ANALELE ŞTIINŢIFICE ALE UNIVERSITĂŢII "AL.I.CUZA" IAŞI
Geologie, Tomul XL-XLI, 1994-1995

LOWER CRETACEOUS *APTYCHUS* ASSEMBLAGES IN RUMANIA
I) SVINITA REGION (SW RUMANIA)

BY

ILIE TURCULEŢ and EMIL AVRAM

KEY WORDS: *Cephalopoda Aptychus*, Lower Cretaceous, South Carpathians, Palentology.

1. Introduction

The Lower Cretaceous assemblages of Aptychi in Rumania were inventoried in relatively few papers, in which their presence in the Apuseni Mts (Ilie, 1935; Paucă, 1941; Turculeţ et al., 1968; Bordea et al., 1978; Lupu, in: Bleahu et al. 1981; Lupu et al., 1993), in the East Carpathians (Paul, 1876; Herbich, 1878; Preda & Atanasiu, 1925; Ilie, 1957; Băncilă, 1941, 1958; Turculeţ, 1964, 1971; Popescu & Patrulius, 1964; Avram & Matei, 1964; Turculeţ et al., 1965, 1967, 1968, 1971; Patrulius, 1969; Patrulius & Avram, 1876; Avram, 1976; Avram & Kusko, 1984), and in the South Carpathians inner structural units (Jekelius, 1916; Răileanu, 1960; Patrulius, 1969) was announced. But none of these papers attempetd to carry out a general biostratigraphical study on their ground, until now.

From all the areas in Rumania displaying **Lower Cretaceous Aptychi**, only the Svinița region is sufficiently fossiliferous in the Berriasian-Hauterivian interval to allow a chronostratigraphical framework of their assemblages. That area is located south-west of Rumania, by the Danube, almost 40 km upstream the Orşova town; structurally, it pertains to the Marginal Dacides (fide Săndulescu, 1984).

Lying on the Upper Jurassic (Kimmeridgian-Lower Tithonian) red-violaceous or grey nodular limestones, the Lower Cretaceous rock sequence in the Svinița region starts with white to light-grey cherty pelagic limestones, with some calcarenite

interbeds (= the Murguceva Formation, ±Upper Tithonian-Berriasian-Middle Hauterivian in age), this unit supporting grey-clayey limestones, with marlstone, marly and clayey interbeds (= the Svinița Formation, of Upper Hauterivian-Albian age); the latter includes a lower, clayey-limy and marlstone member (the Upper Hauterivian Vodiniciki Member), a middle one, mainly composed of marlstones and claystones rich in piritised ammonites (the Barremian-Lower Aptian Temeneacia Member) and an upper, clayey-coaly sandstone, with marly interbeds member (the Tsiganski Member, Upper Aptian-Albian in age) (Avram, 1976; Năstăseanu & Avram, 1986).

The *Aptychus* bearing fossiliferous levels were met within this succession mostly in the Murguceva Formation and in the Vodinciki Member of the Svinița Formation. There were registered 43 fossiliferous sites displaying Aptychi, disposed along several geological sections cutting the Berriasian or (more frecuently) Valanginian and Hauterivian strata.

All the *Aptychus* representatives described below were recorded by one of the authors (& E.A.), who also studied the ammonite and tintinnid assemblages leading to their framework within the chronostratigraphical scale; they were studied by the other autor (I.T.), who also assumed their systematic interpretation. All are preserved in the Institute of Geology and Geophisics repository (no. IG-Pl 8620-18668).

2. Fossiliferous sites bearing Aptychi in Svinița region

As can be seen in the text-figure 1, the early Lower Cretaceous deposits in the Svinița region are exposed in three main areas, namely in the roundings of the Svinița village (within 2 comportaments of a main fault), at 7 km westwards - in the Ravniste area -, and in the Sirinia valley basin. In these areas, the fossiliferous sites displaying Aptychi are disposed (in stratigraphical order) as follows:

Kimmeridgian ?-Lower Tithonian. Some Aptychi were recorded from white limestones rich in *Saccocoma*, at Munteana (south of the Cozla village); this is the only fossiliferous site where Aptychi older than Tithonian were identified by us (site 554, in the Figure 1);

Late Tithonian. Next level displaying Aptychi is situated in the beds transitional from the Lower Tithonian rich in *Saccocoma* violaceous nodular limestones to the light-grey cherty limestones of the Murguceva Formation, along the Danube bank, at Munteana (sites 547-20,547) and in the Murguceva valley, located south of Svinița (sites 14 and 16); the first of these sites also display a tintinnid assemblage of *Crassicollaria* zone (fide Avram, 1984).

Berriasian. The lowermost deposits of the Murguceva Formation, built up of white cherty limestones, offered Aptychi remains, as follows: along the Sirinia valley, on the Cozla-Bigăr route (site 637), where a tintinnid assemblage of *Calpionella alpina* zone was also met; on the right slope of the Murguceva valley almost 1 km upstream the Orșova-Svinița highway (layer MO18), where a tintinnid assemblage of the

Calpionellopsis zone below the bed with *Fauriella* ex.gr. *boissieri* (MO20) led to Late Berriasian age (Avram, 1984); along the Danube left bank, very near to the Iordumovacia valley mouth, south of Svinița, (120 m upstream of Iordumovacia), the same succession at the base of the Murguceva Formation below the levels with *Thurmanniceras otopeta* offered some Aptychi, assumed to be Berriasian in age without any other specification.

Valanginian. Some sections, namely in the Svinița village area: on the Murguceva valley (sites 9,11, MO24), on the Vodiniciki valley (Vl4+60), and north-wards, on the Danube bank downstream the Saraorski valley (138), and also in the Sirinia valley 200 m upstream its tributary Raichici valley mouth (652) offered Aptychi, the Valanginian age of which is proved as follows: 11, displayed a profusion in *Kilianella* ammonite assemblage, with *K.lucensis*, *K.retrocostata* etc., in between;

MO24, situated at almost the same level as 11, presented only *Kilianella* aff. *roubaudiana*;

138, contains *Busnardoites campylotoxus*, the index species of the Lower Valanginian *Campylotoxus* zone;

V14+60 offered some ammonites of the Upper Valanginian *Verrucosum* zone, such as *Teschenites teschenensis* and *Roidighieroites* cf. *rutimeyeri*;

652, with numerous *Olcostephanus*, seems to be Upper Valanginian in age;

9 displays, yet, an Upper Valanginian assemblage of dinoflagellates (after E.Antonescu, unpublished).

Hauterivian. Most part of the fossiliferous sites displaying Aptychi in the here described region are Hauterivian in age. They are located south of Svinița along the Danube bank between the Murguceva and Vodiniciki valleys sites 3,4,6,7,8), on the watershed between these two valleys (21) and in the Vodiniciki valley (V7/1, V5, V2, V12, V14) and north of Svinita at Zeliste (537), on the right bank of the Sirinia valley near to its mouth (180), on the route along the Sirinia valley (187, 636, 650), its tributary Belareka valley (814) and on the right slope of the Sirinia valley (1034). All these fossiliferous sequences are built up of grey-clayey cherty limestones pertaining to the Murguceva Formation and to the basal member of the Svinița Formation, made up of grey-clayey and marly limestones.

Among the Hauterivian fossiliferous sites, 187 displays *Distoloceras spiniger*, leading to the *Radiatus* zone, and 537, with *Bochianites* sp.and situated below the levels with *Crioceratites loryiformis*, seem to pertain to the same ammonite zone; 8 is located immediately below the *Lyticoceras* cf. *cryptoceras* (=*Nodosoplicatum* zone), thus pertaining to this zone or to the *Radiatus* one; as 7,V14 displying also a *Lyticoceras*, but assembled with *Crioceratites* ex. gr. *matsumotoi*, seems to pertain to the *Nodosoplicatum* zone, too, and V12 is geometrically situated at the same level. Above the last limestones with chert pertaining to the Murguceva Formation, the first levels of the Svinița Formation offered in the site V2: *Crioceratites matsumotoi*, *C.trituberculatus* and a *Saynella* ? sp. pointing to a Middle Hauterivian age; 21 and V5, with *Crioceratites* ex gr.*duvali*, seem to be framed in the same interval; 68, with

various *Crioceratites* (aff. *quenstedti, sornayi* etc.) and *Acrioceras* is situated immediately below the sure *Balearites* zone rock-sequence; V7/1,3+25,4 and 5, with *Crioceratites pseudothurmannii, Acrioceras seringei, Balearites balearis, Hamulina* sp., pertain to the Upper Hauterivian *Balearis* zone; and 3 offered *Pseudothurmannia* aff. *picteti* and *Hamulina* cf. *alpina*, leading to the *Angulocostata* zone. Finally, the other fossiliferous sites mentiond here above, namely 636, 650 and 1034, where the absence of any tintinnids and the presence (yet) of the chert indicate a Late Valanginian or Early Hauterivian age, while 814, by lacking the cherty limestones (in an upper position as against the Lower Hauterivian levels) is Late Hauterivian, without any possibility to specify their zonal appurtenance.

3. Systematics

Para-genus ***Lamellaptychus*** Trauth, 1927
Para-subgenus ***Lamellosuslamellaptychus*** Turculet, 1994
Lamellaptychus (Lamellosuslamellaptychus) mortilleti mortilleti
(Pictet & Loriol, 1858)
Pl.I, figs.1-19; Pl.II, figs.1-5, 8-10

1938. *Lamellaptychus mortilleti* (Pict.&Lor.) f.typ., Trauth, pp.145-147, pl.X, figs.27-30 (*cum syn.*)

1968 a. *Lamellaptychus* gr.B, *mortilleti* (Pict. & Lor.) f.typ.Trauth, Turculet & Grasu, pl.I, figs.1-2; 1968b. Turculet & Grasu, p.90, pl.II, fig.8.

Material: 33 valves, 10 of which being assembled in pairs and 23 being single, one of them preserved as a mould. They were recorded in the sites 6 (P-18626), 9(P-18623), 11(P-18621), 16(P-18622), MO24 (P-18624), V14+60 (P-18625), 187(P-18627), 636 (P-18628), 637 (P-18629), 650 (P-18630), 652 (P-18631), and the Danube bank upstream the Iordumovacia valley (P-18620) (see text-fig.1)

Measurements (in mm):

Site	L	S	l	pl	S/L	l/L	pl/L	pl/S	pl/l	Inventory
187	12.1	10.5	5.00	9.2	0.867	0.413	0.760	0.876	1.84	P-18627a
187	14	12.9	7.5	11.9	0.921	0.535	0.85	0.922	1.586	P-18627b
652	15.2	14.5	7.4	12.8	0.953	0.486	0.842	0.882	1.729	P-18631
VI4+60	13.6	12.5	7.2	12.40	0.919	0.529	0.911	0.992	1.722	P-18625
652	23.6	22.4	12.5	19.0	0.949	0.529	0.805	0.848	1.52	P-18623
11	13	11.5	7.9	10.3	0.884	0.607	0.792	0.895	1.303	P-18621
637	17.9	15.9	9.5	14.2	0.888	0.530	0.793	0.893	1.494	P-18629
652	16	14.8	9.2	13.5	0.925	0.575	0.843	0.912	1.467	P-18631
187	14	13.4	6	12.4	0.957	0.428	0.885	0.925	2.066	P-18627
M024	19	17	9	15	0.894	0.473	0.789	0.881	1.666	P-18624
187	23.5	20.6	12	17.8	0.876	0.500	0.757	0.864	1.483	P-18627
6	14.4	11.7	7.6	11	0.812	0.527	0.763	0.940	1.447	P-18626

Description: Sub-triangle shaped valves, displaying the slightly overrunning 90° apical angle, a clearly defined and relatively deep lateral depression, this bounded from the symphysal-terminal area by a diagonal-radial, in places flatened, ridge. The convex surface is covered by numerous, thin, typically lamellid (type B); most of them end on the symphysal edge, but some-on the latero-external one, the former presenting a small inflexion towards the ventrum. On the surface of the lateral depression and of the radial ridge, the ribs drow a general-normal lateral inflexion, very typical of this para-species. l/L ratio varies typicaly between 0.40 and 0.60.

Occurrence. L.(Ll.)mortilleti mortilleti was recorded in the Tithonian deposits of Germany, and in the Berriasian-Valanginian interval in the Alpine-Mediterranean area (France, Switzerland, Italy, Bulgaria, West Carpathians).

In Rumania it was reconised in the *Aptychus* Formation of the East Carpathian (Hăghimaş and Rarău Synclines) and in the Apuseni Mts (Codru Massif), occurring in the Berriasian-Valanginian interval, too. Within the grey marly deposits of Svinița, this para-species is well represented in the Berriasian deposits (120 m N of Iordumovacia valley, 637), in the Valanginian (sites 9, 11, MO24, V14+60, 652) and even in the Hauterivian (6, 187, ?636, ?650).

Lamellaptychus (Lamellosuslamellaptychus) mortilleti longus Trauth, 1938

Pl.II, figs.11-14; pl.III, figs.1-4, 12

1938. *Lamellaptychus mortilleti* (Pict. & Lor.) var.n.*longa*, Trauth, pp.147-148, pl.X, fig.31-32 (*cum.syn.*).

1961. *Lamellaptychus mortilleti* (Pict. & Lor.) var. *longa* Trauth, Stefanov, p.218, pl.III, fig.2; 1963. Mutiu, p.530, pl.II, fig.11.

Material. 14 valves (10 of them assembled in pairs), recorded in the sites 9(P-18633), 16(P-18634), 138(P-18635), 187(P-18636), MO18(P-18632), 636(P-18637) 652(P-18638).

Measurements:

Site	L	S	l	pl	S/L	l/L	pl/L	pl/S	pl/l	Inventory
652	14.6	14	4.8	12.8	0.958	0.328	0.876	2.666	0.914	P-18638
187	14.6	14	5	12.7	0.958	0.342	0.869	2.540	0.907	P-18636
636	12.2	11.4	4.3	11.2	0.934	0.352	0.918	2.604	0.982	P-18637
636	18	15.6	7	15.3	0.866	0.388	0.850	2.040	0.98	P-18637

Description: Subrectangular outlined valves, displaying very near to the type par -subspecies morfological features. They are different from the latter by the l/L ra o, always smaller than 0.40, and by their subparallel symphysal and lateral edges.

Occurrence. L.(Ll.) mortilleti longus was described from the Baverian and Bernois lps. In Rumania it was recorded in the "Neocomian" depositis of the Moesian Platform and also in the *Aptychus* Formation of the Hăghimaş Syncline (Dămuc valley).

valley). In Svinița it is well represented in the (Middle?) Tithonian (16), Berriasian (MO18), Valanginian (9,138,652) and Hauterivian (187) deposits.

Lamellaptychus (Lamellosuslamellaptychus) mortilleti retroflexus Trauth, 1938
Pl.III, fig.10

1968a. *Lamellaptychus*, group B, *mortilleti* (Pict. et Lor.) var.*retroflexa* Trauth Turculeț & Grasu, p.19, pl.I, figs.5-6.

Material: 2 valves very near one another on the same bed surface, probably pertaining to a single pair. They were recorded in the site no.636.

Measurements:

Site	L	S	l	pl	S/L	l/L	pl/L	pl/l	pl/S	Inventory
636	17.5	15.5	8.2	13	0.885	0.468	0.742	1.585	0.838	P-18639

Description. Sub-trapeze outlined valves, displaying a deep lateral depression and bearing an apical-lateral (diagonal) ridge. These valves are clearly distinguishable from those of the typical representatives of the para-species by the course of the ribs on the external, terminal-symphysal area, where they present an adsymphysal, retroverse general inflexion, then direct to the ventrum drawing with the symphysal edge a very acute angle.

Occurrence. *L.(Ll.)mortilleti retroflexus* was described from the "Neocomian" of the Baverian Alps. In Rumania it was recorded in the *Aptychus* Formation of the Hăghimaș Syncline (East Carpathians) (Berriasian-Valanginian). In Svinița, it was recognised in the lowermost Hauterivian (? or Upper Valanginian) deposits, as well.

Lamellaptychus (Beyorichilamellaptychus) mortilleti polycinctus n.pssp. Turculeț
Pl.III, fig.6

Holotypus: the specimen no.P-18640, preserved in the Institute of Geology and Geophysics repository (București).

Derivatio nominis: after the sculpture of the valves, characteristically displying several discordant ribs.

Stratum typicum: the grey, thin bedded marly interbeds of the Murguceva Formation, Hauterivian in age.

Locus typicus: Sirinia valley; 960 m upstream its mouth (Cozla village, Banat).

Material: only 2 valves of a pair, one of them preserved as a mould recorded in the site 187.

Measurements:

Site	L	S	l	pl	S/L	l/L	pl/L	Inventory
187	?25	23.6	12.6	?20	0.94	0.50	0.80	P-18640

Description. Generally resembling the typical para-subspecies (pointed-triangle shaped valves, with the apical angle of 98^0. B-type lamellid sculpture and lateral

depression well defined), but characterised by several discordances of the ribs on the lateral depression.

Lamellaptychus(Lamellosuslamellaptychus) submortilleti submortilleti Trauth, 1938

Pl.III, figs.8, 9

1938. *Lamellaptychus sub-mortilleti* n.n.f.typ., Trauth, pp.143-144, pl.X, figs.23-24 (*cum syn.*)

1968a. *Lamellaptychus*, group B, *submortilleti* Trauth, Turculeț & Grasu, p.29, pl.I, fig.4, 5.

Material. 3 valves, 2 of which assembled in a pair, yielded by the fossiliferous sites V14+60 and 650.

Measurements:

Site	L	S	l	pl	S/L	l/L	pl/L	pl/S	pl/l	Inventory
V14+60	12	10.9	5	9.6	0.908	0.416	0.8	0.880	1.92	P-18641
650	12.5	12	6.7	11	0.96	0.54	0.88	0.92	1.64	P-18642

Description. Small in size, sub-triangular, valves, bearing numerous fine ribs, the course of which is very similar to that of typical *L.(Ll.) mortilleti*. But they are clearly different from the latter by the absence of the lateral depression, a feature typical of *L.(Ll.)submortilleti*.

Occurrence. L.(Ll.)submortilleti was recognised outside Rumania in the Tithonian-Hauterivian interval of Baverian and Austrian Alps, to Northern Carpathians. In Rumania it was found in the *Aptychus* Formation of the Hăghimaș and Rarău synclines (East Carpathians) in the Uppermost Tithonian-Berriasian. In the Svinița area it was recorded in the Uppermost Valanginian (V14+60) and in a doubtful Hauterivian level (650).

Lamellaptychus(Lamellosuslamellaptychus)submortilleti longus Trauth, 1938

Pl.III, fig.8

1938. *Lamellaptychus sub-mortilleti* n.n.var.n.*longa*, Trauth, p.144, pl.X, fig.26 (*cum syn.*)

Material: a pair of valves, recorded in the site no.652.

Measurements:

Site	L	S	l	pl	S/L	l/L	pl/L	pl/S	pl/l	Inventory
652	15.6	14.3	4	12.8	0.919	0.256	0.82	0.895	3.2	P-18643

Description. High-oval outlined valves, joined lenghtways their symphysal margin. Their ribbing is very symilar to that of the typical para-subspecies, but the l/L ratio is characteristic of the subspecies *L.(Ll.)submortilleti longus*, namely smaller than 0.40.

Occurrence. L.(Ll.)submortilleti longus first description was based on a specimen found in Berriasian deposits of southern France. In Rumania it was mentioned in the

Aptychus Formation of the East Carpathians, in the Upper Tithonian-Berriasian levels. In Svinița, this subspecies was met in the Upper Valanginian.

Para-subgenus ***Thorolamellaptychus*** Turculet, 1995

Lamellaptychus(Thorolamellaptychus) noricus (Winkler, 1808)

Pl.III, figs.5, 7

1938. *Lamellaptychus noricus* (Wkl.), Trauth, p.189, pl.XIII, fig.14-15 (*cum syn.*).

Material: 3 valves, from which 2 are assembled in a pair; they were yielded by the sites 14(P-18644) and 187(P-18645).

Measurements:

Site	L	S	l	pl	S/L	l/L	pl/L	pl/S	pl/l	Inventory
187	11	10.3	5.7	8.4	0.936	0.51	0.76	0.81	1.47	P-18645

Description. Small, oval-triangular valves, characterized by their C-type (thoroid) ribbing, in which all the ribs are constantly parallel to the lateral and external margins and stop on the symphysal edge.

Occurrence. *L.(Thl.)noricus* is known from the "Neocomian" deposits of the French, Swiss, German and Austrian Alps. In the Svinița area, it was met in the Upper Tithonian (14) and Valanginian (187) deposits, as well.

Para-subgenus ***Didayilamellaptychus***, Turculet, 1995

Lamellaptychus(Didayilamellaptychus) seranonis (Coquand, 1841)

Pl.III, fig.11

1938. *Lamellaptychus seranonis* (Coq.)f.typ., Trauth, pp.193-194, pl.XIII, fig. 27-29 (*cum syn.*)

Material: 1 pair of valves (one of which being only partly preserved), coming from the site 1034(P-18646).

Description. Small, narrow and partly deformed valves (L=11 mm; S=10,5 mm), characterised by a well-defined lateral depresion, and by the fine ribbing of the convex surface; the course of the ribs displays a general normal lateral inflexion and a large courve backwards near the symphysal edge, so that their ends here are guided towards the apex.

Occurrence. *L.(Dl.)seranonis* is largely spread in the Upper Tithonian-Hauterivian deposits, from Cuba, through Spain, France, the Alps, West Carpathians, to Hungary. In Rumania, it was recognised in the Apuseni Mts (Trascău Massif), East Carpathians (Hăghimaș Syncline and, also, the Sinaia Formation of the Ceahlău Nappe), in the same interval. In the Svinița area, this para-species was recorded in the beds at the Valanginian/Hauterivian boundary.

Lamellaptychus(Didayilamellaptychus) didayi (Coquand, 1841)
Pl.III, figs.13-15; Pl.IV, figs.1-4

1938. *Lamellaptychus didayi* (Coq.), Trauth, p.198, pl.IX, fig.6-7; pl.XIV, fig.3-4 (*cum syn.*).

1961. *Lamellaptychus didayi* (Coquand), Stefanov, p.216, pl.II, fig. 1-7; 1976a. Avram, p.58, pl.X, fig.11; 1986. Calzada et.al., p.99, fig.3.

Material: 7 valves, only one of which being almost complete; they were recorded in the sites 9(P-18649), 636(P-18647), 537(P-18650), and 8(P-18648), in stratigraphical order.

Measurements:

Site	L	S	l	pl	S/L	l/L	pl/L	pl/S	pl/l	Inventory
636x	?24	20	14	13.5	0.833	0.583	0.562	0.685	0.964	P-18647

Description. Sub trapezoidal in shape, massive valves, displaying a triangle shaped, broad lateral depression and a well defined apical-median ridge. Their ornamentation, typically didayiform, is characterised by rare, strong ribs, with normal inflexions on the lateral depression area, and strongly refracted on the medio-apical ridge so that their retroverse (towards the apex) ends stop on the symphysal edge.

Occurrence. *L.(Dl.)didayi* is frequent in the Berriasian-Hauterivian deposits of Spain, South France, the Alps, Dinarids, Carpathians and north-western Africa. In Rumania it was mentioned in the East Carpathians Flysch (Ceahlău Nappe) and in the *Aptychus* Formation (Hăghimas Mts.). In Svinita, this para-species was recognised in the Upper Valanginian (9) and Lowermost Hauterivian deposits (? 636, 537 and 8).

Lamellaptychus(Didayilamellaptychus)angulocostatus angulocostatus
(Peters, 1854)
Pl.IV, figs.5-13; Pl.V, figs.1,3-5,6,8,13

1938. *Lamellaptychus angulocostatus* (Pet.)f.typ., Trauth, pp.204-207, pl.XIV, figs.12-13 (*cumsyn.*)

1961. *Lamellapthychus angulocostatus* (Peters), Stefanov, p.212, pl.1, figs.1-4,6.

1976a. *Lamellaptychus angulocostatus* (Peters) *forma typica* Trauth, Avram, p.58, pl.X, fig.10

Material: 18, more or less complete valves, found in the sites 9(P-18656), 8(P-18655), 7(P-18653), V2(P-18651), V14(P-18651), 180(P-18658), 68(P-18652), 3+140(P-18654), V5(P-18651), 4 and 3(P-18657), in stratigraphical order.

Measurements:

Site	L	S	l	pl.	LE	S/L	l/l	pl/L	pl/S	pl/l	Inventory
3+25	23.2	21.7	?10	19.8	3.2	0.935	0.431	0.853	0.912	1.98	P-18657
68	24.3	22.4	10	21	3	0.921	0.411	0.864	0.937	2.1	P-18652
7	9	8	?4	7.8		0.888	0.440	0.866	0.975	2.228	P-18653
3+140	37.5	31.7	17	26.5		0.845	0.453	0.706	0.835	1.518	P-18654
3+140'	38	32	17.5	29		0.842	0.460	0.763	0.906	1.657	P-18654
V2	?23	21.3	?12	18		0.926	0.521	0.782	00.845	1.5	P-18651
V5	27	24.5	12	21		0.91	0.44	0.78	0.86	1.75	P-18651

Description. Small in size, high-oval outlined valves. They present a triangle shaped, relatively deep, lateral depression bounded outwards by an apicalmedian ridge and an ornamentation typically made up of numerous fine ribs displaying a normal-general inflexion in the area of the lateral depression and an oblique-retroverse (after an acute angle) course towards the symphysal edge; the angular inflexion of the ribs is observable in all growth-stages, but the value of their angle becomes smaller towards the apex(from 70^0-80^0, to 50^0-55^0).

Occurrence. L.(Dl.)angulocostatus ***angulocostatus*** is known in the Berriasian-Lower Barremian interval, in the whole Tethyan areal, from the Caucasus westwards, through the Balkan, Carpathians and Alps, to Cuba. In Rumania, this para-subspecies was met in the Sinaia and Comarnic formations of in the East Carpathians flysch, and also in the Dîmbovicioara Couloir and the Moesian Platform. In Svinița, it is very frequent in te uppermost Valanginian (9) and in the whole Hauterivian, up to the *Angulocostata* zone (sites 8, V14, 7, 180, V2, 3+140, 68, V5, 4, 3–25).

Lamellaptychus (Didayilamellaptychus) angulocostatus longus Trauth, 1938
Pl. V, figs.2,7,12

1938. Lamellaptychus angulocostatus (Pet.) var.n.*longa*, Trauth, p.200, pl.XIV, fig.18(*cumsyn.*)

Material: 5 valves (4 of the assembled in pairs), recorded in the sites 21(P-18659) and V12(P-18660)

Measurements:

Site	L.	S	l	pl.	S/L	l/L	pl/L	pl/l	Inventory
V12	15.3	?12.5	5.7	?10.2	0.81	0.372	?0.813	1.80	P-18660

Description. Valves similar to those of the type para-subspecies, but longer, so that l/L ratio is smaller than 0.40.

Occurrence. L.(Dl.)angulocostatus ***longus*** is a para-subspecies mainly Hauterivian in age, known in the French Alps, Austrian Prealps, Calcareous Alps, Pieniny Klippen Belt, etc., and in Cuba. In Rumania it was identified by Trauth in Jekelius' material (probably Upper Valanginian or Lower Hauterivian in age) from the Brașov Formation. In Svinița, this para-subspecies was recorded also in the Hauterivian deposits.

Lamellaptychus(Didayilamellaptychus)angulocostatus atlanticus (Hennig, 1913)
Pl.V, figs 9, 11,14-15

1938. *Lamellaptychus angulocostatus* (Pet.)var.*atlantica*(Henn.), Trauth, pp.210-211, pl.XIV, fig.19.

1976. *Lamellaptychus angulocostatus* (Peters) *forma atlantica* Hennig, Avram, p.59, pl.X, fig.14 (*cumsyn.*).

Material: 4, more or less complete, valves, found in the sites V7/1(P-18663), 814(P-18661), 3+25 and 4+65(P-18662).

Measurements:

Site	L	S	l	pl	S/L	l/L	pl/L	pl/S	pl/l	inventory
4+65	29.2	26.3	12	22.5	0.917	0.41	0.873	0.951	2.12	P-18662
3+25a	24.5	22	11.5	15.3	0.897	0.469	0.624	0.695	1.33	P-18662

Description. Smallor medium-sized valves, characterised by an evolution of their ribbing different from evolution of their ribbing that of the type para-subspecies (ontogenetical): in the youngest stages the ribs are oblique-retroverses, refracted after an acute angle towards the apex and ending on the symphysal edge; in later stages the acute-angular course of the ribs gradually evolves into a large curve, and these touch the symphysal margin after an angle progressively nearer to 90° (= sub-seranonimorphic course).

Occurrence. *L.(Dl.)angulocostatus atlanticus* was described from the Hauterivian deposits of the French and Swiss Alps, Northern Calcareous Alps and Austrian Pieniny Klippen, and also from Cuba. In Rumania it was recognised in the Hauterivian deposits of the Ceahlău Nappe (East Carpathians). In Svinița, this para-subspecies was met in the Upper Hauterivian deposits.

Lamellaptychus(Didayilamellaptychus)angulocostatus atlanticus-radiatus Trauth, 1938

Pl.V, fig.12,16

1938. *Lamellaptychus angulocostatus*(Pet.) var.n.*atlantica-radiata*, Trauth, p.211, pl.XIV, figs.20-25.

Material: 2 disparate valves, recorded in the sites 180 (P-18664) and V5(P-18665).

Measurements:

Site	L	S	l	pl	S/L	l/L	pl/L	pl/S	pl/l	Inventory
V5	28	26	13	25.5	0.928	0.464	0.910	0.980	1.961	P-18665

Description. Valves of medium size, and trapezoidal outline; they are covered by a ribbed ornamentation very similar to that of *L.(Dl.)angulocostatus atlanticus*, but displaying in addition a fascicle of radial striae, obvious on the outer (external) symphysal area of the ridge, especially where they cross the recurrent ribs; these striae present a divergent course between the apex and the external-terminal area of the valves.

Occurrence. *L.(Dl.)angulocostatus atlanticus-radiatus* was described from the Hauterivian deposits, of South France. In Svinița, it was recognised only in the middle part of the same stage.

Para-genus ***Punctaptychus*** Trauth, 1927

Para-subgenus ***Beyrichipunctaptychus*** Turculeţ, 1994

Punctaptychus (Beyrichipunctaptychus) punctatus seranonoides n.pssp. Turculeţ

Pl.VI, figs.1, 1a

Holotypus: the only specimen we have, preserved in the Institute of Geology and Geophysics repository, no.P-18666.

Derivatio nominis: Its ornamentation, similar to that of *Lamellapthychus seranonis* (Coquand).

Stratum typicum: Tithonian grey-yellowish micritic limestones, cropping out in the Munteana area, north of Svinița.

Locus typicus: The cutting of the route Svinița-Moldova Nouă, at Munteana (Cozla village, Banat, SW Rumania) - site 547-20.

Material: only the holotype, a very complete and well preserved valve.

Measurements:

Site	L	S	l	pl	S/l	l/L	pl/L	pl/S	pl/l	Inventory
547-20	45	38	23	34.7	0.844	0.511	0.711	0.913	1.508	P-18666

Description. Valve large in size, with normal outline and displaying a typical *Punctaptychus* - like ornamentation: ribs starting from the inner margin of the valve, then presenting a general normal lateral inflexion, and finishing, after a sigmoidal course, on the lateral and external margins. However, it is clearly different from the typical representatives of the para-species by the *Didayi* - like (D-type) course of some 5 ribs, which do not finish normaly, on the external edge of the valve, but are suddenly recurved towards the apex near the external margin, and stop on the symphysal edge.

Remarks. As the recurved ribbing was known up till now only in the para-genus *Lamellaptychus* (see *L.seranonis, L.didayi, L.angulocostatus*, etc.), its detection in the para-genus *Punctaptychus* is a surprise and points to the presence of the homeomorphic features in Aptychi.

4. Conclusions

A comparison between the range of the above described *Aptychus* para-genera species and subspecies with the ranges adopted by Gasiorowski (1962) and Durand-Delga & Gasiorowski (1970) led us to emphasize the presence of *Lamellaptychus(Lamellosuslamellaptychus) mortilleti mortilleti* and *L.(Dl.)mortiletti longus* in the Lower Hauterivian, and of *L.(Thorolamellaptychus) noricus* in the Upper Tithonian, too; all the other para-species/para-subspecies were recognised in Svinița in the range as generally accepted by the mentioned authors.

A peculiar feature of the *Aptychus* assemblages in Svinița is the complete absence of the ribbed Aptychi of A-type (Beyrichi group) which, in the West Carpathians were recorded up to the Upper Valanginian (VII_2 level, of Gasiorowski (1962).

ANEXE: ilustrații
EXPLANATION OF THE TEXT-FIGURE

Text-Fig.1. Simplified geological map of the Svinița region (after E. Avram, unpublished). Legend: 1, Upper Cretaceous deposits; 2, Lower Cretaceous deposits (Berriasian-Lower Aptian, locally and Late Tithonian and Upper Aptian-Lower Albian) deposits; 3. pre-Cretaceous formations; 4.uncomformity; 5. fault; 6. fossiliferous sites dispalying *Aptychus* representatives. Inset shows the location of the study area within Rumania.

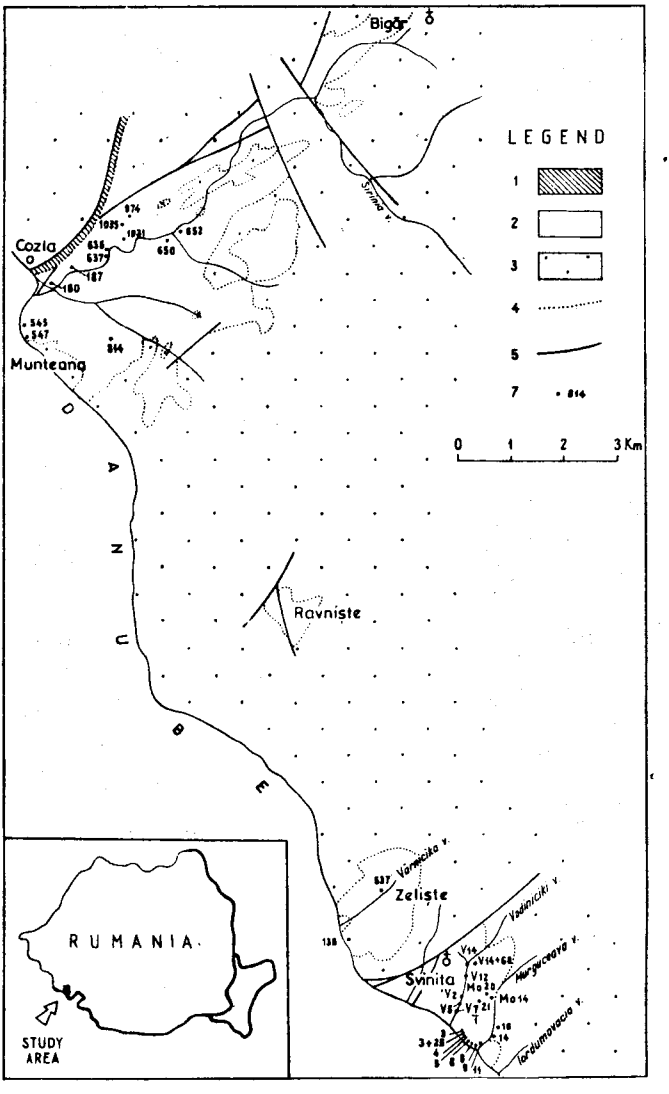


PLATE I

Figs.1-19, *Lamellaptychus(Lamellosuslamellaptychus) mortilleti mortilleti* (Pict.&Lor.). 1, Murguceva valley, site 11 (inventory no. P.18621), Lower Valanginian; 2,6,8,9,13,16,17, Sirinia valley, site 187 (no. P-18627), Lower Hauterivian; 3,7,10,19, Sirinia valey, site 652 (no.P-18631), Upper Valanginian; 4, Vodiniciki valley, site V14+60 (no.P-18625), Upper Valanginian; 5, Sirinia valley, site 637 (no. P-18629), Lower Valanginian; 11, Murguceva valley, site M024(no.P-18624), Lower Valanginian; 12,14,15, Sirinia valley, site 636 (no. P-18628), ? Lower Hauterivian; 18, Murguceva valley, site 9 (no. P-18623), Upper Valanginian.

All the figures augmented x2.

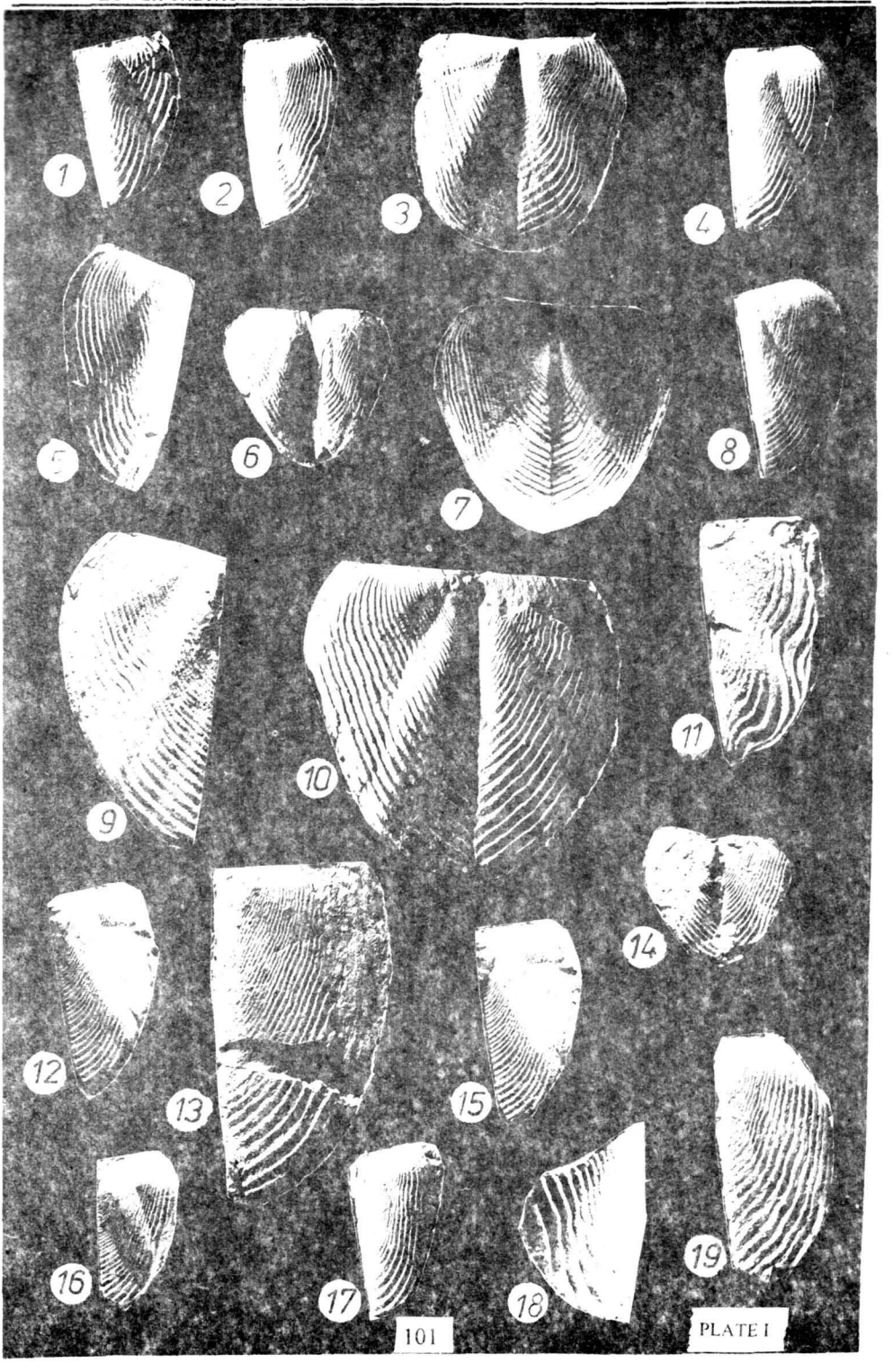


PLATE I

PLATE II

Figs.1-5,8-10, *Lamellaptychus* (*Lamellosuslamellaptychus*)*mortilleti mortilleti* (Pict. & Lor.) 1, Orsova-Svinita highway, 120 m NW of the Iordumovacia valley (no. P-18620), Berriasian; 2-5, 10, Sirinia valley, site 187 (no.P-18627), Lower Hauterivian; 8, Murguceva valley, site 11 (no.P-18621), Lower Valanginian (mold in marls); 9, Sirinia valley, site 650 +(no.P-18630),? Lower Hauterivian.

Figs.6,7, *Lamellaptychus* (*Lamellosuslamellaptychus*) *aff.mortilleti mortilleti* (Pict.&Lor.). 6, Murguceva valley, site 16(no.P-18622), Tithonian; 7, Sirinia valley, site 187(no.P-18627), Lower Hauterivian.

Figs.11-14, *Lamellaptychus*(*Lamellosuslamellaptychus*)*mortilleti longus* Trauth 11, Sirinia valley, site 187(no.P-18636), Lower Hauterivian;12, Sirinia valley, site 652(no.P-18638), Upper Valanginian; 13-14, Sirinia valley, site 636(no.P-18637),? Lower Hauterivian.

All the figures augmented x2

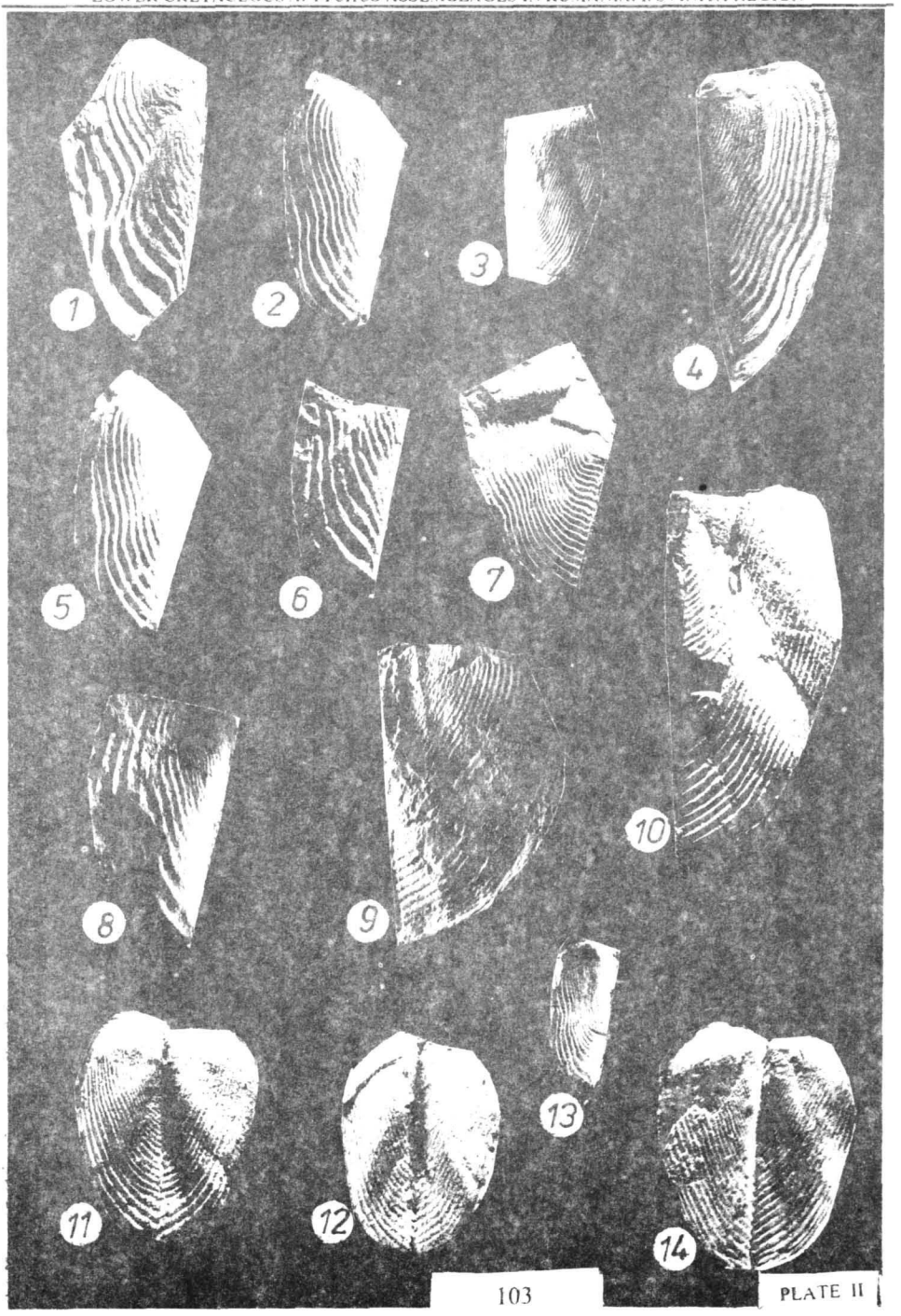


PLATE II

PLATE III

Figs.1-4,12, *Lamellaptychus(Lamellosuslamellaptychus) mortilleti longus* Trauth 1, Murguceva valley, site 16(no.P-18634), Tithonian;2, Sirinia valley, site 187 (no.P-18636), Lower Hauterivian; 3, Murguceva valley, site 9(no.P-18633), Upper Valanginian; 4, Murguceva valley, site M018(no.P-18632), Berriasian; 12, Danube bank near Zeliste, site 138(no.P-18635), Lower Valanginian.

Figs.5,7, *Lamellaptychus(Thorolamellaptychus)noricus*(Wilk.). 5, Murguceva valley, site 14(no.P-18644), Tithonian; 7, Sirinia valley, site 187(no.P-18645), Lower Hauterivian.

Fig.6, *Lamellaptychus(Lamellosuslamellaptychus)mortilleti polycinctus* n.pssp. Turculet, holotype, Sirinia valley, site 187(no.P-18640), Lower Hauterivian.

Fig.8, *Lamellaptychus(Lamellosuslamellaptychus)mortilleti longus* Trauth, Sirinia valley, site 652(no.P-18643), Upper Valanginian.

Fig.9, *Lamellaptychus(Lamellosuslamellaptychus)submortilleti submortilleti* Trauth, Murguceva valley, site V14+60(no.P-18641), Upper Valanginian.

Fig.10, *Lamellaptychus(Lamellosuslamellaptychus)mortilleti retroflexus* Trauth Sirinia valley, site 636(no.P-18639),? Lower Hauterivian.

Fig.11, *Lamellaptychus(Didavilamellaptychus)seramonis* (Coquand). Sirinia valley, site 1034(no.P-18646),? Lower Hauterivian.

Figs.13-15, *Lamellaptychus(Didavilamellaptychus)didavi* (Coquand). Murguceva valley, site 8 (no. P-18648), Lower Hauterivian.

All the figures augmented x2.

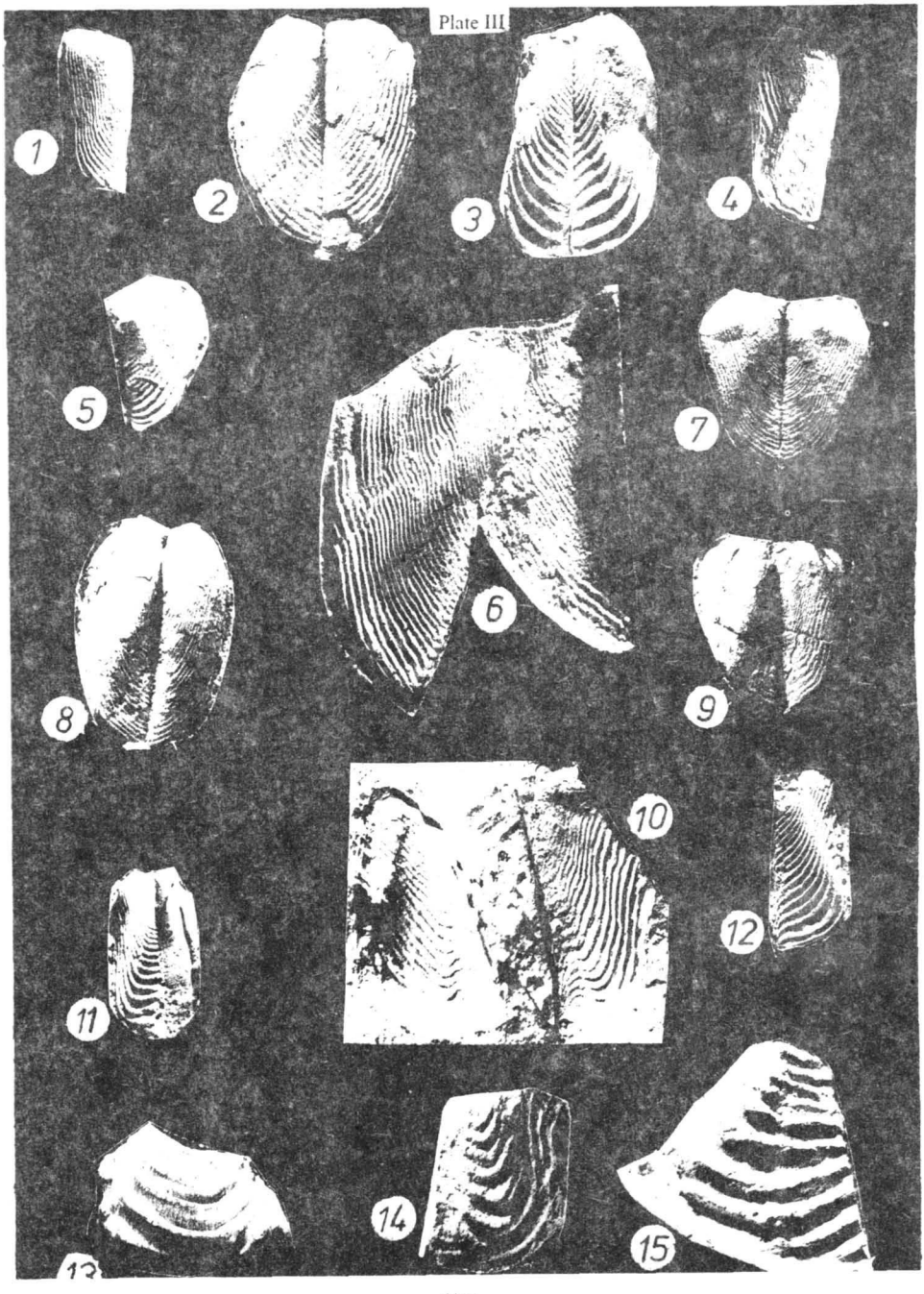


Plate III
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

PLATE IV

Figs.1-4. *Lamellaptychus(Didayilamellaptychus)didayi* (Coquand). 1. Murguceva valley, site 9(no.P-18649), Upper Valanginian; 2. Sirinia valley, site 636(no.P-18647),? Lower Hauterivian; 3,4. Orsova-Svinita highway, site 8(no.P-18648), Lower Hauterivian.

Figs.5-13. *Lamellaptychus(Didayilamellaptychus)angulocostatus angulocostatus* (Peters.). 5. Watershed between the Murguceva and Vodiniciki valley, site 68(no.P-18652); 6. Vodiniciki valley, site V2(no.P-18651), Hauterivian; 7,10. Orsova-Svinita highway, site 3+25(no.P-18657), Upper Hauterivian; 8,12. Vodiniciki valley, site V5(no.P-18651), Hauterivian;9,11. Orsova-Svinita highvay, site 7(no.P-18653), Hauterivian; 13. Orsova-Svinita highway, site 3+140 (no.P-18654), Hauterivian.

All the figures augmented x2.

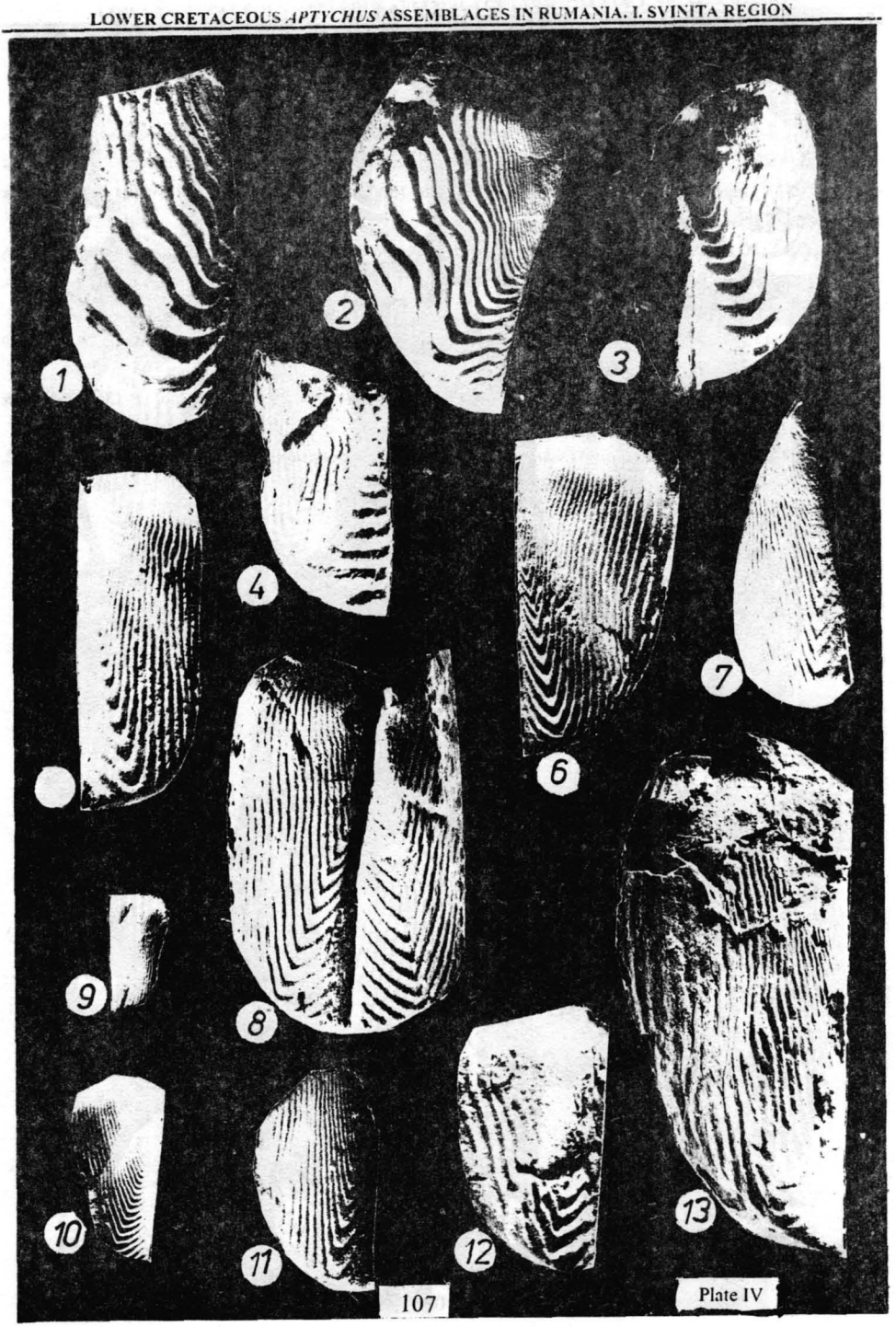


Plate IV

PLATE V

Figs.1, 3-5, 6, 8, 13, *Lamellaptychus* (*Didayilamellaptychus*)*angulocostatus angulocostatus* (Peters). 1, Vodiniciki valley, site V14(no.P-18651), Lower Hauterivian; 3-5, Orsova-Svinița highway, sites 3 and 4(no.P-18657), Upper Hauterivian; 6,8, Sirinia valley, site 180(no.P-18658); 13, Orsova-Svinița highway, site 8(no.P-18655), Lower Hauterivian.

Figs. 2,7, 10, *Lamellaptychus*(*Didayilamellaptychus*)*angulocostatus longus* Trauth. 2,7, Vodiniciki valley, sites V12 and V5(no.P-18660), Hauterivian; 10, watershade between the Murguceva and Vodiniciki valleys, site 21(no.P-18659), Hauterivian.

Figs. 9, 11, 14-15, *Lamellaptychus*(*Didayilamellaptychus*)*angulocostatus atlanticus*(Hennig). 9, Belareka valley, site 814(no.P-18661), Hauterivian; 11,14, Orsova-Svinita highway, sites 3+25 and 4+65, respectively(no. P-18662), ?Upper Hauterivian; 15, Vodiniciki valley, site V7/1(no. P-18663), Upper Hauterivian.

Figs. 12, 16, *Lamellaptychus* (*Didayillamellaptychus*) *angulocostatus atlanticus-radiatus* Trauth. 12, Sirinia valley, site 180(no. P-18664), Hauterivian; 16, Vodiniciki valley, site V5(no.P-18665), Hauterivian.

All the figures augmented x2.

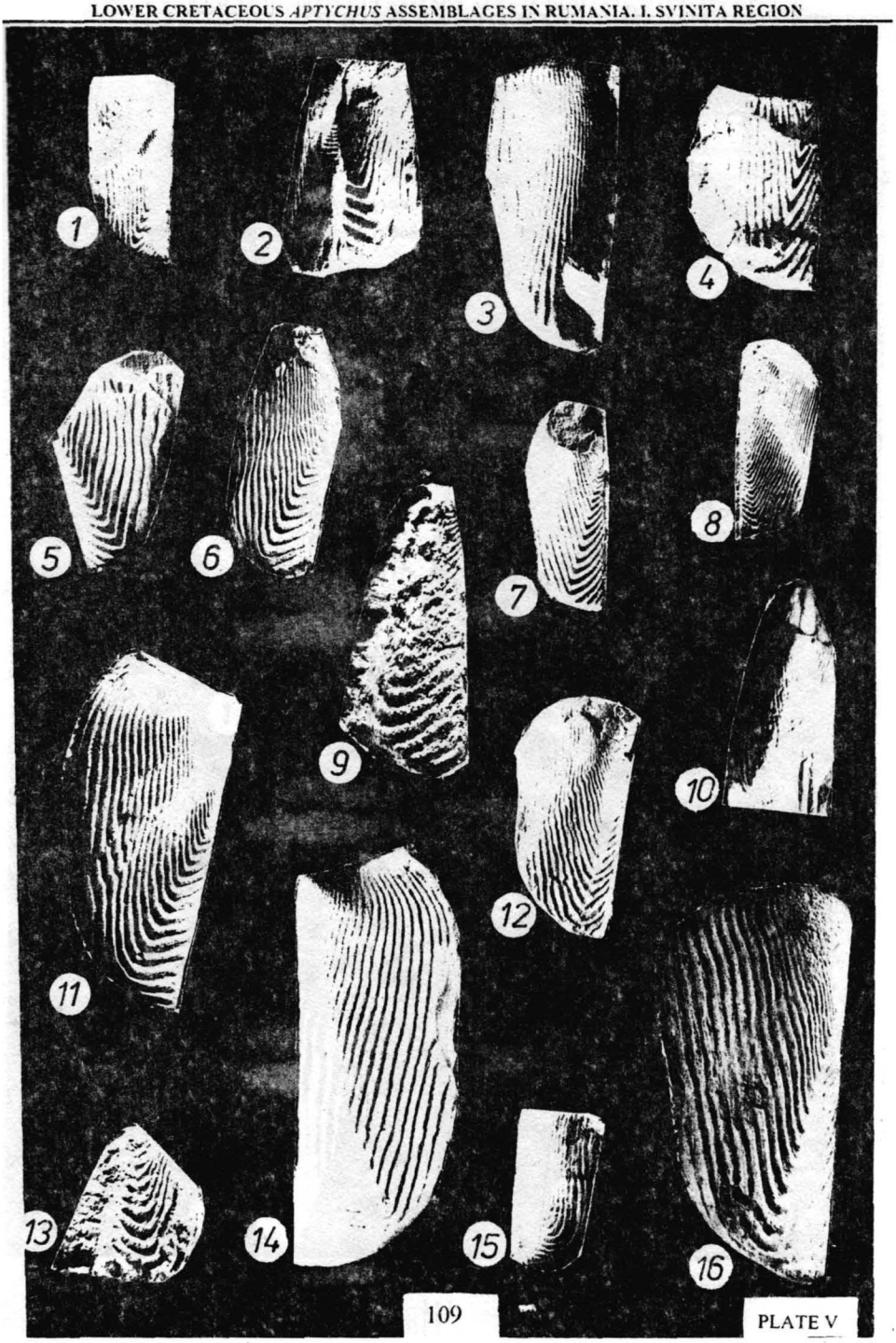


PLATE V

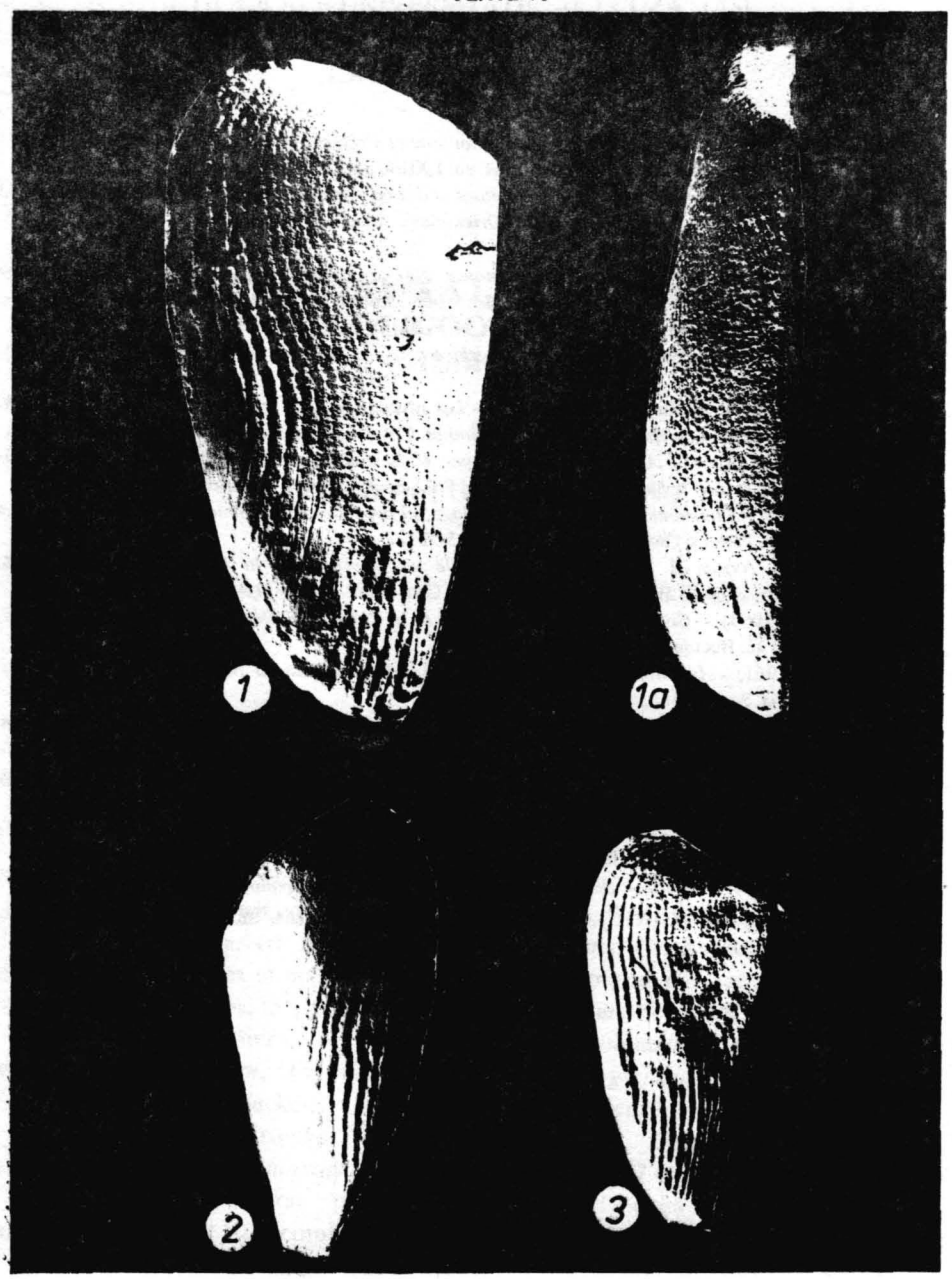
PLATE VI

Figs.1, 1a, *Punctaptychus(Beyrichipunctaptychus)punctatus seramonoides* n. pssp. Turculet, holotype. Danube bank at Munteana, site 547-20(no.P-18666), Tithonian;

Figs.2,3, *Punctaptychus(Beyrichipunctaptychus)punctatus punctatus* (Voltz). Danube bank at Munteana; 2 site 547(no. P-18667), Upper Tithonian; 3, site 554(no. P-18668), Kimmeridgian ?-Tithonian.

All the figures augmented x2.

PLATE VI



SELECTED REFERENCE

Avram E. (1976) - *La succession des dépôts tithonique et Crétacés inférieurs de la région de Svinița (Banat).* Inst.Geol.Geofiz., Dări de seamă, vol LXII/4, pp.53-73, Bucuresti.

Avram E. (1976a) - *Les fossiles du flysch éocrétacé et des calcaires tithoniques des hautes vallées de la Doftana et du Tîrlung (Carpates Orientales).* Mém.Inst.Géol.Géoph., vol.XXIV, p.5-75, București.

Avram E. (1984) - *Remarques stratigraphiques sur la Formation de Murguceva (Tithonique supérieur-Hauterivian) de la région de Svinița(Banat) basées sur l'étude des Calpionelles.* D.d.s.Inst.Geol.Geofiz., vol.68/4, p.17-34.

Calzada A., Santafé J. (1986) - *Dos lamellaptychi cretacicos de Fortuna.* Mediterr. no.5, pp.97-103. Alicante.

Durand-Delga M. & Gasiorowski S.M. (1970) - *Les niveaux à Aptychus dans les pays autour de la Méditerranée occidentale et dans les Carpathes.* C.R.d.s., Acad.France, t.270, pp.764-770, Paris.

Gasiorowski S.M. (1962) - *Aptychi from the Dogger, Malm and Neocomian in the Western Carpathians and their stratigraphical value.* Studia Geol.Pol., vol.X, 134 pp., Warszawa

Mutiu R. (1963) - *Contribuții la studiul paleontologic al depozitelor neocomiene din vestul Platformei Moesice.* Petrol si Gaze, vol.14, nr.11, pp.525-531.

Năstăseanu S., Avram E. (1986) - *Une nouvelle sous-division de la Formation de Svinița: la sous-formation de Pîrîul Țiganilor.* D.d.s.Inst.Geol.Geof., vol.70-71/4, pp.79-85, Bucuresti.

Patrulius D. (1969) - *Geologia Masivului Bucegi și a Culoarului Dâmbovicioara.* Ed.Acad.Rom., pp.69-142, București.

Ștefanov I. (1961) - *Amonitni operculumi (Aptihi) ot dolnata Kreda na Bâlgaria.* Trudova v.geol.na Bâlgaria, Ser.Paleont., t.III, pp.209-228, Sofia.

Trauth F. (1938) - *Die Lamellaptychi des Oberjura und der Unterkreide.* Paläontographica, A, LXXXVIII, pp.115-229, Stuttgart.

Turculeț I. & Grasu C. (1968a) - *Observații asupra Stratelor cu Aptychus din regiunea Dămuc-Valea Rece (Hăghimaș).* Lucr-Stat.Cerc."Stejarul", vol.I, pp.25-36, Piatra Neamț.

Turculeț I. & Grasu C. (1968b) - *Contribuții la cunoașterea Stratelor cu Aptychus din Munții Codrului (M.Apuseni).* An.st.Univ.Iasi, Sect.II/b, t.XIV, pp.87-92, Iasi.

Turculeț I. (1994) - *Asupra oportunității separării de parasubgenuri în cadrul paragenului Lamellaptychus (Cephalopoda, Ammonoidea).* Acad. Română. Studii și cerc. Geologie, t.40, București.