SENONIAN RUDISTS FROM GURI PISHKASHIT
(WEST FROM OHRID LAKE), ALBANIA

The Senonian limestones in the Guri Pishkashit region lie transgressively on the ultramaphic rocks. They are rich in rudists and microfossils which date the Santonian-Lower Campanian age.

Introduction

The ultramaphic rocks widespread in the region between Prenjas and Pogradeci town (west from Ohrid Lake). They consist of highly tectonized and altered serpentinites and dunites. The Senonian deposits, composed of mainly limestones and conglomerates at the base, lie transgressively on them. The Senonian deposits have been formerly widespread but, due to the strong erosion, recently occur only as the small erosional remnants (fig. 1).

The old iron-nickel mine of Guri Pishkashit, west from the Ohrid Lake, is one of the sectors with the outcropping Senonian deposits.

The iron-nickel body, 2-10 meters thick (now is totally explored), consisting of dark red ironiferous oolites and pisoliths, occur on the eroded ultramaphics in Guri Pishkashit (figs 2, 3).

More above, the section continues as follows (fig. 3):

In the lower part, the limestones set on the iron-nickel mineral and consisting of the marly

---

**Fig. 1** — Sketch-map of the Pogradeci region with the remnants of the Cretaceous deposits: 1: Ultramaphic rocks; 2: Cretaceous deposits; 3: Paleogene deposits; 4: Quaternary; 5: Upper Triassic-Lower Jurassic limestones; 6: Middle Triassic limestones.

biomicritic sorts passing up to grey marls (determined by P. Theodhori). The rudists such as Biradiolites stoppansi (Pirona) etc. are recorded in them. The microfossils as Cuneolina sp., Trochospira sp., Thaumatoporella parvovesiculifera (Raineri), miliolids, ostracods etc. (determined by A. Pirdeni) are also recorded in these 2-3 metres thick limestones.

Upwards, is passed to the red marly limestones up to the reddish biomicritic marls, which often pass to the intercalations of red biomicritic stratified limestones. The abundant iron-nickel and serpentinite grains occur in these limestones. Hippurites sp., H. castroi Vidal, H. colliciatus Woodward, H. nabresinensis (Futterer), Hippuritella microstyla (Douvillé), Vacconites sulcatus Defrance, Radiolites cf. galloprovincialis Matheron, Radiolites sp., Biradiolites fissicostatus d'Orbigny, Biradiolites sp. etc. have been recorded in the lower part and Durania cf. martelli Parona in the middle part of these limestones (fig. 3).

---

Fig. 2 — The setting of the Senonian deposits in the Guri Pishkashit region (key marks as in Fig. 3).

— Assetto dei depositi senoniani nella regione di Guri Pishkashit (simbologia come in Fig. 3).

Fig. 3 — Stratigraphic section of Guri Pishkashit.

— Sezione stratigrafica di Guri Pishkashit.
The numerous microfossils such as Aeolisaccus kotori Radoicic, Thaumatoporella parvovesculifera (Raineri), Dicyclina schlumbergeri Munier-Chalmas, Cunolina sp., Minouxia sp., miliolides, ostracods etc. have been also found in these 35-40 m thick limestones.

Paleontologic description

**Hippurites castroi** Vidal, 1874
plate 1, fig. 1, txf. 4

1895 *Hippurites castroi* Douville, p. 171, pl. XXV, figs 3-5
1903 *Orbignya castroi* Toucas, p. 54, pl. VI, figs 12; text-fig. 86
1932 *Hippurites (D’Orbigny) castroi* Kuhn, p. 41

**Material.** 6 exemplars of the right valves; 3 transversal and 2 oval sections

**Description.** All the exemplars possessed are very small. The right valve (attached) is conic with diameter ranging from 13 to 19-20 mm. Their outer surfaces are covered by thin radial ribs separated by furrows of the same dimension as well as three slight depressions corresponding to three valve’s pillars.

![Diagram](image)

**Fig. 4 — Hippurites castroi** Vidal. Transversal section of the right valve. × 1.

— *Hippurites castroi* Vidal. Sezione trasversale della valva destra. × 1.

The ligamental ridge (L) is slightly developed and is moted only by the inner bending of the valve’s wall. The valve is well rounded. The first siphonal pillar S is weakly developed, with very wide base and less distinct; its outer part is circular. The second siphonal pillar E preserve nearly the same form as the first one nevertheless, it is narrower at the base and more developed than the first one; its outer part is also circular. Three pillars occupy nearly 1/3 of the entire perimeter of the valve. The distance L-S always less smaller than S-E. The cardinal apparatus and left valve are missing.

**Comparison.** Our exemplars are similar to *H. sulcatoides* Douville, mostly regarding the development of the ligamental ridges. But, the siphonal pillars are more developed in the latter, mainly the second one, which is less narrower at the base. Nevertheless, our exemplars are distinguished by *H. ex. gr. bioculata* regarding above mentioned characteristics.

**Stratigraphic range.** Recorded in the Maastrichtian deposits of Spain.

**Hippurites colliciatus** Woodward, 1855
plate 1, fig. 2, txf. 5

1897 *Hippurites colliciatus* Douville, p. 221, figs 8, 9
1900 *Hippurites colliciatus* Parona, p. 12, tav. I, figs 4, 5
1903 *Orbignya colliciatus* Toucas, p. 52
1932 *Hippurites (Orbignya) colliciatus* Kuhn, p. 42
1976 *Hippurites colliciatus* Lapu, p. 121, pl. 12, figs 1, 2; pl. 38, figs 16, 17
1981 *Hippurites colliciatus* Pamukchiev, p. 157, pl. 77, figs 1, 1a
1982 *Hippurites colliciatus* Czabalay, p. 80, pl. X, figs 6, 7
1988 *Hippurites colliciatus* Cestari, Sirna, p. 19, tav. I, figs 46-49

**Material.** 1 exemplar.

**Descriptions.** The attached valve has a relatively small dimensions and conical form (17-21 mm diameter). Its outer surface is covered by several thin radial ribs. Apart from this, three slight depressions corresponding to three pillars occur as well.

![Diagram](image)

**Fig. 5 — Hippurites colliciatus** Woodward. Transversal section of the right valve. × 1.


The ligamental pillar L is noted only by a slight bending inside of the valve, its outer walls. The first siphonal pillar S is weakly developed, of triangular form with circular anterior part. The second siphonal pillar E is more developed than others, its base is narrow and the elongated anterior part is directed towards the ligamental ridge. The distance L-E occupies nearly 1/3 of the valve’s perimeter. The distance L-S is greater than S-E. The left valve and the teeth apparatus are missing.

**Comparison.** *Hippurites colliciatus* Woodward is similar to *H. maestroi* Vidal. The latter has more developed ligamental ridge. *H. variabilis* Munier-Chalmas is distinguished by less developed S and E siphonal pillars and more developed L ligamental one. *H. lapteirousi* Goldfuss has weaker developed S and E siphonal pillars, whereas *H. cornucopiae* De France has more developed S siphonal pillar and also slightly compressed at the base.

**Stratigraphic range.** Santonian-Campanian of the Eastern Alps (Gosau, etc), Apennines, Romania,
Minor Asia, while in Bulgaria is recorded in Maastrichtian.

**Hippurites nabresinensis** Futterer, 1893  
plate 1, fig. 3

1897 *Hippurites lapeerousi* var. *crassa* Douvillé, p. 222, pl. XXII, fig. 10  
1932 *Hippurites* (Orbigyna) *nabresinensis*, Kuhn, p. 57  
1932 *Hippurites* (Orbigyna) *nabresinensis* Parona, p. 11  
1976 *Hippurites nabresinensis* Lupu, p. 120, pl. 11, fig. 4, pl. 38, fig. 14  
1981 *Hippurites nabresinensis* Pamouktchiev, p. 156, pl. 74, figs 2, 3  
1982 *Hippurites nabresinensis* Czabahy, p. 80, pl. X, fig. 5

**Material.** 5 exemplars of the right valves in transversal section.

**Description.** The right valve is of a small dimensions with 15-16 mm in diameter and conical form. Its surface is covered by numerous thin longitudinal ribs and two opened grooves corresponding to two siphonal pillars.

In transversal section is clearly seen that the ligamental ridge L is not developed and is noted only by a slight bending of the valves wall towards the inner part. The first and the second siphonal pillars, S and E respectively, have almost the same form and dimension. They are most wide at the base, less distinct and fairly circular. The cardinal apparatus and left valve are missing.

**Comparison.** Our exemplars are most similar to *H. lapeerousi* Goldfuss. The siphonal pillars of the latter are less developed and more wide at the base. It is similar to *H. cornucopiae* Defrance, mostly from the ligamental ridge. The latter has developed siphonal pillars and depressed at the base. *H. castroii* (Vidal) has the same characteristics as well.

**Hippuritella microstyla** (Douvillé, 1895)  
plate 1, figs 3, 5, txf. 6

1895 *Hippurites microstyla* Douvillé, p. 183, pl. 28, figs 7, 8  
1903 *Orbigyna microstyla* Toucas, p. 36, fig. 58  
1932 *Hippurites* (Orbigyna) *microstyla* Kuhn, p. 56

**Material.** 5 exemplars of the right valves in transversal section.

**Description.** The right valve (attached) is conical and of small dimensions (8-9 mm up to 12-22 mm in diameter). The outer surface is covered by the most transversal ribs, which are thin near each other. Three slight depressions or grooves corresponding to three pillars of the valve occur as well.

---

**Hippurites sp.**  
plate 1, fig. 4

**Material.** 1 exemplar of the right valve in transversal section, less compressed.

**Description.** The valve is conical and of a relatively small dimensions with diameter ranging from 17 to 32 mm. Although, it is compressed in the dorsal-ventral direction, its main characteristic are well-preserved. The outer surface is covered by thin radial ribs. Apart from these, two moderately deep grooves corresponding to siphonal pillars, occur in the posterior part.

The ligamental ridge L is noted only by slight bedding of the valves wall towards the inner part. It is preserved also on the outer surface as a light depression but very wide. It has not anterior part but is most circular. Two siphonal pillars are nearly of the same dimension and form. Nevertheless, the first siphonal pillars S is more wide at the base and less distinct as the second siphonal pillar E. The latter is deeper. The three pillars occupy more than 1/3 of the valve's perimeter, whereas the distance S-E is smaller as L-S. The left valve (free) and the traces of cardinal apparatus are missing.

**Comparison.** The exemplar is compressed making difficult specific determination. It is most similar to *H. lapeerousi* Goldfuss. The siphonal pillars of the latter are less developed and more wide at the base. It is similar to *H. cornucopiae* Defrance, mostly from the ligamental ridge. The latter has developed siphonal pillars and depressed at the base. *H. castroii* (Vidal) has the same characteristics as well.

---

![Fig. 6 — Hippurites microstyla (Douvillé). Transversal section of the right valve.](image-url)

---

The ligamental pillar L is most small and short, very wide at the base, triangular and very sharp. Two siphonal pillars, S and E respectively are almost
equal, very wide at the base, less distinct and with circular anterior part. Nevertheless, the second siphonal pillar E is more distinct.

The teeth 1 and 3 are oval and are set in two sides of the siphonal pillar. The trace of the bearer of the posterior muscle is situated between pillars L and S, whereas the trace of the anterior muscle, also oval one occur in front of the first.

The distance L-S and S-E are nearly equal and the three pillars occupy together almost 1/3 of the valve’s perimeter. The free valve (the left one) is absent.

**Comparison.** Our exemplars are most similar to *Hippuritella maesleri* (Vidal), but the latter has always sharp upper part. They are also most similar to *H. variabilis* (Monier-Chalmas), but the latter has the ligamental ridges with circular upper part. *H. maesleri transitoria* Pamoukhiev differs from our exemplars because of circular pillars; deeper pillars grooves in the outer surface.

**Stratigraphic range.** Upper Santonian of Spain, France, Greece and Rumania.

**Vaccinities sulcatus** (Defrance, 1821)

Plate II, fig. 2, txf. 7

1802 *Hippurites sulcatus* Douville, p. 43, pl. V, figs 4-8
1895 *Hippurites sulcatus* Douville, p. 159, pl. XXXIII, figs 1-3
1897 *Hippurites sulcatus* Douville, p. 207, pl. XXXII, figs 1-3
1904 *Vaccinities sulcatus* Toucas, p. 102, pl. XV, figs 1-3, text figs 161-163
1926 *Hippurites (Vaccinities) sulcatus* Parona, p. 17, P. II, figs 3-4
1932 *Hippurites (Vaccinities) sulcatus* Kahn, p. 88
1960 *Hippurites (Vaccinities) sulcatus* Lupu and Lupu, p. 244, pl. 2, figs 34-36
1960 *Hippurites (Vaccinities) sulcatus* Peclincev p.69, text figs 23-26
1963 *Hippurites (Vaccinities) sulcatus* Polsak, p. 443, pl. 79, fig. 2
1976 *Vaccinities sulcatus* Lupu, p. 10, pl. 1, fig. 1, pl. XXXV, figs 1, 2
1982 *Vaccinities sulcatus* Czablay, p. 71, pl. XV, figs 3 (cum syn)

**Material.** Three fragmentary exemplars of the right valve.

**Description.** The right valve is nearly cylindric with diameter ranging between 5-6 cm. The outer surface is covered by several 1-2 mm thin radial ribs, separated from each other by 2-3 mm wide grooves. The ribs and grooves are regularly spread throughout the valve’s surface, including that of siphonal zone. The siphonal zone has nearly 1/4 of valve’s perimeter.

The ligamental ridge L is short and triangular. Its upper part is less curved forward, cut and almost as long as the first siphonal pillar S. The latter is also short, wide and slightly compressed at the base. The second siphonal pillar E is thinner and nearly two times longer than the first one. Its upper part is like pear, whereas its base is compressed and narrower than the upper part. The distance L-S is a few greater than S-E one.

The cardinal apparatus is preserved in one of the exemplars. Two teeth 1 and 3 of the left valve and the cardinal tooth of the right valve are seen. The axis of 1 and 3 teeth forms a 45° angle with the pillar of ligament, corresponding to the data from the type of form. The bearer of the posterior muscle mp occur between L and S. Apart form this the anterior O and main supplemental cavities of the right valve D are preserved.

**Comparison.** *Vaccinities sulcatus* Defrance is most similar to *Vaccinities archiaci* Monier-Chalmas, but the latter has the first pillar S narrower at the base. *Vaccinities praesculatus* Douville is depressed at the base.

**Stratigraphic range.** Upper Santonian-Lower Campanian of France, Eastern Alps (Gosau facies), Yugoslavia, Hungary and Romania.

**Radiolites cf. galloprovincialis** Matheron, 1842

Plate II, fig. 5

1908 *Radiolites galloprovincialis* Toucas, p. 76, pl. 15, figs 1-5
1926 *Radiolites galloprovincialis* Parona, p. 26
1952 *Radiolites galloprovincialis* Kahn, p. 141
1954 *Radiolites galloprovincialis* Astre, p. 15, pl. 4, fig. 6
1967 *Radiolites galloprovincialis* Polsak, p. 71, pl. 42, fig. 3

**Material.** 2 exemplars of the right valve partially preserved.

**Description.** The right valve (attached one) is relatively large and conical. The outer folds consisting of several lamellae rectilinear, well — interlocked and regularly distanced from each other. Apart from this, several ribs occur on the outer surface. They are thin and less distinct, uniformly spread and separated from one another by less deep grooves, wider than the ribs.

The preservation of the cardinal apparatus is partial in transversal section. The ligamentar ridge L
is short and traverse all the valve's wall as a thin rectilinear line. The traces of the left valve's teeth 1 and 3 and the trace of the anterior muscle's bearer ma which is long are also preserved. The outer wall of valve has polygonal prismatic structure. The siphonal part with its two bands is missing.

Comparison. Our exemplars although partially preserved, are similar to those presented by Toucas in figs 2 and 3. R. angesiodes Lapeirouse distinguishes by smaller shell and less distinct folds.

Stratigraphic range. Recorded is Santonian of Spain, France, Algeria and Tunisia and Cenomanian of Istria (by Parona).

Biradiolites fissicostatus d'Orbigny, 1847
plate II, fig. 1, txf. 8

1867 Biradiolites fissicostatus d'Orbigny, p. 234, pl. 575, figs 1-4
1909 Biradiolites fissicostatus Parona, p. 155, fig. 11
1909 Biradiolites fissicostatus Toucas, p. 118, pl. XXIV, figs 4-7
1932 Biradiolites fissicostatus Kuhn, p. 86
1968 Biradiolites fissicostatus Pejovic, pl. VI, figs 1, 2.

Material. 1 exemplar of the attached valve (right one) in transversal section.

Description. The attached valve is conical, prolonged and compressed dorsally. In this side it is flat and without ribs. Two strong ribs are prolonged both in anterior and posterior part, having opposite directions from each other. Apart from this, three other ribs occur in the ventral side. Those which separate the siphonal bands in two parts and that of the anterior part are stronger.

![Fig. 8 — Biradiolites fissicostatus d'Orbigny. Transversal section of the right valve. × 1.](image)

Biradiolites fissicostatus d'Orbigny. Sezione trasversale della valva destra. × 1.

The siphonal bands are situated in front of the cardinal side. The anterior siphonal band E in nearly flat and more wide than the other one. The posterior siphonal band S is located in the other side of fold between two ribs and is more deep. The cardinal apparatus is missing.

Comparison. B. fissicostatus Toucas is most similar to the described species, but the first has greater siphonal band, whereas our species is compressed.

Stratigraphic range. Upper Santonian of the southern France, Italy (Venetia) and Yougoslavia (Montenegro).

Biradiolites stoppani (Pirona, 1869)
plate II, fig. 4

1909 Biradiolites stoppani Toucas, p. 106, pl. XX, figs 8-15
1913 Biradiolites stoppani Kuhn, p. 92.

Material. 2 well preserved exemplars of the right valve.

Description. The right valve is conical to cylindrical. Its surface is covered by several strong ribs, which are most distinct and separated by wide grooves with thinner longitudinal ribs. The valves diameter ranges from 44 mm to 66 mm.

The cardinal side has strong ribs. The anterior siphonal band E is 23 mm wide, less distinct and covered by several thin longitudinal ribs, whereas the posterior siphonal band S is some wider than the first and its ribs are rarer and stronger. The intermediate zone, having the form of furrow with some more stronger ribs than those of siphonal bands occur between two siphonal bands. The left valve is missing.

Comparison. Biradiolites angulata d'Orbigny is similar to our exemplars, but its surface is covered by almost equal ribs, differing from them.

Stratigraphic range. Upper Santonian of Italy.

Biradiolites sp.
plate I, fig. 7

Material. 2 exemplars of the right valve in the transversal section.

Description. The right valve is conical with a relatively small diameter. Its maximal diameter is about 40 mm, whereas that of the inner layer is 20 mm. Outer surface is covered by several ribs, 5 of which are stronger and separated from each other by deep furrows. The siphonal bands also occur on this side of the valve. The thinner radial ribs occur in the dorsal side as well.

Sauvagesia sp.
plate II, fig. 3

Material. 2 exemplars of the right valve in the transversal section.

Description. The conical valve is covered on the surface by several ribs, some of them are strong. Its diameter ranges from 35 to 40 mm.

The ligamental ridge L is well developed and thin tabular, slightly directed towards the posterior part of the shell. The tooth 2 is located near the upper part of the ligamental ridge and two teeth of the free valve 1 and 3 occur laterally its. The trace of the
anterior muscle bearer is elongated, the same as the posterior (mp) one. The main cavity is wide and occupies almost a lower half of the valve. The outer walls have netty structure with polygonal pores.

**Durania martelli** Parona, 1911
plate II, fig. 3

1911 *Durania martelli* Parona, p. 9, figs 1-2
1958 *Durania martelli* Tavani, p. 174
1966 *Durania martelli* Torre, p. 15, pl. V, figs 1a-b

**Material.** 1 exemplar of the right valve in the transversal section.

**Description.** The right valve is conical. Its surface is covered by several strong longitudinal ribs (radial one). The siphonal bands S and E are a few elevated on the valve's surface from which the posterior one is more wider. They are separated from one another by some ribs.

**Comparison.** *Durania gausensis* (Dac.) is distinguished by our species in having two siphonal bands separated by a strong rib. The strong ribs on the surface in *D. cornupastoris* (des Moul.) are missing.

**Stratigraphic range.** Turonian and Senonian of Italy.

**Stratigraphic values of rudists**

The studied fauna, mostly rudists, are important fossils for the Cretaceous biostratigraphy due to limited stratigraphic range and wide geographic one. *Hippurites nabresinensis* Futterer, *H. colliciatus* Wood. (Santonian-Maastrichtian) and *Durania martelli* Par. (Turonian-Campanian) are most widespread. The majority of species are related only with the Santonian deposits and the following three of them: *Hippuritella microstyla* (Douv.), *Biradiolites fissicostatus* d'Orb. and *B. stoppani* (Pir.) occur only in the Upper Santonian. The microfauna founded in these limestones, although of the wide stratigraphic range, does not exclude these ranges.

In conclusion, basing on the above mentioned data, the age of the limestones which constitute the top of the iron-nickel ore of Guri Pishkasht belongs to Santonian-Lower Campanian the late one, perhaps, whereas the uppermost part of the limestones could be passed up to early Campanian.

The Santonian transgression covering the studied region, according to the recent data, has also covered the other regions of the southern Albanides such as: Prenjas, Polis, Çervenâk, Guri Kuq, Mali Thatê, Zemblik etc. at which are found rudists and other fossils as in the studied region. It has been also widespread in Eastern Greece and Macedonia (Peza & Garori, 1985; Peza, 1989). The Santonian Sea in this region has had about 20° temperature waters and normal salinity.

The above mentioned rudistic association is also recorded in other mediterranean countries such as France, Spain, Italy, Yugoslavia, Greece, Rumania, Bulgaria, Hungary, etc., speaking for the same paleobiogeographic conditions during the Santonian in these areas.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LU</strong></td>
<td><strong>LU</strong></td>
<td><strong>LU</strong></td>
<td><strong>LU</strong></td>
<td><strong>LU</strong></td>
<td><strong>LU</strong></td>
</tr>
</tbody>
</table>

1. *Hippurites castroii* Vidal  
4. *Hippuritella microstyla* (Douv.)  
5. *Vacciniites sulcatus* Deft.  
7. *Biradiolites fissicostatus* d'Orb.  
8. *Biradiolites stoppani* (Pir.)  
9. *Durania martelli* Parona

---

**Table 1** — Stratigraphic range of rudists of Guri Pishkasht.

---

— Range stratigrafico delle rudiste di Guri Pishkasht.
RIASSUNTO

Nella regione di Guri Pishkashit i calcoli del Senoniano giacciono trasgressivamente su rocce ultramafiche. Essi sono ricchi in rudiste e microfossili che indicano un'età Santoniano-Campaniano inferiore. Le rocce ultramafiche sono diffuse nella regione tra le città di Penjas e Pogradec (ad ovest del lago Ohrid). Esse consistono di serpentiniti e duntii alterate e fortemente tettonez- zate. I depositi senoniani, composti alla base da calcoli e con- glomerati, giacciono sopra di essi in modo trasgressivo. I depositi senoniani erano originariamente diffusi, ma, recentemente, a causa della forte erosione, ne rimangono piccoli relitti erosivi.

L'antica miniera di ferro-nickel di Guri Pishkashit, ad ovest del lago di Ohrid, è uno dei settori ove affiorano i depositi senoniani. Il corpo di ferro-nickel, spesso 2-10 m (oggi totalmente esplorato), consiste di ooliti e pisoliti ferrose rosso scure e giace sopra le ultramafiti erose a Guri Pishkashit. La successione continua come segue:

— nella parte inferiore i calcoli giacciono sulle mineralizza- zioni ferro-nickel con biomariti marnose che passano verso l'alto a marno grijte dove si rinvengono rudiste come Biradiolites stoppani (Pirona) etc. Microfossili come Cumulina sp., Trochospora sp., Tasmatisporidium parvovesticuliferum (Mannini), miloliti, ostracodi etc., si rinvengono in questi 2-3 m di calcoli.


REFERENCES


KUHN O. (1932) - Fossillium Catalogus, I Animalia, Rudistae, pars 54, Neubrandenburg.


PARONA C.F. (1911) - Rudiste del Senoniano di Ruda. Reale Acc. Sc. di Torino, XI: 3-12, 2 Fig., Torino.


PEZA L.H. & GARONI R. (1985) - Stratigrafia e depoziitmeve kretake të zonz Mirdita dhe premisat e kërkimit të mineralave të dobishme, Tirane.


PLATES
PLATE I
TAVOLA I

Fig. 1 — Hippurites castroi Vidal. × 2.
Fig. 2 — Hippurites colliciatus Woodward (2) and Hippuriella microstyla (Douville) (3, 4). × 2.
Fig. 3 — Sauvagesia sp. (1) Hippurites nabresinensis Futterer (2), Hippuriella microstyla (Douville). × 1.
Fig. 4, 6 — Hippurites sp. × 1.
Fig. 5 — Hippuriella microstyla (Douville). × 1.
PLATE II
TAVOLA II

Fig. 1 — *Biradiolites fissicostatus* D'Orbigny. × 1.
Fig. 2 — *Vaccinites sulcatus* Defrance. × 2.
Fig. 3 — *Durania* Martelli Parona (2), *Sauvagesia* sp. (1). × 1.
Fig. 4 — *Biradiolites stoppani* (Pirona). × 1.
Fig. 5 — *Radiolites galloprovincialis* Matheron. × 1.
Fig. 6 — *Biradiolites* sp. × 1.
PLATE II

1

2

3

4

5

6