massive colony of bulbous or cylindrical shape. The corallites are round in cross-section, and joined with the septotheca and costate peritheca. The septa are developed in an octomeral system, always in two cycles. The columella is styliform, enclosed by pali, which appear at the ends of first cycle septa. Septa are laterally dentate. The endotheca consists of vesicular dissepiments; the microstructure is not preserved.

Dimensions: $d = 1,5\text{--}2,5\text{ mm}$, $c\text{--}c = 2\text{--}3\text{ mm}$, $s = 16$.

Comparison: GOLDFUSS' species *Astraea formosa* was later ascribed by REUSS (1954), FELIX (1898) to the tertiary genus *Stephanocoenia*. By a revision of the original material ALLOITEAU (1957: 58) established that the Cretaceous forms, ascribed to *Stephanocoenia*, belong partly to the genus

Columastraeta, and partly to *Columactinastraeta*, as they have different microstructure. Besides this, the species *formosa* has plocoid corallites and undoubtedly belongs to the *Columastraeta*. Already FELIX noticed that the species *formosa* was similar to the species *Columastraeta striata*, which differs only in the number of septa. L. and M. BEAUVAIL (1974) ascribed it to *Columactinastraeta*, but this genus does not have a peritheca.

Distribution: Santonian of Gosau and of Southern France, Santonian-Campanian of Hungary.

New locality: Orešje (O—7—2 B), Santonian-Campanian.

Columastraeta striata (GOLDFUSS 1826)

Pl. 4, Figs. 1—2

Description: A massive plocoid colony of bulbous or crusty shape. The corallites are round and joined with a thin costate peritheca. The calices are slightly convex. The septa are developed in a hexameral system, in three cycles. The columella is styliform and is enclosed by pali. The endotheca consists of thin vesicular dissepiments.

Dimensions: diameter of corallite = 2—3 mm, diameter of calice = 1,5—2,5 mm, distance between centres = 2—3 mm, number of septa = 24.

Comparison: Our specimens have a constant number of septa, i.e. 24, which is characteristic of this species. The corallites are somewhat smaller than the originals of REUSS. They are the same as those mentioned by KOLOSVÁRY (1954: 112—113). According to the diameter of the corallites our specimens are close to the species *C. formosa*, but the latter has an octomeral system of septa.

Distribution: Santonian of Gosau and of Southern France, Santonian-Campanian of Hungary.

New locality: Orešje (O—7—2 A), Santonian-Campanian.

Genus: *Elasmophyllia* d'ACHIARDI 1875

Elasmophyllia deformis (REUSS 1854)

Pl. 4, Figs. 1—2

Description: A phaceloid colony, 14 cm high. The corallites are round in cross-section when they are monocentric. After division two or three corallites usually stay together and obtain an irregular shape. The septa are developed in 4—5 cycles. They are compact, all of them equally thick and almost equally long. The columella is very thin and elongated; in the case of our specimens it was recrystallized. The endotheca is abundant and tabulate. The microstructure is not preserved.

Dimensions: d = 5—16 mm, s = ca 70.

Comparison: REUSS' original has a poorly developed columella like our specimens. Therefore I consider that OPPENHEIM (1930: 290) was not right in ascribing to this species specimens of *Stenogyra sinousa*, which is characterized by a strong lamellar columella.

Distribution: Senonian of Gosau.

New locality: Orešje (O—5—3 B), Santonian-Campanian.

Genus: *Mycetophylliopsis* OPPENHEIM 1930

Mycetophylliopsis antiqua (REUSS 1854)

Pl. 5, Figs. 3—4

Description: A massive colony with serial corallites. There is no wall between them. The septa are partly confluent, and partly interrupted. They are developed in two cycles, the first of which is very thick. Between two thick septa there are 1—3 thinner septa of younger cycles. A columella is absent. The endotheca consists of thin vesicular and tabulate dissepiments. Microstructure is not preserved in our specimens ALLOITEAU (1957) established a montlivaltid microstructure in this genus.

Dimensions: colony = $90 \times 50 \times 50$ mm, s = 5—7/5 mm.

Comparison and systematic: Our specimen fits in with the originals from the Austrian locality.

ALLOITEAU (1952) and WELLS (1956) ascribed this genus to the family Montlivaltiidae, because ALLOITEAU had established a montlivaltid microstructure. But the vesicular endotheca is not montlivaltid at all. Why could it not be left in the family Mussidae, as arranged by OPPENHEIM.

Distribution: Senonian of Gosau.

New locality: Orešje (O—7—1 L), Santonian-Campanian.

Genus: *Ellipsosmilia* d'ORBIGNY 1849

Ellipsosmilia sp.

Pl. 6, Figs. 1—3

Description: A solitary coral with the shape of a slightly bent and flattened horn, oval in cross-section. The septa are developed in five cycles. They are laterally dentate. There is no columella. The endotheca is montlivaltid, and consists of tabulate and long dissepiments. The wall is parathecal. The microstructure is of simple trabeculae or larger scherodemites.

Dimensions: Corallum = $70 \times 50 \times 30$ mm, s = 85.

Comparison: In its septal and endothecal structure this genus is similar to *Montlivaltia*, but *Ellipsosmilia* has simple instead of divergent trabeculae. Only one species of this genus, *E. cornucopiae* (see ALLOITEAU

1952: 612—613) from the Cenomanian is known. Our specimen differs from it in having larger corallites and more septa. But I have only one specimen, so I cannot describe a new species.

New locality: Orešje (N—7), Santonian-Campanian.

Genus: *Procladocora* ALLOITEAU 1952
Procladocora simonyi (REUSS 1854)

Pl. 7, Figs. 1—7

This species was described by the author (TURNŠEK et BUSER 1976) from the Upper Cretaceous breccia of Slovenia.

Dimensions: $d = 6-10$ mm, $s = ca\ 50$.

New locality: Orešje (O—7—1/A, E, F, K, J), Santonian-Campanian.

Procladocora tenuis (REUSS 1854)

Pl. 8, Figs. 1—9

Description: A phaceloid-dendroid colony with corallites budding at an acute angle of 45° . In cross-section they are round or oval. The septa are compact, and developed in 3—4 cycles. The first 12 septa are long, whereas the last are half their length. The septa are uneven, their axial ends are thickened, and here and there they have axial prolongations which form a trabecular columellar structure. In our specimens these axial prolongations are to a considerable extent broken. The lateral side of the septa has rare teeth. The wall is septoparathecal and thick. The endotheca consists of numerous tabulate and long dissepiments. The microstructure is not preserved.

Dimensions: $d = 3-5$ mm, $s = 24-48$.

Comparison: This species differs from *P. simonyi* in having smaller corallites and a smaller number of septa. ALLOITEAU (1957: 196) was of the opinion that *C. tenuis* belonged to the genus *Goniocora*, but *Goniocora* has a styliform columella.

Distribution: Santonian of Gosau and of Southern France.

New locality: Orešje (O—7—4 B, O—7—1 R), Santonian-Campanian.

Genus: *Phyllocoeniopsis* ALLOITEAU 1957

ALLOITEAU (1957: 124—125) based the genus *Phyllocoeniopsis* on the species *Astraraea cribraria* MICHELIN 1841. In his table (p. 136) he gave a comparison with other similar massive-plocoid forms. He distinguished *Phyllocoeniopsis* from *Phyllocoenia* by the fact that the former has a rare tabulate and vesicular endotheca and a different microstructure.

Phyllocoeniopsis pediculata (DESHAYES 1831)

Pl. 9, Figs. 2—5

Description: The colony is massive-plocoid, with dimensions $15 \times 12 \times 12$ cm, and is the largest in the collection. The calices are raised on the surface, oval, and in the base of the colony are joined with the tabulate and costate peritheca. The septa are compact, and developed in a decamerall system, in three cycles. In the axial parts of the corallites the septa are tortuous and somewhat broken. Their trabecular prolongations form a parietal columella. The septa are laterally dentate. The wall is parathecal or septothecal. In the periphery of the corallites and in the peritheca there appear tabulate and vesicular traverses. The microstructure is not preserved.

Dimensions: $d = 4-6$ mm, $c-c = 6-10$ mm, $s = 40$ ($10 + 10 + 20$).

Comparison: Our specimen fits in with FELIX' description (1903) of "*Phyllocoenia pediculata*". The tabulate traverses and round calices place it in the genus *Phyllocoeniopsis*. Because of badly preserved microstructure I have to follow the ALLOITEAU's (1957: 127) attribution.

Distribution: Santonian of Gosau and of Southern France, Santonian-Campanian of Romania.

New locality: Orešje (N—1), Santonian-Campanian.

Phyllocoeniopsis sp.

Pl. 9, Fig. 1

The specimen N—8 B is massive-plocoid colony with dimensions $60 \times 60 \times 50$ mm. Corallites are roundish in cross-section, somewhat smaller than in *P. pediculata*. Number of septa is ca 20, but unclear, and I was not able to determine the species.

Genus: *Neocoenia* HACKEMESSER 1936

HACKEMESSER placed his new genus *Neocoenia* close to the genera *Phyllocoenia* MILNE-EDWARDS et HAIME, *Leptastraea* and *Ulastraea* PREVER. He distinguished it by its narrower peritheca and papillous reticular columella. ALLOITEAU (1957: 127—128) characterized his new genus *Neocoeniopsis* in a very similar way, but it differs in having rare sinaptulae in the wall.

Neocoenia lepida (REUSS 1854)

Pl. 10, Figs. 1—3

Description: A massive-plocoid colony with raised calices on the surface. In the base they are joined by a peritheca. In cross-section the calices are round to oval. The peritheca varies in width; in some places there

are only walls between the corallites. The septa are compact, and developed in three cycles. The younger ones are always thinner, so thick and thin septa alternate. All of them are laterally dentate. At their axial ends they are thickened; in some places they have trabecular prolongations which form a parietal papillous columella. At some levels the axial space is empty, because there are no prolongations. The endotheca is only in the peripheral part of the corallites, and it is rare. In the peritheca it is tabulate. The wall is parathecal. Microstructure is not preserved.

Dimensions: $d = 3-4$ mm, $c-c = 3-5$, $s = 24-36$.

Comparison: ALLOITEAU (1957: 128) suggested that this species be ascribed to his new genus *Neocoenopsis*. Our specimen fits in well with the REUSS' originals from Gosau. It has no sinapticalae, and belongs to the genus *Neocoenia* HACKEMESSER.

Distribution: Santonian of Gosau and of (?)France, (?)Cenomanian of Grece (probably another species: $d = 2-3$ mm) and of Libanon, Santonian-Campanian of Hungary and of Romania, Campanian of Vrbovačka reka in Serbia.

New locality: Orešje (O—5—3 A), Santonian-Campanian.

Genus: *Pleurocora* MILNE-EDWARDS et HAIME 1848

The first authors distinguished the genus *Pleurocora* from *Cladocora* (1850: XXXVIII) because of its shorter corallites, its thicker wall and its larger lateral dentations, they mentioned also pali. OPPENHEIM added *Pleurocora* has more tortuous and irregular septa in its axial part. ALLOITEAU (1952) and WELLS (1956) recognized this genus and placed it in the family Heliastraeidae.

Our specimens show all the mentioned characteristics. In axial parts of corallites the septa are not only "tortuous", or structure papillous, but the septa are partly perforated. Owing to this genus *Pleurocora* belongs to *Fungiina*. I place it in the family *Haplaraeidae*.

Pleurocora haueri MILNE-EDWARDS et HAIME 1848

Pl. 11, Figs. 1—3

Description: A dendroid colony with ramified corallites, which are round in cross-section. The septa are compact in the periphery and slightly perforated in the axial part of some corallites. They are developed in four cycles and laterally dentate. Their axial prolongations form a spongy columellar structure. The endotheca consists of tabulate dissepiments. In our specimens some corallites have broken axial septa and look different to the better preserved ones. The microstructure is not preserved.

Dimensions: $d = 7-10$ mm, $s = 24-32$.

Comparison: ALLOITEAU (1957: 189, 196) was of the opinion that *P. haueri* (= *P. rudis*) belonged to the genus *Haplohelix*. But *Haplohelix* is a massive colony, whereas *P. haueri* has ramified corallites. REUSS' specimens of *P. haueri* are massive-plocoide forms and do not belong to this species and not to this genus.

Distribution: Santonian of Southern France, Senonian of Gosau. ANGELIS d'OSSAT (1905) mentioned this species in the Urgonian of Catalonia, without any photographs and it is most probably another species.

New locality: Orešje (O—5—3 C, 0—5—3 D), and Samoborska gora (SG—1), Santonian-Campanian.

Pleurocora crassa (REUSS 1854)

Pl. 12, Figs. 1—5

Description: A dendroid colony, with the corallites budding at an acute angle. In cross-section the corallites are round to oval. The septa are compact in the periphery, with perforations and trabecular prolongations in the axial part forming a parietal columella. They are developed in four cycles. 32 septa reach into the centre of the corallite, the others are shorter. They are laterally dentate. The wall is thick and septothecal. FELIX considers that it is thick due to the thickenings of the sclerodermites in the wall. The endotheca consists of tabulate dissepiments.

Dimensions: $d = (3)5-7$ mm, $s = 32-48$.

Comparison: FELIX (1903: 282) ascribed REUSS' species *Aplophyllia crassa* to the genus *Dendrosmilia*. But during his revision ALLOITEAU (1957: 198) found that the Tertiary genus *Dendrosmilia* has a different microstructure from that of the species *crassa*, and that this species does not belong to *Dendrosmilia*.

By a study of our material I came to the conclusion that the species *crassa* belongs to the genus *Pleurocora*. It is very similar to *Pleurocora haueri*, and is distinguished only by its thicker wall and smaller and sparser corallites.

Distribution: Senonian of Gosau, where it is very rare.

New locality: Orešje (N—3), Santonian-Campanian.

Genus: *Astraraea* FELIX 1900
Astraraea media (SOWERBY 1832)

Pl. 13, Figs. 3—5

Description: A massive cylindrical colony, with dimensions of only $3 \times 1 \times 1$ cm. The corallites are thamnasterioid; here and there they are separated by a narrower or wider perithecium. On the surface the calices are

deepened, being polygonal or round in cross-section. The septa are perforated and are developed in four cycles. They are laterally and dorsally dentate. In the axial part there are trabecular prolongations forming a parietal columella. The endotheca consists of periphery sinapcticulae and vesicular dissepiments. The microstructure is not preserved.

Dimensions: $d = 4-6$ mm, $s = 30-36$.

Comparison: The species *A. corbarica* (ALLOITEAU 1939: 19-20) has the same diameter of corallites as *A. media*, but it has more septa. But in *A. media*, REUSS (1854: 119) and FELIX (1903: 187) mentioned 36-60 septa, too. So it might be possible that *A. corbarica* is a younger synonymus of *A. media*.

Distribution: Santonian of Gosau and of Southern France, and of Anatolia (Romania). In Yugoslavia it is mentioned in the Campanian of Vrbovačka reka in Serbia.

New locality: Orešje (O-7-1 D, O-7-4 A), Santonian-Campanian.

Genus: *Thamnoseris* ÉTALLON 1858
Thamnoseris hoernesii (REUSS 1854)

Pl. 13, Figs. 1-2

Description: A massive cerioid colony with the shape of a bulb or crust. It has dimensions $4 \times 6 \times 6$ cm. The corallites are polygonal, joined directly with a thin, incomplete, parasynapticular wall. The septa are developed in four cycles. The last two are unequal and incomplete. In some corallites axial prolongations of septa can be observed, which form a parietal columellar structure. The endotheca is vesicular dissepimental.

Dimensions: $d = 4-7$ mm, $s = 30-48$.

Comparison: ALLOITEAU (1957: 163) suggested that the species *Isastraea hoernesii* be ascribed to his new genus *Brachyseris*. I wrote about this genus and its revision (TURNŠEK et BUSER 1976), where I considered it to be a younger synonymus of *Thamnoseris*.

Distribution: Senonian of Gosau and India. Cenomanian of Abruzzi.

New locality: Orešje (N-9 A, N-4), Santonian-Campanian.

Genus: *Dermosmiliopsis* ALLOITEAU 1957

ALLOITEAU (1952: 671) completed his description of the genus with the photograpgs of the type species of *D. orbignyi* (1957: Pl. 4, Fig. 6), therefore the genus is valid. *Dermosmiliopsis* differs from the Jurassic genus *Dermosmilia* in that it has a rarer endotheca but more perforated septa. In the structure of the septa it is similar to *Brachyphyllia* REUSS, which is, however, placoid, whereas *Dermosmiliopsis* is phaceloid.

Dermosmiliopsis tenuicosta (REUSS 1854)

Pl. 14, Figs. 1—5

Description: A phaceloid colony having dimensions $9 \times 9 \times 4$ cm. The corallites are parallel, budding at an acute angle, extracalically in several directions. In cross-section the corallites are round to oval. The septa are numerous, thin, and developed in five cycles. They are perforated especially in their axial part, and have lateral dentations. Their axial prolongations form a parietal columella. The endothec consists of very thin, long dissepiments.

Dimensions: $d = 4-9$ mm, $s = ca\ 90$.

Comparison: REUSS (1854: 105) gave the diameter of the corallites of this species as 5—9 mm. In his picture (Pl. 6, Fig. 18) they are larger, so that specimen belongs to the species *D. orbignyi*.

REUSS ascribed this species to the genus *Rhabdophyllia*, which is characterized by massive plocoid colonies. The species *tenuicosta* is phaceloid. FELIX (1903: 303—305) ascribed the species *tenuicosta* to the genus *Stenosmilia*, but his specimens (see also ŞURARU 1961): have a clearly lamellar columella. So FELIX' specimens do not belong to *tenuicosta*, but they belong to some other species of *Stenosmilia*. *D. tenuicosta* belongs to *Dermosmiliopsis*. It has smaller corallites than type species *D. orbignyi*.

Distribution: Santonian of Corbières in Southern France and of Gosau in Austria.

New locality: Orešje (J—1, N—10), Santonian-Campanian.

Dermosmiliopsis orbignyi ALLOITEAU 1957

Pl. 15, Figs. 1—7

Description: A phaceloid colony with the parallel corallites, which are round in cross-section. The septa are developed in five cycles. They are perforated. The perforation is stronger in the younger cycles. The endotheca consists of thin dissepiments. The columella is parietal, papillous. The microstructure is not preserved.

Dimensions: $d = 10-25$ mm, $s = ca\ 100$.

Comparison: ALLOITEAU described this new species in 1952: 671 and gave it the year 1950. In 1957 (Pl. 14, Fig. 6) he made photographs of the holotype and once more marked the species as n. gen. n. sp. So we can use this last year considering all previous names as nomina nuda. Our specimens fit in wholly with the holotypus.

Distribution: Upper Santonian of Sougraigne in Southern France.

New locality: Orešje (O—11—1 B, N—5), Santonian-Campanian.

Genus: *Synastraea* MILNE-EDWARDS et HALME 1848

Synastraea procera (REUSS 1854)

Description: A thamnasterioid colony in the shape of a crust, having dimensions $5 \times 4 \times 2$ cm. The septa are strongly perforated, confluent, and developed in 3—4 cycles. The columella is papillous; the endotheca is synapticular. Microstructure is not preserved.

Dimensions: $d = 4-6$ mm, $s = 32-36$.

Comparison: The number of septa as given by several authors varies a lot. REUSS (1854: 120) quoted 24—30 septa in his texte, but the photographs of his specimens show 32—38, and even 50 septa. OPPENHEIM, (1930: 159—161) too, gave a different number, more than 30 septa. So our specimen fits in with the originals.

Distribution: Santonian of Gosau and of Southern France, Santonian-Campanian of Hungary.

New locality: Orešje (N—4), in the rock together with *Thamnoseris hoernesii*. Santonian-Campanian.

Genus: *Actinacis* d'ORBIGNY 1849

Actinacis martiniana d'ORBIGNY 1849

Pl. 16, Figs. 1—4

This species has already been described in our country (TURNŠEK 1968: 362, 372).

Distribution: Senonian of Gosau, Santonian of Southern France, Maastrichtian of Dragačevo in Western Serbia.

New locality: Orešje (O—7—1 G), Santonian-Campanian.

STRATIGRAPHIC COMPARISON OF THE CORAL SPECIES

The species found at Orešje on Mt Medvednica have so far been known from the localities at Gosau in Austria (16 of the same species), from various localities in Southern France (14 species), from Hungary (5 species), and Romania (3 species). One species was found in each of the following: Portugal and even India. In Yugoslavia so far 4 of the same coral species have been known from Serbia and one from Slovenia (see Fig. 4).

The corals from the Gosau area were attributed by REUSS (1854) to the Turonian and Senonian. Already FELIX (1903; 1914) restricted them to the Senonian. On the basis of new research into a large number of coral species from Gosau, L. and M. BEAUVAIS (1974: 484) placed them in the Santonian. In their opinion, in the Maastrichtian corals are everywhere in decline.

The Upper Cretaceous localities in Southern France are stratigraphically more exactly defined. All the species which were found at Orešje, are, in France, from the Santonian and one extends in to the Campanian, too (see ALLOITEAU 1954; 1957, L. et M. BEAUVAIS 1974).

The Hungarian localities have been placed by KOLOSVÁRY (1954) in the Senonian. He noted, however, that they belong to its middle part, the Santonian-Campanian, and do not extend into the Maastrichtian.

The coral species in Romania were found in the Santonian-Campanian (ŞURARU 1957; 1961), and in Portugal in the Campanian (FELIX (1903 b), BEAUVAIS et al. (1975).

The species from India is mentioned as belonging to the Senonian, without further specification (STOLICZKA 1873).

In Yugoslavia the so far known building corals come from Vrbovačka reka; they were placed by MILOVANOVIĆ (1939) in the Campanian. One species was found in the Maastrichtian of Kosjerić (TURNŠEK 1968), and one in the Senonian breccia on Banjška planota (TURNŠEK et BUSER 1976).

From all the comparisons it can be seen that the corals from Orešje are of Santonian-Campanian age. Thus the Santonian-Campanian age of the reef at Orešje, as was determined on the basis of rudists, foraminifers and nanoplankton (see POLŠAK et al. 1978), has been fully confirmed by the corals.

The palaeoecological conditions have been given mainly in the first, biostratigraphic description of the locality. The corals are colonial except for one specimen. The majority of the specimens are massive colonies, some are ramified. All of them are reef-builders or hermatypic. The occurrence of such corals points to a real reef formation. The small dimensions of the colonies, on the other hand, indicate poorer conditions for growth than existed for instance, in the Upper Jurassic. Broken ramifications of the corals and the broken inner parts of the septa testify to a restless environment during growth. The less favourable conditions for the reefs during the Upper Cretaceous have been explained by L. and M. BEAUVAIS (1974) by the increased quantity of terrigenous material, which hindered the growth of the coral colonies.

The primary locality of colony-forming Senonian corals has been so far known in Yugoslavia in Vrbovačka reka in Serbia. Orešje is from the same period and in all probability represents the same type of sedimentary area.

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TABLE — PLATES

Fotografije zbruskov so negativi, zbrusek je povečan direktno na papir.

All the photographs of thin sections are negatives, thin section being directly enlarged on to the paper.

TABLA 1

Actinastraea ramosa (MICHELIN 1847)

Nahajališče: Orešje, santonij-kampanij

- Sl. 1. Površina cerioidne kolonije, ki je vejaste ali ramosne oblike. Vzorec Z—1, x 1
- Sl. 2. Podolžno tangencialni presek ene vejice. Fosil je močno prekrystaliziran, vendar se vidijo cerioidni koraliti s septi in kolumelo. Zbrusek Z—1 a, x 8
- Sl. 3. Prečni presek vejice. Septalna struktura ohranjena samo na obrobju. Zbrusek Z—1 b, x 8

PLATE 1

Actinastraea ramosa (MICHELIN 1847)

Locality: Orešje, Santonian-Campanian

- Fig. 1. Cerioid colony is of ramose shape. The surface of the colony. Specimen Z—1, x 1
- Fig. 2. Longitudinal tangential section of the branch. The structure is badly preserved, however, the cerioid corallites with septa and columella can be seen. Thin section Z—1 a, x 8
- Fig. 3. Transverse section of one branch. Septal structure of corallites is preserved only in periphery. Thin section Z—1 b, x 8

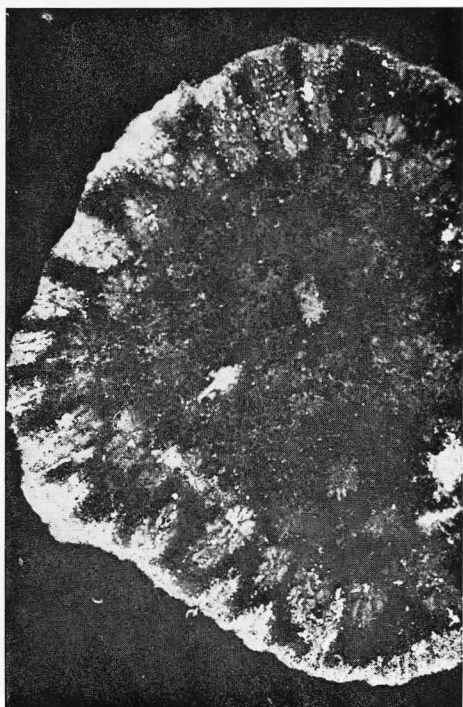
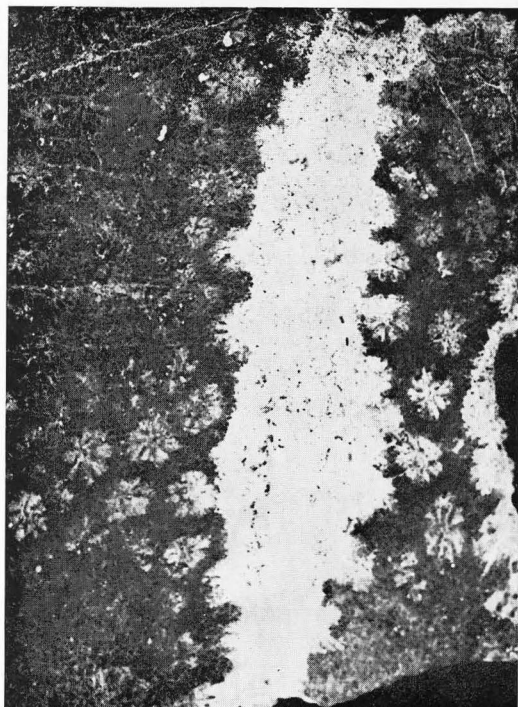


TABLA 2

Actinastraea octolamellosa (MICHELIN 1846)

Nahajališče: Orešje, santonij-kampanij

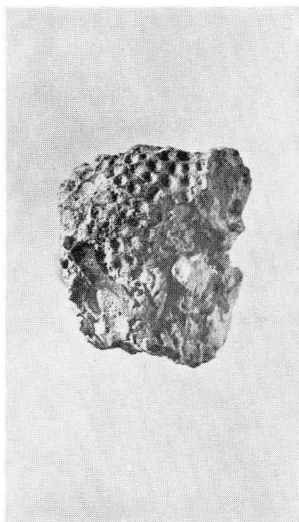
- Sl. 1. Površina cerioidne gomoljaste kolonije. Vzorec O—7—1 C, x 1
- Sl. 2. Ista kolonija, x 4
- Sl. 3. Prečni presek koralitov. Zelo slabo so ohranjeni, le v nekaterih je ohranjena septalna struktura. Zbrusek O—7—1 C a, x 4

PLATE 2

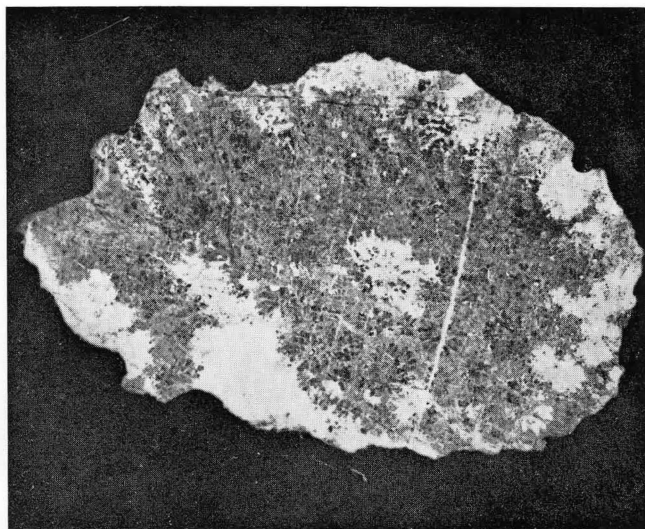
Actinastraea octolamellosa (MICHELIN 1846)

Locality: Orešje, Santonian-Campanian

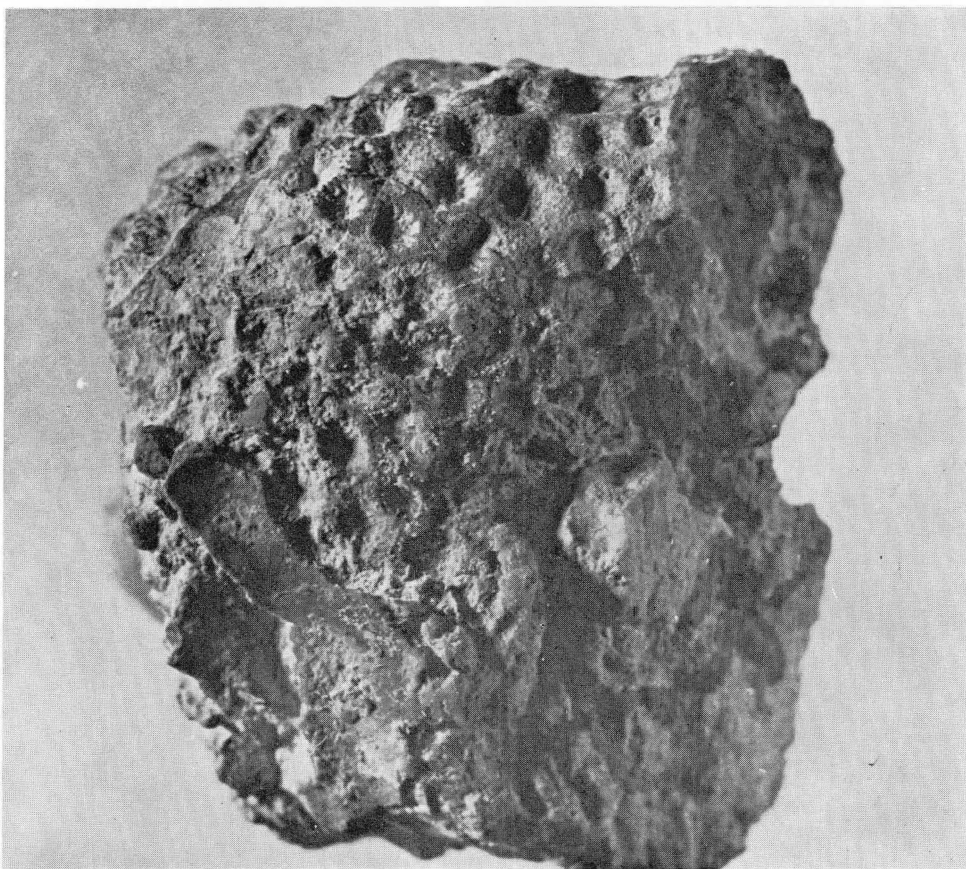
- Fig. 1. The surface of the cerioid bulbous colony. Specimen O—7—1 C, x 1
- Fig. 2. The same colony, x 4
- Fig. 3. Transverse section of corallites. Only in some of them the septal structure is preserved. Thin section O—7—1 C a, x 4



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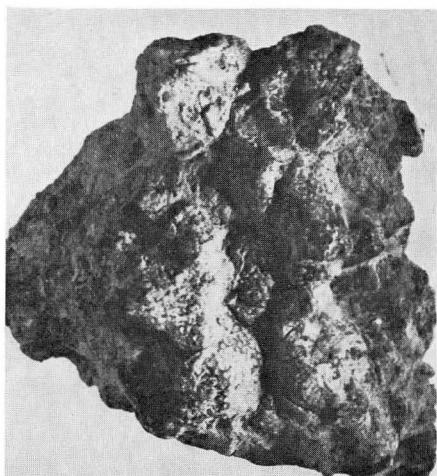
2

TABLA 3
Columactinastraea pygmaea (FELIX 1903)
Nahajališče: Orešje, santonij-kampanij

- Sl. 1. Površina cerioidne kolonije, ki ima obliko gomoljev ali nepravilnih vejic. Vzorec N—8 A, x 1
- Sl. 2. Prečni presek vejic s prečnim in deloma poševnim presekom koralitov. Zbrusek N—8 A a, x 4
- Sl. 3. Prečni presek koralitov. Zbrusek N—8 A b, x 4
- Sl. 4. Prečni in podolžni presek koralitov. Vidna papilozna kolumela. Zbrusek N—8 A b, x 8

PLATE 3
Columactinastraea pygmaea (FELIX 1903)
Locality: Orešje, Santonian-Campanian

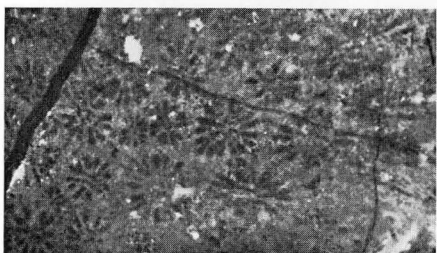
- Fig. 1. The surface of the cerioid colony which has the shape of bulbs or irregular branches. Specimen N—8 A, x 1
- Fig. 2. Transverse section of colony branches showing cross — and partly oblique — sections of corallites. Thin section N—8 A a, x 4
- Fig. 3. Transverse section of corallites. Thin section N—8 A b, x 4
- Fig. 4. Transverse and longitudinal sections of corallites. Note papillous columella. Thin section N—8 A b, x 8



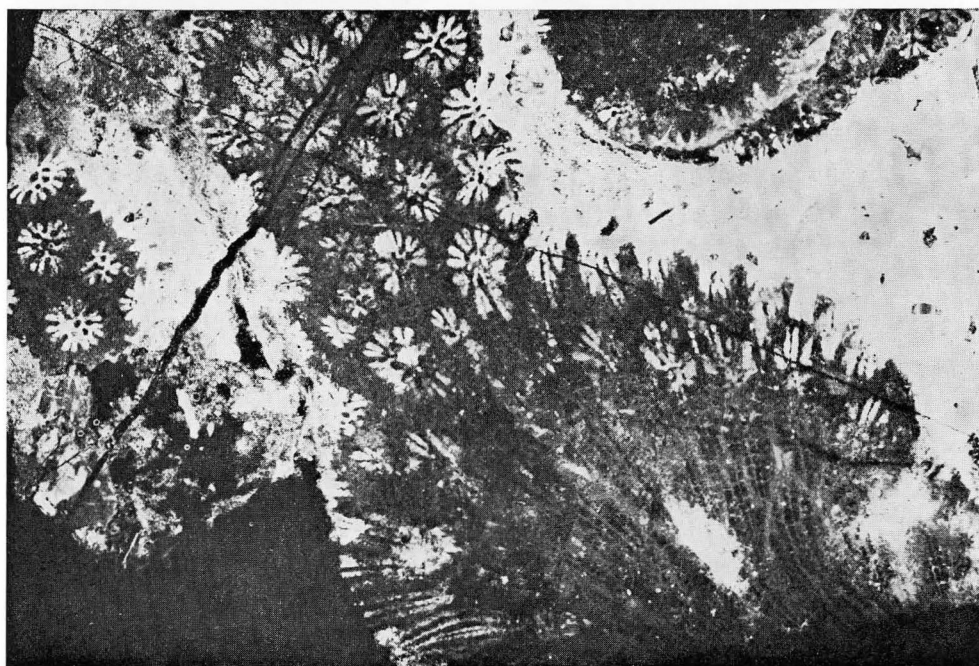
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TABLA 4

Columastraea striata (GOLDFUSS 1826)

Nahajališče: Orešje, santonij-kampanij

- Sl. 1. Površina masivne kolonije. Plokoidni koraliti so povezani s periteko.
Vzorec O—7—2 A, x 1
- Sl. 2. Ista kolonija, x 4

Columastraea formosa (GOLDFUSS 1826)

Nahajališče: Orešje, santonij-kampanij

- Sl. 3. Prečni presek koralitov, ki so povezani s tanko periteko. Zbrusek
O—7—2 B a, x 8

PLATE 4

Columastraea striata (GOLDFUSS 1826)

Locality: Orešje, Santonian-Campanian

- Fig. 1. The surface of the massive colony. Plocoid coralites are joined by the peritheca. Specimen O—7—2 A, x 1
- Fig. 2. The same colony, x 4

Columastraea formosa (GOLDFUSS 1826)

Locality: Orešje, Santonian-Campanian

- Fig. 3. Transverse section of corallites which are joined by narrow peritheca.
Thin section O—7—2 B a, x 8

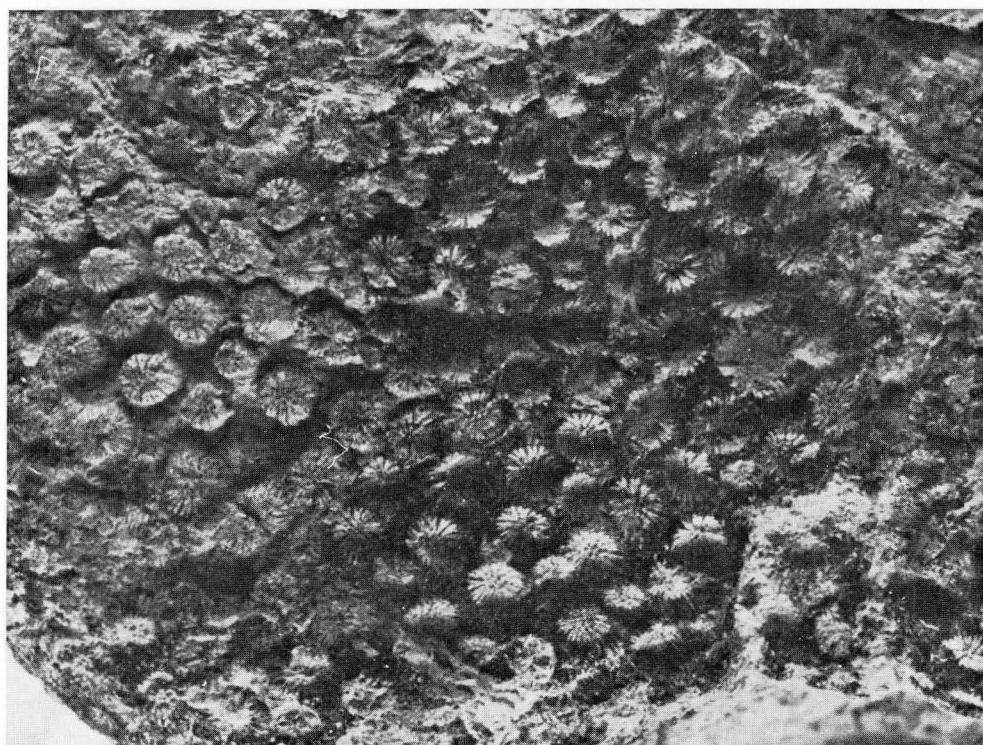
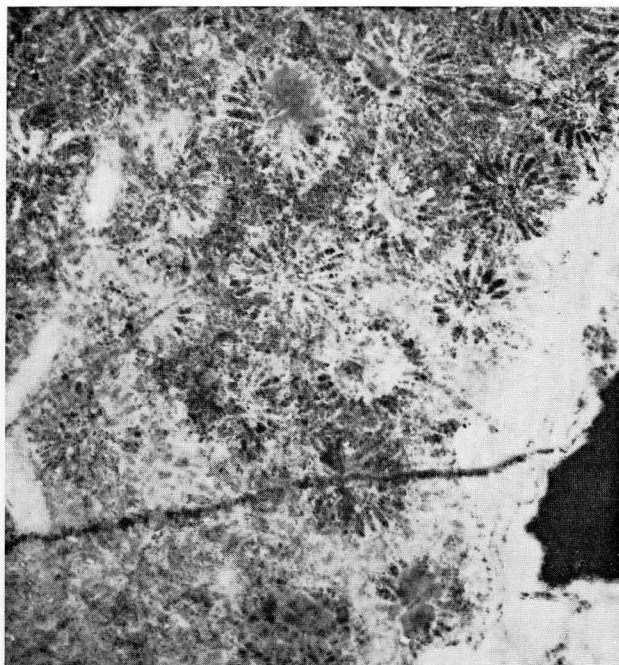


TABLA 5

Elasmophyllia deformis (REUSS 1854)

Nahajališče: Orešje, santonij-kampanij

Sl. 1. Faceloidna kolonija od strani. Vzorec O—5—3 B, x 1

Sl. 2. Prečni presek koralitov, ki so različno razpotegnjeni. Zbrusek O—5—3 B a, x 4

Mycetophylliopsis antiqua (REUSS 1854)

Nahajališče: Orešje, santonij-kampanij

Sl. 3. Površina kolonije s serialnimi koraliti. Vzorec O—7—1 L, x 1

Sl. 4. Prečni presek koralitnih serij. Zbrusek O—7—1 L a, x 4

PLATE 5

Elasmophyllia deformis (REUSS 1854)

Locality: Orešje, Santonian-Campanian

Fig. 1. Phaceloid colony from the side. Specimen O—5—3 B, x 1

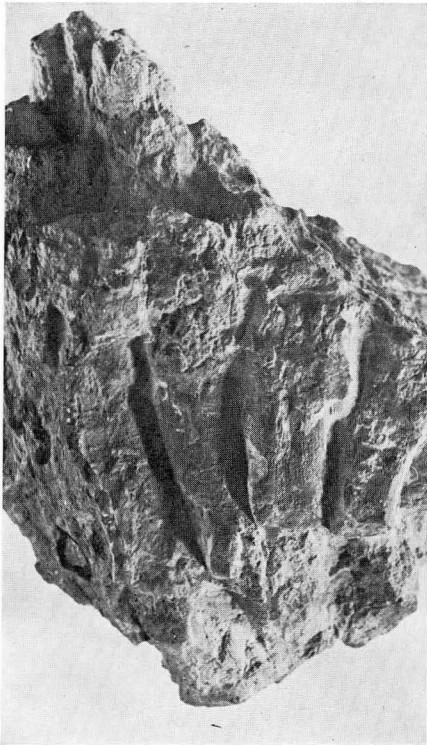
Fig. 2. Transverse section of irregularly prolonged corallites. Thin section O—5—3 B a, x 4

Mycetophylliopsis antiqua (REUSS 1854)

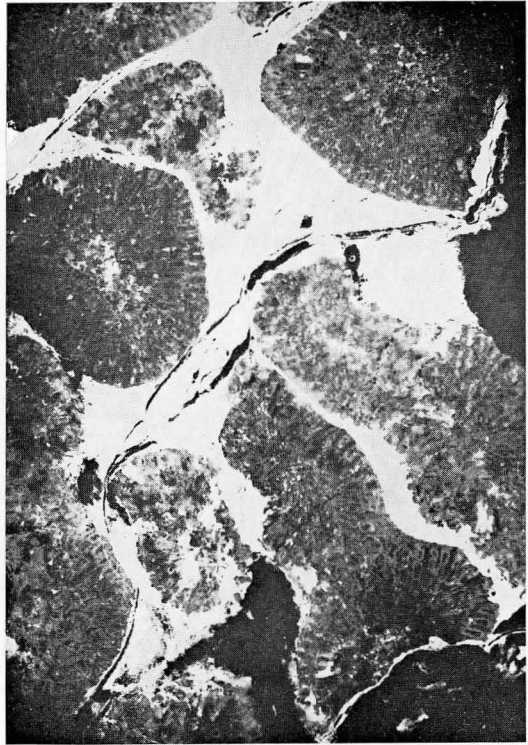
Locality: Orešje, Santonian-Campanian

Fig. 3. The surface of the colony with the series of corallites. Specimen O—7—1 L, x 1

Fig. 4. Transverse section of the corallite series. Thin section O—7—1 L a, x 4



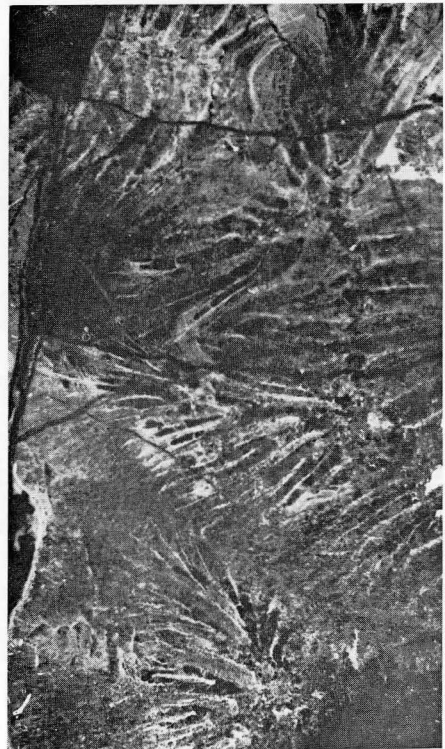
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TABLA 6

Ellipsosmilia sp.

Nahajališče: Orešje, santonij-kampanij

- Sl. 1. Prečni presek koraluma. Zbrusek N—7 a, x 4
- Sl. 2. Del istega preseka koraluma, x 8
- Sl. 3. Površina koraluma od strani. Vzorec N—7, x 1

PLATE 6

Ellipsosmilia sp.

Locality: Orešje, Santonian-Campanian

- Fig. 1. Transverse section of the corallum. Thin section N—7 a, x 4
- Fig. 2. The part of the same section, x 8
- Fig. 3. The surface of the corallum from the side. Specimen N—7, x 1

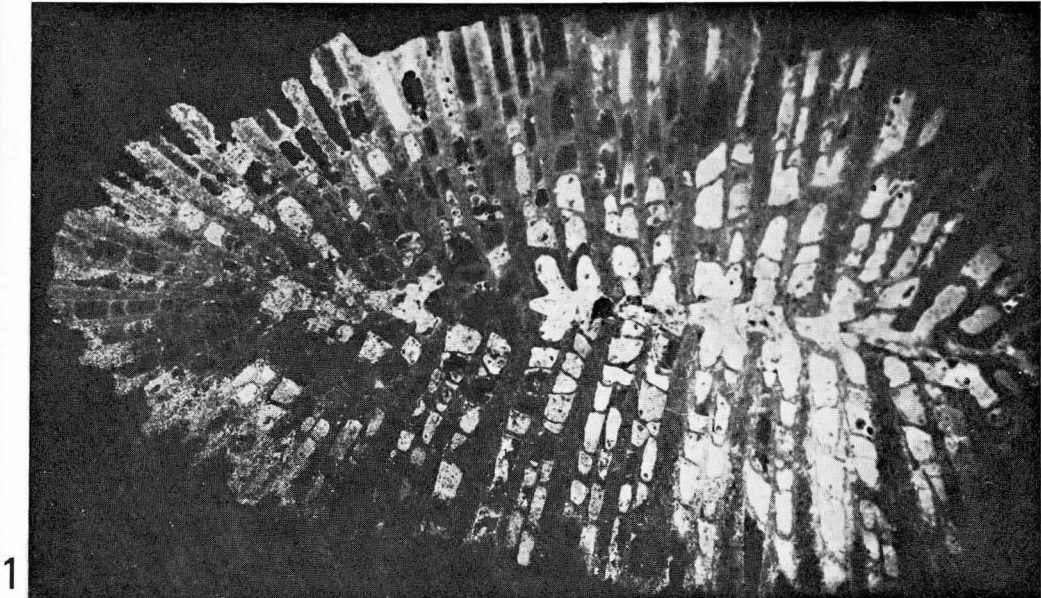


TABLA 7

Procladocora simonyi (REUSS 1854)

Nahajališče: Orešje, santonij-kampanij

- Sl. 1—5. Prečni preseki koralitov. Zbruski iz vzorca O—7—1 K, vsi x 4
Sl. 6. Prečni presek dveh koralitov. V enem so septa polomljena. Zbrusek O—7—1 F b, x 8
Sl. 7. Podolžni aksialni presek koralita. Zbrusek O—7—1 F a, x 8

PLATE 7

Procladocora simonyi (REUSS 1854)

Locality: Orešje, Santonian-Campanian

- Figs. 1—5. Transverse sections of corallites. Thin sections of the specimen O—7—1 K, all x 4
Fig. 6. Transverse section of two corallites. In one of them septa are broken. Thin section O—7—1 F b, x 8
Fig. 7. Longitudinal axial section of one corallite. Thin section O—7—1 F a, x 8

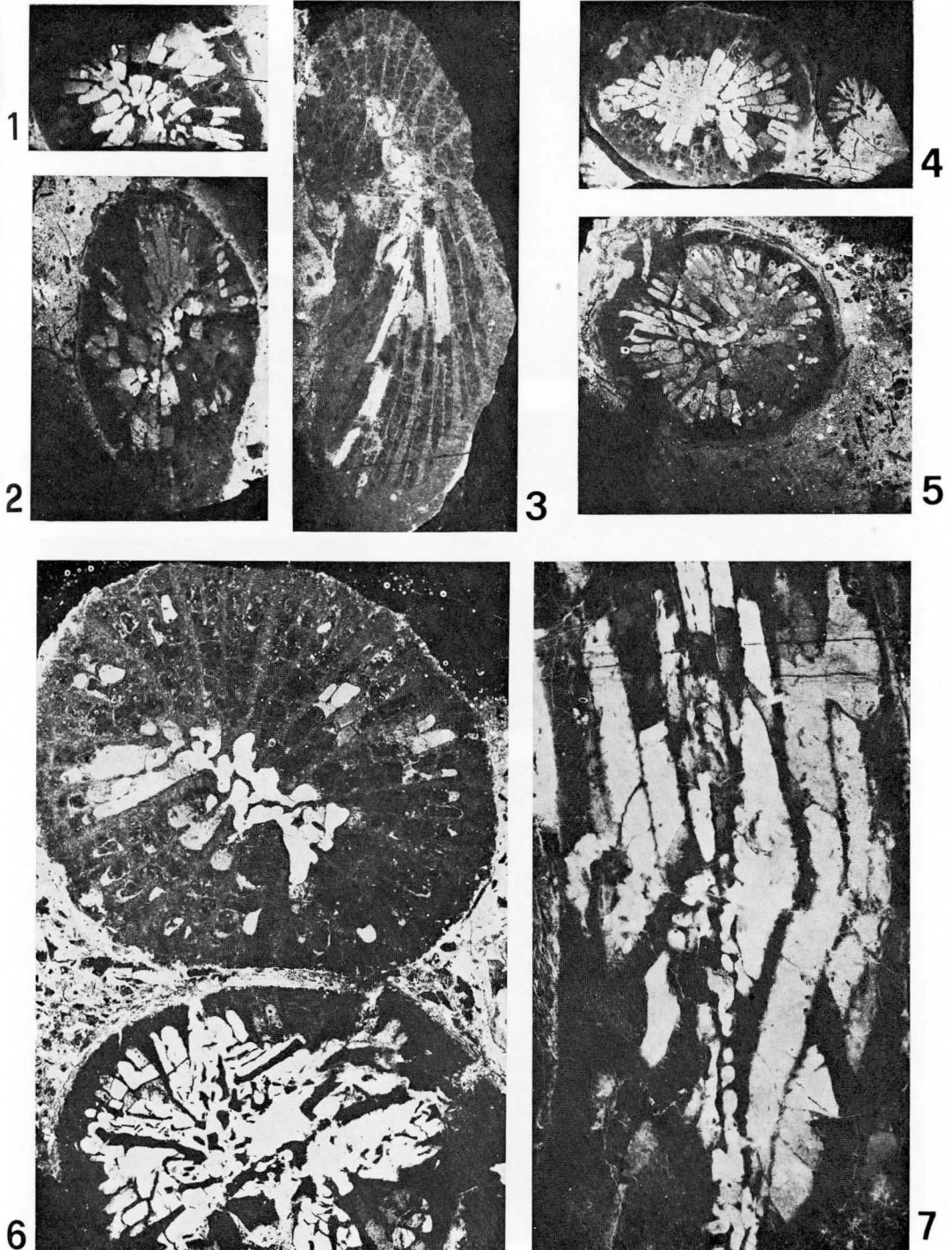


TABLA 8

Procladocora tenuis (REUSS 1854)

Nahajališče: Orešje, santonij-kampanij

- Sl. 1, 2. Prečni presek koralitov. Zbrusek O—7—1 R a, x 4
Sl. 3. Podolžni presek enega koralita. Zbrusek O—7—1 R b, x 4
Sl. 4, 5. Prečni presek koralitov. Septa so kompaktna, toda polomljena. Isti zbrusek kot na sl. 1, 2, x 8
Sl. 6. Podolžni presek koralita. Zbrusek O—7—1 R b, x 8
Sl. 7. Zbrusek s prečnimi in podolžnimi preseki koralitov. O—7—4 B, x 4
Sl. 8. Prečni presek koralitov. Septa so vijugasta, toda kompaktna. Isti zbrusek kot sl. 7, x 8
Sl. 9. Podolžni presek koralita. Isti zbrusek kot sl. 7, x 8

PLATE 8

Procladocora tenuis (REUSS 1854)

Locality: Orešje, Santonian-Campanian

- Figs. 1, 2. Transverse sections of corallites. Thin section O—7—1 R a, x 4
Fig. 3. Longitudinal section of one corallite. Thin section O—7—1 R b, x 4
Figs. 4, 5. Transverse section of corallites. Septa are compact, but broken. The same thin section as Figs. 1, 2, x 8
Fig. 6. Longitudinal section of corallite. Thin section O—7—1 R b, x 8
Fig. 7. Thin section with the transverse and longitudinal sections of corallites. O—7—4 B, x 4
Fig. 8. Transverse section of two corallites. Septa are curved but compact. Part of Fig. 7, x 8
Fig. 9. Longitudinal section of corallite. Part of Fig. 7, x 8

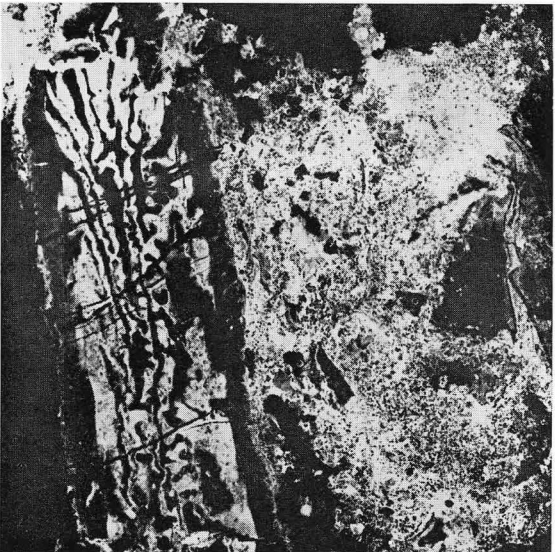
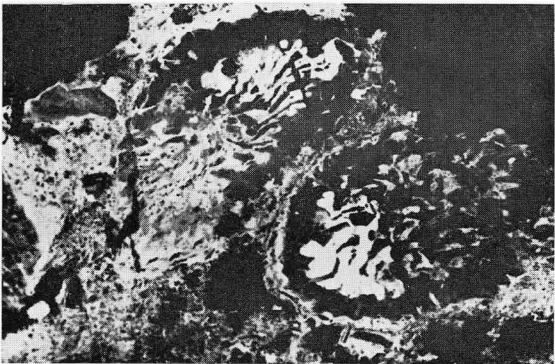
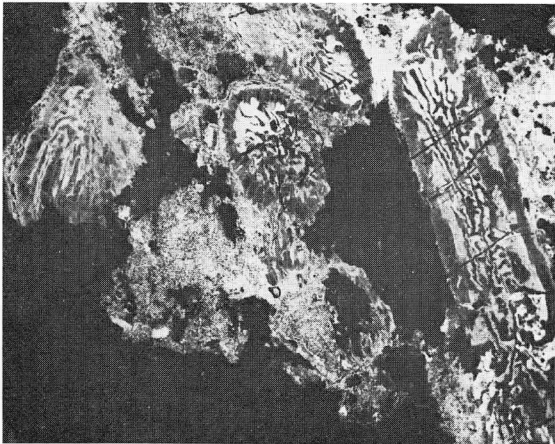
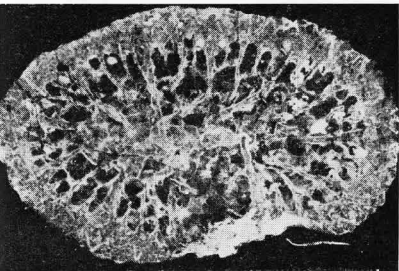
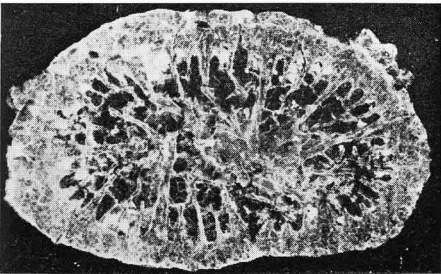
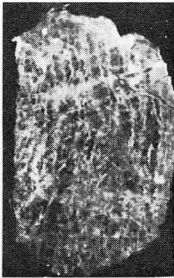
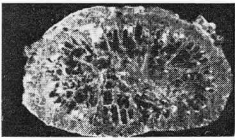
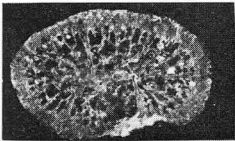


TABLA 9

Phyllocoeniopsis sp.

Nahajališče: Orešje, santonij-kampanij

Sl. 1. Masivno plokoidna kolonija gomoljaste oblike. Vzorec N—8 B, x 1

Phyllocoeniopsis pediculata (DESHAYES 1831)

Nahajališče: Orešje, santonij-kampanij

Sl. 2, 3. Prečni presek koralitov. Različna ohranjenost sept in periteke. Zbrussek N—1 a, x 4

Sl. 4, 5. Del zbruska s slik 2 in 3, x 8

PLATE 9

Phyllocoeniopsis sp.

Locality: Orešje, Santonian-Campanian

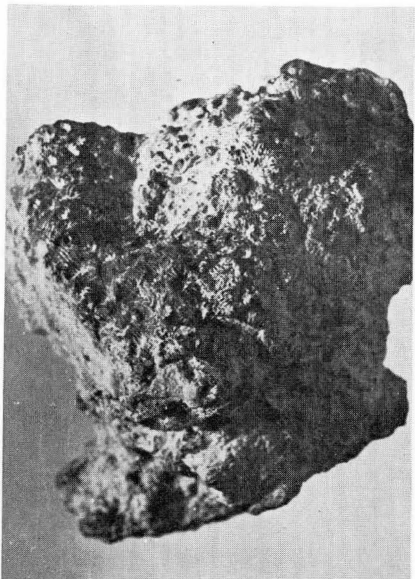
Fig. 1. Massive plocoid colony of bulbous shape. Specimen N—8 B, x 1

Phyllocoeniopsis pediculata (DESHAYES 1831)

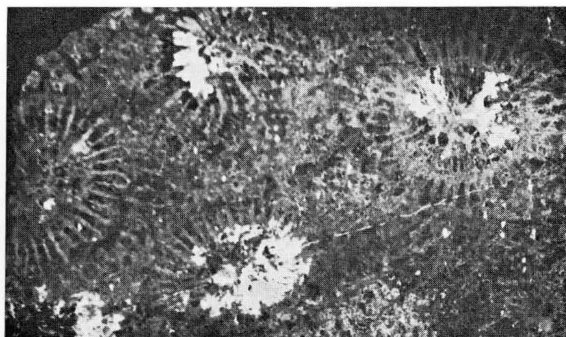
Locality: Orešje, Santonian-Campanian

Figs. 2, 3. Transverse section of corallites. Different preservation of septa and peritheca. The same thin section N—1 a, x 4

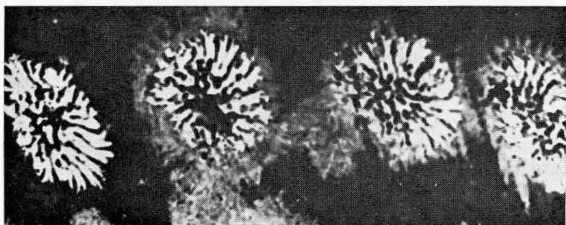
Figs. 4, 5. Part of the thin section of Figs. 2, 3, x 8



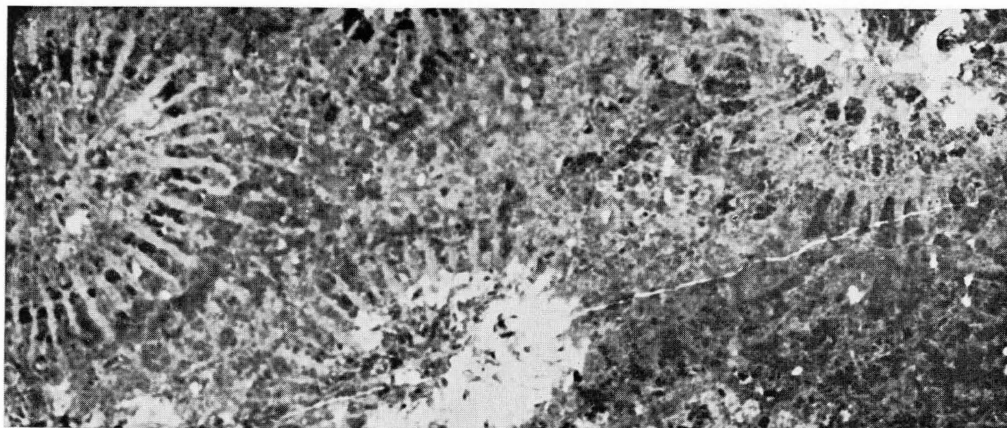
1



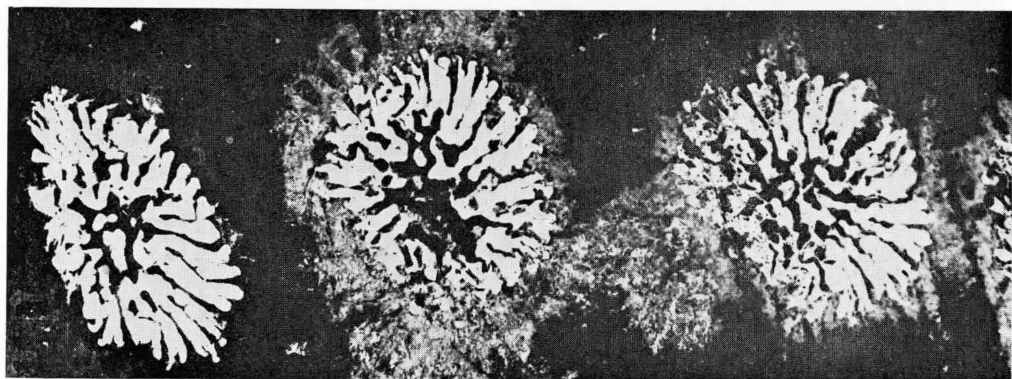
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3



4



5

TABLA 10

Neocoenia lepida (REUSS 1854)

Nahajališče: Orešje, santonij-kampanij

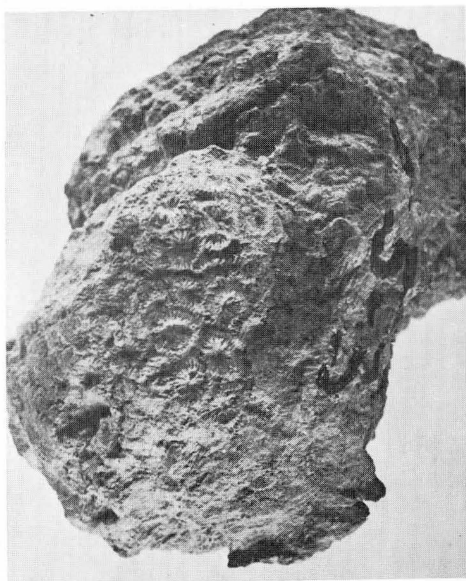
- Sl. 1. Površina masivne kolonije z izbočenimi čašami in različno široko periteko. Vzorec O—5—3 A, x 1
Sl. 2. Del iste površine, x 4
Sl. 3. Prečni presek koralitov. Zbrusek O—5—3 A a, x 4

PLATE 10

Neocoenia lepida (REUSS 1854)

Locality: Orešje, Santonian-Campanian

- Fig. 1. The surface of the massive colony with arised calices and narrower or wider peritheca. Specimen O—5—3 A, x 1
Fig. 2. Part of the same colony, x 4
Fig. 3. Transverse section of corallites. Thin section O—5—3 A a, x 4



1



3



2

TABLA 11
Pleurocora haueri MILNE-EDWARDS et HAIME 1848
Nahajališče: Orešje, santonij-kampanij

- Sl. 1. Zbrusek s prečnimi in podolžnimi preseki koralitov. O—5—3 D b, x 4
Sl. 2. Prečni presek dveh koralitov. Lepo vidna perforirana septa. Zbrusek
O—5—3 D e, x 8
Sl. 3. Podolžni presek koralita. Zbrusek SG—1 d, x 8

PLATE 11
Pleurocora haueri MILNE-EDWARDS et HAIME 1848
Locality: Orešje, Santonian-Campanian

- Fig. 1. Thin section with several transverse and longitudinal sections of corallites. O—5—3 D b, x 4
Fig. 2. Transverse section of two corallites. Note perforated septa. Thin section O—5—3 D e, x 8
Fig. 3. Longitudinal section of one corallite. Thin section SG—1 d, x 8

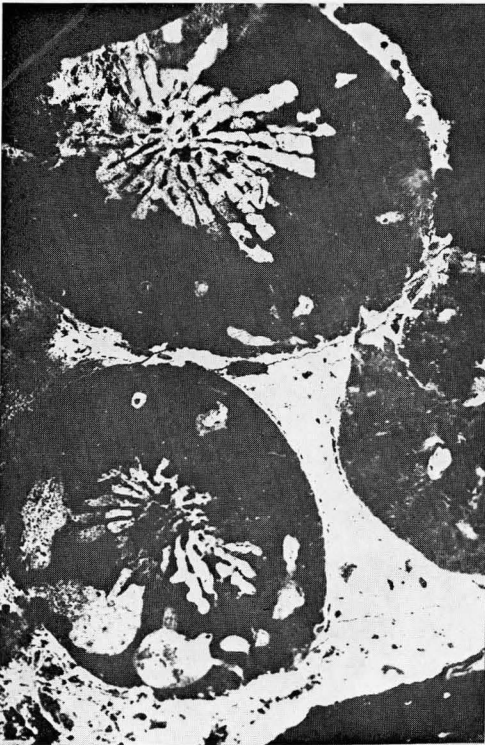
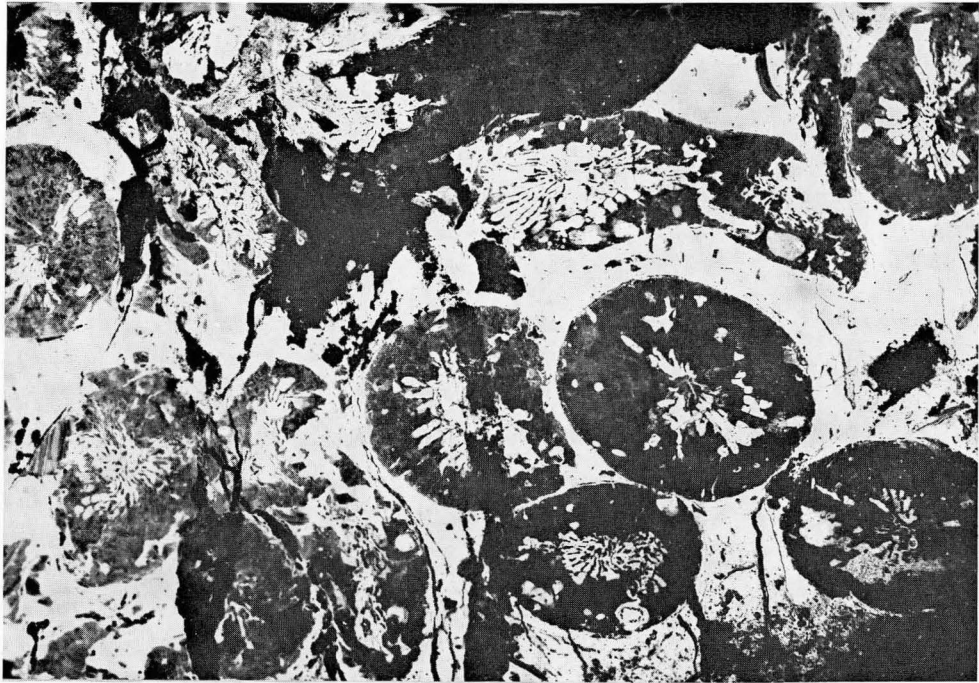


TABLA 12

Pleurocora crassa (REUSS 1854)

Nahajališče: Orešje, santonij-kampanij

- Sl. 1. Podolžni in prečni presek koralitov. Zbrusek N—3 a, x 4
- Sl. 2. Prečni presek koralita s sl. 1. Lepo vidna perforirana septa in debela stena. x 8
- Sl. 3. Podolžni presek koralita s sl. 1, x 8
- Sl. 4. Prečni in podolžni presek koralitov. Zbrusek N—3 b, x 4
- Sl. 5. Isto kot sl. 4, x 8

PLATE 12

Pleurocora crassa (REUSS 1854)

Locality: Orešje, Santonian-Campanian

- Fig. 1. Longitudinal and transverse sections of corallites. Thin section N—3 a, x 4
- Fig. 2. Transverse section from the Fig. 1. Note perforated septa and thick wall. x 8
- Fig. 3. Longitudinal section of corallite from the Fig. 1, x 8
- Fig. 4. Transverse and longitudinal sections of two corallites. Thin section N—3 b, x 4
- Fig. 5. The same as Fig. 4, x 8

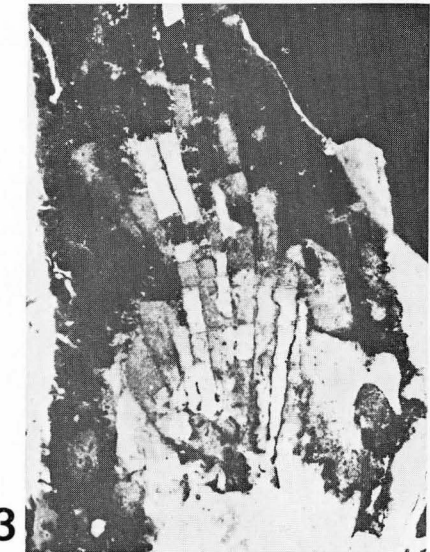
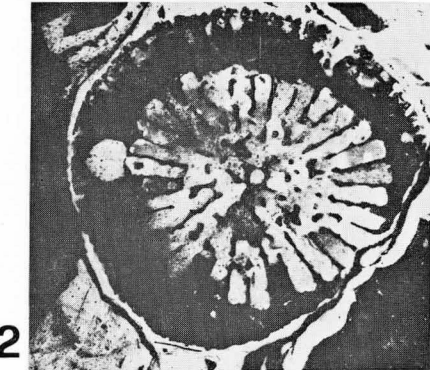
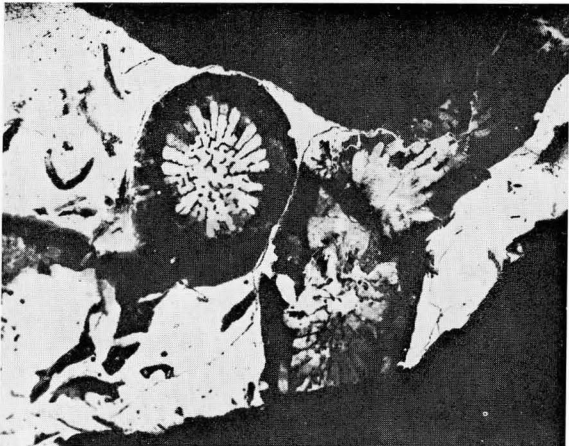
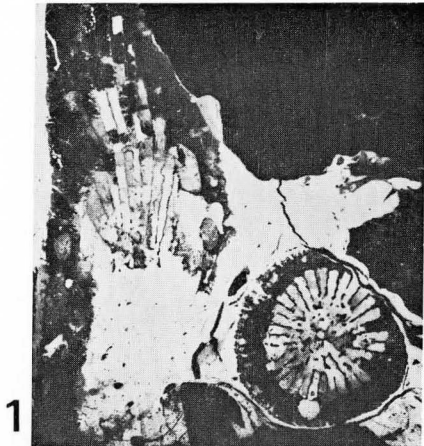


TABLA 13

Thamnoseris hoernesii (REUSS 1854)

Nahajališče: Orešje, santonij-kampanij

- Sl. 1. Površina masivne cerioidne kolonije gomoljaste oblike. Vzorec N—4, x 1
Sl. 2. Ista površina, x 4

Astraraea media (SOWERBY 1832)

Nahajališče: Orešje, santonij-kampanij

- Sl. 3. Površina masivne gomoljaste kolonije. Vzorec O—7—4 A, x 1
Sl. 4—5. Prečni presek tamnasterioidnih koralitov. Mestoma vmes mrežasta periteka. Zbrusek O—7—4 A, x 4

PLATE 13

Thamnoseris hoernesii (REUSS 1854)

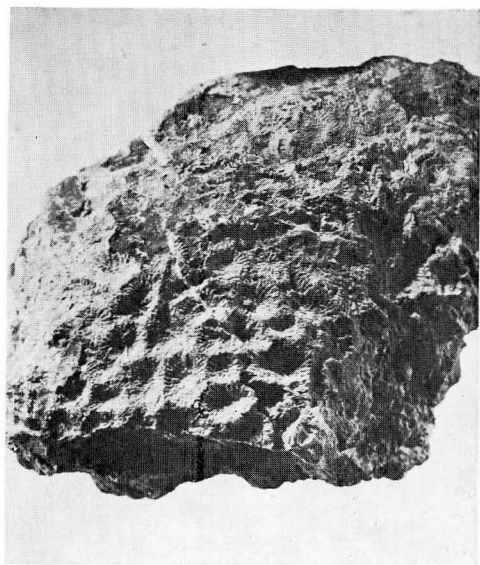
Locality: Orešje, Santonian-Campanian

- Fig. 1. The surface of the cerioid colony of bulbous shape. Specimen N—4, x 1
Fig. 2. Part of the same surface, x 4

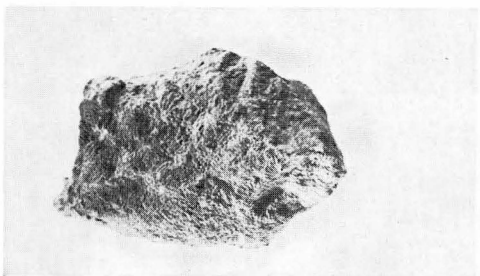
Astraraea media (SOWERBY 1832)

Locality: Orešje, Santonian-Campanian

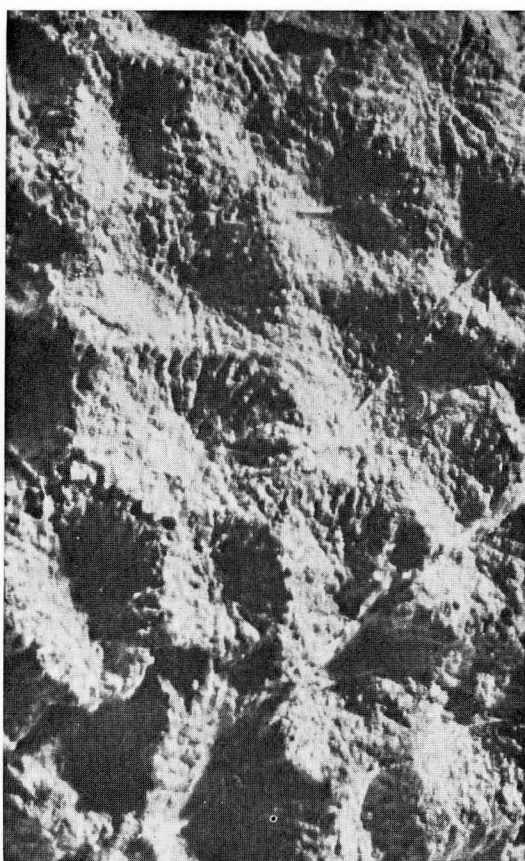
- Fig. 3. The surface of the bulbous colony. Specimen O—7—4 A, x 1
Figs. 4—5. Transverse section of thamnasterioid corallites. Here and there reticulate peritheca between them. Thin section O—7—4 A a, x 4



1



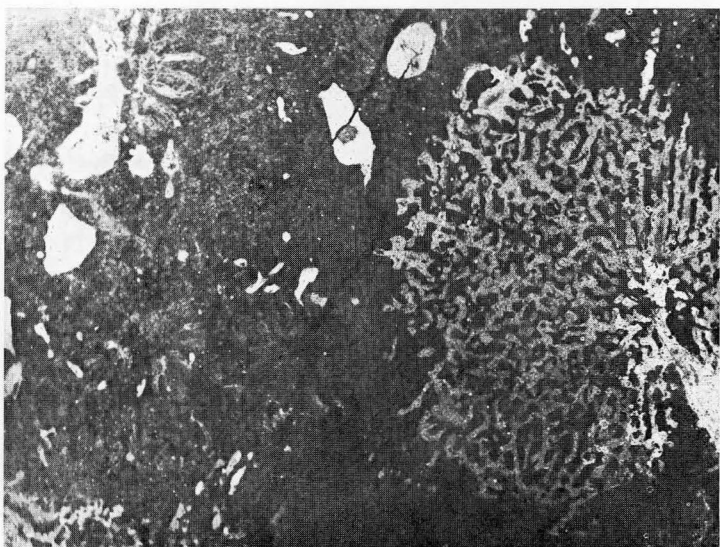
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TABLA 14

Dermosmiliopsis tenuicosta (REUSS 1854)

Nahajališče: Orešje, santonij-kampanij

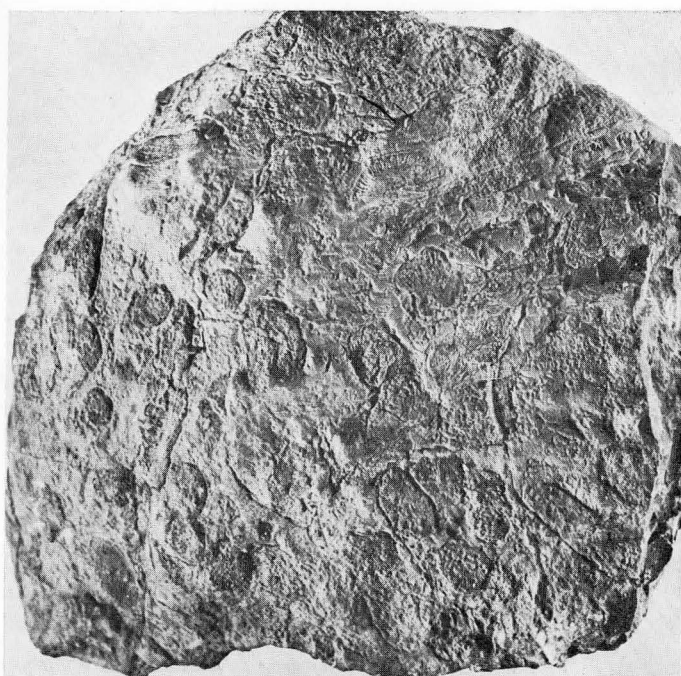
- Sl. 1. Površina kamenine s koralno kolonijo. Vzorec J—1, x 1
- Sl. 2. Podolžni presek enega koralita. Zbrusek J—1 b, x 4
- Sl. 3. Prečni presek koralita, aksialni del s parietalno kolumelo. Zbrusek J—1 b, x 4
- Sl. 4. Prečni presek dveh koralitov. Zbrusek J—1 a, x 4
- Sl. 5. Prečni presek koralita s sl. 4, x 8

PLATE 14

Dermosmiliopsis tenuicosta (REUSS 1854)

Locality: Orešje, Santonian-Campanian

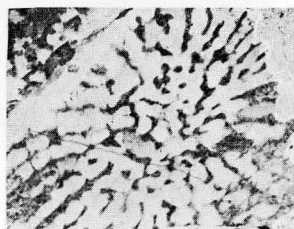
- Fig. 1. The surface of the stone with the coral colony. Specimen J—1, x 1
- Fig. 2. Longitudinal section of one corallite. Thin section J—1 b, x 4
- Fig. 3. Transverse section of one corallite, its axial part with the parietal columella. Thin section J—1 b, x 4
- Fig. 4. Transverse section of two corallites. Thin section J—1 a, x 4
- Fig. 5. Transverse section of corallite from Fig. 4, x 8



1



2



3



4



5

TABLA 15

Dermosmiliopsis orbignyi ALLOITEAU 1957

Nahajališče: Orešje, santonij-kampanij

- Sl. 1. Prečni presek koralita. Zbrusek N—5 a, x 4
- Sl. 2. Podolžni presek koralita. Struktura močno prekristalizirana. Zbrusek N—5 b, x 4
- Sl. 3. Prečni presek koralita. Ohranjen je samo del septalnega aparata. Zbrusek O—11—1 B j, x 4
- Sl. 4. Isto kot sl. 3, x 8
- Sl. 5. Podolžni, nekoliko poševni, presek koralita s perforiranimi septi. Zbrusek O—11—1 B i, x 4
- Sl. 6. Isto kot sl. 5, x 8
- Sl. 7. Podolžni presek koralita. Zbrusek O—11—1 B h, x 8

PLATE 15

Dermosmiliopsis orbignyi ALLOITEAU 1957

Locality: Orešje, Santonian-Campanian

- Fig. 1. Transverse section of one corallite. Thin section N—5 a, x 4
- Fig. 2. Longitudinal section of one corallite. Structure very badly preserved. Thin section N—5 b, x 4
- Fig. 3. Transverse section of one corallite. Only a part of septal structure is preserved. Thin section O—11—1 B j, x 4
- Fig. 4. The same as Fig. 3, x 8
- Fig. 5. Longitudinal, a little oblique, section of one corallite with perforated septa. Thin section O—11—1 B i, x 4
- Fig. 6. The same as Fig. 5, x 8
- Fig. 7. Longitudinal section of one corallite. Thin section O—11—1 B h, x 8

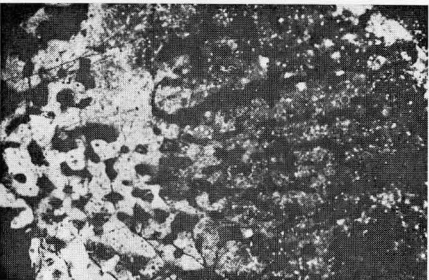
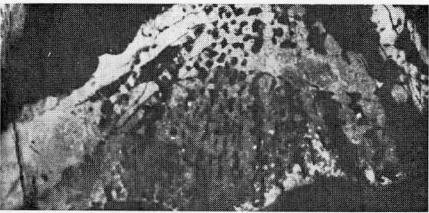
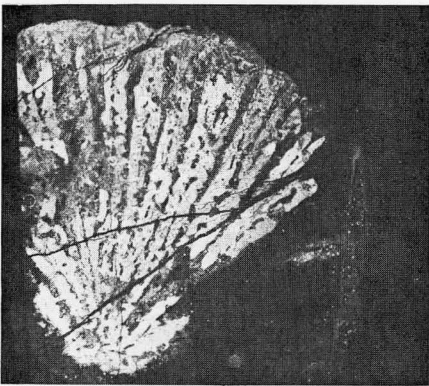
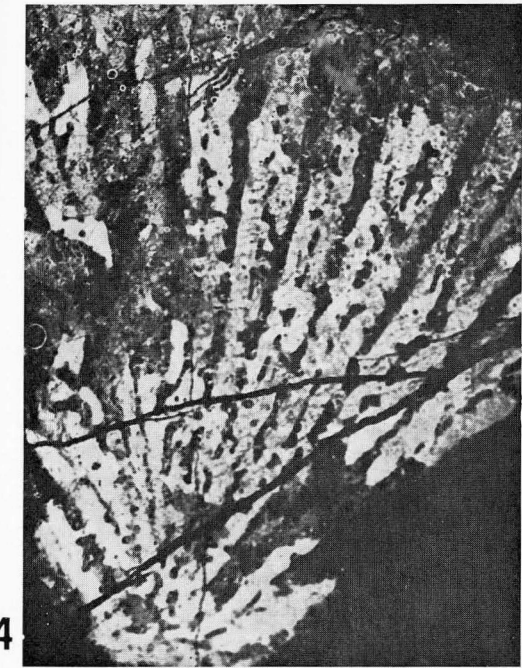
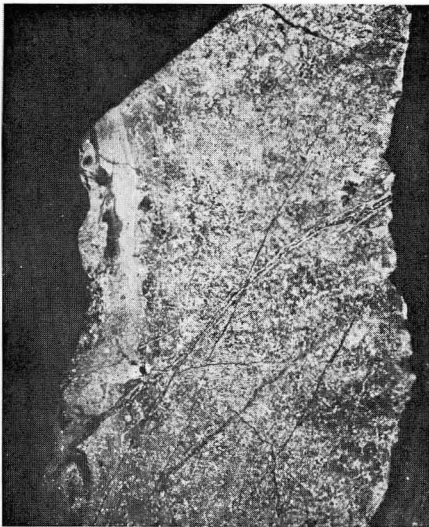
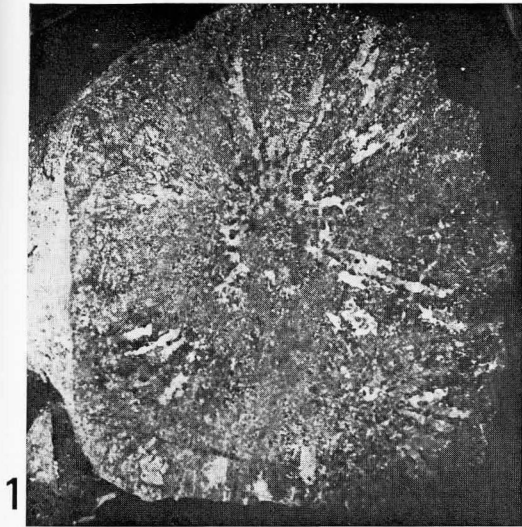


TABLA 16

Actinacis martiniana d'ORBIGNY 1849

Nahajališče: Orešje, santonij-kampanij

- Sl. 1. Prečni presek kolonije. Zbrusek 0—7—1 G a, x 4
Sl. 2. Podolžni presek kolonije. Zbrusek 0—7—1 G b, x 4
Sl. 3. Isto kot sl. 2, x 8
Sl. 4. Isto kot sl. 1, x 8

PLATE 16

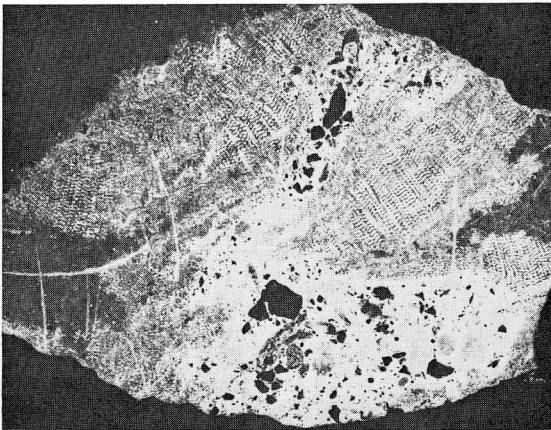
Actinacis martiniana d'ORBIGNY 1849

Locality: Orešje, Santonian-Campanian

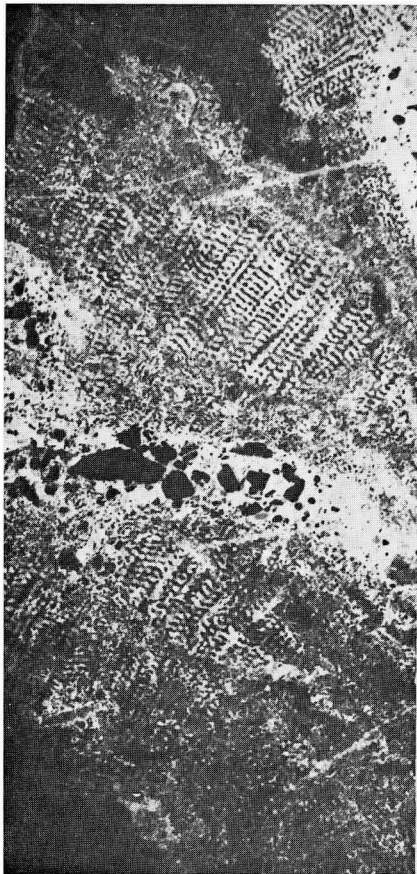
- Fig. 1. Transverse thin section of the colony. O—7—1 G a, x 4
Fig. 2. Longitudinal thin section of the colony. O—7—1 G b, x 4
Fig. 3. The same as on Fig. 2, x 8
Fig. 4. The same as on Fig. 1, x 8



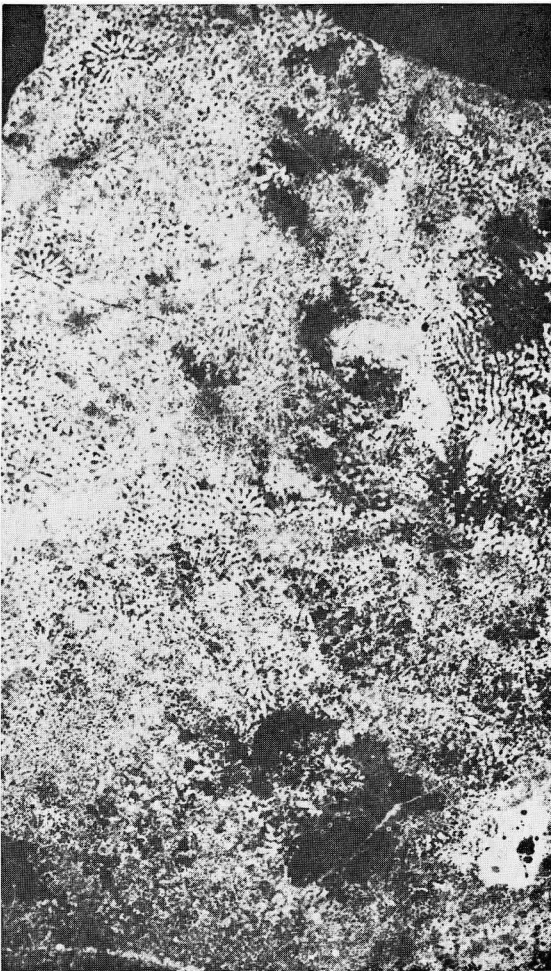
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Izdala
Slovenska akademija znanosti in umetnosti
v Ljubljani

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1978

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