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PRELIMINARY OBSERVATIONS ON THE UPPER CRETACEOUS CORAL–RUDIST FACIES OF OSTUNI (SOUTH–EASTERN MURGE, APULIA)*

ANGELA LAVIANO**

Key–words: rudists, stratigraphy, palaeoecology, Upper Cretaceous, southern Italy.

Riassunto. Nel presente lavoro vengono esposti i primi risultati di ricerche stratigrafiche, paleontologiche e paleoecologiche condotte su una successione carbonatica del Cretaceo superiore affiorante nelle Murge sud–orientali.

La successione è stata suddivisa in due parti: l'intervallo inferiore comprendente i primi 72 m è caratterizzato da una alternanza di calcari micritici con bioclasti e biomicriti in strati dello spessore di circa 1 m con macrofossili (Rudiste e frammenti di altri Lamellibranchi) concentrati in nidi, Foraminiferi bentonici (Miliolidi e Textularidi), Ostracodi ed Alghe calcaree. L'intervallo superiore (circa 100 m) è caratterizzato da facies bioermali a Coralli e Rudiste in banchi a stratificazione irregolare, alternate a calcareniti ricche in Gasteropodi, Echinidi, Ostreidi e, nelle parti più alte, in associazioni ichnofaunistiche. Sulla base della macrofauna la successione è stata riferita ad un intervallo di tempo compreso tra il Coniaciano ed un probabile Maestrichtiano.

Summary. The Upper Cretaceous carbonate platform deposits of Ostuni have been studied from a stratigraphical, palaeontological and palaeoecological point of view.

In the sequence studied two parts can be distinguished: the lower one consists of stratified biomicritic limestones with clusters of rudists, other pelecypods and microfauna, represented by ostracods, algae and benthonic foraminifers; the upper one consists of a sequence of coral–rudist buildups with banks of calcarenites and calcirudites characterized by trace fossil assemblages, gastropods, rudists, other pelecypods and benthonic and planktonic foraminifers.

The lithobiofacies analyses and their vertical succession suggest a model of local platform carbonate facies distribution: from bottom to top the sequence shows an evolution from environments of "inner zone", the main facies of which is represented by wackestones with bioclasts, to environments of "outer zone" with moderately to strongly agitated water and open circulation, the main facies of which is represented by packstones and grainstones with coral–rudist communities alternating with mollusk, echinoid, foraminifer communities and trace fossil assemblages.

The macropalaeontological analyses testify to a Coniacian to a probably Maastrichtian age because of the presence of *Biradiolites angulosus, B. martellii, B. monopterus, Gorjanovicia costata, Youfia* cf. *reticulata, Mitrocaprina* sp., *Sabinia* cf. *aniensis, Hippurites sulcatus, H. nabresinensis, H. colliciatus.*

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** Department of Geology and Geophysics of the University of Bari.

Introduction.

Situated in the south–eastern murgian area, the succession studied, referable to the lower and middle part of the «Calcare di Altamura» unit, as been reconstructed by means of the study of many stratigraphical sections. These are located around Ostuni: Tav. 191 III SW «Casalini», III NE «Villanova», III SE «Ostuni» of the Italian Geological Map. In particular the sections outcrop near the coastal belt at Mass.ia Gorgognolo, at the rail–way station of Ostuni, at Contrada S. Lorenzo and between Ostuni and Mt. S. Oronzo (Fig. 1).

The Department of Geology and Geophysics for many years has been conducting detailed investigations (both structural and palaeogeographical) of the Apulian mesozoic carbonate platform.

In this paper, which can be considered as part of this research program, the preliminary results of a stratigraphical, palaeontological and facies analysis studies carried out in the examined area, are described.

Foreword.

Up to now, the investigated area (Fig. 1), as well as the south–eastern Murge, have not been subject to detailed study; therefore previous research mostly concerns general geological feature.

De Giorgi (1881), one of the first authors, has been the only one to give a detailed and still valid tectonic and stratigraphic description of the Cretaceous of the south–eastern Murge and Salento; in particular he identified the area between Ostuni and Carovigno as belonging to the Upper Cretaceous, due to the occurrence of the following rudist species: *Radiolites alata* d'Orbigny, *Hippurites cornuvaccinum* Brönn, *H. organisans* Desmaret, *H. sulcatus* Defrance.

Di Stefano (1892) referred to the Upper Urgonian the limestones outcropping near Fasano–Ostuni, which were attributed to the Jurassic in the first edition of the Italian Geological Map. The author considers them to be similar to the limestones with *Toucasia carinata* (Matheron) found in the area around Corato (Bari). Furthermore he assigned to the upper Turonian the overlying limestones which outcrop around Mola di Bari, Ruvo ... as far as Ostuni, Carovigno ... and Matera.

Successively Virgilio (1900) published a monographic study in which he accepted Di Stefano's view about the chronostratigraphic data.

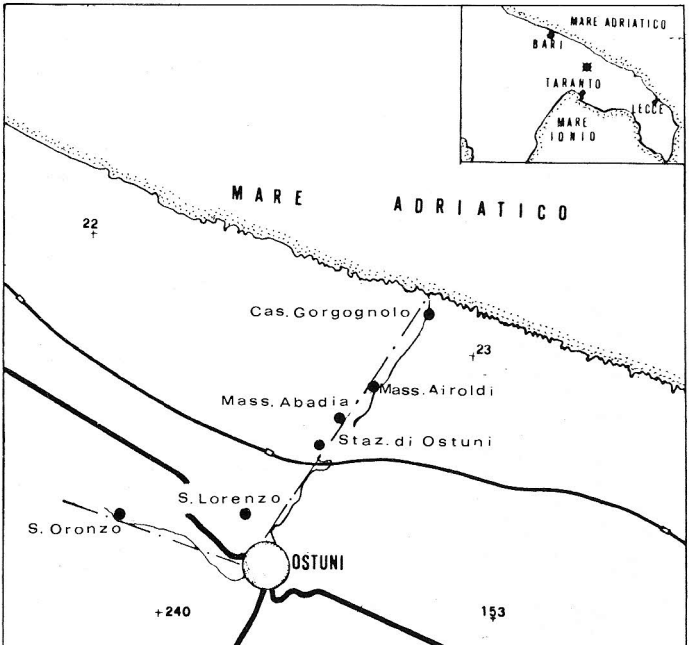
Campobasso and Olivieri (1967) are the first recent authors to carry out a geological and palaeontological study in the south–eastern Murge. The authors distinguish two lithostratigraphic units and refer to them provisionally with the names «Calcare di Fasano» and «Calcare di Ostuni».

The first unit outcropping along the escarpment that extends from the outskirts of Fasano to those of Ostuni, is referred to the Turonian and to the

Lower Senonian, due to the occurrence of *Biradiolites angulosus* d'Orbigny, *Durania martellii* Parona, *Radiolites* cf. *spinulatus* Parona, *Caprinula* sp., *Chondrodonta* sp., *Ichthyosarcholites* sp., *Plagioptychus* cf. *aguilloni* d'Orbigny, *Hippurites* sp., *Eoradiolites* sp., *Distefanella salmojraghi* Parona. Furthermore, in the upper levels of the unit the authors had recognized the presence of *Dicyclina schlumbergeri* Munier–Chalmas, *Accordiella conica* Farinacci, *Thaumatoporella parvovesiculifera* (Raineri), *Rotaliidae, Miliolidae, Textulariidae, Ophthalmidiidae, Valvulinidae* and had considered this assemblage as characteristic of the Senonian age.

The second unit which outcrops in the area of the town of the same name, as well as in the Ceglie Messapico Murge region ... , is referred to the Lower and Middle Senonian due to the occurrence of *Hippurites socialis* Douvillé, *Medeella* cf. *acuticostata* Torre, *Durania martellii* Parona, *Radiolites praegalloprovincialis* Toucas, *Biradiolites* cf. *dainellii* Parona, *Radiolites angeioides* (Lapeirouse) Lamarck, *Radiolites* cf. *spinulatus* Parona, *Biradiolites lumbricoides* Douvillé, *Hippurites* cf. *sulcatus* Defrance, *Bournonia* cf. *retrolata* (Astre).

In the same area Vezzani (1968) recognizes the presence of a carbonatic



succession (200 meters thick) referable to the Cenomanian–Senonian. The author attributes the lowest levels of the succession, outcropping for a thickness of 50–60 metres, to the Cenomanian–Turonian due to the presence of *Chondrodonta* sp., *Sauvagesia* sp., *Caprinula* sp., *Caprina* sp., and Nerineids. This part of the succession is visible, also, in the area of Ostuni station and in the quarries faces of Mass.ia Airoldi and Mass.ia Abadia. In some samples coming from the coastal belt, the author observes the presence of *Bacinella irregularis* Radoicic and *Haplophragmoides* sp., that is an association that seems to correspond with the *Cuneolina pavonia parva* Cenozone (Sartoni & Crescenti, 1962) and in particular with the upper part of this Cenozone (Cenomanian) due to the absence of primitive *Cuneolina* spp.

The upper part (150 m thick), without locating of the outcrops, is referred to the Turonian and to the Coniacian on the basis of the following species: *Radiolites* sp., *Hippurites* sp., *Durania martellii* Parona, *Hippurites* cf. *socialis* Douvillé, *Biradiolites angulosus* d'Orbigny, *Youfia reticulata* (Boehm); whereas the microfauna marks an age between Upper Turonian and Senonian (Coniacian –Santonian) for the presence of the following species: *Dicyclina schlumbergeri* Munier–Chalmas, *Cuneolina pavonia parva* Henson, *Pseudolituonella reicheli* Marie, *Stensioeina* sp., *Miliolidae, Textulariidae, Valvulinidae, Rotaliidae, Ophthalmidiidae* and, in the upper levels, species such as *Accordiella conica* Farinacci, *Siderolites* sp., and *Murgiella lata* Luperto Sinni.

Interesting unpublished data referable to the eastern part of the studied area are to be found in a degree thesis, Mastromatteo (1972). Mastromatteo's data established that: the coastal belt outcrops, considered Cenomanian in age by Vezzani (op. cit.) can be assigned to the Upper Senonian on the basis of the presence of rudists assignable to the genus *Youfia* and microfauna such as *Accordiella conica* Farinacci, *Moncharmontia apenninica* (De Castro) and orbitoids belonging to the group of the *Orbitoides media*; the outcrops of Mass.ia Airoldi and Mass.ia Abadia, considered Cenomanian–Turonian in age by Vezzani, can be assigned to the Senonian on the basis of the presence of *Accordiella conica* Farinacci; the outcrops of the railway station and that of the S. Lorenzo area, the first of which was considered Cenomanian–Turonian by Vezzani, can be assigned to the Turonian–Lower Senonian, due to the presence of *Gorjanovicia martinensis* Campobasso, *Biradiolites monopterus* Parona, *Durania martellii* Parona, *Durania japigiae* Campobasso, *Distefanella raricostata* Sliskovic.

Stratigraphy

The sections have been sampled along two segments: the first east of Ostuni, from the coastal belt to the village and the second one from the village to Mt. S. Oronzo (Fig. 1). The surrounding area has been also examined for a

better understanding of the stratigraphic and facies distribution; the localities investigated are schematically listed in Fig. 1. A mediate interpolation among studied outcrops has allowed us to define a stratigraphic succession, the schematic trend of which, within some limitation, is outlined in Fig. 2.

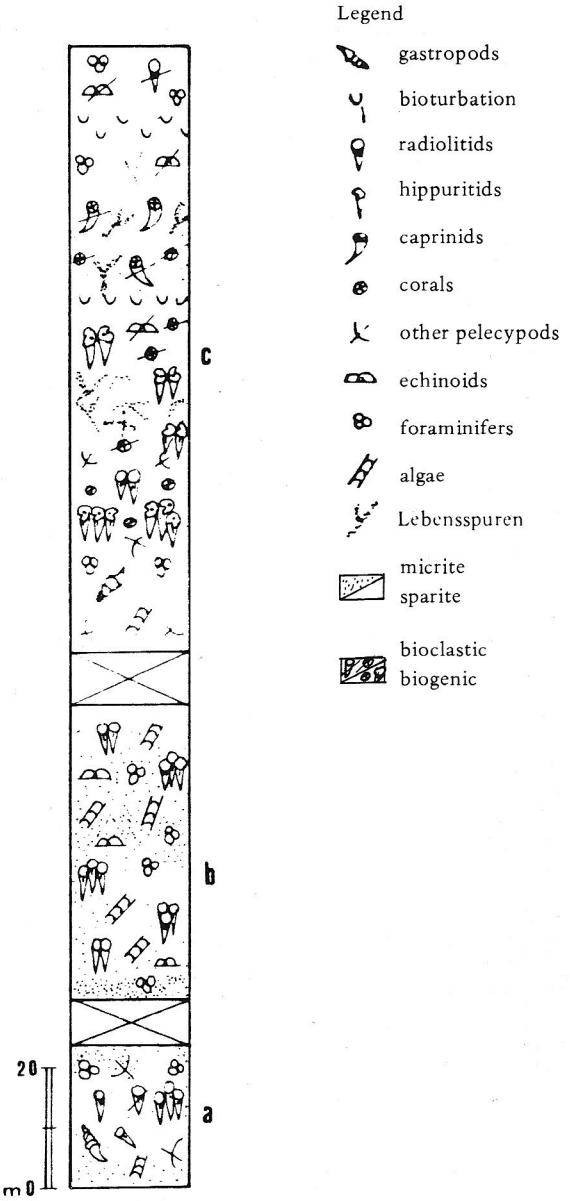


Fig. 2 – Lithology and faunal content of the carbonate sequence, schematized; a) Ostuni rail–way station section; b) S. Lorenzo area section; c) «Strada dei Colli» section.

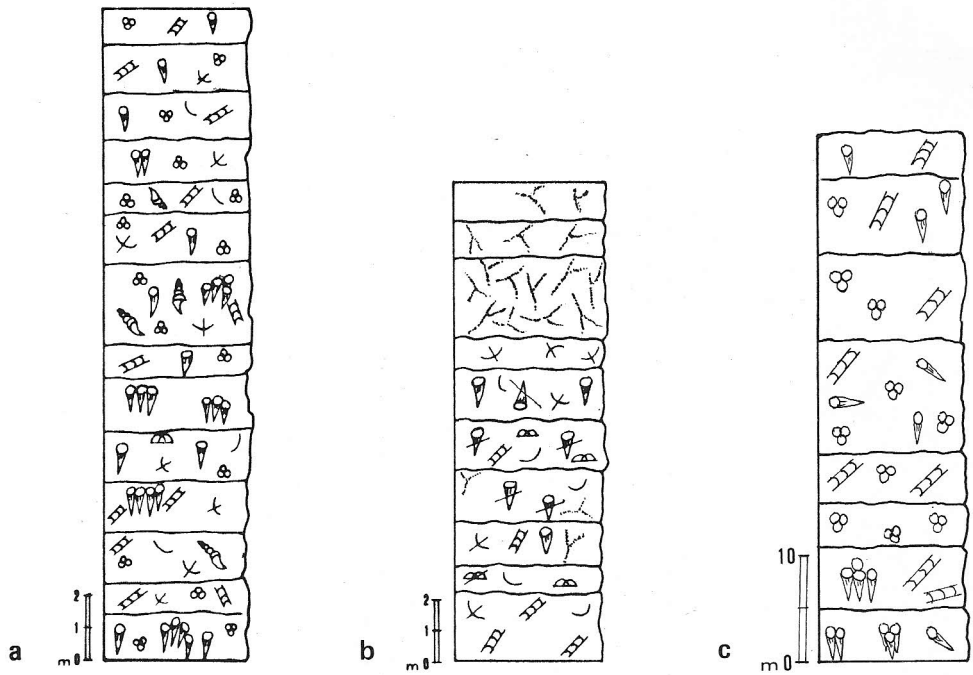


Fig. 3 – Stratigraphic sections of Ostuni rail–way station (a), Mass.ia Airoldi (b), S. Lorenzo area (c); the symbols are illustrated in Fig. 2.

The lower part of the succession outcrops in a quarry face near the rail–way station of Ostuni for a thickness of about 22 m, and in quarries located near Mass.ia Airoldi (15 m thick) and Mass.ia Abadia (20 m thick). In the western zone, that is the S. Lorenzo area, stratified micritic and biomicritic limestones (50 m thick) visible along the road from the cemetery Ostuni overlie the first succession (Fig. 3a, b, c).

Westward of Ostuni town, the middle and upper parts of the succession (100 m thick) outcrop along the road from Ostuni to Mt. S. Oronzo («Strada dei Colli section») (Fig. 4a). In addition, in the coastal belt of the area, in a quarry front near Mass.ia Gorgognolo, layers of bioclastic limestones with rudists and foraminifers outcrop for a thickness of about 10 m (Fig. 4b); this may be correlated with the upper part of the Mt. S. Oronzo succession.

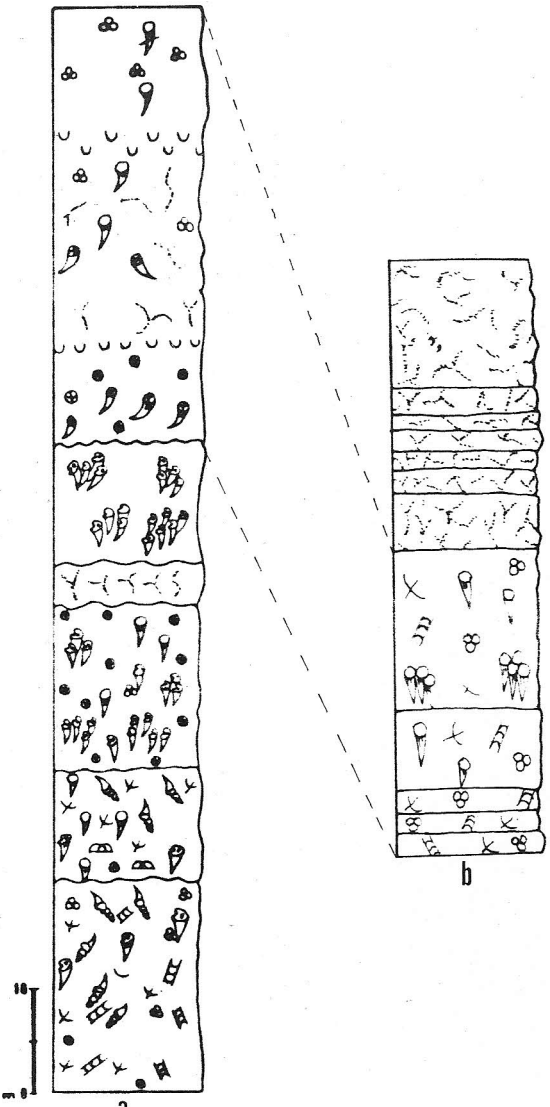
While the first part is characterized by monotonous carbonate facies variably distributed even over short distances, well preserved bioconstructed bodies with corals and rudists in growth position are frequent in the second part. Often these bodies, especially the coral facies, are rather small, about one metre in size (Fig. 5).

Finally, in a natural section visible in the town of Ostuni an impressive exposure (4 m thick) of biogenic bank of caprinids, radiolitids, and hippuritids can be observed (Fig. 6).

Description of the stratigraphic sequence.

Lower part (Ostuni rail–way station section) (Fig. 3a).

It is characterized by monotonous regularly stratified white limestones, the thickness of which is in the range of about 1 m, and by the presence of several assemblages of rudists together with a few other pelecypods. The lithotypes consist of micrites with bioclasts, biomicrites, micrites and dolomicrites.



The most frequent sedimentary structure consists of diffuse irregular bioturbations and micrite envelopes that can be observed around the edges of pelecypods. The skeletal fragments are composed of small foraminifers (miliolids, textularids, *Cuneolina* sp., *Accordiella conica* Farinacci, *Arnaudiella* sp.) and algal fragments (*Thaumatoporella parvovesiculifera* (Raineri), *Aeolisaccus kotori* Radoicic) reaching higher percentage in the upper part where the rudists are rare. The coarser fraction is formed by pelecypods debris and rare *Thaumatoporella parvovesiculifera* (Raineri).

From a textural point of view these lithotypes are mud–supported sediments with a prevailing wackestone texture. The more important diagenetic

Fig. 5 – Particular view of the upper level with corals which marks the bioclastic bank visible also in Fig. 7 («Strada dei Colli» section).

characteristics are given by wide dolomitization masking the original texture that was composed of biomicrite and micrite.

Though the fossils are altogether plentiful, they are not distributed evenly, but are concentrated in clumps. The results of the identifications, which were rendered more complex by the intense diagenetic processes that the fossil have been subject to and by the considerable cementation of the sediment, are reported below:

Biradiolites angulosus d'Orbigny, *B. martellii* (Parona), *B. monopterus* (Pirona), *Bournonia* sp., *Radiolites spinulatus* Parona, *Durania japigiae* Campobasso, *Gorjanovicia campobassoi* Laviano, *G. costata* Polsak, *G. martinensis* Campobasso.

The outcrops of Mass.ia Airoldi and Mass.ia Abadia (Fig. 3 b) show the same lithological features, yet are characterized by an extreme rarefaction of the megafaunistic content and a respective increase in microfauna with *Cuneolina* sp., fragments of *Rotaliidae* and *Diciclinidae, Accordiella conica* Farinacci.

The lower part underlies the sequence outcropping along the roadway cutting leading from Ostuni station to the town, in the vicinity of Contrada S. Lorenzo which is composed of a stratified succession (50 m thick) of greyish–

Fig. 6 – Reefoid limestone with large-sized specimens of hippuritids in physiologic arrangement. (Ostuni town, section).

white layers of biomicrites and dolomicrites. The megafauna is represented by *Biradiolites monopterus* Parona, *Durania* sp., *Gorjanovicia martinensis* Campobasso, *Bournonia* sp. The microfauna is constituted by miliolids, textularids, *Thaumatoporella parvovesiculifera* (Raineri), and *Aeolisaccus kotori* Radoicic (Fig. 3c).

Middle and upper part («Strada dei Colli» section) (Fig. 4a).

This sequence (100 m thick), whose point of contact with the underlying limestone is not visible, displays particular characteristics with respect to those

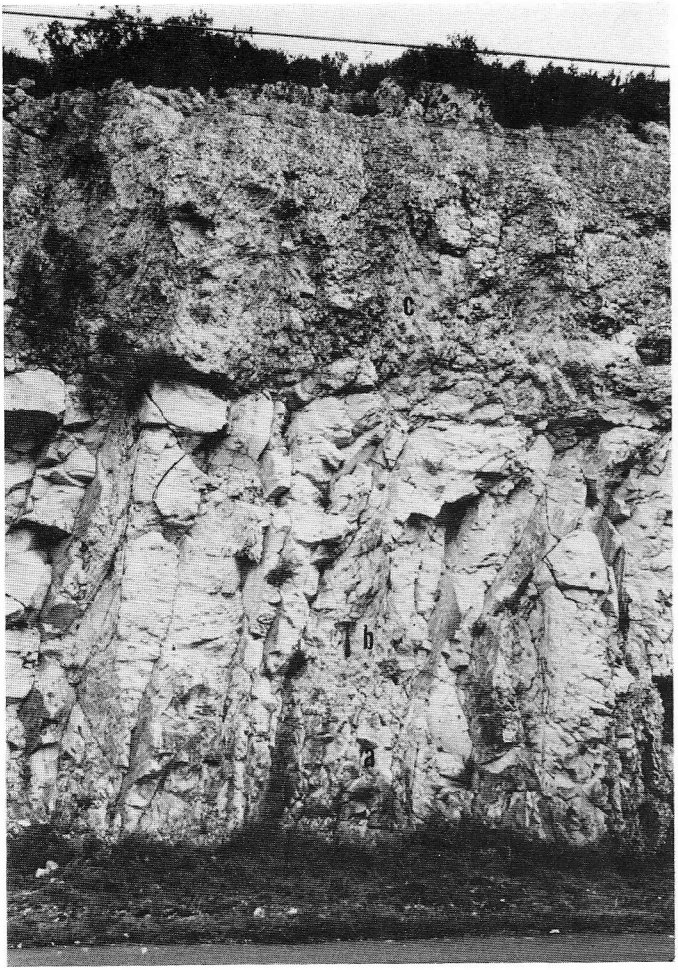


Fig. 7 – Coral lens (a and b); the bioclastic bank (c) with hippuritids and radiolitids is visible in the upper part («Strada dei Colli» section).

observed along the other sections; notable variations in the composition of fossil assemblages and in the grain–size of the sediment.

The following sequence was observed:

– massive bank, 20 m thick, mainly bioclastic. The lower part is marked by two levels of coral biolithites (a and b of Fig. 7) with branched stems (1 m and 3 m thick respectively). The main lithotypes are intrapelbiomicrites and micrites with bioclasts, among the peloids there are pellets and intraclasts, among the bioclasts fragments of megafossils, calcareous algae (*Thaumatoporella parvovesiculifera* (Raineri), *Aeolisaccus kotori* Radoicic, *Phitonella* sp.), foraminifers (*Orbitoides* sp., *Nummofallotia apula* Luperto Sinni, *Dictyopsella* sp., *Globotruncana* sp.). This interval consists of grain–supported sediments with grainstone texture. The megafauna is concentrated at the base of the unit decreasing in the middle part. The fossil are essentially represented by indeterminable big internal moulds of gastropods, small specimens of *Hippurites nabresinensis* Futterer, and by fragment of other very ornate pelecypods. The upper part is characterized by numerous single valves of *Pycnodonte (Phygraea) vesicularis* (Lamarck) and large internal mould of gastropods;

– upwards and laterally the biological content of calcarenitic limestones change. The megafossil assemblages are abundant and diversified, composed principally of rudists (small right valves of *H. nabresinensis* Futterer, *Gorjanovicia* sp.), echinoids, other large pelecypods such as ostreids and branching and solitary corals. The lithotypes are biosparite with few peloids and many bioclasts, occasionally they consist of micrite with bioclasts (10 m thick) (Fig. 7, part c);

– biolithitic bank with an overall thickness of about 15 m bounded at the top by a distinct surface of erosion. It is characterized in the lower part by the presence of a massive quantity of rudist assemblages consisting of specimens of *Sauvagesia raricostata* Polsak, *Gorjanovicia* cf. *lipparinii* Polsak, *Hippurites (V.) sulcatus* Defrance, *H. colliciatus* Woodward. Many specimens of radiolitids and hippuritids are affected by dissolution and recrystallisation processes. In place the rock is characterized by accumulation of fragments of organisms.

The lithotypes consist of biomicrite with rare benthonic and planktonic foraminifers (*Rotalia trochidiformis* (Lamarck), *Nummofallotia* sp., *Globotruncana* sp.), corals, fragments of rudists and ostreids. From a textural point of view these lithotypes consist in grain–supported sediments with packstone texture. The upper part of the bank shows a very organic buildup of coral colonies and valves of *H. nabresinensis* Futterer;

– biocalcarenitic – biocalciruditic well–cemented bank, 5 m thick, showing many distinct and well preserved biogenic structures concentrated in two levels. The lower one is characterized by a regular boxwork system of *Thalassinoides*, the components of which are cylindrical in transversal sections. The structures

of the upper levels are represented by some cylindrical y–shaped burrows (*Thalassinoides*) and by some vertical burrows (*Skolithos*). The absence of deformation in the structures suggests the hypothesis that the sediments were already quite compacted when wakers constructed them. The burrows are cut at a certain level by erosional surface and are filled by the overlying sediments. The lithotypes consist in biomicrites and micrites with wackestone texture;

– biolithitic bank characterized by the dominant presence of rudists, whole or in fragments (10 m thick). The rudists are principally represented by specimens of *H. nabresinensis* Futterer, forming a monotypical assemblage, and a few other undetermined specimens. The individuals are rather close together and intrastructural cavities are filled with muddy clastics. This lithotype from a

Fig. 8 – Patch–reef with hippuritids (*H. nabresinensis*): the fossil are in physiologic arrangement («Strada dei Colli» section).

textural point of view consists of grain–supported sediments with a grainstone texture (Fig. 8);

– biocalcarenitic – biocalciruditic bank (40 m thick), in which two hardground surfaces are also visible, marked by bioerosions and hardened calcareous crusts. The first of these hardgrounds forms the starting–point of burrows attributable to *Skolithos* and *Thalassinoides*: those of the latter are not developed in to a complex system. These structures were formed in different periods by organisms belonging to two distinct edaphic groups: one associated with a lithified surface and the other (the older of the two) connected with unconsolidated sediments; besides, the indeformed structures indicate a rather compacted sediment (Fig. 9). The second level of hardground is visible in the upper part of the bank (Fig. 10).

The associated fauna is irregularly distributed: in the lower part (10 m thick), small colonies of branched corals and poorly preserved caprinid valves (*Sabinia* cf. *aniensis* Parona) can be observed. The upper calciruditic part (30 m thick) (Fig. 10) is characterized by fragments and/or worn–away valves of rudists (*Mitrocaprina* sp., *Youfia* cf. *reticulata* Boehm) associated with a few

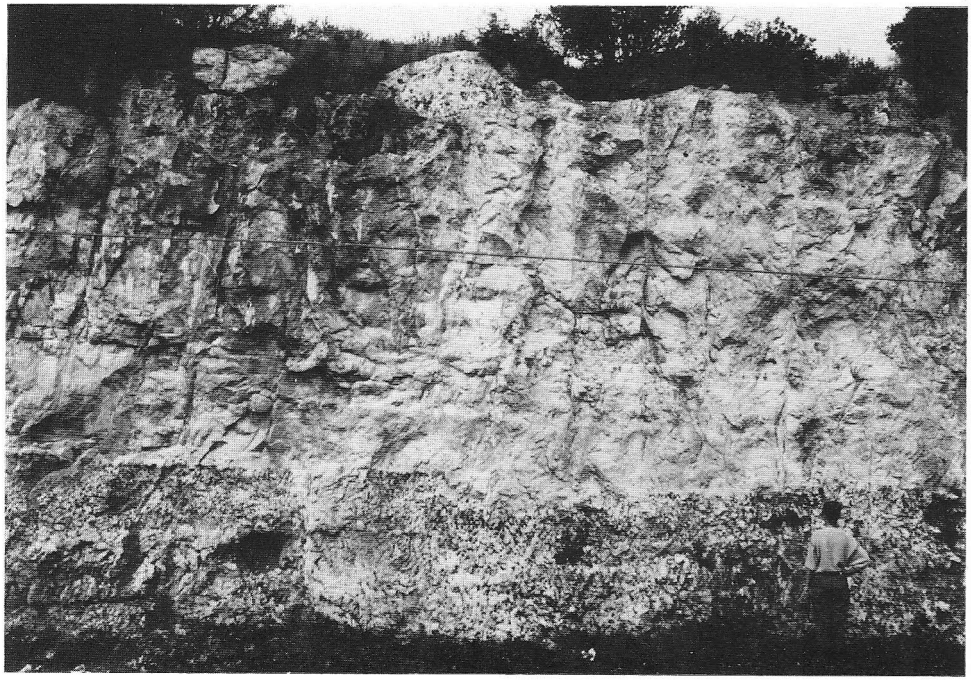


Fig. 9 – General view of the biocalcarenitic–biocalciruditic bank in which burrows referable to *Skolithos* and *Thalassinoides* can be observed in the lower part. The burrows are cut off by an eroded surface («Strada dei Colli» section).

Planolites–like traces. The lithofacies is represented by bioclastic limestone with fine to coarse–grained clastics. From a textural point of view it consists of a grain–supported sediment with packstone and, rarely, a grainstone texture; in some places the presence of microspatic intergranular cement is observable. The bioclasts mainly consist of megafossil fragments (the edges of which are irregular because of algal borings and micritisation processes) and of microfauna (*Rotalia trochidiformis* (Lamarck), *Bicyclina* sp., *Cuneolina* sp., *Dictyopsella* sp.). The finer fraction contains more quantity of specimens of *Phitonella* sp. and *Goupillaudina* sp.

Biostratigraphical and palaeoenvironmental considerations.

On the whole the succession studied can be referred to the Lower and Upper Senonian on the basis of mega– and microfauna. Particularly, the lower levels, outcropping at the quarry face of the station Ostuni, along the road–way cutting leading to the «Contrada S. Lorenzo», and at the quarries of Mass.ia Airoldi and Mass.ia Abadia, are referable to the Coniacian – Lower Santonian on the basis of the following species: *Biradiolites angulosus* d'Orbigny, *B. mar-*

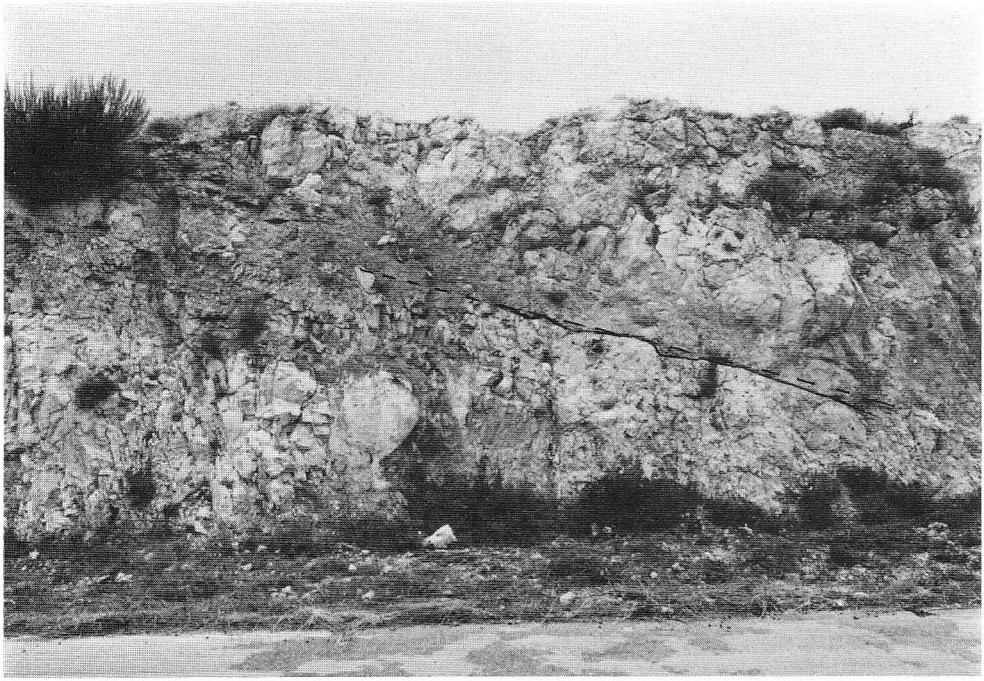


Fig. 10 – General view of the upper part of «Strada dei Colli» section; biocalcirudites with *Youfia*, *Mitrocaprina*, other pelecypods like *Cardium*. An hard–ground intercalation marked by a dark outline can be observed («Strada dei Colli» section).

tellii (Parona), *Durania japigiae* Campobasso, *Radiolites spinulatus* Parona, *Gorjanovicia costata* Polsak. The micropalentological assemblage (*Cuneolina* sp., *Accordiella conica* Farinacci, *Arnaudiella* sp.) confirms this dating. From the stratigraphical point of view emphasis must be placed on the presence, in this level, of some species of the genus *Gorjanovicia*, up to now referred to the *Gorjanovicia costata* and *Sauvagesia tenuicostata* Cenozone (Polsak, 1967; Polsak, Baüer & Sliskovic, 1982) attributed to Santonian–Lower Campanian.

The upper levels outcropping along the road–way cutting leading from Ostuni town to Mt. S. Oronzo, can be referred to the following stratigraphical ranges: the basal and middle part must be referred to a Santonian – Lower Campanian on the basis of the following mega and microfauna: *H. nabresinensis* Futterer, *H. sulcatus* Defrance, *H. colliciatus* Woodward, *Sauvagesia raricostata* Polsak, *Nummofallotia apula* Luperto Sinni, *Rotalia trochidiformis* (Lamarck). Then, the upper part of this section and the layers outcropping near the coastal zone at Mass.ia Gorgognolo can be referred to the Upper Campanian or probably to the Maastrichtian. This is owing to the presence of *Youfia* cf. *reticulata* Boehm, *Sabinia* cf. *aniensis* Parona, *Mitrocaprina* sp., *Goupillaudina* sp., *Globotruncana* sp., *Orbitoides* sp.

From a palaeoenvironmental point of view the mega– and microfossil assemblages together with lithofacies analyses have demonstrated that, on the whole, the depositional environment of the succession is referable substantially to the outer – platform zone, with the exception of the lower part of the succession which consists of biomicrites and pelbiomicrites with benthonic foraminifers, algae, and clumps of rudists. This lower part can be considered as belonging to an environment with moderate energy of an inner platform zone.

It should be noted that this part of the succession is not in direct contact with the higher one visible along the «Strada dei Colli». Nevertheless, towards the top, facies typical of «platform edges» can be observed, characterized by coral and rudist reef.

At first, coral/algal communities occur and the rudist and coral banks are observable. In particular these facies are composed of grainstones with micritic matrix. Near the top, the bioconstructed bank shows an extraordinary density of specimens of *H. nabresinensis* forming practically monotypical assemblages. The specimens are very close to and very often in contact with each other. The matrix is prevalently micritic and the foraminifers very scarce.

Levels characterized by facies with restricted circulation and very slow rate of sedimentation overlay; they are characterized by trace fossils associations and biomicrite lithotypes. The presence of different types of «Lebensspuren» indicates a different position more or less external with respect to the morphological «highs» represented by the bioconstructions.

In this part two levels of hardground have been observed, which tend to indicate an interruption of the sedimentation and this leads us to hypotesize

the existence of deep currents which led to a rapid diagenesis of the sediment; this would also justify the presence of fossil traces of rough erosion surface.

Finally, in the upper part of the section levels with a greater water circulation are found: these are characterized by the dismantling of reef bodies, consisting of organic debris and specimens of large rudists. Planktonic foraminifers, echinoids and the extraordinary quantity of *Phytonella* sp. are in autochthonous position. The lithotypes consist of packstone and, rarely, grainstone with a very fine microbioclastic and/or micritic matrix.

In conclusion the continuous presence of planktonic forms, large benthonic foraminifers, hardground horizons and burrow assemblages dominated by groups such as «*Skolithos*», *Thalassinoides* and *Planolites* confirm the presence of open marine deposits of outer shelf areas.

Conclusions.

The results of the researches carried out on a number of outcrops referable to the «Calcare di Altamura» unit, have yielded very interesting data, both from the stratigraphical and from the palaeoenvironmental point of view. As regards the stratigraphy of the area, it can be concluded that the calcareous strata outcropping at the base, and all along the Ostuni escarpment can now be referred to the Senonian–Maastrichtian ?. Particularly:

– palaeontological data demonstrate the Senonian age of the outcrops of the Ostuni rail–way station, the S. Lorenzo area, Mass.ia Airoldi and Mass.ia Abadia. The same outcrops (except that of the S. Lorenzo area) were previously attributed by Vezzani (op. cit.) to the Cenomanian–Turonian while, as concern the areas of Ostuni rail–way station and S. Lorenzo area and Mass.ia Abadia and Mass.ia Airoldi respectively to the Turonian–Senonian and to the Senonian by Mastromatteo (op. cit.);

– the basal and middle part of the section of «Strada dei Colli», studied for the first time, have been referred to the Santonian–Campanian age;

– the upper part of the same section and the layers outcropping near the coastal zone at Mass.ia Gorgognolo are referred to the Upper Campanian–Maastrichtian? age; the layers of the coastal belt were previously attributed by Vezzani (op. cit.) to the Cenomanian age.

The presence of more recent strata (Maastrichtian) along the coastal plain (10 m above sea level) permits us to establish a correlation between these strata and those outcropping in the higher and more inland parts of the territory around Ostuni (200 m a.s.l.). This information confirms the presence of a fault located between the coastal plain and the escarpment.

Previously, the presence of this fault was hypothesized by Vezzani and Campobasso and Olivieri (op. cit.).

From the palaeoenvironmental point of view, the most interesting date is the recognition of external platform facies: different lithobiofacies which from the base to the top are arranged according to increasing energy levels and from lagoonal to shelf–edge facies are present: in particular we may observe micritic sediment of lagoonal type at the basis on which biogenic intervals of reefoid environment and many meters of bioclastic levels overlay.

Acknowledgements.

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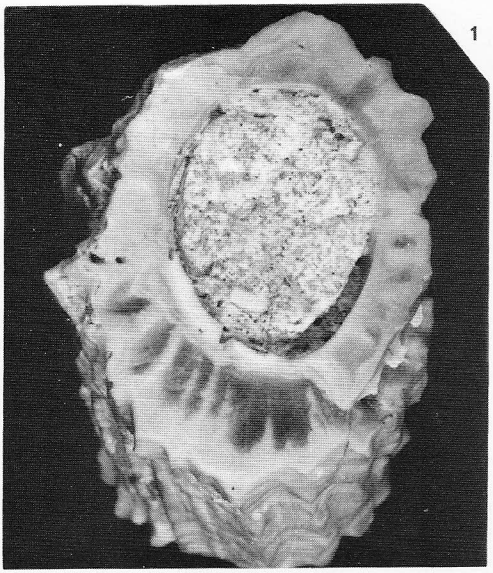
TAVOLA 13

Fig. 1 – *Gorjanovicia costata* Polsak. Transversal section of the lower valve. Ostuni railway station section, E 15; nat. size.

Fig. 2, 3 – *Youfia* cf. *reticulata* Boehm. Transversal and longitudinal sections of the «shell median layer» of the specimen of the fig. 6. «Strada dei Colli» section, AI 1; nat. size.

Fig. 4 – *Sabinia* cf. *aniensis* Parona. Transversal section; this specimen resembles *Sabinia aniensis* Parona in the characters of canals. «Strada dei Colli» section; x 0.5.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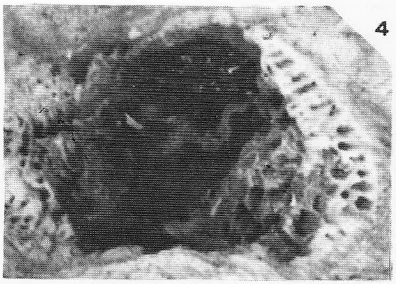
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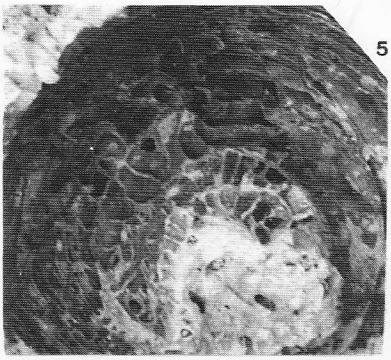
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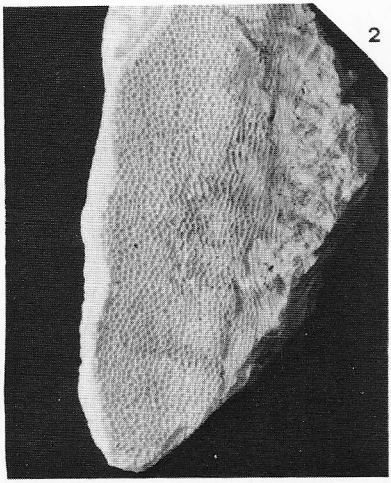
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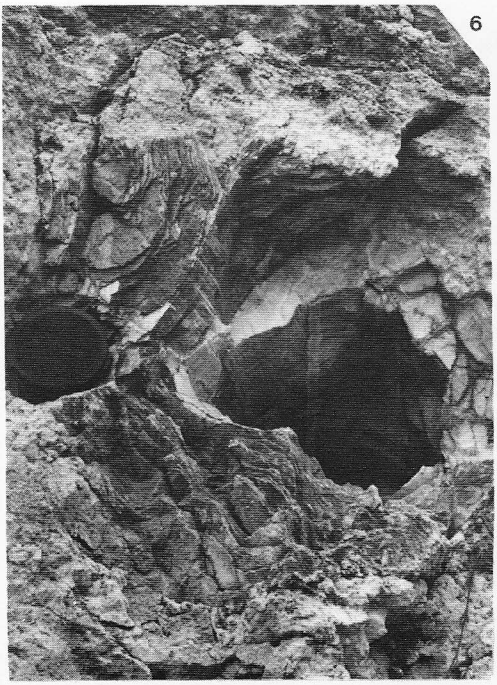
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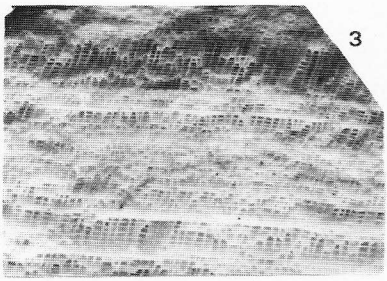
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TAVOLA 14

Fig. 1 – *Hippurites colliciatus* Woodward. «Strada dei Colli» section; nat. size.

Fig. 2 – *Sauvagesia* cf. *raricostata* Polsak. Incomplete lower valve. «Strada dei Colli» section; x 1.5.

Fig. 3 – *Youfia* sp. Upper and lower valve. Ostuni town; x 0.5.

Fig. 4 – *Hippurites nabresinensis* Futterer. Internal mould. «Strada dei Colli» section, A 16; x 2.3.

Fig. 5 – *Gorjanovicia campobassoi* Laviano. Longitudinal section of the right valve; it is possible to recognize the siphonal band in form of strong ribs. Ostuni rail–way station section; nat. size.


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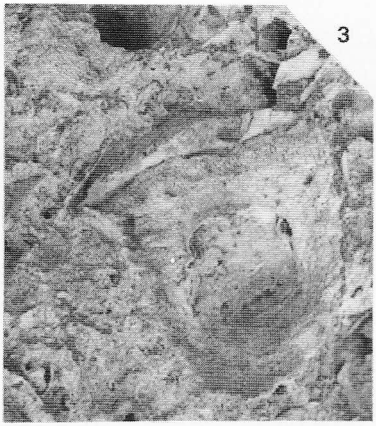
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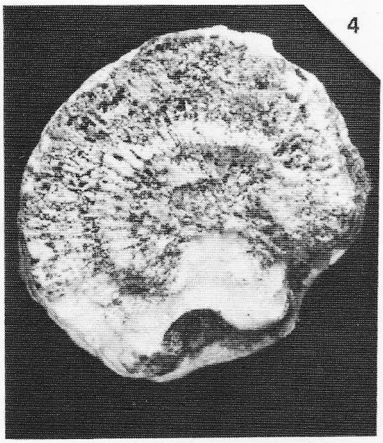
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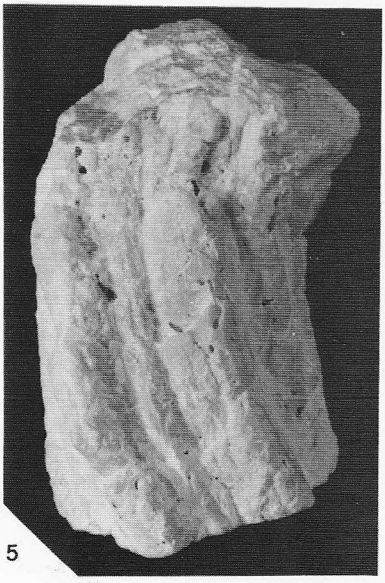
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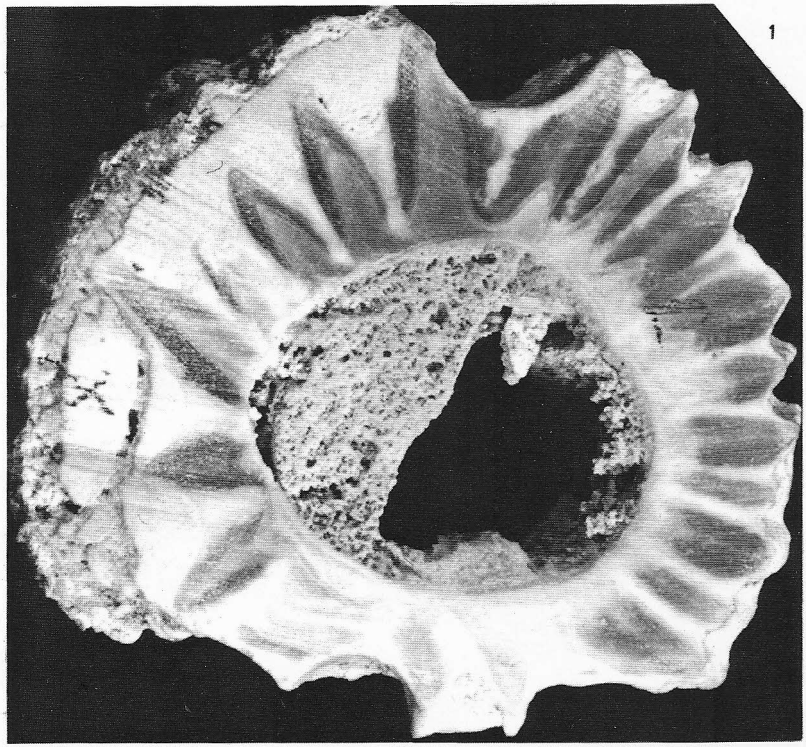
TAVOLA 15

Fig. 1 – *Radiolites spinulatus* Parona. Transversal section of the lower valve. Ostuni rail–way station section, E 16; x 2.3.

Fig. 2 – *Bournonia* sp. S. Lorenzo section; nat. size.

Fig. 3 – *Sabinia* sp. Ostuni town; x 0.5.

Fig. 4 – *Gorjanovicia campobassoi* Laviano. Transversal section of the lower valve. Ostuni rail–way station section, E 12; nat. size.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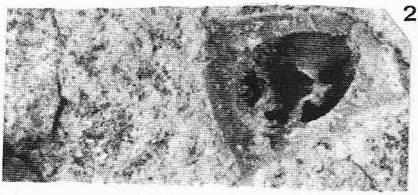
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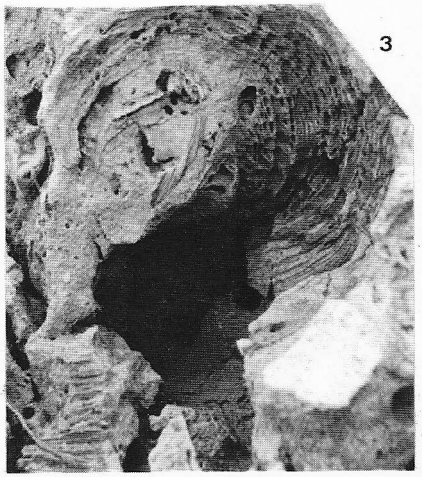
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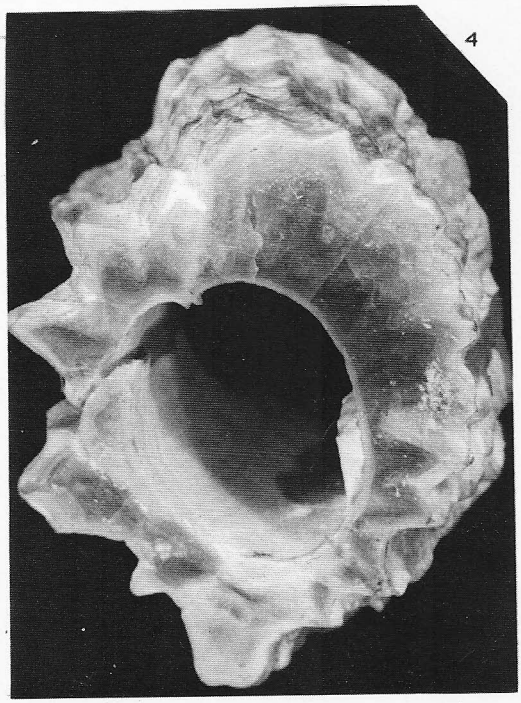
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