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An Upper Cretaceous Mollusc Fauna from the Marbles of Almyropotamos (Euboea, Greece)

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(With 3 textfigures and 2 plates)

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Zusammenfassung

Aus dem Marmor von Almyropotamos im südlichen Euboea (Griechenland) wird eine Mollusken-Fauna mit folgenden Formen beschrieben: Schnecken aus der Gruppe der Neritidae (indet.), *Nerinea* aff. *edoardi* Parona, *Neoptyxis* sp., *Italoptygmatis* aff. *geinitzi* (Goldfuss), *Oligoptyxis* sp., *Actaeonella schiosensis* Böhm, *Trochactaeon* sp. und der Rudist *Neoradiolites* sp. Aufgrund der Fauna ist eine Einstufung in das obere Cenomanien wahrscheinlich. Zusammen mit anderen Fossilfunden zeigt dies, daß der Kalk, aus dem der Marmor von Almyropotamos durch Metamorphose hervorging, während des gesamten Mesozoikums in einem seichten Meeresabschnitt entstand. Vergleichbare Gesteinszonen treten in Griechenland in den tektonischen Zonen von Gavrovo-Tripolitsa und des Parnaß auf. Wie diese, ist die Einheit von Almyropotamos daher den Externzonen zuzurechnen.

Summary

A mollusc fauna containing a neritid gastropod, *Nerinea* aff. *edoardi* Parona, *Neoptyxis* sp., *Italoptygmatis* aff. *geinitzi* (Goldfuss), *Oligoptyxis* sp., *Actaeonella schiosensis* Böhm, *Trochactaeon* sp., *Neoradiolites* sp. is described. It has been collected in the marbles of Almyropotamos in the south of the island of Euboea, Greece, and suggests an Upper Cenomanian age.

This and other fossil records indicate that the Almyropotamos Marble forms a continuous Mesozoic carbonate series, deposited in a shallow marine environment. Comparable successions in Greece are known only from the non-metamorphic zone of Gavrovo-Tripolitsa and the Parnassos zone. Like these, the unit of Almyropotamos has therefore to be included into the external zones.

Introduction

From the marbles of the Almyropotamos unit of Southern Euboea lamellibranchs of Triassic age and a rich Cretaceous gastropod fauna has been recorded previously (H. A. Kollmann in G. Katsikatsos 1970, 1971, 1979). Hence it has been proved that the Almyropotamos marbles which have been considered to be of Paleozoic age (Guernet 1971) or even older are a carbonate series of Mesozoic age passing upwards into metamorphic flysch (fig. 2).

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Tectonically, the Mesozoic series of the Almyropotamos formation lies below other metamorphic formations. Its tectonic position within the internal Hellenids (see below) equals the tectonic window of the Olympos area (GODFRIAUX 1968). Consequently, the paleogeographic position of the Mesozoic series of the Almyropotamos formations within the Hellenids remains problematic. Some scientist are in favour of the view that the formations of Almyropotamos are part of the

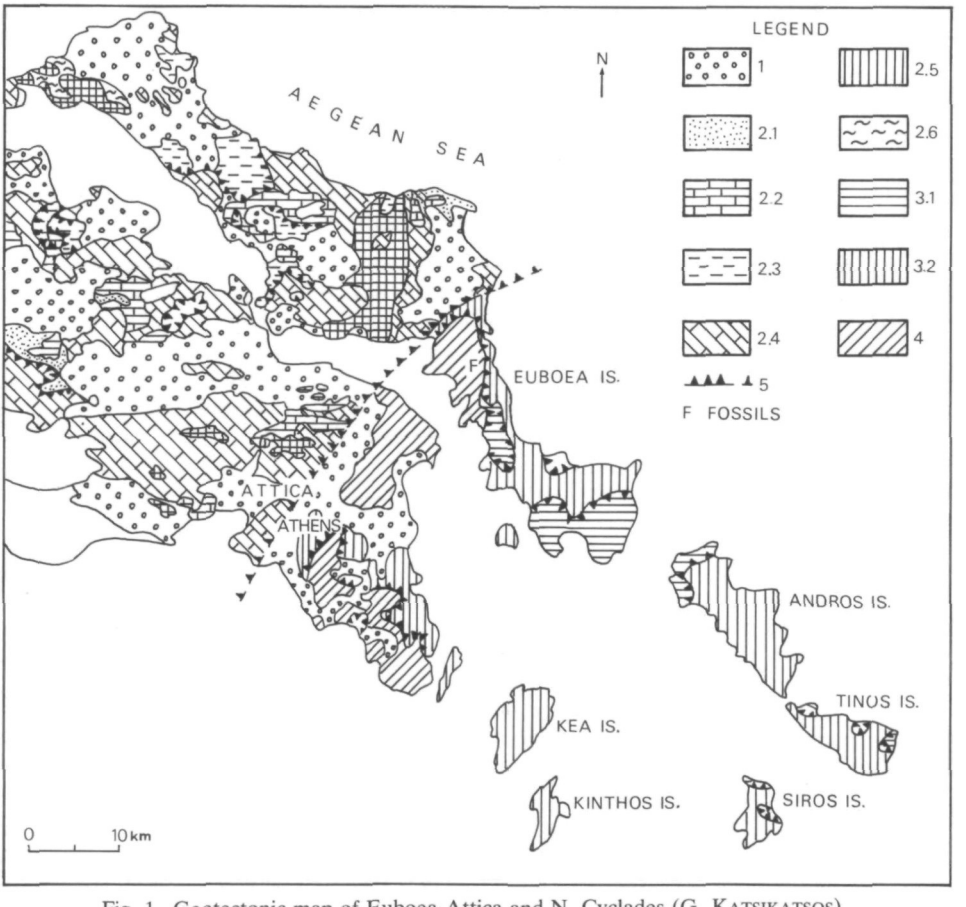

Fig. 1. Geotectonic map of Euboea-Attica and N. Cyclades (G. KATSIKATSOS).
1. Neogene and Quarternary formations. 2. Pelagonian zone: 2.1. Flysch. 2.2. Upper Cretaceous limestones. 2.3. Eohellenic nappe formations. 2.4. Middle Upper Triassic – Upper Jurassic limestones and dolomites. 2.5. Neopalaeozoic – Middle Triassic formations. 2.6. Crystalline basement. 3. Neohellenic nappe. 3.1. Ochi unit. 3.2. Styra unit. 4. Autochthonous system. 5. Overthrust.

zone of Gavrovo – Tripolitsa whereas others believe that they belong to the Parnassos zone. A third view is that they should be included into the internal zones (Subpelagonian – Pelagonian zones).

One of the main reasons for studying the Almyropotamos unit in detail is to clarify the dispute on its paleogeographical position within the Hellenids. For this

purpose, further material has been collected together with supplementary field observations. Results of this investigations are presented in this preliminary report.

The new material has been collected from the north piedmont of the large doline of Argyros (F in Fig. 1), where fossils have previously been found in the Almyropotamos marbles by G. KATSIKATSOS. In earlier investigations (H. A. KOLLMANN in G. KATSIKATSOS 1970, 1971, 1979) fossils from this locality seemed to indicate a Turonian age. New investigations on type material, modern literature and a better knowledge of the variablity within the species allowed a revision of these first determinations.

The geological structure of the Euboea island (G. CH. KATSIKATSOS)

The geological structure of Euboea is very complicated. Except for the post-alpine formations which are not discussed here, the island is characterized from base to top by the following units:

Autochthonous units
Neohellenic tectonic nappe
Pelagonian zone of unmetamorphic formations
Flysch

1. Autochthonous units. This is a system of metamorphic formations of great thickness, consisting mainly of marbles and schists, found in southern Euboea and Attika. In Southern Euboea, the autochthonous system is represented by the unit of Almyropotamos, consisting of coarse-grained marbles of great thickness (about 2000 meters), passing upwards into metaflysch (fig. 2). The marbles of the Almyropotamos unit are grey, whitish or completely white and are mainly medium-bedded to thick-bedded, occasionally also unbedded. They are intensively karstified. In rupture zones large karstic forms such as the two dolines in the area of the Argyro village have been formed. Thin horizons of dolomitic marbles and schists intercalate in the entire thickness of these marbles. Intercalations of brecciated marbles of considerable thickness are occurring also.

Based on detailed geological mapping and on fossil records a stratigraphic range of Upper Triassic to Upper Cretaceous has been proved for the marbles of Almyropotamos by G. KATISKATSOS (1971, 1979). In earlier presentations a transgressive unconformity within the marbles has been assumed. This stemmed mainly from the fact that Jurassic could not be proved in the St. George-Styra Bay area. Here, Upper Cretaceous marbles with rudists and actaeonellids seem to follow directly above upper Triassic marbles containing *Megalodon*. This unconformity seemed to be supported by brecciated marbles in this area (G. KATSIKATSOS 1979).

However, recent field observations rather suggest that the Almyropotamos marbles form a continuous Mesozoic carbonate series and that the lack of Jurassic in this area is of tectonic nature. Hence, the Almyropotamos unit must be included into the external geotectonic zones and, among those, into one which during the Mesozoic was a submarine high, as the Gavrovo – Tripolitsa zone and the Parnassos zone. They both are non-metamorphic in the area of the external

geologic zones, whereas the Almyropotamos unit is metamorphic. This makes a correlation of the Almyropotamos zone with the external zones difficult.

2. Neohellenic nappe. This nappe includes metamorphic formations of Southern Euboea, Attica and the Northern Cyclades; they lie as a huge overthrust nappe on the autochthonous units of the above areas (fig. 1). The tectonic movement took place after the Middle Eocene.

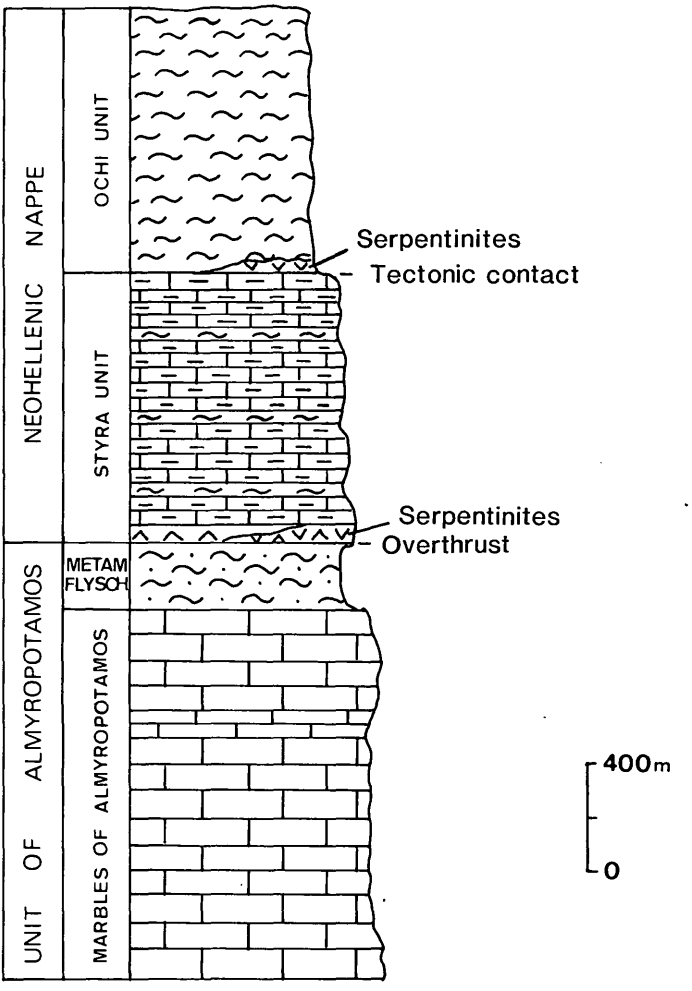

Fig. 2. Stratigraphic column of Southern Euboea (G. KATSIKATSOS).

The nappe consists of various tectonic units and has been named Neohellenic nappe by G. KATSIKATSOS (1979) to distinguish it from the older Eohellenic nappe of the Pelagonian zone. Within the Neohellenic nappe two tectonic units may be distinguished:

The unit of Styra

The unit of Ochi

a) The tectonic unit of Styra is a series of medium-bedded marbles and cipolins with intercalations of mica schists, occasionally passing gradually into quartzites. Tectonically, it underlies the Ochi unit but overlies the metaflysch or marbles of the autochthonous Almyropotamos unit. Ophiolithic bodies are frequent on the tectonic contact. In certain areas the thickness of the Styra unit exceeds 2500 meters.

b) The tectonic unit of Ochi consists of metasediments, mainly metapelites with intercalations of red or black quartzites as well as metabasites and metatuffs. Generally, Na-amphiboles (mainly glaucophane) as well as epidote and locally lawsonite are abundant in these rocks. The total thickness of this unit is more than 1500 meters. Serpentinite bodies occur on the tectonic contact to the underlying Styra unit.

Great dissimilarities are evident in the lithostratigraphic sequences of the Neohellenic nappe formations in different areas. They are characterized by at least one HP-LT metamorphism at 55–45 m. y. (lower to Middle Eocene). In some areas this is overprinted by an Oligocene metamorphism of green schist facies.

3. The Pelagonian Zone of non-metamorphic formations. This zone is overthrusted on the tectonic units of Southern Euboea and Attica. In Central and Northern Euboea, it consists of the following formations (fig. 3):

Crystalline basement. This consists of ortho- and para-rocks, mainly biotite-schists less muscovite- and bimica-gneiss-schists, passing locally into migmatites. Amphibolite and amphibole gneisses are also found. The crystalline basement and its metamorphism is pre-carboniferous. The thickness of the exposed formations exceeds 800 meters.

Neopaleozoic series of clastic formations. This series consists of alternating layers of slighthy metamorphic sandstones, arkoses, phyllites, sericite and chlorite schists. The thickness of the series in Central Euboea exceeds 1000 meters.

Lower to Middle Triassic formations. These formations consist mainly of three groups of rocks: clastic rocks, mostly metasandstones; basic igneous rocks, usually submarine effusives of basaltic magma- and limestone intercalations of considerable thickness.

Middle Triassic to Upper Jurassic limestones and dolomites. The thickness of these carbonate rocks is usually more than 1000 meters. They have been deposited in a shallow marine environment. Generally the contact between carbonates and the underlying formations is normal.

Eohellenic tectonic nappe formations. According to lithology, origin and tectonic position, these formations may be devided into two groups: Vulcano-sedimentary formations and masses of ultrabasic rock formation. The tectonic nappe originated in an ocean existing in the Triassic and Jurassic. This ocean vanished at the end of the Jurassic and the formations were pushed over the platform of the Pelagonian zone.

Upper Cretaceous limestones. The deposition began in the Cenomanian and continued upwards into the Maastrichtian. The limestones form a transgressive

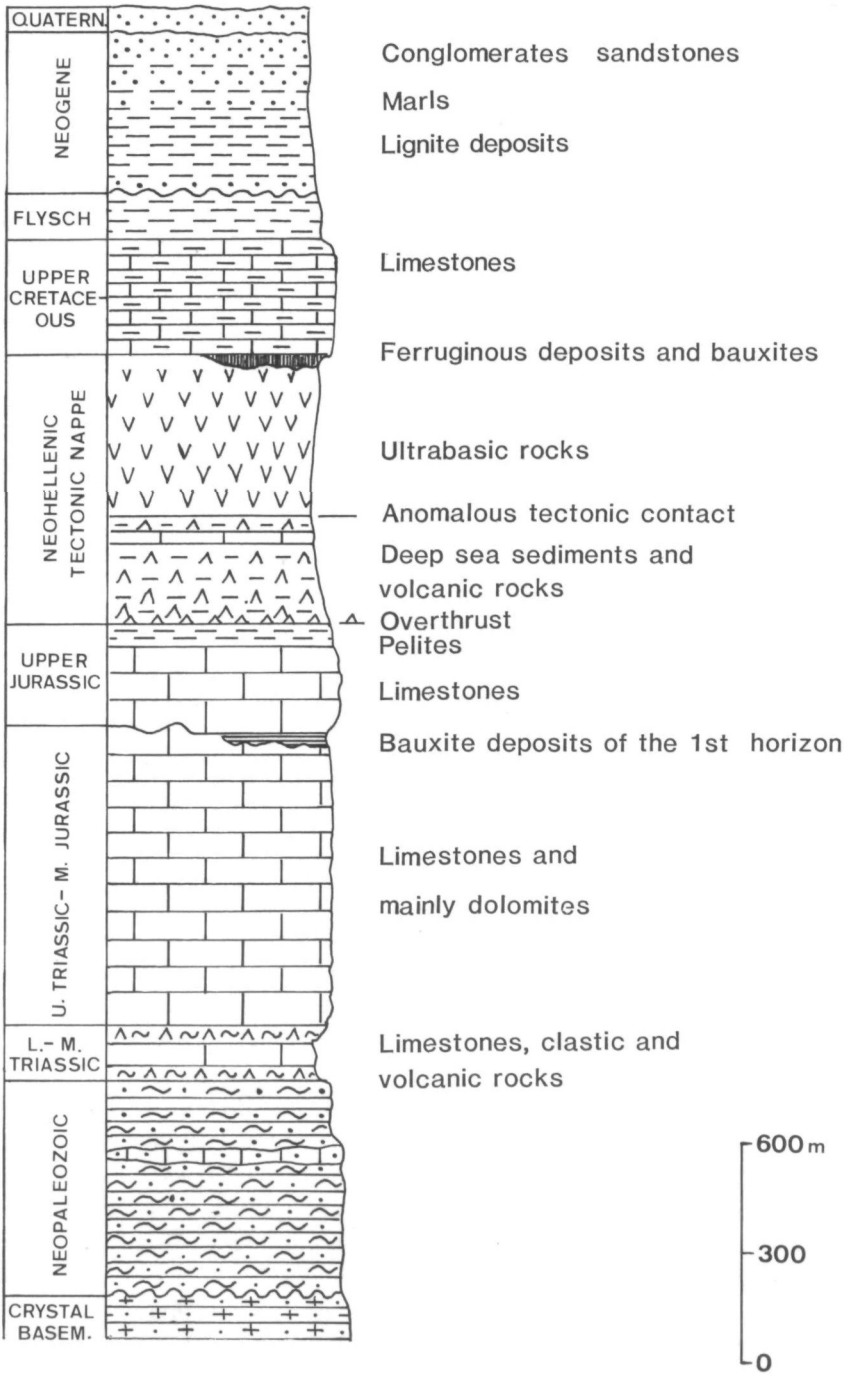

Fig. 3. Stratigraphic column of Central and Northern Euboea (G. KATSIKATSOS 1977).

series on the pre-Cenomanian formations. Their thickness varies between 150 and 800 meters.

4. Flysch. The Maastrichtian limestones gradually pass upwards into flysch sediments consisting mainly of sandstones and argillaceous schists with local limestone intercalations.

Systematic part (H. A. KOLLMANN)

Neritid gastropod (indet.)
(Plate 2, Figure 9)

Material: 1 section

Description: Section oval, with slight extension on one side. Interior of section subdivided into two parts of which one is larger than the other and triangular in shape.

Discussion: The specimen is interpreted as a section of an obliquely cut neritid gastropod. The radial part of the shell which subdivides the interior would therefore be the columella. As it is thicker in the lower part it is in accordance with the columella of some Neritidae. The flat shoulder of the shell is characteristic for this family.

Nerinea aff. *edoardi* PARONA
(Plate 1, Figure 1–3)

1909 *Nerinea Edoardi* PARONA, Monti d'Ocre, p. 217, pl. 25, fig. 26 a, 27 b.

Material: 2 fragmentary sections.

Description: Large turriculate shell, whorls high, slightly convex. Single columellar plait, strong, triangular in cross section. Prominent parietal plait, slightly bent upwards. In large whorls palatal plait with triangular cross-sections, increasing considerably in strenght with growth. No angle between basal and palatal wall which therefore can not be distinguished in ontogenetically early whorls where no palatal plait is developed.

Discussion: Two species described from Italy agree closely with the specimen from the Almyropotamos marble:

Nerinea annulata GEMMELARO, 1865, from Sicily

Nerinea edoardi PARONA from the Appenine mountains.

Both species have slightly convex whorls. Of the three internal plaits, the columellar plait and the parietal plait are prominent. The parietal plait is bent upwards. The angle between the palatal and basal wall is not distinct. In these species a palatal plait exists only in large whorls. In *N. edoardi* it grows unproportionally larger in size with ontogenetic development than the other plaits. This is in agreement with the specimen described here. In *N. annulata* the palatal plait appears to remain rather small. This has also been shown by CARBONE, PRATURLON

& SIRNA (1971). From the figures given by GEMMELARO (1865), PARONA (1909), and CARBONE, PRATURLON & SIRNA (1971) it cannot be excluded that the two species fall within the variability of a single one.

Nerinea jaekeli FUTTERER and *Cossmannea edoardi* CARBONE, PRATURLON & SIRNA (non PARONA) belong to the morphological group of *Nerinea gemmifera,* which always has a distinct angle between the palatal and the basal wall and a palatal plait close to the base.

Occurrence: *Nerinea edoardi* PARONA is known from the Cenomanian of the Monti d'Ocre, Italy. *N. annulata* is associated with *Ichthyosarculites* in Sicily and is therefore of Cenomanian age, too.

Neoptyxis sp.

(Plate 1, Figure 6–7)

Material: 3 longitudinal sections.

Description: Small whorls strongly concave, sides of larger ones approximately cylindrical. The following plaits are observable: 2 columellar plaits, lower one very distinct, at the external end strongly bent upwards, truncate. Upper columellar plait weak, acute, with thin base. Cross-section of inner parietal plait broad, external end slightly bent upwards, acute. Outer parietal plait very small. Palatal plait opposite to lower columellar plait, triangular, mostly not very prominent, only in one specimen strong and blunt. One flat, blunt plait on the base.

Discussion: The pattern of internal plaits agrees with *Neoptyxis* PČELINTSEV (1934). *Plesioptyxis* PČELINTSEV (1953) is a junior synonym. *Neoptyxis* differs from *Plesioplocus* PČELINTSEV by its more prominent upper columellar plait. A list of species is given by HACOBJAN (1976).

From Greece, *N. incavata* (BRONN) and *N. symeonidisi* have recently been described (KOLLMANN, 1982). While *Neoptyxis symeonidisi* has high whorls which are strongly concave, *N. incavata* has concave but low whorls. In contrast to these species the whorls of the specimens described here are flat.

Age: After HACOBJAN (1976) the stratigraphic range of *Neoptyxis* is Barremian to Turonian. According to his range chart the genus does not occur higher than in the Lower Turonian. The Lower Turonian occurrences seem to be restricted to the southern Soviet Union.

Italoptygmatis aff. *geinitzi* (GOLDFUSS)

(Plate 1, Figure 4–5)

1841 – 44 – *Nerinea Geinitzi* GOLDFUSS, Petrefacta Germaniae, p. 47, pl. 177, fig. 8.
1863 – *Nerinea digitalis* STOLICZKA in STUR, Siebenbürgen, p. 50, fig. 3.
1874 – *Nerinea Geinitzi* GOLDFUSS – GEINITZ, Elbthalgebirge I, p. 265, pl. 53, fig. 7.
1965 – *Nerinea (Ptygmatis) schiosensis* PIRONA – LUPU, Cherghes, p. 51, pl. 1, fig. 4.
1965 – *Nerinea (Ptygmatis) digitalis* STOLICZKA – LUPU, p. 51, pl. 1, fig. 5.

1972–73 – *Plesioptygmatis d'almeidai* BERTHOU & TERMIER, Cenomanien de l'Estremadure portugaise, p. 79, pl. 4, fig. 1, 2.

non: 1874 *Nerinea Geinitzi* – GEINITZ, Elbthalgebirge 1, p. 265, pl. 53, fig. 9 (= *Plesioptygmatis* sp.).

Material: 2 sections.

Description: Surface of the whorls flat to slightly convex. Interior narrow, elongate. Columella bearing two plaits, lower one in each whorl either slightly less prominent or more prominent than upper one. Strongly obtuse angle between columella and partietal wall, the latter bearing one plait close to columella. Basal wall narrow, concave, passing without edge into broad plait which forms lowermost part of palatal wall. Palatal wall above plait approximately as broad as basal wall. Lower part of palatal wall, especially at plait, very thick.

Discussion: The narrow interior space with its axis oblique to the columella is one character of *Italoptygmatis* HACOBJAN. After HACOBJAN (1976) the type species of this genus is *Nerinea schiosensis* PIRONA. It should be mentioned that the shell section figured by PIRONA on plate 1, fig. 3 has a broad, more or less concave basal wall passing into a siphonal channel. The shape of the whorls is characteristic for the genus *Laevinerinea* DIETRICH. The other specimens are not sectioned, but plate 1, fig. 3 shows the characters of *Italoptygmatis,* of which the narrow concave basal region of the interior of the whorls is most striking. This is also the case with material of *Italoptymatis schiosensis* (PIRONA), which has served FUTTERER (1892) for his description of the Cretaceous fauna of the surroundings of Santa Croce (Italy).

The species assigned to *Italoptygmatis* apparently have a smooth shell surface and can therefore only be distinguished with sections. They always have two columellar plaits, a strong parietal plait close to the columella, a plait in the lowermost portion and perhaps a small one in the uppermost portion of the palatal region. The latter and a indistinct basal plait are very variable and often not present within one species. The relative size of the columellar plaits is also extremely variable. The only consistant character is the palatal plait. Although it is variable, too, it may serve for distinguishing two species of *Italoptygmatis:*

1. *Italoptygmatis schiosensis* (PIRONA 1884), which has a small acute palatal plait. Synonymous are *Nerinea schiosensis* var. *cylindrica* FUTTERER 1892; *Nerinea candagliense* FUTTERER 1892 (non PIRONA, 1884, which belongs to the genus *Neoptyxis*); *Polyptyxis schiosensis* (PIRONA)–CARBONE, PRATURLON & SIRNA 1971; *Plesioptygmatis nobilis* (MUENSTER) – CARBONE, PRATURLON & SIRNA 1971; *Polyptyxis schiosensis* PČELINTSEV 1953; *Parasymplotyxis cylindrica* FUTTERER – HACOPJAN 1976.

Specimens assigned to *Italoptygmatis schiosensis* or to synonymous species which have to be transferred to other genera: ?*Nerinea schiosense* PIRONA 1884 pl. 1, fig. 3 (= *Laevinerinea*); *Nerinea schiosensis, N. requieni, N. nobilis* POLŠAK 1967 (= *Haploptyxis*); *Nerinea schiosensis* DELPEY 1940; *Plesioptygmatis schiosensis* PIRONA – BERTHOU & TERMIER 1972–73 (= *Laevinerinea*).

2. *Italoptygmatis geinitzi* (GOLDFUSS, 1841–44) which has a large blunt palatal plait constricting the interior of the whorls to a narrow slit. The synonymous forms have been listed above.

The specimens from the marble of Almyropotamos probably belong to *Italoptygmatis geinitzi* (GOLDFUSS) but due to the shell distortion an assignment can't be made with absolute certainty.

Age: According to the authors, *Italoptygmatis geinitzi* (GOLDFUSS) is restricted to the uppermost lower Cenomanian and the upper Cenomanian.

Oligoptyxis sp. PČELINTSEV 1953

(Plate 1, Figure 8)

Material: 1 Specimen.

Description: High-spired shell with low, more or less convex whorls. Periphery of whorls rounded. Columella very thick; interior of whorls with moderately concave columellar portion, oblique between parietal and palatal region. Very small parietal plait in some whorls.

Discussion: *Phaneroptyxis* is morphologically close, but has always concave whorls; they are concave, flat or convex in *Oligoptyxis* PČELINTSEV. One character which is not visible when the shell is recrystallized is the columella structure. In well preserved material a long narrow siphonal channel is indicated by the growth lines. The other important morphological feature of *Oligoptyxis* is the small parietal plait, which does not occur in *Phaneroptyxis*.

Stratigraphic and geologic distribution: The genus is known from the southern Soviet Union (HACOBJAN, 1976) and Austria (KOLLMANN 1976). The stratigraphic distribution is Upper Albian to Turonian.

Actaeonella schiosensis BOEHM

(Plate 2, Figure 10–11)

1895 *Actaeonella (Volvulina) schiosensis* BOEHM, Schiosi- und Calloneghe-Fauna, p. 133, pl. 13, fig. 1–3.

1965 *Actaeonella caucasica schiosensis* BOEHM–KOLLMANN, Actaeonella, p. 253–255

1971 *Trochactaeon obtusus* (ZEKELI)–CARBONE, PRATURLON & SIRNA, Rocca di Cave, p. 153, fig. 25

Material: Several sections, cutting plain mostly not through axis or shell distorted.

Description: Shell involute. Lower portion of whorls subcylindrical, maximum diameter at ⅘ of shell from base; distinct shoulder between subcylindrical and posterior part which has slightly convex sides, sloping towards apical tip. Strong palatal inflation opposite to angle between columella and parietal region divides interior of whorl in broader lower part and narrow upper part. Columella high, sides inclined at narrow angle towards axis, bearing three plaits. Uppermost

columellar plait below basal part of the preceding whorl interior. Protoconch approximately at height of shoulder.

Discussion: Due to recrystallization, no patterns which indicate a basal prolongation of the whorls could be observed in sections of the columella. The most important criterium for distinguishing the genera *Actaeonella* d'ORBIGNY, 1842, and *Sogdianella* DJALILOV, 1974, is therefore not oberservable. Nevertheless, *Sogdianella* may be excluded, as this genus has no or only very weak palatal inflations and a columella generally overlapping the preceding whorls more than in *Actaeonella*. The position of the protoconch high up in the shell is distinctive for early representatives of the genus *Actaeonella*, such as *A. schiosensis* BOEHM, *A. caucasica* ZEKELI (of which sections have been figured by HACOBJAN 1967) and *A. baconica* BENKÖ-CZABALY, 1962. While *A. caucasica* and *A. baconica* do not show a strong palatal inflation, this morphological feature has been reported by BOEHM (1895) for *A. schiosensis*. The specimen figured by BOEHM has subparallel whorls with a short but distinct tip.

Distribution: Upper Cenomanian of Italy.

Trochactaeon sp. (ex gr. *Trochactaeon matensis* FITTIPALDI)

(Plate 2, Figures 12–13)

Material: Several fragmentary sections.

Description: Oviform shells; columella in one specimen partly preserved, high. Whorls convex and high.

Last whorl slighty convex and nearly cylindrical; tapering towards suture in uppermost part; columella narrow, high approximately parallel to shell axis, bearing three plaits. Parietal inflation broad.

Discussion: For nearly cylindrical, broadly shelled actaeonellids like the ones described here HACOBJAN (1972) has established the genus *Mesotrochactaeon*. A distinction of this morphological group from more inflated shells for which HACOBJAN has maintained the name *Trochactaeon* and has described several new genera is not possible in several cases. For this reason HACOBJAN is not followed in this subdivision of *Trochactaeon*.

The following species belong to this morphological group: *Trochactaeon matensis* FITTIPALDI, including the synonymous *T. ellipsoides;* all *Trochactaeon* species described by D. LUPU (1965) from Cherghes, Rumania, which probably all fall within the variability of *T. matensis; Mesotrochactaeon ellipsoides* (FITTIBALDI)–HACOBJAN (1976); a number of species described by PČELINTSEV (1953), further *A. obtusus* DELPEY, 1940 (non ZEKELI, 1852) which are synonymous *(Actaeonella obtusa* DELPEY, 1956, belongs to the genus *Sogdaniella); Trochactaeon packardi* (ANDERSON) from California was also assigned to the same group by SOHL & KOLLMANN 1985.

Biostratigraphy: P. SAINT-MARC (1981) reviews the occurrence of *"Trochactaeon obtusus"* in the sense of DELPEY (1940) in the Lebanon. According to SAINT-MARC, this form group occurs from the lowermost Cenomanian upwards

into the Upper Turonian. HACOBJAN (1976) doubts the occurrence of the species he assigns to *Mesotrochactaeon* in beds older than the lower Turonian but in Rumania, *Calycoceras* sp. occurs above the actaeonellid-bearing beds of the Fornadia Formation the latter therefore being of Upper Cenomanian age (LUPU 1965, 1985). The same group of *Trochactaeon* has also been recorded in Scafidi, close to Kozani, Greece, where it occurs together with caprinids and is therefore considered as Cenomanian (BRUNN 1956).

Neoradiolites sp.

(Plate 2, Fig. 14)

Material: 1 specimen.

Description and discussion: Together with fragments a single complete rudist has been found. The outer surface of the shell does not have coarse ribs. The interior shows a small truncate ligamental ridge. These two characters are indicative for the genus *Neoradiolites* MILOVANOVIC. Other morphological characters are not observable.

Stratigraphy and distribution: *Neoradiolites* has been described from Yugoslawia, Greece (CHARVET, DECROUEZ & POLŠAK 1976) and Rumania (D. LUPU 1976). POLŠAK states in the above mentioned paper that the genus is known in Yugoslawia only from Turonian strata. In the Argolis provinc of Greece it appears together with foraminifera dated by DECROUEZ as Cenomanian. There seems to be a good agreement between these specimens and the one figured here.

General remarks on the gastropod fauna

The fauna is typically Tethyan (SOHL 1971) and consists of 7 taxa. Of these, four are nerineids, one is an neritid, and two are actaeonellids. The marble also contains sections of gastropods without typical whorl sections. These were therefore not determinable.

The faunal diversity is normal for comparable environments. This has been shown for example by BOEHM (1895) in the Schiosi formation in Northern Italy, by LUPU (1963) in Rumania, and by SAINT-MARC (1981) in the middle Cretaceous limestones of Lebanon.

All gastropod groups recorded from the Almyropotamos marble lived under shallow water marine conditions. The shells are frequently broken, indicating a high energy environment.

Biostratigraphy

According to the stratigraphic range of the gastropod genera and species the marbles of Almyropotamos are of Upper Cenomanian age.

Nevertheless, stratigraphic assignments of Tethyan gastropod faunas must still be treated with some caution as in many cases the stratigraphic range of taxa is not known well enough. Especially the assignment to the chronostratigraphic scale in the literature is not transparent in many cases.

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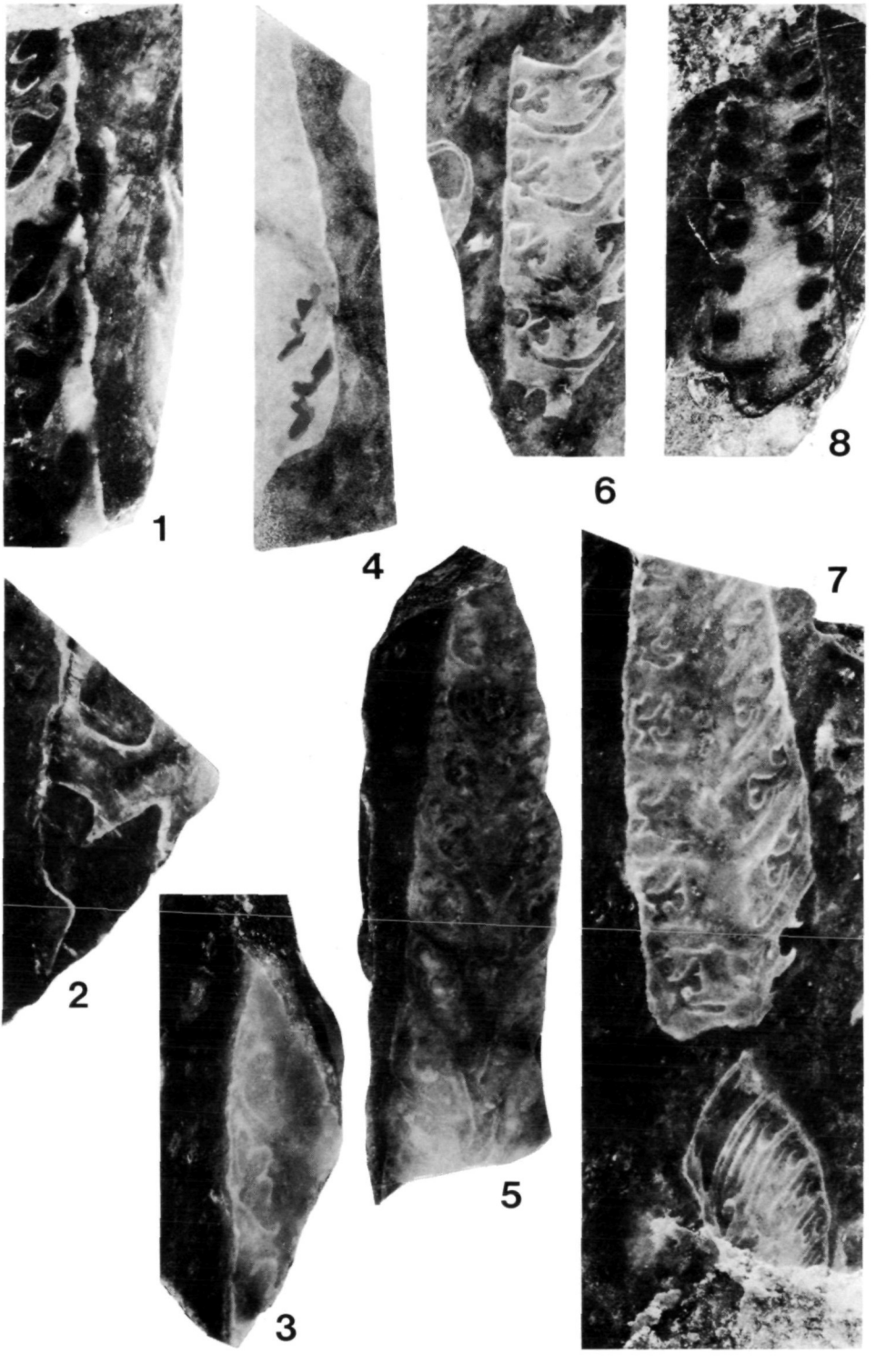
Explanation of plates

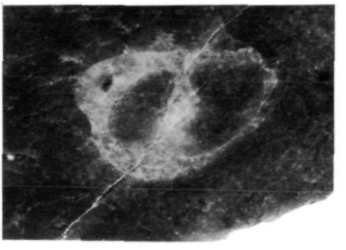
Plate 1

Fig. 1–3: *Nerinea* aff. *edoardi* PARONA.
Fig. 4–5: *Italoptygmatis* sp.
Fig. 6–7: *Neoptyxis* sp.
Fig. 8: *Oligoptyxis* sp.

Plate 2

Fig. 9: Neritid gastropod (indet.)
Fig. 10–11: *Actaeonella schiosensis* BOEHM
Fig. 12–13: *Trochactaeon* sp.
Fig. 14: *Neoradiolites* sp.
All specimens are figured in natural size.





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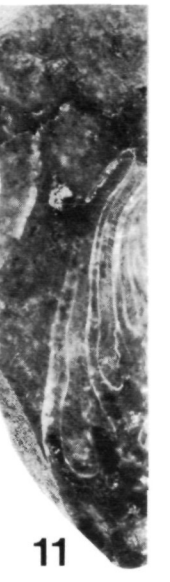

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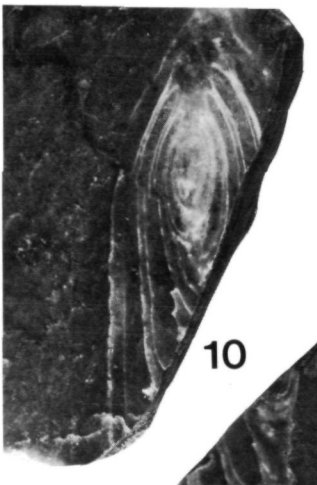

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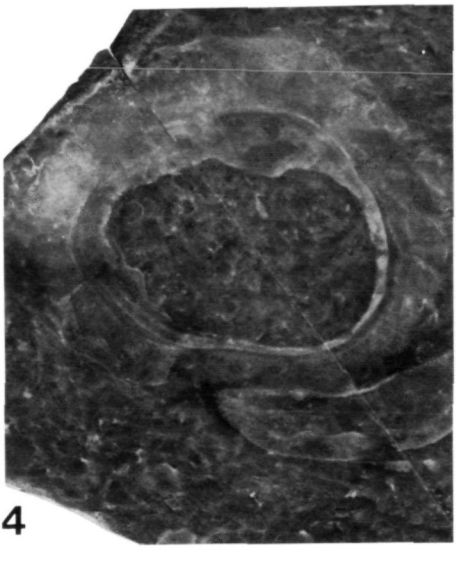

14