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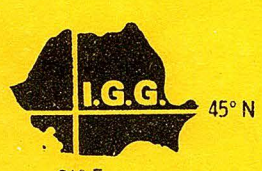
GUIDE TO EXCURSION B2 (POST–CONGRESS)

UPPER NEOGENE FROM THE DACIC BASIN

by

Ioan Papaianopol, Dan Jipa, Florian Marinescu, Nicolae Ţicleanu,
Rodica Macaleţ



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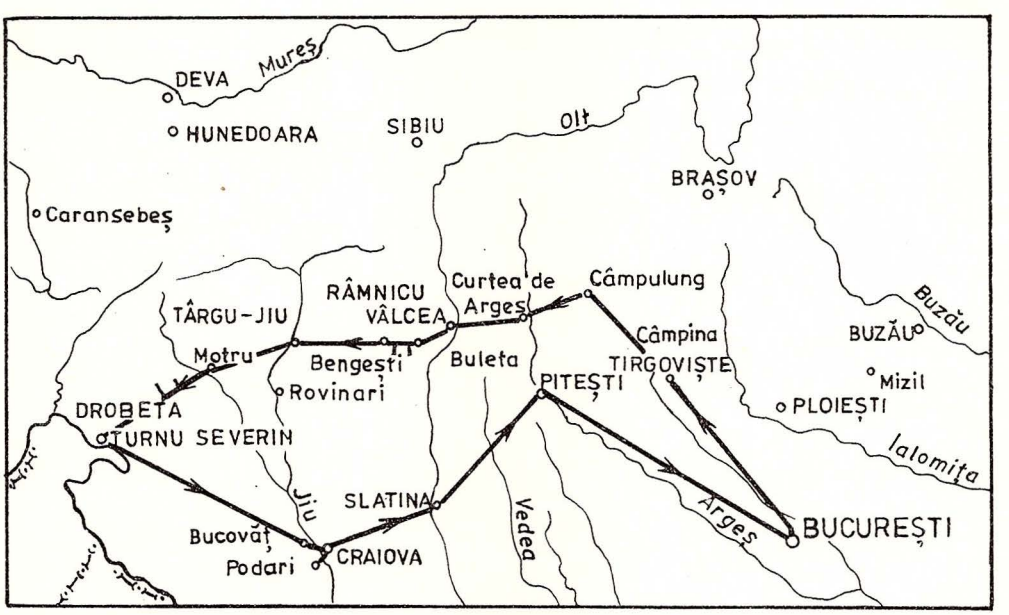

Excursion itinerary (B2)

DACIC BASIN

The deposits belonging to the Neogene cover more than half of the Romanian territory. This fact, corroborated with considerable accumulations of mineral resources existing in the Neogene (we only mention coals, hydrocarbons, and evaporites), explain the intense geological activity carried out for the detailed lithostratigraphic knowledge of the deposits belonging to this interval. Biostratigraphic and chronostratigraphic researches were also made, all these allowing macro- and microfaunal, macro- and microfloral, mineralogical, petrographic and sedimentological studies, on which the paleogeographic and paleoecological concerns were based.

Most of the Neogene deposits developing in the Outer Carpathian Zone belong to the Dacic Basin.

The Dacic Basin was one of the component parts of the Paratethys, which, separating from the Tethys at the end of the Badenian, evolved subsequently as a closed basin. The areal development of the Paratethys comprises three parts: a western, a central, and an eastern one. The Dacic basin is that part of the Central Paratethys, developed south of the Carpathians, towards the Balkans, reaching eastwards the margin of Dobrogea. The Dacic Basin is a special domain: considering most of the basement on which it developed, it can be called a Moesian domain, intermediate between the Pannonian Basin, of the Central Paratethys, to the west, and the Euxinic Basin, of the eastern Paratethys, to the east.

During its evolution the Dacic Basin was greatly influenced by both the Pannonian Basin and the Euxinic Basin. At present it is still difficult to distinguish with certainty from among all the common living specimens those which come from the east from those coming from the Dacic Basin towards the east. The existence of numerous forms common to both the Dacic and the Euxinic Basins during several Neogene stratigraphic intervals led to the opinion that it underwent great eastern influences. The detailed analysis of the speciation and extinction of these organisms showed the remarkable importance of the Dacic Basin not only as a transition, communication zone between the Pannonian Basin and the Euxinic Basin but also as a source of some groups of organisms, at least of the aquatic ones, therefore allowing their evolution, whence they further spread eastwards.

Therefore in its development the Dacic Basin played the role of an interior sea, a segment of the Paratethys, being intermediate between the east and west. Hence its importance for the paleogeographic evolution, the regional stratigraphy and the correlations within the Paratethys.

The structural units existing prior to the Neogene, therefore before the clear outlining of the Dacic Basin, are the Subcarpathian Depression and the Moesian Platform. In this framework, in the Dacic Basin, several basin deposits accumalated, currently considered by a lot of research workers as molasse, within which a packet of marine deposits (in the Lower and Middle Miocene), a brackish deposit, therefore dating back to the beginning of the isolation pf the Paratethys from the Tethys (the terminal part of the Middle Miocene up to the Lower Pliocene), and a lacustrine fresh water deposit undergoing colmation (final moment of the Pliocene) can be distinguished during the evolution of the basin.

The evolution of the basin was strongly influenced by the Carpathian tectogenesis. In the period corresponding to the Lower Miocene and the end of the Oligocene it is quite difficult to recognize the Dacic Basin as a paleogeographic entity. A large part of its surface was immersed, the respective function manifesting only in the southern and south-eastern parts of the depression in front of the Carpathians. It is the time interval with an intense tectonic activity, in which the emplacement of some sliding nappes or scales continues or the movements

involving important faults in their activity come to an end. The sedimetation extends much in the Dacic Basin, with large communication zones, also towards the neighbouring areas, only in the Karpatian, with tiny-detrital sedimentation and in the Lower Badenian, with pelitic-tuffitic sedimentation. Thus there is a remarkable similarity between the biostratigraphic content of some Badenian terranes (with Heteropods and Pteropods) from the western extremity of the Dacic Basin (NW of Turnu Severin) and those of the Langhian terranes in northern Italy. There are even lithostratigraphic similarities. The communication between the Paratethys and the Tethys is obvious in this zone in spite of the Dinarides separating the two regions at present.

For the Dacic Basin everything culminates with the moment at the end of the Lower Badenian, when this basin is part of the lagoonal ensemble of the Central Paratethys, which favours the salt accumulation, especially of halite. This is likely the time when the Tethys considerably diminishes, maybe it even interrupts its links with the Paratethys and possibly even those towards the east, towards the Indian Ocean. The sea formed after these lagoons during the Upper Badenian has relatively reduced links with the Tethys; even the plankton, as a factor which covers the most rapidly the areas invaded by waters, is special. It is worth noting that in the whole circum-Carpathian region but especially in its southern part, pelitic deposits, very rich in siliceous plankton (histricospherae, radiolaria, diatoms), followed also by pelites or pelites alternating with siltites or even fine sands accumulate, in which the calcareous plankton with *Spiratella* and *Velapertina* are quite important. The latter genus, with a large distribution in the central Paratethys, seemingly recognized also in the circum-Pacific areas, is mentioned as an extremely rare presence in the Tethys, as a proof of a very restricted communication. The numerous common mollusc forms existing in the terranes belonging to the two time intervals are likely the consequence of the much slower evolution of the marine benthos under normal salinity conditions.

Perfectly corresponding to the general Paratethys evolution, the faunal changes taking place in the next interval, the Sarmatian, are the result of the common evolution at that time, when the closed Paratethys Sea, through the isolation from the Tethys, becomes brackish, with a steadily decreasing salinity. The faunal modifications existing at the beginning of the Volhynian are especially the consequence of a selection according to adaptation, imposed by the salinity decrease; thus the stenohaline forms disappear, while the eurihaline ones develop by modifying themselves.

The beginning of the Volhynian is dominated by argillaceous sediments over large areas from the Dacic Basin, which are fine-stratified, with numerous sandy intercalations, varying in number and thickness. The whole Volhynian lithological succession is often argillaceous (both in the east and west of the Dacic Basin). In some other places (e.g. the East Carpathian Bend Zone) with an intense subsidence, a thick packet of deposits accumulated, marked by a flysch type lithology (between the Trotuş Valley and the Buzău Valley). Also, in some places from the internal diapir fold zone in eastern Muntenia there are sections where the Volhynian is prevailingly detrital, especially sandy. A peculiarity consists in the sporadic existence of some gypsum intercalations in the lower part of the Volhynian, in places even with molluscs (with *Ervilia, Obsoletiforma, Mohrensternia, Hydrobia, Acteocina*) at Salcia. Another characteristic of the Volhynian deposits from the Subcarpathians is their discontinuous presence, a consequence of the local tectonic mobility.

In the central-northern zone of the Moesian Platform the Volhynian consists of conglomerates, calcareous sandstones, clays and sands, while southwards it becomes prevailingly argillaceous, consisting of greyish and sandy clays.

It should be noted that locally the surfaces covered by the Volhynian deposits are more

extended in the foredeep than in the Bessarabian deposits, while in the central and eastern parts of the Moesian Platforms they are exceeded southwards by the Bessarabian ones, in places by more than 30 km.

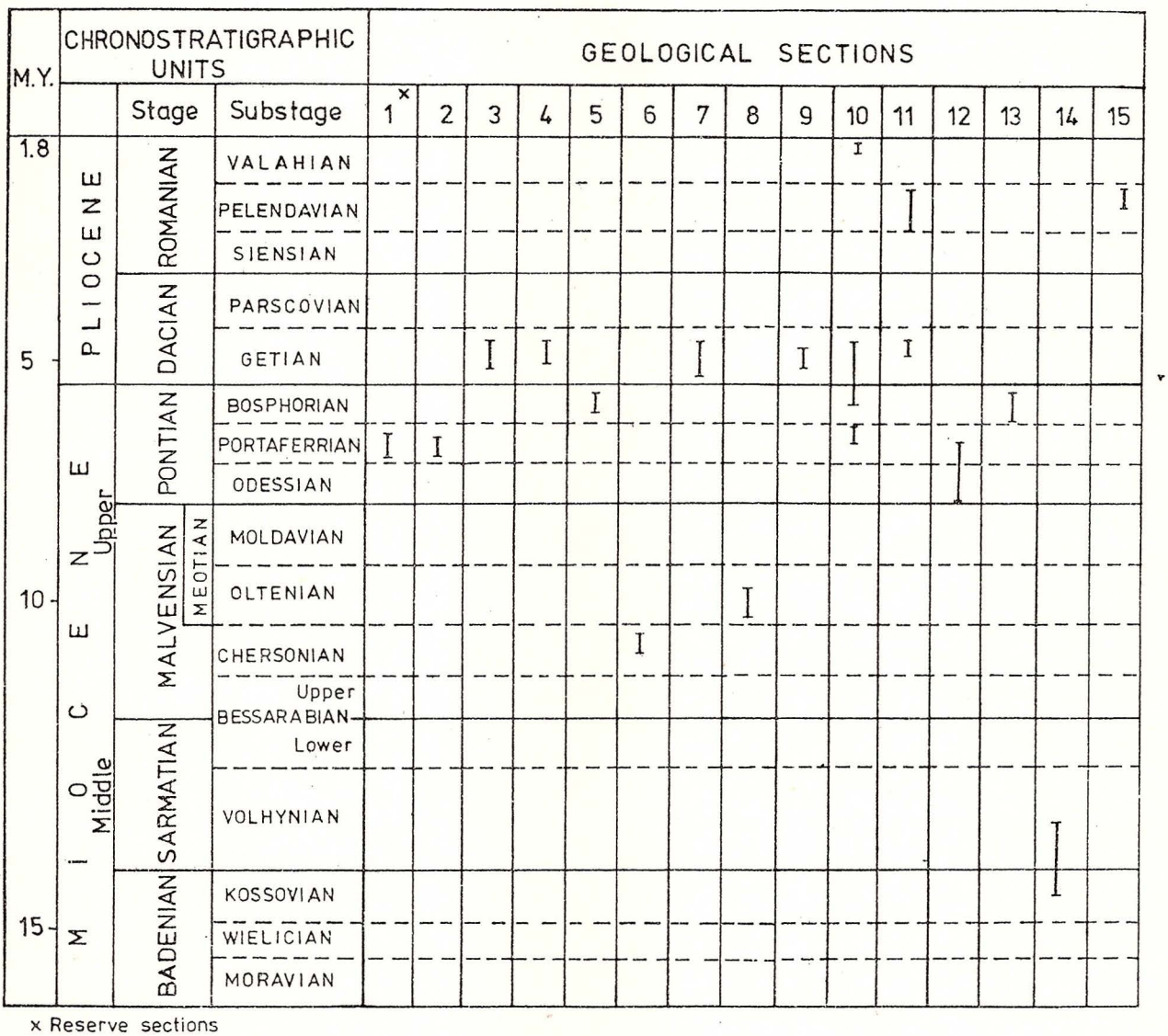

Fig. 1 – The cross-sections presented in the excursion B_2.

During the Bessarabian important modifications are also noticed as follows: the flysch type facies in the eastern part of the Dacic Basin passes to either prevailingly pelitic deposits ("*Cryptomactra Beds*") in the south and towards the Euxinic Basin or deposits in which sandstones prevail, or to oolithic limestones or biostromes with *Mactra* (Istriţa Limestone). As in the case of the Volhynian, the Bessarabian deposits are no longer found west of the meridian of the Ploieşti town but they occur again west of the Olt River as well as on a small area east of the Olt River. They consist of clays, sandy clays, locally showing a banded aspect, and sands in which *Cryptomactra pesanseris* is quite often found. On the other hand the Upper Bessarabian is prevailingly coarse detrital (gravels) throughout the zone up to the Danube. Several places are worth mentioning along the Subcarpathian Foredeep, in which the Upper Bessarabian

deposits comprise a *Congeria* level which is present also on the Moldavian Platform.

On the Moesian Platform this interval is marked by the frequency of the calcareous deposits which include also sandstones, clays and sands which are strongly ingressive especially in the central and eastern parts of the Moesian Platform.

The facies of the next interval (Chersonian) cover much more restricted areas than the Bessarabian. Lithologically they comprise gritty and calcareous deposits north and south of the Buzău Valley (Măgura Limestone, Istriţa Limestone). West of the Olt Valley the Chersonian is characterized by the presence of gravels with varied and restricted extensions, in which biostromes with *Mactra* are to be found.

The Chersonian deposits cover restricted areas on the Moesian Platform, especially in its southern part. Limestones, clays and sands prevail.

Concerning the mollusc faunas, an important speciation was noticed in the case of some gastropod genera (*Mohrensternia, Gibbula, Calliostoma, Duplicata, Cerithium, Acteocina*). The extinction of the species of the genus *Mohrensternia* takes place at the end of this interval, a lot of the species of the above-mentioned genera disappearing at the end of the Volhynian. Among bivalves the genus *Ervilia*, extremely widespread in the Volhynian, is found only in places, also in the Lower Bessarabian (in the central part of the Moesian Platform). Both some cardiids genera (*Plicatiforma, Obsoletiforma, Inaequicostata*) and some trochids ones (genus *Callistoma*) show a considerable development in the Lower Bessarabian. These changes coincide also with the calcareous nannoplankton zones (NN7 in the Volhynian) that changes concomitantly with the modifications mentioned in the chapter on Microfauna (NN8 in the terminal Volhynian and in the Lower Bessarabian). It is difficult to attribute these modifications to the changes in salinity, for which no specific measurements are available, although it may have ranged within the mixed-mesohaline α limits.

A quite pronounced faunal change that affected both the cardiids and the trochids coincides with the important paleogeographic moment that led to the isolation of the Pannonian Basin within the central Paratethys, therefore concomitantly with the Upper Bessarabian, corresponding to the NN9 nannoplankton zone. This is the moment when a strictly endemic nannoflora begins to develop in the Pannonian Basin. This paleontological change, which stresses out the ceasing of the connections with the Dacic Basin, too, determines within it, as well as on the edges of the Euxinic Basin in Moldova, sectors with a much lower salinity than in the remainder of the basin, where a *Congeria* fauna is developed locally in association with cardiaceae, trochids, cerithides and even *Barbotella*. It is to mention that some of these congeria are of the same type as *Congeria ornithopsis* form the Pannonian Basin, from which they is likely to come; the specimens typical of this species are quite rare outside the Carpathians.

From the Volhynian up to the end of the Upper Bessarabian one can presume, in the Dacic Basin as well as in the Euxinic Basin (eastern Paratethys), that the modifications of the molluscan faunas are the result of the normal biological evolution (?); however, at the end of the Bessarabian occurred a phenomenon that cannot be explained yet: all the groups of mollusca become extinct, excepting the genus *Mactra* which becomes exclusive and yields numerous species typical of the Chersonian. The beginning of this interval, mostly calcareous, with *Mactra bioherms*, includes in its upper part (the East Carpathian Bend Zone) a particular element: devoid of any macrofauna remains or poor in molluscan remains, it includes, however, the *Discoaster calcaris* association characteristic of the zone NN10, therefore conformably overlying the preceeding zone.

The subsequent formations are considered to represent the next interval – the Meotian – regarded as a stage although both the paleogeographic evolution and that of the faunas indicate

the existence of two different biostratigraphic intervals. The lower interval begins with low-salinity deposits, rich in *Congeria* (dominated by the subgenus *Mytilopsis*), some of which are frequently found in zone C of the Pannonian, as well. There follows a sequence of deposits whose fauna (*Dosinia, Ervilia, Abra, Pirenella, Tympanotomus* and even *Cardium*) points to a high-salinity episode. Both intervals have been assigned to the Oltenian considering the area where they are widely spread. The upper biostratigraphic interval – the Moldavian – indicates the existence of a very low salinity, the only specimens which point to a brackish medium being the *Congeria* belonging to the *panticapaea* group (subgenus *Mytilaster*), *Congeria* from the *navicula* and *novorossica* (subgenus *Andrusoviconcha*) and the genus *Dreissenomya*. The deposits with *Unio* and *Viviparus* are prevailing in the Moldavian, which indicates an almost fresh-water interval, in places even continental (*Helix*), according to lithology.

Regarding the possible correlations with the Tethys, it is to note the remains of the calcareous nannofossils found in the Oltenian, which point to the appurtenance of this interval also to zone NN10 (*Discoaster calcaris*), whereas the more brackish intercalations in the Moldavian include elements which indicate zone NN11 (*Discoaster quinquermus*), a quite long lasting zone.

The Moldavian is overlain by the Pontian deposits. It is divided into three substages: Odessian (Lower Pontian), Portaferrian (Middle Pontian) and Bosphorian (Upper Pontian).

Along the Pericarpathian Foredeep the most widespread deposits in the Lower Pontian (Odessian) are mostly pelitic, frequently massive but bedded, quite rich in the genus *Paradacna* ("*Paradacna abichi* Beds"). In the west of the Dacic Basin, nearby the Pannonian Basin, these deposits also include *Pontalmyra otiophora, Limnocardium* (*Hungarocardium*) *zagrabiense, Valenciennius*, original or derived forms from the Pannonian fauna. Between the two extremities of the Dacic Basin occur areas with detrital, gritty-calcareous deposits including *Prosodacnomya, Pseudoprosodacna, Pontalmyra, Pseudocatillus, Euxinicardium*, as well as a sector with limnic deposits with coal. It is worth mentioning that numerous molluscs of a Pannonian origin remain in the western third of the Dacic Basin where in the siltic intercalations are found the first specimens of *Pseudocatillus* widely spread in the east and *Paradacna abichi* which, through the Euxinic Basin reaches the Egeea, where it is frequently found. The extension to the Tethys stresses out the significance of the Odessian ingression from the Euxinic Basin, the Lower Pontian representing the most transgressive Pontian interval in the eastern Paratethys.

The strongly ingressive character of the Pontian can be seen in the Central Paratethys in the Portaferrian (Middle Pontian); in some sectors of the Dacic Basin it exceeds the previous terranes, whereas in the Pannonian Basin it occurs frequently as the first Pontian terrane disposed on the basin basement. As a matter of fact it is the time interval in which the Pontian occurs farthest westwards, which coincides with the northern marginal lagoons left by the Tethys in its retreat during the Messinian.

This character, even transgressive, of the Portaferrian terranes is accompanied by an ample speciation phenomenon in the Dacic Basin, the interval being the richest and most varied in fossils from the whole Upper Neogene of the Central Paratethys: while in the Pannonian Basin the congerias predominate, in the Dacic Basin the cardiaceae are prevailing. Among the molluscs subgenus *Rhombocongeria* has the widest spreading, the species *Rhombocongeria rhomboidea* occurring from the area of the Balaton Lake (Pannonian Basin) up to the Caucasus (Euxinic Basin), both in the argillaceous terranes and in medium-grained sands.

As in the Lower Pontian, in the Middle Pontian there is a central northern area rich in coals. This points to the existence of a littoral lacustrine facies (with *Unio, Hyriopsis, Viviparus, Dreissena*), with an very abundant vegetation. The Portaferrian coal facies is more widespread

than the Odessian one. The fresh-water fauna from the Portaferrian alternates, periodically and locally, with the brackish water one, typical of the Middle Pontian (with *Tauricardium, Pontalmyra, Euxinicardium, Dacicardium*).

Although locally the Upper Pontian terranes (Bosphorian) marks ingressions, in comparison with the previous ones they represent their continuation. Lithologically, they are predominantly sandy or argillaceous-siltic. The molluscan faunas point out generally a stabilization of their evolution, stressing out only the development of certain genera, such as *Pontalmyra* and *Phyllocardium*. Numerous specimens became extinct, among which mention should be made of most of the *Congeria* and especially the disappearance of all the specimens of *Rhombocongeria*; among the species which still exist, e.g. *Congeria (Mytilopsis) subcarinata*, some local specimens will be yielded. Likewise, many species of cardiaceae are replaced evolutively (orthogenetically) by others. Nevertheless new genera (*Lunadacna, Luxuridacna*) occur as well. The fresh-water facies, with salinities of about 0.5 ‰ paralic (with *Prosodacnomya, Hyriopsis, Viviparus*), occupies the same central-northern sector of the Dacic Basin, yielding only small coal accumulations. From the lithostratigraphic point of view the Upper Pontian sands display special characteristics particularly in the west of the Dacic Basin where they are mostly yellow-coloured due to the domination of the iron oxides, not visible in the previous Pontian intervals.

In the Moesian Platform, the Pontian exceeds much the Meotian deposition area lying directly over the Bessarabian or the Cretaceous.

The drillings stressed out that in the central and eastern part of the Moesian Platform, the Upper Pontian (Bosphorian) is mostly spread, which consists mainly of clays. Some sandy intercalations are quite rare. The Bosphorian terranes in the Moesian Platform represent the only place in the Dacic Basin where elements of calcareous nannoplankton pointing to zone NN 11 (*Discoaster quinqueramus*) have been found.

The Pontian, which includes in its upper part the basal part of the Pliocene, is succeeded by the Dacian, an interval with distinct biostratigraphic features. Within this interval it is to note the development of the cardiaceae of the *Prosodacna* group. The change of the molluscan faunas is obvious by the disappearance of some genera (*Lunadacna*), subgenera (*Bosphoricardium, Arpadicardium*) or of numerous species of *Pontalmyra, Pseudocatillus, Plagiodacna, Chartoconcha*. It is to note the appearance or development of other groups, the beginning of which is in the Pontian (*Pachydacna, Psilodon, Zamphiridacna, Stylodacna*). This evolution continues during the whole Dacian, the appearance of the genera *Limnodacna* and *Horiodacna* as well as of some edemisms, among which the forms of the genus *Psilodon*, are worth mentioning.

The lithology of the terranes within this interval is dominated by sands or pelites. The wide development of the coal accumulations as a result of the development of the paralic bog facies is characteristic. The fine-detrital facies can be reservoir rocks significant for the hydrocarbon accumulations.

The molluscan faunas are clearly separated after the prevailing lithological facies, those related to the coal accumulations being the continuation of the Pontian ones. The other forms can be used as biostratigraphic markers for the two subdivisions of the Dacian (Getian and Parscovian), with an unequal areal development. In the foredeep zone the Lower Dacian (Getian) is more widespread than the Upper Dacian (Parscovian). The opinions according to which the Parscovian terranes are equally extended versus the Getian ones are contradicted by the sedimentological details which point to the existence of an interval devoid of sediments at that time, synchronous with a slight erosion; as a matter of fact the continuation of the Getian terranes by the Romanian ones are in favour of this opinion.

The deposits of the Dacian stage are well developed in the Moesian Platform, too, but here, unlike in the Subcarpathian Depression, the Upper Dacian occupies larger areas than the Lower Dacian. The Dacian consists of clays, sandy clays and sands, with or without coals in its upper part. No lithologic constant occurs at the Dacian level, significant modifications of the lithofacies can be observed on small distances.

The Neogene succession in the Dacic Basin ends with the Romanian stage. This final stage of the Pliocene is represented by deposits which point out not only the end of the sedimentation in the Dacic Basin, but also its colmation. It represents the last stratigraphic interval of the basin, which becomes a large fresh-water lake in which unionids, melanopsides and viviparus are found. Biostratigraphically three intervals with unequal areal developments have been separated, their presence pointing out also the inequality of the sediments accumulation. The median interval is wider spread both in the foredeep zone and in the Moesian Platform; by the richness of molluscs with thick shell quite ornated (sculptured) it stresses out particular paleontological conditions. The Middle Romanian deposits locally lie over the Lower Dacian terranes. Limnocardiids (*Euxinicardium, Adacna, Didacna, Monodacna*) are found only in the easternmost part of the Dacic Basin, north of the Buzău Valley; it shows that during the Upper Romanian (or the upper part of the Middle Romanian) brackish waters penetrated from the east (from the eastern Paratethys), which brought these molluscs. Also in the eastern part of the Dacic Basin occur remains of the Tethyan calcareous nannoplankton indicating zones NN 15 (*Reticulofenestra pseudoumbilica*) and NN 16 (*Discoaster surculus*), which reached (during the middle part of the Romanian) the easternmost part of the Dacic Basin.

Discription of outcrops

1. Middle Pontian (Portaferrian) Section at Poienari

(Fig. 2)

The described exposure is situated in the right side of the highway between the towns of Piteşti and Câmpulung Muscel.

In the lower part of the section occur grey clays, followed by yelowish medium-grained sands and again grey clays (4 m thick). They are overlain by a thin coal layer (20 cm) which underlies an alternation of fine grey sands and clays (4 m). Sands predominate, clays having only decimetric thicknesses. They are overlain by gravels and gritty sands (40 cm), followed by fine grey sands upon which rest grey clays, and then by layer of carbonaceous clay and coal (30–80 cm) which includes gypsum crystals. In the hanging wall of the carbonaceous layer occur medium-grained sands, clays and clays with pebbles which underlie fossiliferous medium-grained yellowish sands including: *Pseudoprosodacna semisulcatoides* EBERSIN, *P.* aff. *littoralis* EICHWALD, *Prosodacnomya sabbae* ANDREESCU, *P. rostrata* SINZOW, *Unio (Rumanunio) portaferricus* ANDREESCU, *Potamoscapha* aff. *krausi* (WENZ), *Viviparus incertus* MACAROVICI, *V. botenicus* LUBENESCU, *Melanopsis (Melanopsis) decollata* STOLICZKA, *Hydrobia spicula* SABBA, *H. pontilitoris* WENZ, *Theodoxus* sp.

The fossiliferous sands are overlain by grey clays, yellowish coarse- and medium-grained sands, including the same specimens of *Pseudoprosodacna, Prosodacnomya, Unio* and *Viviparus*, succeeded by grey clays with *Pseudoprosodacna* and *Viviparus*, and then by medium-grained sands (5 m), grey clays and again sands.

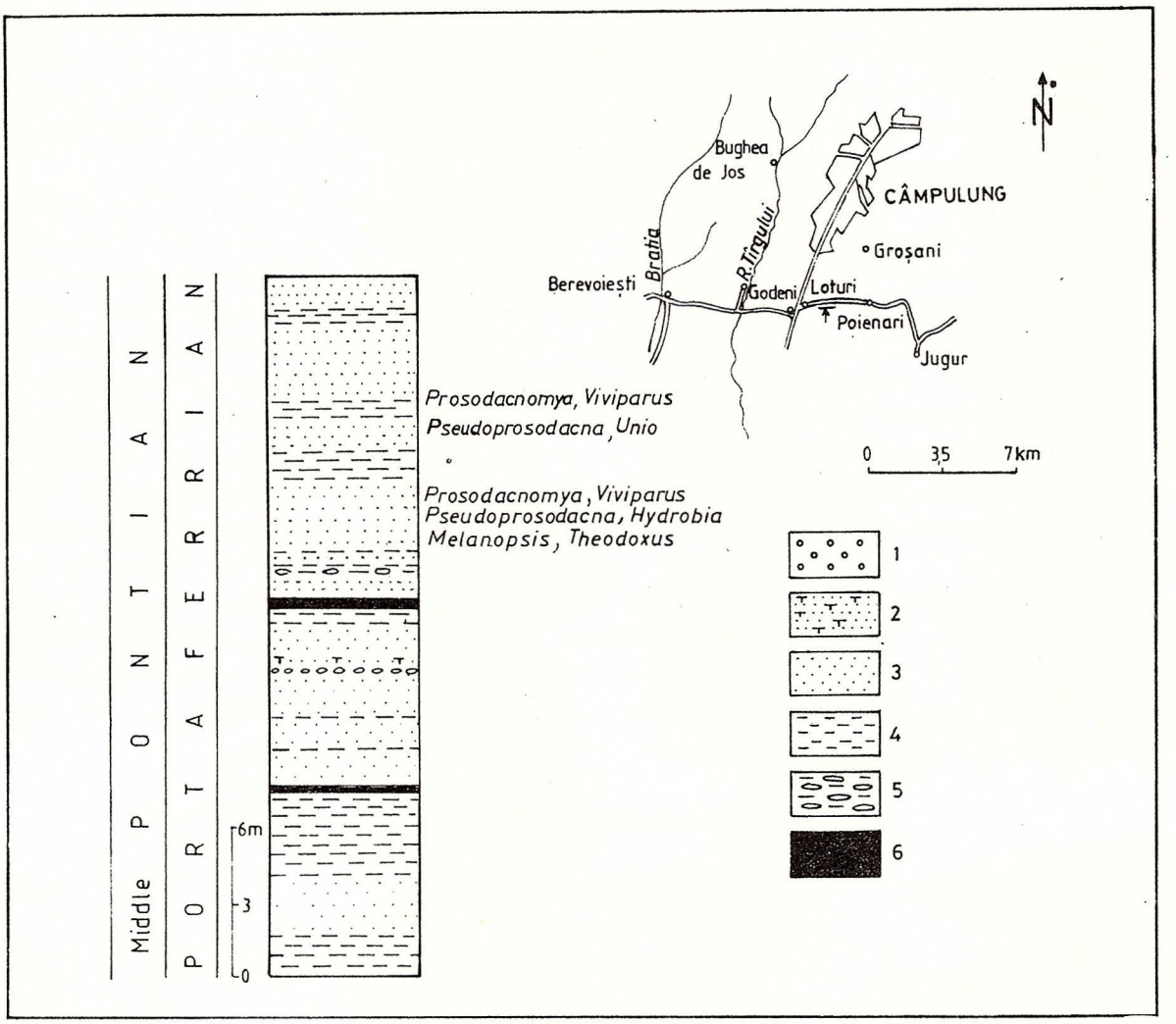

Fig. 2 – Stratigraphic column of the Middle Pontian (Portaferrian), Poienari village. 1, gravel; 2, slightly consolidated gritty sand; 3, sand; 4, clay; 5, clay with pebbles; 6, coal.

The exposure presented here is situated in the eastern part of the Getic Depression where, during the Middle Pontian (Portaferrian), coaly facies with significant thicknesses developed in the sector delimited by the Argeşel and Slănic valleys. For this reason the Portaferrian deposits do not include the classical type of faunas of the *Congeria rhomboidea* Beds; they have been replaced by fresh-water faunas, dominated by *Pseudoprosodacna, Prosodacnomya, Unio, Viviparus, Theodoxus*, pointing to a limnic environment with a salinity less than 0.5 ‰, at most 3 – 0.5 ‰ (mixed-oligohaline).

In the Dacic Basin there is a gulf, probably influenced by significant fluviatile supplies and somehow isolated from the rest of the basin, in which the waters, although brackish, showed a higher salinity. All these features characterizing a reduced area during the Portaferrian in the Dacic Basin will cover a wider area during the Bosphorian and they will predominate during the Getian. It is noteworthy that these characteristics of the environment, highly restricted in the Dacic Basin during the Portaferrian, cover large areas of the Pannonian Basin within the same time span.

Ostracoda Microfauna
(determined by R. Olteanu)

Tyrrhenocythere portaferricus OLTEANU, *T. pontica* (LIVENTAL), *T. filipescui* HANGANU, *Cyprideis portaferricus* OLTEANU, *Cypria tocorjescui* HANGANU, *Pontoniella acuminata* (ZALANYI), *P. truncata* SOKAC, *P. sagittosa* KRSTIC, *Bakunella dorsoarcuata* (ZALANYI), *Leptocythere camelii* (LIVENTAL), *Mediocyprideis apatoica* (SCHWEYER), *Caspiolla balcanica* ZALANYI, *C. venusta* (ZALANYI), *C. liventalina* (EVLACHOVA).

2. Middle Pontian (Portaferrian) between Berevoeşti and Slănic (Argeş)
(Fig. 3)

In the right side of the highway between Berevoeşti and Slănic deposits similar in lithologic, stratigraphic position and faunal content to those described at Poienari are cropping out.

In the base of the succession occur grey sandy clays and grey clays, with fragments of

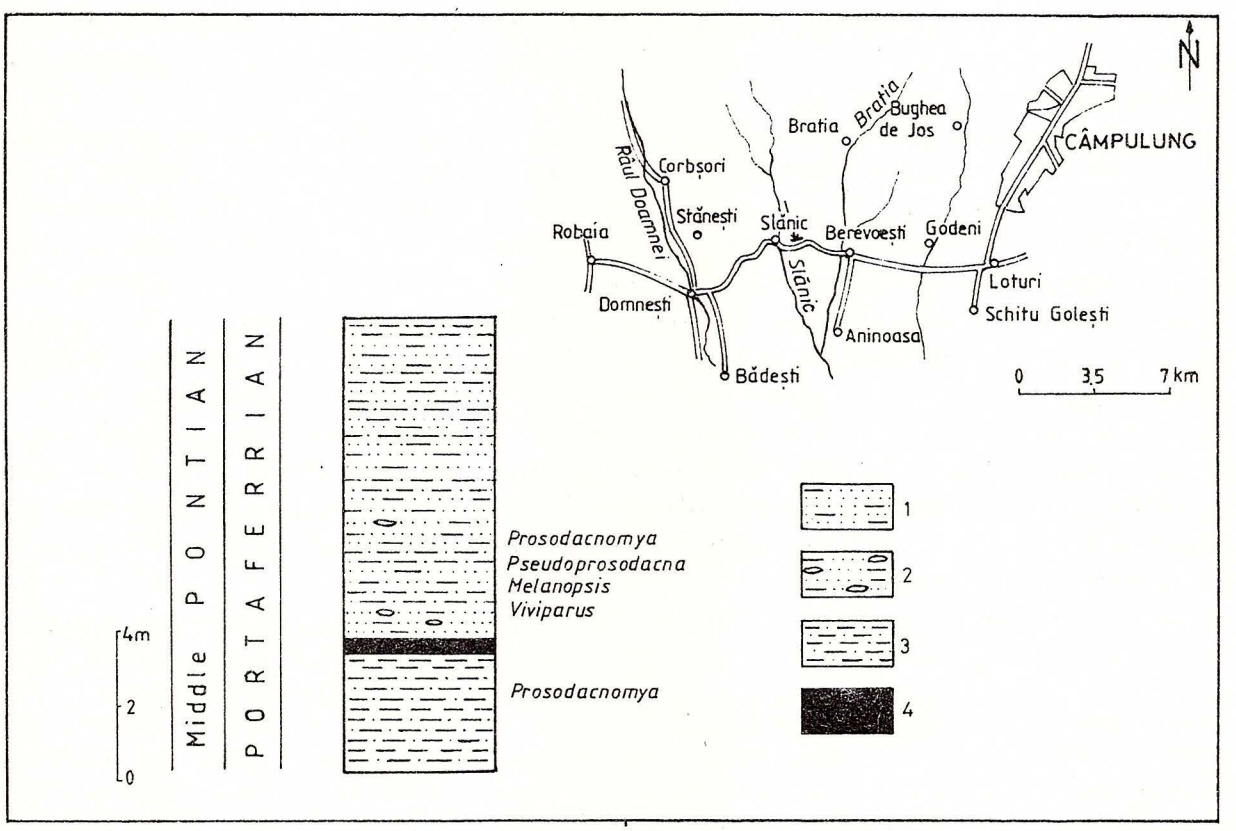

Fig. 3 – Stratigraphic column of the Middle Pontian (Portaferrian), between the Slănic village and the Berevoieşti village. 1, clayey sand; 2, clayey sand with pebbles; 3, sandy clay; 4, coal.

Prosodacnomya, overlain by a coaly layer of 70–80 cm. In the hanging wall it hosts argillaceous sands with pebbles, succeeded by sandy clays overlain by argillaceous sands and sandy clays.

In the sandy clays overlying the coal the molluscan fauna includes: *Prosodacnomya rostrata* (SINZOW), *P. sabbae* ANDREESCU, *Pseudoprosodacna semisulcatoidea* EBERSIN, *Unio (Rumanunio) portaferricus* ANDREESCU, *Melanopsis (Melanopsis) decollata* STOLICZKA, *Hydrobia spicula* SABBA.

The highly fresh-water facies of the Portaferrian, developed between Argeşel and Slănic, becomes less consistent westwards, concomitantly with the diminution of the coaly layers facies. Thus, west of the Slănic Valley, towards the Olt Valley, the Middle Pontian coaly facies diminishes northwards until it dies out.

Study of quartz grains
by C. Costea

Morphoscopy of the quartz grains according to Crofts' comparative scale (1974):
– sphericity between spherical and subspherical
– roundness between angular and very rounded.
Exoscopy (media penetrated by the quartz grains):
– infratidal, intertidal, torrential, deltaic, glacial, eolian, deltaic, torrential.

3. Lower Dacian (Getian) Section on the Bădislava Valley (Bălileşti village)
(Fig. 4)

The Bădislava Valley is a right tributary of the Topolog Valley, their confluence occurring in front of the locality of Ticveni. Along it Pontian and Getian deposits are cropping out, the latter ones being closer to the highway.

In the lower part of the Getian succession grey sandy clays and grey medium-grained sands can be seen, which include: *Pachydacna (Pachydacna) acuticostata* PAPAIANOPOL, *P. (P.) mirabilis* (TEISSEYRE), *P. (P.) socialis* PAPAIANOPOL, *Limnocardium (Tauricardium) olteniae* (IONESCU-ARGETOAIA), *Stylodacna heberti* (COBĂLCESCU), *Zamphiridacna orientalis* (SABBA), *Prosodacna (Psilodon) munieri* SABBA, *Dreissena rimestiensis* FONTANNES.

There follow yellowish medium- to coarse-grained sands, with redish bands, which include in the lower part elements of gravel and clay pebbles. They are overlain by fine- to medium-grained sands with a gravel layer with sand lenses and grey sandy clays with rare sandy intercalations with a rich fossiliferous content: *Limnocardium (Tauricardium) olteniae* (IONESCU-ARGETOAIA), *Pachydacna (Parapachydacna) serena* (SABBA), *Stylodacna heberti* (COBĂLCESCU), *Phyllocardium planum planum* (DESHAYES), *Pontalmyra (Pontalmyra) amaradica* PAPAIANOPOL, *P. (P.) corporata* PAPAIANOPOL, *Pseudocatillus geticus* PAULIUC, *Viviparus argesiensis* SABBA.

They are succeeded by grey sandy clays including decimetric argillaceous intercalations, overlain by yelowish, fine-, more rarely medium-grained sands. There follow grey clays, locally sandy, which include isolated specimens of *Stylodacna heberti* COBĂLCESCU.

There follows an alternation of clays and sands, in different percentages, all of a grey-yellowish colour. The sands also contain soft clay pebbles. These deposits are highly fossiliferous, the fauna being locally accumulated in lumachelle layers, which include: *Pachydacna (Parapachydacna) cobălcescui* (FONTANNES), *P. (P.) serena* SABBA, *P. (P.) solitaria* PAPAIANOPOL, *Stylodacna heberti* (COBĂLCESCU), *Zamphiridacna orientalis* (SABBA), *Dacicardium rumanum* (FONTANNES), *Prosodacna (Psilodon) munieri* SABBA, *P. (P.) varians* ANDREESCU, *Pseudocatillus patruliusii* PAPAIANOPOL, *Dreissena rumana* SABBA, *D. rimestiensis* FONTANNES, *D. polymorpha* PALLAS, *Viviparus argesiensis* SABBA, *V. berbestiensis* LUBENESCU, *V. duboisi* (MAYER-EYMAR), *V. getianus* LUBENESCU, *Bulimus (Tylopoma) bengestiensis* (FONTANNES), *Zagrabica carinata* ANDRUSOV, *Lithoglyphus decipiens* BRUSINA, *Melanopsis (Melanopsis) decollata decollata* STOLICZKA.

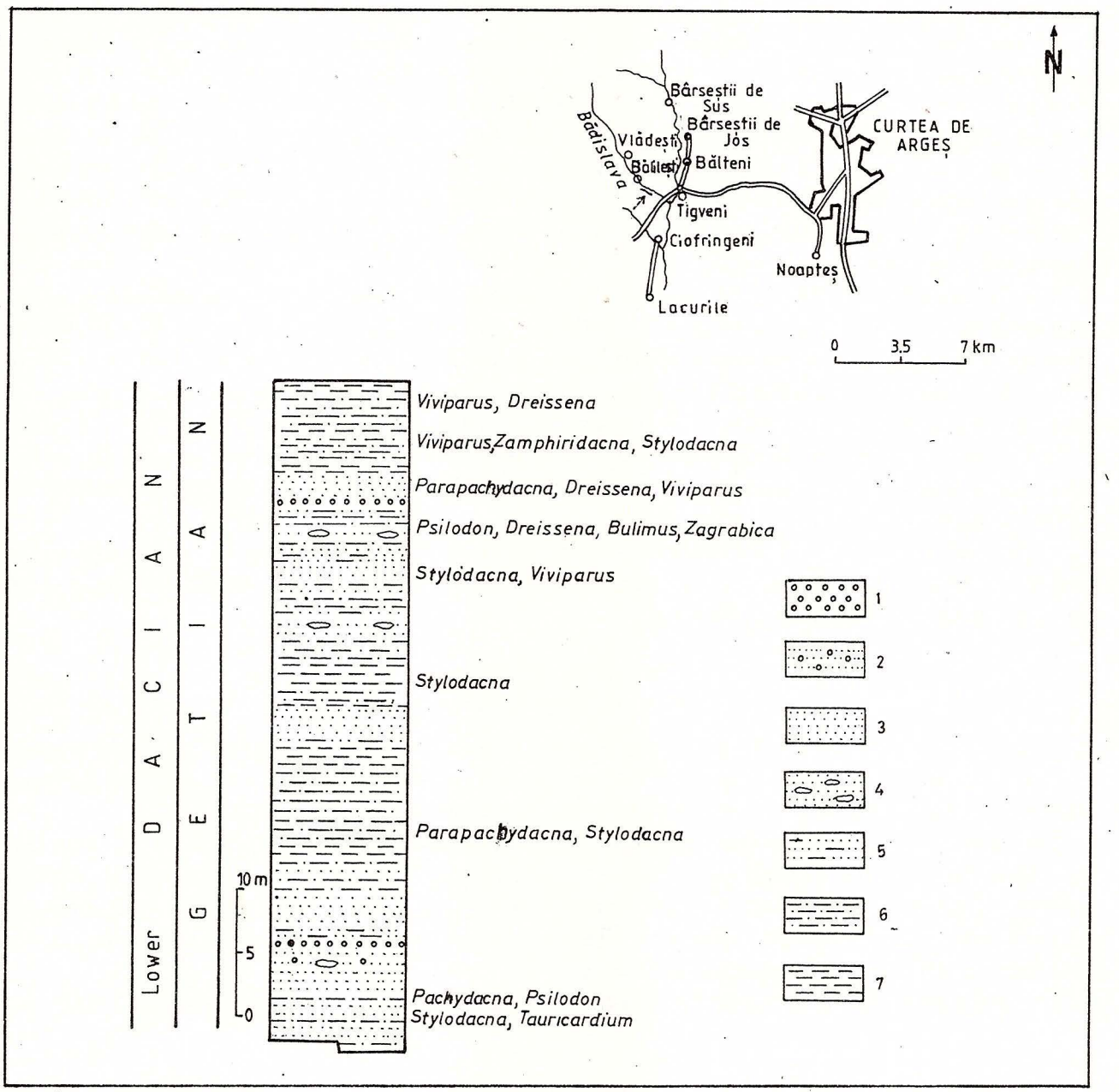

Fig. 4 – Stratigraphic column of the Lower Dacian (Getian) Bădislava Valley, Bălileşti village. 1, gravel; 2, sand with gravel; 3, sand; 4, sand with pebbles; 5, clayey sand; 6, sandy clay; 7, clay.

In the upper part of the sequence there is a lumachelle very rich in *Viviparus* specimens. This sequence is overlain by a sequence of grey sandy clays, including: *Stylodacna heberti* (COBĂLCESCU), *Dreissena rumana* SABBA, *D. polymorpha* PALLAS, *Viviparus argesiensis* SABBA, *V. getianus* LUBENESCU.

The latest outcrops of Getian terranes in this valley include also sandy clays with rare sandy intercalations with: *Zamphiridacna orientalis* SABBA, *Stylodacna heberti* (COBĂLCESCU), *Dreissena polymorpha* PALLAS, *Viviparus argesiensis* SABBA, *V. berbestiansis* LUBENESCU, *V. getianus* LUBENESCU, *V. duboisi* (MAYER-EYMAR), *V. conicus* LUBENESCU.

The upper part of this succession is dominated by the genus *Viviparus*. The fauna is less rich, being represented only by isolated specimens of *Viviparus* and *Dreissena*.

A study of the molluscan faunas in the Lower Dacian deposits (Getian) in the Bădislava Valley emphasizes the decrease tendency of salinity from bottom to top. The specimens of *Pachydacna* in the lower part of the succession although small-sized, are robust, with a strong carena; they populated shallow zones, being affected also by the dynamic action of water, as currents and waves. Unlike the *Pachydacna*, the species of *Stylodacna*, with large shells and very reduced hinge, prefer also the shallow but still zones. The level with *Tauricardium, Phyllocardium* and *Pontalmyra*, similar to the Upper Pontian assemblages, might point to higher salinities of the mixed-oligohaline interval (3–5‰).

The lumachelles in the upper part of the described succession, although include also numerous limnocardiids (*Parapachydacna, Psilodon, Dacicardium, Stylodacna, Zamphiridacna*), abound in specimens of *Viviparus* and *Dreissena*, pointing to a more reduced salinity (less than 3 ‰). The good preservation of the molluscan specimens, particularly of *Dreissena* (with very thin valves), indicates a shallow, well-aerated zone, with still waters.

In the last fossiliferous level, where they occur almost exclusively, *Viviparus* and *Dreissena* point to an almost fresh-water medium; they were laid down under aggitated conditions, the shells being usually broken.

In general, the sedimentologic surveys effectuated on the Upper Neogene in the Bădislava Valley led to a paleoenvironment at the contact between high-energy alluvial sedimentation and low-energy lacustrine environment.

Ostracoda Microfauna
(determined by R. Olteanu)

Amplocypris dorsobrevis KRSTIC, *Cytherissa bogatschovi* (LIVENTAL), *Leptocythere polymorpha* OLTEANU, *Cyprideis geticus* OLTEANU, *C. parageticus* OLTEANU, *C. palelliformis* OLTEANU, *Bakunella dorsoarcuata* (ZALANYI), *Loxoconcha schweyeri* SUZIN.

The spore-pollen content (determinated by Ana Ionescu): *Pinus diploxylon, P. haploxylon, Abies* sp., *Thsuga canadiensis, Picea* sp., *Carya* sp., *Pterocarya* sp., *Yuglans* sp., *Ulmus, Zelkova, Quercus microhenrici, Compositoipollenites* sp., *Chenopodipollenites* sp., *Cycadopites* sp., *Osmunda* sp., *Betula* sp., *Ilex* sp., *Tricolporopollenites* sp., *Leiotriletes moxoides, Levigatosporites haardti, Polypodiaceoisporites* sp.

The phytoplanktonic content: *Emslandia* sp.; vegetal tissues have been found, as well.

Study of quartz grains
by C. Costea

Morphoscopy of the quartz grains according to Crofts' comparative scale (1974):

– sphericity ranges between highly spherical and subacute, with concentration in subspherical;

– roundness ranges between highly angular and subrounded, with concentration in acute.

Exoscopy (media penetrated by quartz grains):

– torrential, eolian, violent eolian, torrential, fluviatile (low-energy aquatic), intertidal.

4. Lower Dacian (Getian) in the Sâmnic Valley (Blidari village)

(Fig. 5)

The Lower Dacian succession, which will be presented here, is situated in the Sâmnic Valley (Blidari village) in front of the viaduct over the Sâmnic Valley. This paper presents the upper part of the Lower Dacian in the study area.

In the lower part of the exposure occur grey-yellowish micaferous sands, followed by grey bedded clays and sandy clays, overlain by yellowish-grey micaferous sands with two intercalations of gravel beds. They are succeeded by grey clays with thin beds of sands and argillaceous sands, followed by grey micaferous sands, sandy clays, a gravel bed and again clays.

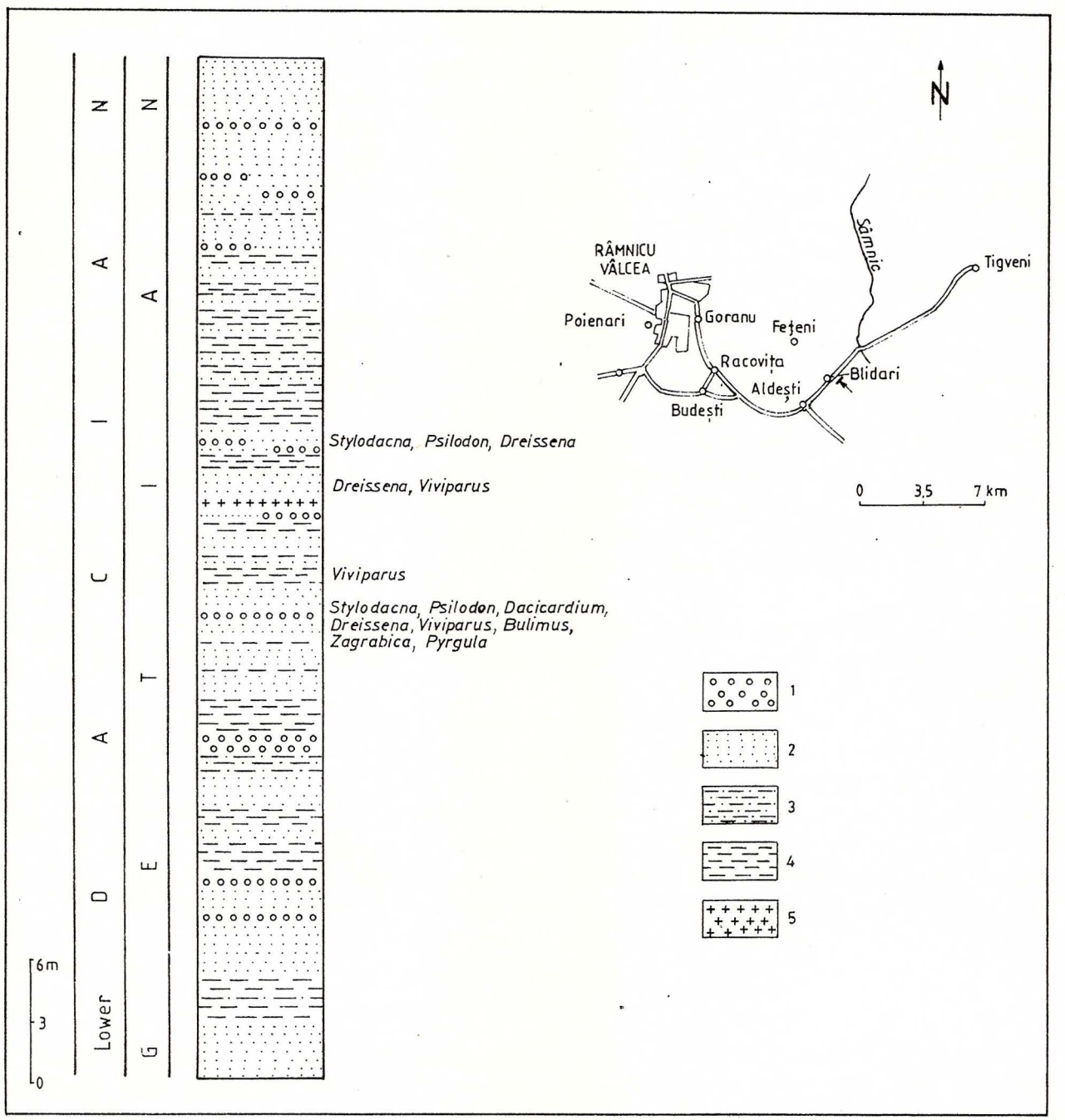

Fig. 5 – Stratigraphic column of the Lower Dacian (Getian), Sâmnic Valley, Blidari village. 1, gravel; 2, sand; 3, sandy clay; 4, clay; 5, tuff.

There follow yellowish-reddish medium-grained sands overlain by grey clays that underlie yellowish-reddish sands with centimetric argillaceous intercalations and a thin gravel bank. The sands are fossiliferous: *Stylodacna heberti* (COBĂLCESCU), *Zamphiridacna orientalis* (SABBA),

Pachydacna (Parapachydacna) cobălcescui (FONTANNES), *Prosodacna (Psilodon) munieri* SABBA, *Dacicardium rumanum* (FONTANNES), *Pseudocatillus geticus* PAULIUC, *Unio (Rumanunio) rumanus* TOURNOUËR, *Dreissena rimestiensis* FONTANNES, *D. rumana* SABBA, *D. polymorpha* PALLAS, *Viviparus argesiensis* SABBA, *V. duboisi* (MAYER-EYMAR), *V. getianus* LUBENESCU, *Bulimus (Tylopoma) speciosus* COBĂLCESCU, *B. (T.) bengestiensis* (FONTANNES), *Zagrabica reticulata* SABBA, *Pyrgula* aff. *eugeniae* NEUMAYR, *Micromelania* sp.

They are succeeded by grey clays with rare specimens of *Viviparus argesiensis* SABBA and *V. cucestiensis* LUBENESCU which underlie fine- or medium-grained sands with thin argillaceous intercalations, overlain by clays and medium-grained sands with fine-grained gravel.

There follows a tuffite level (6–7 cm thick), overlain by fine- and medium-grained sands, including: *Dreissena rimestiensis* FONTANNES, *D. polymorpha* PALLAS, *Viviparus cucestiensis* LUBENESCU, *V. getianus* LUBENESCU.

They are succeeded by coarse-grained sands abounding in shell detritus and fragments of *Dreissena* and *Viviparus*.

After 4–5 m of covered profile, the succession can be followed above the railway level.

In the base of the outcrop occur grey clays and grey sandy clays, overlain by medium-grained sands and sands with gravel within which lenses or thin fossiliferous layers are intercalated, which include: *Stylodacna heberti* (COBĂLCESCU), *Prosodacna (Psilodon) munieri* SABBA, *Dreissena rimenstiensis* FONTANNES, *D. polymorpha* PALLAS.

They are succeeded by masive grey clays, locally slightly sandy, overlain by an alternation of clays and sands with thicknesses of centimeters or decimeters order.

In the upper part of the exposure occur fine- and medium-grained sands, with pebble layers and thin clayey intercalations, followed by fine sands with pebble intercalations in the lower part.

The fauna is dominated by the genus *Dreissena* and this makes us presume that the general salinity of the basin in this place was mixed-oligohaline (3–5‰), with a value close to the maximum one.

The spore-pollen content (determined by Ana Ionescu) is: *Pinus haploxylon, Abies* sp., *Picea* sp., *Pinaceae, Thsuga* sp., *Cupresoceae, Carya* sp., *Pterocarya* sp., *Yuglans* sp., *Alnus* sp., *Tilia* sp., *Quercus* sp., *Ulmus, Zelkova, Liquidambar* sp., *Nyssa* sp., *Lycopodium* sp., cf. *Sphagnum, Ericipites* sp., *Compositae, Typha* sp., *Oleaceae, Lonicera* sp., *Palmae, Triatriopollinites* sp., *Leiotriletes maxoides, Levigatosporites haardti, Cicatricosisporites* sp.

The phitoplanktonic content is: *Batiacasphaera* sp., *Microthodiscus* sp.

This sample has been taken off from the clays from the upper lumachelle level.

Ostracoda Microfauna
(determined by R. Olteanu)

Bakunella djanelidzei VEKUA, *B. dorsoarcuata* (ZALANYI), *Cyprideis geticus* OLTEANU, *Cytherissa bogatschovi* (LIVENTAL), *Cypria tocorjescui* HANGANU, *Candona filona* (LIVENTAL), *C. alta* ZALANYI, *C. balcanica* (ZALANYI).

Study of quartz grains
by C. Costea

Morphoscopy of the quartz grains after Crofts' comparative scale (1974):
- sphericity between highly spherical and subspherical;
- roundness between angular and subangular.

Exoscopy (media penetrated by quartz grains):
– torrential, deltaic, torrential, infratidal, intertidal.

5. Upper Pontian (Bosphorian), Ţuţurului Hill, Bârseşti Village
(Fig. 6)

The profile is exposed in the left side of the Govora River, in the area of the Bârseşti village, in front of the intersection of the highway to Horezu with the road to Buleta. Here, the Upper Pontian deposits rest upon the Chersonian lumachelle limestones, which occur as fragments in the furrows, upstream the church.

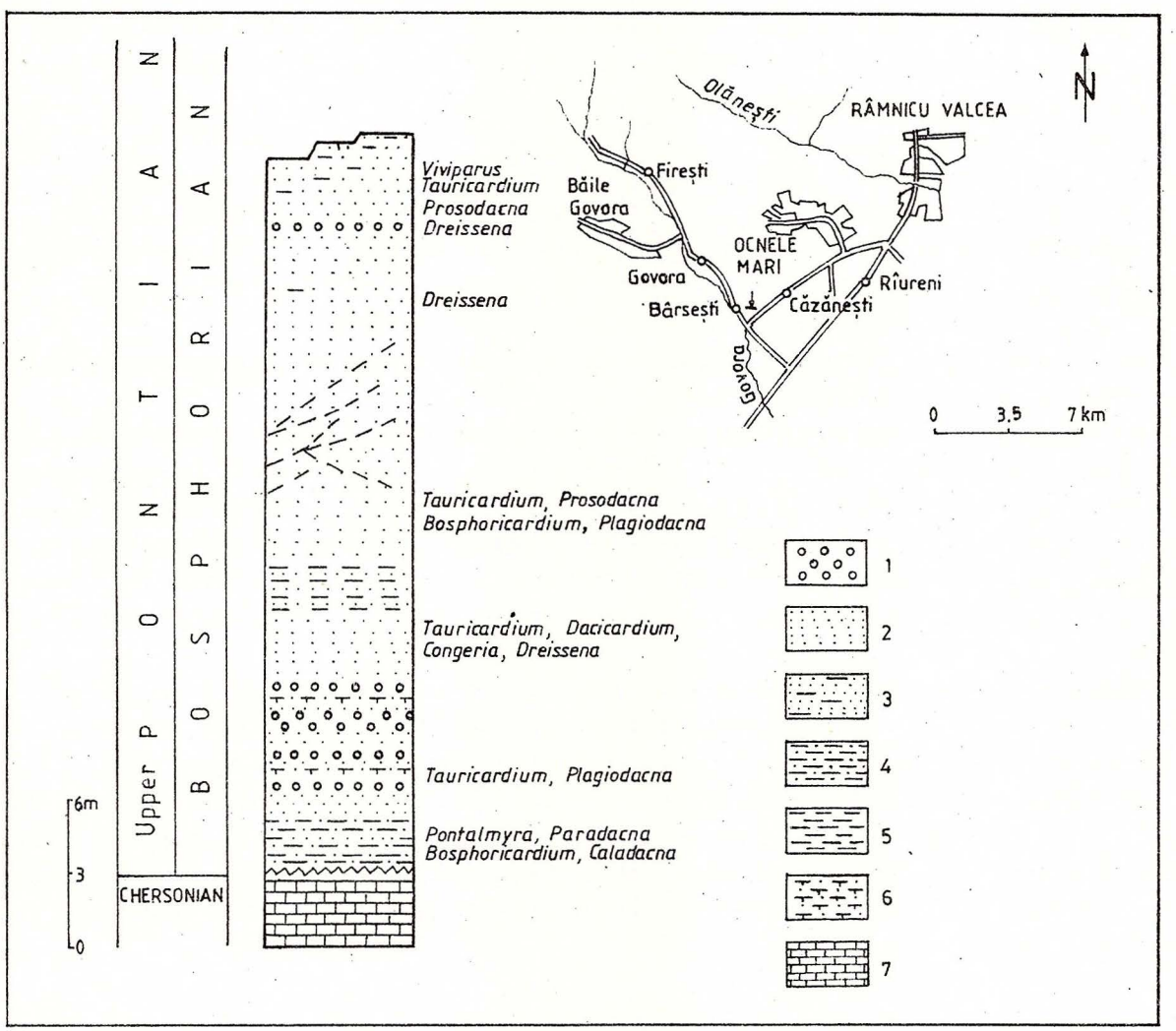

Fig. 6 – Stratigraphic column of the Upper Pontian (Bosphorian), Ţuţurului Hill, Bârseşti village. 1, gravel; 2, sand; 3, clayey sand, 4, sandy clay; 5, clay; 6, sandstone; 7, limestone.

In the lower part of the Upper Pontian occur grey sandy clays, locally reddish, and fossiliferous argillaceous sands, including: *Limnocardium (Tauricardium) petersi* (M. HÖRNES), *L. (T.) petersi oviformis* EBERSIN, *L. (Bosphoricardium) emarginatum* (DESHAYES), *L. (Euxinicardium) inlongaevum* EBERSIN, *Pontalmyra (Pontalmyra) constantiae* SABBA, *P. (P.) sulcatina sulcatina* (DESHAYES), *P. (P.) rumana* PAPAIANOPOL, *P. (P.) sabbae* PAPAIANOPOL,

P. (P.) extensa PAPAIANOPOL, *P. (Sinupontalmyra). corbuloides* (DESHAYES), *Pseudocatillus subzlatarskii* EBERSIN, *Phyllocardium planum planum* (DESHAYES), *Paradacna retowskii* ANDRUSOV, *P. candida* PAPAIANOPOL, *P. contorta* PAPAIANOPOL, *Chartoconcha bayerni* (R. HOERNES), *Dacicardium vetustum* PAPAIANOPOL, *Caladacna verecunda* PAPAIANOPOL, *Dreissenomya (Sinucongeria) aperta* (DESHAYES).

They are succeeded by yellowish fossiliferous sands overlain by yellowish-reddish medium-grained sands with intercalations of pebbles and thin sandstones layers. Very thin argillaceous layers occur, as well. The molluscan fauna is represented by: *Limnocardium (Tauricardium) petersi* (M. HÖRNES), *L. (Euxinicardium) nobile* SABBA, *L. (Bosphoricardium) emarginatum* (DESHAYES), *Phyllocardium planum planum* (DESHAYES), *Pontalmyra (Pontalmyra) subincerta* ANDRUSOV, *P. (P.) corporata* PAPAIANOPOL, *P. (P.) constantiae* SABBA, *Caladacna steindachneri* (BRUSINA), *Pseudocatillus securus* PAPAIANOPOL et PAVNOTESCU, *Plagiodacna carinata* (DESHAYES), *Prosodacna (Prosodacna) fischeri* DAVITAŞVILI, *P. (P.) pseudocestiensis* EBERSIN, *Chartoconcha bayerni* (R. HOERNES), *C. minima* PAPAIANOPOL, *Paradacna retowskii* ANDRUSOV, *Unio (Rumanunio) rumanus* TOURNOUËR, *Congeria (Mytilopsis) subcarinata subcarinata* (DESHAYES), *C. (M.) subcarinata botenica* ANDRUSOV, *C. (M.) getica* PAPAIANOPOL, *Dreissena rostriformis rostriformis* (DESHAYES), *D. stefănescui* FONTANNES, *Dreissenomya (Sinucongeria) aperta* (DESHAYES), *Viviparus achatinoides* (DESHAYES).

The large number of *Congeria* is to be stressed out in this fauna.

There follow whitish, micaferous sands, with a cross-structure, and rare specimens of *Dreissena* and fragments of limnocardiids.

Whitish micaferous sands with small-sized pebbles and more cemented intercalations are to be found in the upper part of the hill. The fauna of these deposits is represented by: *Limnocardium (Tauricardium) praesquamulosum* EBERSIN, *L. (T.) petersi* (M. HÖRNES), *L. (Bosphoricardium) emarginatum* (DESHAYES), *Prosodacna (Prosodacna) fischeri* DAVITAŞVILI, *Phyllocardium planum planum* (DESHAYES), *Caladacna verecunda* PAPAIANOPOL, *Chartoconcha bayerni* (R. HOERNES), *Dreissena stefănescui* FONTANNES, *Viviparus papaianopoli* LUBENESCU.

In this last fossiliferous layer the frequency of the specimens of *Dreissena* and *Viviparus* is to be mentioned. It is overlain by bedded sandy clays devoid of macrofauna.

The molluscs point out the decrease of salinity from the lower to the upper part. Thus, in the basal part, where the pontalmires are quite numerous, one can presume a salinity higher than 5 ‰, situated in the lower part of the mixed-mesohaline domain. Subsequently, higher values of salinity (3–5 ‰) (mixed-oligohaline) have been observed in places where congerias are abounding. These values decrease in the upper part of the succession, displaying values lower than 3 ‰.

Ostracoda Microfauna
(determined by R. Olteanu)

Pontoleberis pontica (STANCHEVA), *Candona (Caspiola) balcanica* (ZALANYI), *C. (C.) labiata* (ZALANYI), *C. (C.) karatengisa* (SCHNEIDER), *Pontoniella acuminata* (ZALANYI), *sagittosa* KRSTIC, *P. lotzyi* (ZALANYI), *Cypria tocorjescui* HANGANU, *Leptocythere olivina* (LIVENTAL), *L. multituberculata* (LIVENTAL), *L. paralella* (MEHES), *L. litica* (LIVENTAL), *L. andrusovi* (LIVENTAL), *L. bosqueti* (LIVENTAL), *Tyrrhenocythere filipescui* (HANGANU), *Bakunella dorsoarcuata* (ZALANYI), *Cytherissa bogatschovi* (LIVENTAL), *Amplocypria dorsobrevis* KRSTIC, *Candona (Caspiocypris) vekuensis* OLTEANU.

Study of quartz grains
by C. Costea

Morphoscopy of the quartz grains after Crofts' comparative scale (1974):
–sphericity between spherical and subacute;
–roundness between highly angular and subrounded, with concentration in angular.
Exoscopy (media penetrated by the quartz grains):
– torrential, eolian, deltaic, infratidal, glacial, intertidal.

6. Chersonian at Buleta

(Fig. 7)

In the northern part of the Buleta village, nearby some abundant springs, the Chersonian deposits are cropping out. The lower part of the exposure is in fine- and medium-grained sands, of a yellowish colour, with pebble lenses or disseminated elements.

They are succeeded by gritty sands alternating with calcareous sandstones and lumachelle limestones. Some gritty sands or sandstones intercalations are fossiliferous, including the same molluscan fauna as the overlying lumachelles.

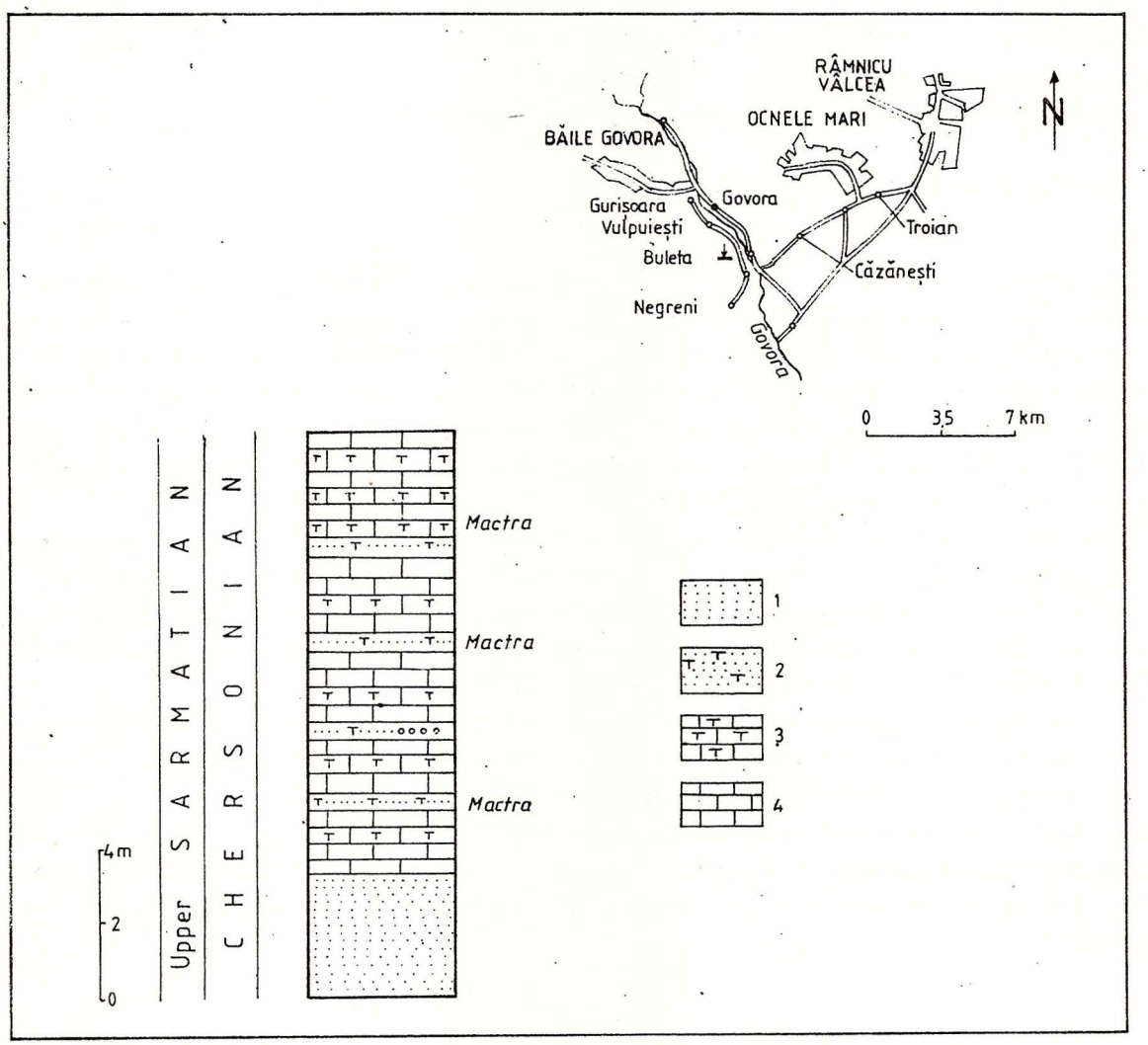

Fig. 7 – Stratigraphic column of the Chersonian, Buleta village. 1, sand; 2, slightly consolidated gritty sand; 3, calcareous sandstone; 4, limestone.

They are represented especially by elements of the genus *Mactra*: *Mactra (Sarmatimactra) balcica* MACAROVICI; *M. (Chersonimactra) caspia* EICHWALD, *M. (C.) crassicolis* SINZOW, *M. (C.) bulgarica* TOULA, *M. (C.) elongata* MACAROVICI, *M. (C.) intermedia* MACAROVICI.

In the upper part of the succession calcareous sandstones and limestones devoid of fauna can be found in this place.

The reasons of the exclusiveness of this genus are not clear; it is certain that the calcite aboundness in waters favoured the significant thickening of the valves, *M. bulgarica* and *M. crassicolis* predominating. There are doubts as for the reduced salinity, presumed by several authors, considering that genus *Mactra* does not accepts salinities less than 14 ‰; an argument in favour of this statement is that although it abounds in the Black Sea sometimes, it is absent in the surrounding coasts and lagoons.

Study of quartz grains
by C. Costea

Morphology of the quartz grains after Crofts' comparative scale (1974):
- sphericity between highly spherical and subacute;
- roundness between highly angular and subrounded.

Exoscopy (media penetrated by the quartz grains):
- torrential, deltaic, eolian, torrential, intertidal, infratidal.

7. Lower Meotian at Costeşti
(Fig. 8)

At Costeşti, on the left side of the highway down from Costeşti towards Bogdăneşti, 6 km before the Horezu locality, the Lower Meotian (Oltenian) sands are exposed in a large quarry. They are medium-grained, yellowish or whitish, often strongly micaceous, containing numerous concretions varying in shape and size, with an interesting aspect, that gave rise to interesting discussions on their genesis. Their fauna is quite rare, these sands including isolated specimens of: *Congeria (Mytilopsis) homoplatoides* ANDRUSOV, *C. (M.)* aff. *moldavica* ANDRUSOV, *Theodoxus crenulatus semiplicatus* NEUMAYR.

These sands with concretions (10 m exposure) are overlain by greyish or yellowish clays with rare *Viviparus moldavicus* specimens. To the south of this place the sands are overlain by sandstones, calcareous sandstones and microconglomerates with *Theodoxus* and *Congeria*, which underlie sandstones and microconglomerates decimetric in thickness. Specimens of *Dosinia meotica* ANDRUSOV may be encountered within sandstones.

The sand deposits exposed in the Costeşti quarry belong to the lower horizon of low salinity from the Lower Meotian (Oltenian). The sandstones with *Dosinia*, which crop out south of Costeşti, belong to the beds of *Dosinia*, a higher salinity horizon.

Although originating from a brackish environment, the salinity of *Dosinia* Beds deposits varies depending on several local peculiarities, being rather high for the respective time. It is close to that of the Sarmatian. It can be estimated at 10–18 ‰, varying round the lower value in this place.

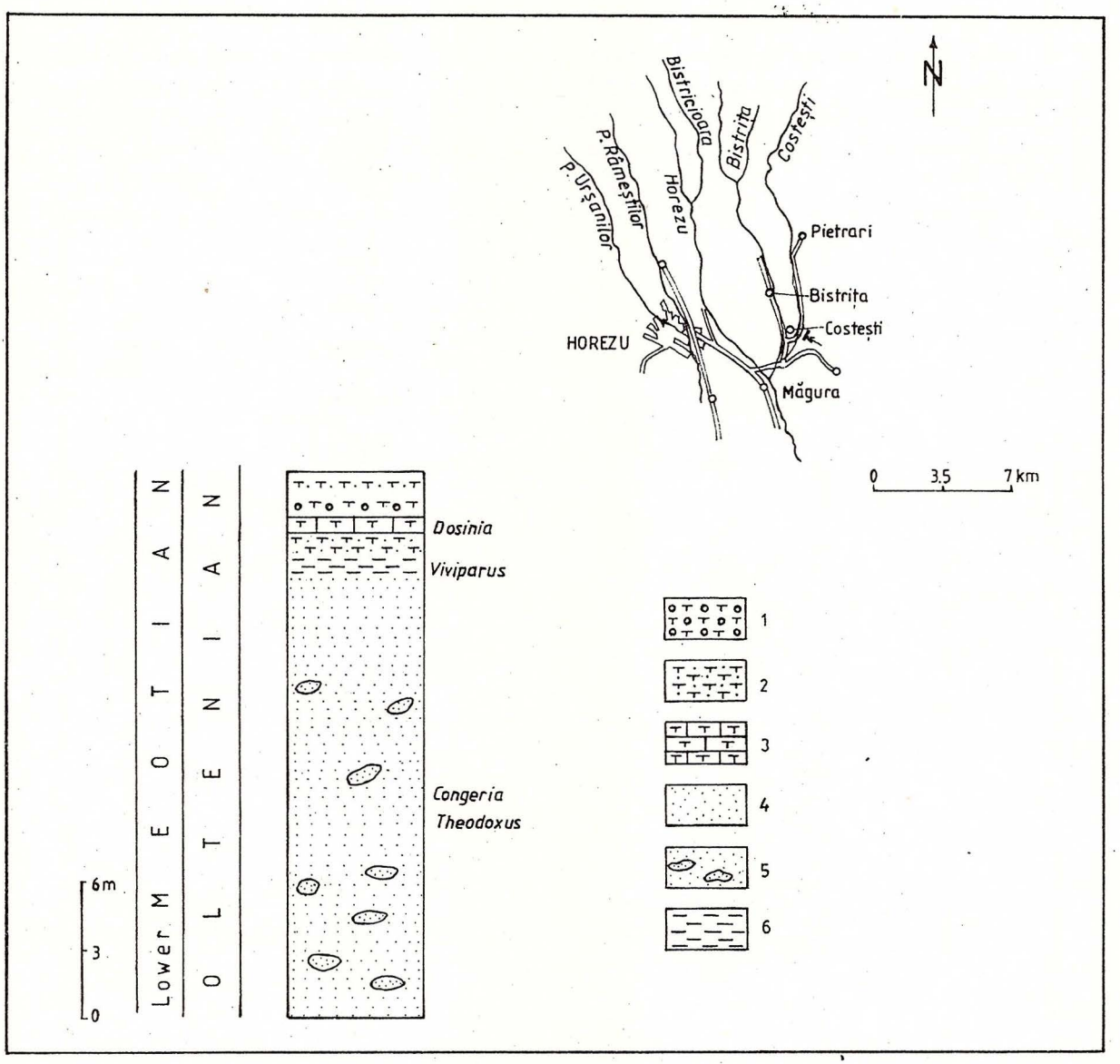

Fig. 8 – Stratigraphic column of the Lower Meotian (Oltenian), Costeşti village. 1, microconglomerate; 2, sandstone; 3, calcareous sandstone; 4, sand; 5, sand with concretions; 6, clay.

Study of quartz grains
by C. Costea

Morphoscopy of quartz grains according to Crofts' (1974) comparative scale:
– sphericity is distributed strictly to the very spheric and subspheric classes;
– roundness between angular and rounded.
Exoscopy (media crossed by quartz grains):
– torrential, deltaic, eolian, glacial, torrential, intertidal.

8. Lower Dacian (Getian) on the Cerna Valley (Pojoci Village) (Fig. 9)

A succession situated from the stratigraphic point of view in the upper half of the Lower Dacian in the region is exposed on the right bank of the Cerna Valley, round the Pojoci village.

The lower part is marked by the presence of yellowish, medium-grained, in places limonitized, sands intercalated with medium or fine gravels, argillaceous sands or sandy clays. They are overlain by argillaceous sands with sandy clays and more rarely sands intercalations.

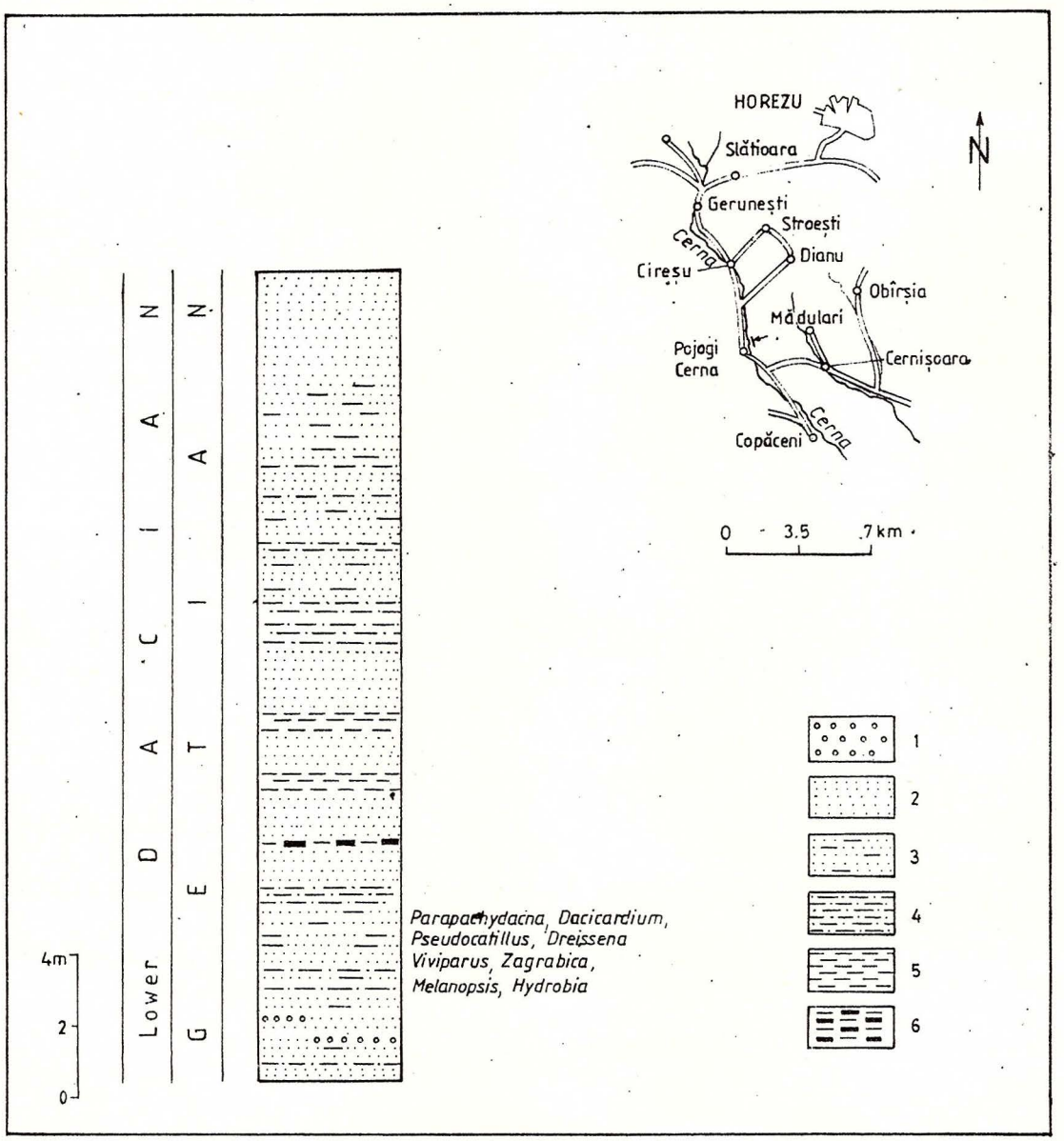

Fig. 9 – Stratigraphic column of the Lower Dacian (Getian) Pojogi village. 1, gravel; 2, sand; 3, clayey sand; 4, sandy clay; 5, clay; 6, coal clays.

These deposits contain a rich mollusç fauna: *Dacicardium rumanum* (FONTANNES), *D.* aff. *dacianum* (PAPAIANOPOL), *Pachydacna (Parapachydacna) cobălcescui* (FONTANNES), *P. (P.)* aff. *serena* (SABBA), *Pseudocatillus geticus* PAULIUC, *Dreissena rimestiensis* FONTANNES, *D. polymorpha* PALLAS, *Viviparus conicus* LUBENESCU, *V. argesiensis* SABBA, *V. duboisi*

(MAYER-EYMAR), *Melanopsis (Melanopsis) decollata* STOLICZKA, *Hydrobia syrmica* NEUMAYR, *H.* aff. *grandis* COBĂLCESCU.

There follow yellowish medium-grained sands which underlie a 20 cm thick coal clay which underlies yellowish medium-grained sands with frequent rust-coloured stripes. The succession continues with greyish or greyish-blackish clays, followed by argillaceous sands and sands, greyish-brownish clays and yellowish-rust-coloured, medium-grained sands. They are overlain by greyish sandy clays that underlie an alternation of yellowish-reddish sands, argillaceous sands and decimetric beds of sandy clays. In the upper part there are greyish argillaceous sands overlain by yellowish sands.

The above-presented succession, which precedes the setting of the coaly facies, corresponds to a period marked by a pronounced salinity decrease. It is estimated that in the above case salinity is a little over 0.5 ‰, towards 1–3 ‰.

Ostracoda Microfauna
(determined by R. Olteanu)

Bakunella dorsoarcuata (ZALANYI), *Cypria tocorjescui* HANGANU, *Amplocypris dorsobrevis* SOKAC, *Candona filona* (LIVENTAL), *C. alta* (ZALANYI), *C. lobata* (ZALANYI), *C. balcanica* (ZALANYI), *Cytherissa bogatschovi* (LIVENTAL), *Cyprideis tuberculata* (MEHES).

Study of quartz grains
by C. Costea

Morphoscopy of quartz grains according to Crofts' (1974) comparative scale:
– sphericity between spherical and acute;
–roundness between angular and subrounded.
Exoscopy (media crossed by quartz grains):
– torrential, deltaic, eolian, glacial, torrential, fluviatile, deltaic, intertidal.

9. Pontian and Lower Dacian (Getian) on the Valea Mare Valley (Bengeşti Village)

(Fig. 10)

The oldest deposits cropping out on this section belong to the Middle Pontian (Portaferrian). They occur in the lower part of the valley close to the village, and consist of massive greyish clays, in places containing more sands including: *Congeria (Rhombocongeria) rhomboidea* M. HÖRNES *Limnocardium (Tauricardium) petersi* (M. HÖRNES), *Paradacna abichi abichiformis* (GORJANOVIC – KRAMBERGER), *Parvidacna* aff. *planicostata* STEVANOVIĆ.

These deposits are overlain by greyish or yellowish, in places slightly cemented sands intercalated with sandy clays, within which the fauna still indicates their pertaining to the Portaferrian: *Limnocardium (Euxinicardium) cobălcescui* PAPAIANOPOL et MĂGUREANU, *L. (E.) nobile* SABBA, *L. (E.) cosoni* PAPAIANOPOL, *Plagiodacna carinata* (DESHAYES), *P. dacica* PAPAIANOPOL, *Pseudocatillus pseudocatillus* (BARBOT), *Pontalmyra (Pontalmyta) dacica* PAPAIANOPOL, *P. (P.) monticola* PAPAIANOPOL, *Pseudoprosodacna scutila* PAPAIANOPOL et LUBENESCU, *P. semisulcatoides* EBERSIN, *P. olteniae* (MOTAŞ), *Chartoconcha asaphiopsis* (BRUSINA), *Lithoglyphus rumanus* SABBA, *Hydrobia pontilitoris* WENZ.

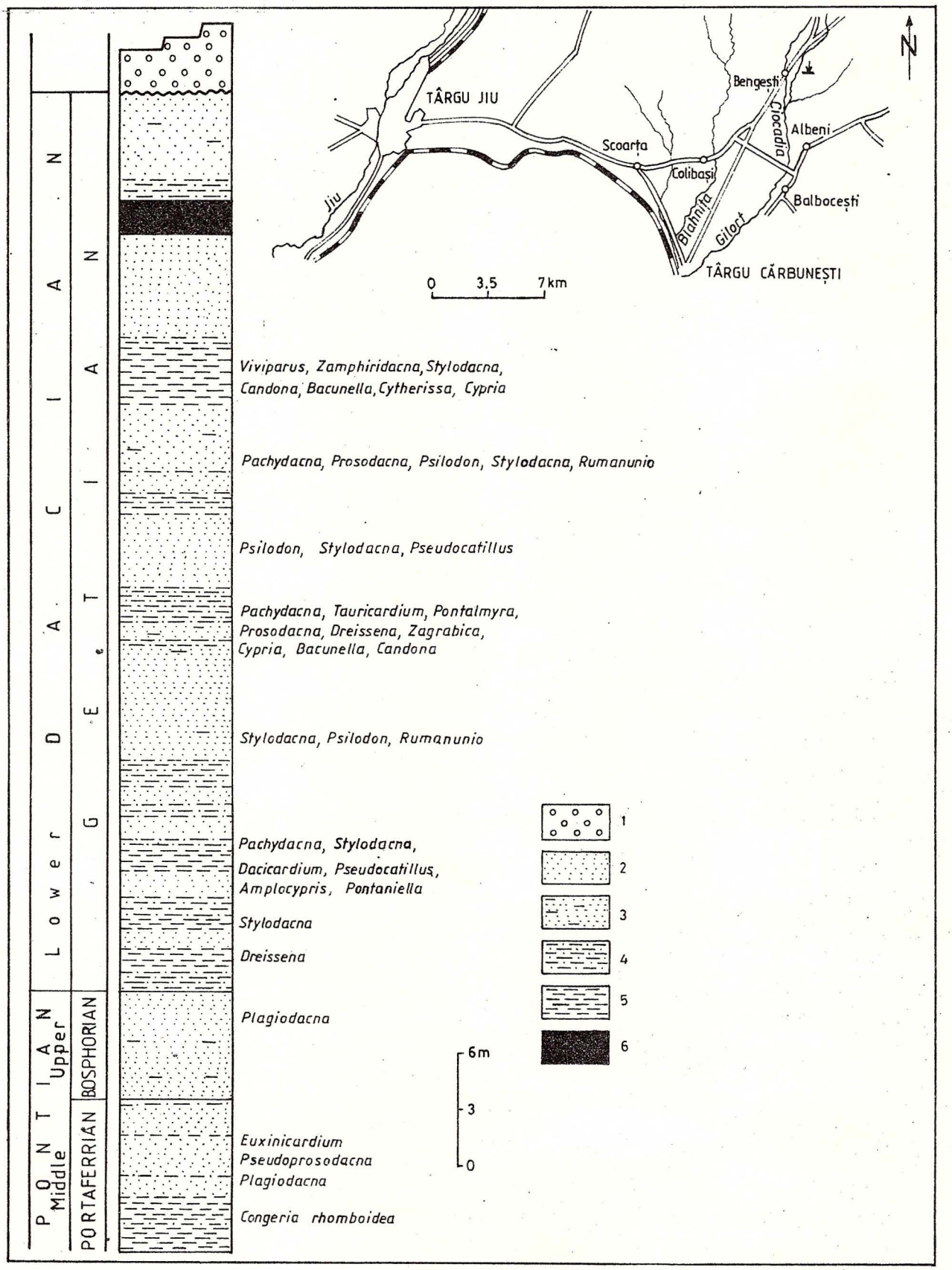

Fig. 10 – Stratigraphic column of the Pontian and of the Lower Dacian (Getian), Bengeşti village. 1, terrace gravel; 2, sand; 3, clayey sand; 4, sandy clay; 5, clay; 6, coal.

A fauna attesting the presence of the Upper Pontian (Bosphorian) is to be found somewhat higher, at the mouth of the Râpa Mare Brook, in whitish-yellowish, locally weakly argillaceous, sands: *Plagiodacna carinata* (DESHAYES), *P. dacica* PAPAIANOPOL, *Candona balcanica* (ZALANYI), *C. venusta* (ZALANYI), *Cypria tocorjescui* HANGANU, *Loxoconcha schweyeri* SUZIN.

There follows an almost complete succession of the Lower Dacian (Getian), which is proposed as parastratotype for this interval. It comprises in the lower part an alternation of greyish sandy clays with argillaceous sands, in which rare specimens of *Dreissena rimestiensis* and *Pseudocatillus* are present. This succession underlies greyish-yellowish sands, greyish or yellowish sandy clays with specimens of *Stylodacna heberti* (COBĂLCESCU) in their upper part.

Greyish sandy clays and argillaceous sands representing a rich fossiliferous packet rest upon the above succession.

The fauna consists of: *Pachydacna (Pachydacna) mirabilis* (TEISSEYRE), *P. (P.) motasi* PAPAIANOPOL, *P. (P.) rumana* PAPAIANOPOL, *Stylodacna heberti* (COBĂLCESCU), *Dacicardium rumanum* (FONTANNES), *Pseudocatillus subpolemonis* EBERSIN, *Cyprideis punctilatta* (BRADY), *Amplocypris dorsobrevis* SOKAC, *Candona venusta* (ZALANYI), *Pontoniella loczyi* (ZALANYI).

The section continues with prevailingly reddish, fine- or medium-grained, in places weakly or strongly cemented, sands including: *Prosodacna (Psilodon) munieri* SABBA, *Stylodacna heberti* (COBĂLCESCU), *Unio (Rumanunio) rumanus* TOURNOUËR.

There follow richly fossiliferous greyish sandy clays with the following faunal content: *Pachydacna (Pachydacna) acuticostata* PAPAIANOPOL, *P. (P.) mirabilis* (TEISSEYRE), *P. (P.) rumana* PAPAIANOPOL, *P. (P.) socialis* PAPAIANOPOL, *Limnocardium (Tauricardium) oltenaie* (IONESCU-ARGETOAIA), *Dacicardium rumanum* (FONTANNES), *D. dacianum* (PAPAIANOPOL), *Pontalmyra (Pontalmyra) amaradica* PAPAIANOPOL, *Prosodacna (Prosodacna) longiuscula gilletae* MOTAŞ, *P. (P.) longiuscula minima* ANDREESCU, *P. (P.) daciana* PAPAIANOPOL, *Dreissena rimestiensis* FONTANNES, *Zagrabica reticulata* SABBA, *Bacunella dorsoarcuata* (ZALANYI), *Cypria tocorjescui* HANGANU, *Candona venusta* (ZALANYI), *Amplocypris dorsobrevis* SOKAC, *Pontoniella acuminata acuminata* (ZALANYI).

These sandy clays are overlain by yellowish sands containing: *Stylodacna heberti* (COBĂLCESCU), *Prosodacna (Prosodacna) longiuscula gilletae* MOTAŞ, *Prosodacna (Psilodon) munieri* SABBA, *Unio (Rumanunio) rumanus* (TOURNOUËR), followed by yellowish or reddish sands with more or less cemented levels including: *Pachydacna (Pachydacna) motasi* PAPAIANOPOL, *P. (P.) gorjensis* PAPAIANOPOL, *P. (P.) socialis* PAPAIANOPOL, *P. (P.) rumana* PAPAIANOPOL, *Prosodacna (Prosodacna) paupera* PAPAIANOPOL, *P. (P.) munieri* SABBA, *Unio (Rumanunio) rumanus* TOURNOUËR.

Rich fossiliferous bluish clays and sandy clays rest upon the sands, the *Viviparus* specimens forming lumachelles. Beside the specimens of *Viviparus* such as: *Viviparus argesiensis* SABBA, *V. monasterialis* (FONTANNES), *V. carenatus* LUBENESCU, *V. bernestiensis* LUBENESCU, *V. getianus* LUBENESCU, the following specimens are also found: *Stylodacna heberti* (COBĂLCESCU), *Zamphiridacna orientalis* (SABBA).

The microfauna of the mentioned clays consists of: *Candona filona* (LIVENTAL), *C. alata* (ZALANYI), *C. lobata* (ZALANYI), *C. balcanica* (ZALANYI), *Bacunella djanelidzae* VEKUA, *Cytherissa bogatschovi* (LIVENTAL), *Cypria tocorjescui* HANGANU, *Cyprideis tuberculata* MEHEŞ. The fossiliferous clays are overlain by yellowish, fine- or medium- grained sands with argillaceous sand intercalations underlying a coaly layer.

The Lower Dacian section ends with greyish, locally slightly sandy clays, followed by coarse- or medium-grained sands intercalated with argillaceous sands.

The succession of the Pontian and Dacian faunas of this section reveals the constant tendency of salinity decrease from the lower towards the upper part. Thus the highest salinity was recorded at the level of the *Congeria rhomboidea* Beds, estimated at 7–8 ‰ (the mixed-mesohaline type). In the Upper Pontian the salinity values decrease to about 5–6 ‰.

During the Lower Dacian salinity decreases even more, its values being higher (towards 5 ‰) in the lower part, and lower (towards 3 ‰) in the upper part, where the clays with *Viviparus* were deposited. This is the moment which precedes the setting in of the eutrophic swamp that generated the coals. An oligospecific mollusc fauna, very rich in individuals, especially in *Viviparus*, adapted to this highly fresh water environment that existed prior to the coal genesis.

The ostracoda microfaunas are determined by R. Olteanu.

Spore-pollen content of the Middle Pontian
(determined by Liliana Stoian)

61 taxa have been identified. The pollen belonging to *Abies* prevails, being followed by *Pinus silvestris, Cathaya, Pinus haploxylon, Pinus cembra, Sciadopytis verticillata, Picea omorica.* The rest of the identified taxa belong to the following families, genera and species: *Picea excelsa, Tsuga ciliata, Quercus (Q. microhenrici), Fagus, Ginko, Magnolia, Sequoia, Betula, Zelkova, Ephedia, Cedrus, Tilia, Carpinus, Palmae, Nymphaea, Cyperaceae, Convulvus, Alnus incana, Anacardiaceae, Lythraceae, Nyssa, Sapotaceae, Comaceae, Alisma, Onagraceae, Utricularia, Cruciferae, Araliaceae, Cyrillaceae, Pterocarya paliurus, Zygnema, Pedicularis, Compositae.*

The spores belong to the following genera and species: *Isoëtes echinospora, Neogenisporites, Selaginella, Lycopodium, Sphagnum, Spyrogyra.*

Phytoplankton: *Pterodinium cingulatum, Trichodinium delicatum, Tchanadinium coummium, Cribroperidinium, Scrinoidinium parvimarginatum, Leptodinium, Magnolia, Gonyaulax.*

Spore-pollen content for the Lower-basal Dacian

The sample contains 26 taxa; the abundance of conifers (*Picea omorica, Abies*) is noticed to the detriment of the other species and genera: *Pinus silvestris, P. haploxylon, Cedrus, Sciadopytis verticillata, Tsuga ciliata, Cathaya, Carpinus. Ulmus, Yuglans, Salix, Tilia, Fagus, Nyssa, Sapotaceae, Pedicularis, Umbeliferae, Chenopidiaceae, Nymphaea, Polypodiaceae.*

Fresh water phytoplankton: *Monogemmites, Mongutia, Ovoidites ligneolus.*

Study of quartz grains (Middle Pontian)
by C. Costea

Morphoscopy of quartz grains according to Crofts' (1974) comparative scale:
– sphericity between spherical and subacute;
– roundness between subangular and rounded.
Exoscopy (media crossed by quartz grains):
– torrential, deltaic; eolian, glacial, torrential, intertidal, infratidal.

Study of quartz grains (Lower Dacian)
by C. Costea

Morphoscopy of quartz grains according to Crofts' (1974) comparative scale:
– sphericity between spherical and subaçute;
– roundness between subangular and rounded.
Exoscopy (media crossed by quartz grains):
– torrential, deltaic, eolian, fluviatile with medium energy, fluviatile with low energy, intertidal.

10. Lupoaia quarry
(Fig. 11)

Among the more than 23 quarries in which the coals of the Pliocene Oltenia carboniferous basin are exploited, the Lupoaia quarry shows the most complete exposure, of about 110 m in highness, in the Dacian-Romanian deposits from the western part of the Dacic Basin.

The succession of Pliocene deposits from this quarry has been considered as stratotype of the Jiu-Motru Formation (Andreescu et al., 1985), being characterized by the prevalence of pelite-humites and to a less extent of arenites. Also here the Motru coal complex was exposed, which comprises the coal beds V–XIII.

The Jiu-Motru Formation consists of clays, siltic clays, sandy clays, silts, coals (lignite), argillaceous coals, coal clays, argillaceous sands, sands and very rarely gravel lenses.

As regards the faunal content of the Jiu-Motru Formation, it belongs to the following zones (according to Andreescu et al., 1986):

– NSM_9 – *Viviparus argesiensis, V. woodwardi, V.* ex gr. *bifarcinatus, Jazkoa* ex gr. *sturdzae, Potamida psilodonta, Potamida* cf. *slanicensis*;

– NSM_{10} – *Viviparus* ex gr. *bifarcinatus, Melanopsis onichia, Psilunio sibinensis, P. pannonicus*;

– NSM_{10b} – *Viviparus stricturatus, Melanopsis pterochila, M. onusta, M. Breastensis, Potamida bittneri, P. prominulus, Psilunio* ex gr. *neumayri*;

– NSM_{11a} – *Psilunio altercarinatus, Rugunio turburensis, Cuneopsidea hochstetteri, Rytia brandzae, R. bielzi, Pseudohyriopsis problematica*;

– NSM_{11b} – *Unio haeckeli, Ritia bielzi, R. slavonica, R. brandzae, Rugunio condai, Cyclopotomida destremi, Wenziella ponderosa, Pristinunio pristinus.*

Magnetostratigraphic investigations were carried out for the succession of deposits from the Lupoaia quarry by Rădan and Rădan (in Andreescu et al., 1986), the authors considering that the analysed deposits belong to the Gilbert and Gauss epochs, between the Nunivak episodes; the lower part is at the level of the succession of deposits exposed in the Lupoaia quarry, and the upper part coincides with the end of the Gauss epoch.

Taking into account the stratigraphic position of the Jiu-Motru Formation from some other sections, the faunal content of the Pliocene deposits in this quarry as well as the magnetostratigraphic correlation, the mentioned authors assign this formation to the Upper Parscovian-Pelendavian age (Andreescu et al., 1985).

Concerning the age of the Jiu-Motru Formation and generally of the Pliocene deposits in the western part of the Dacic Basin there is also another opinion (Marinescu, 1978; Marinescu, Papaianopol, 1987; Papaianopol, 1989 a) according to which, the Upper Dacian is not present as deposits in the Carpathian Foredeep from the western part of the Dacic Basin. This opinion is mainly based on the absence of the molluscs characteristic of this interval. In this case the

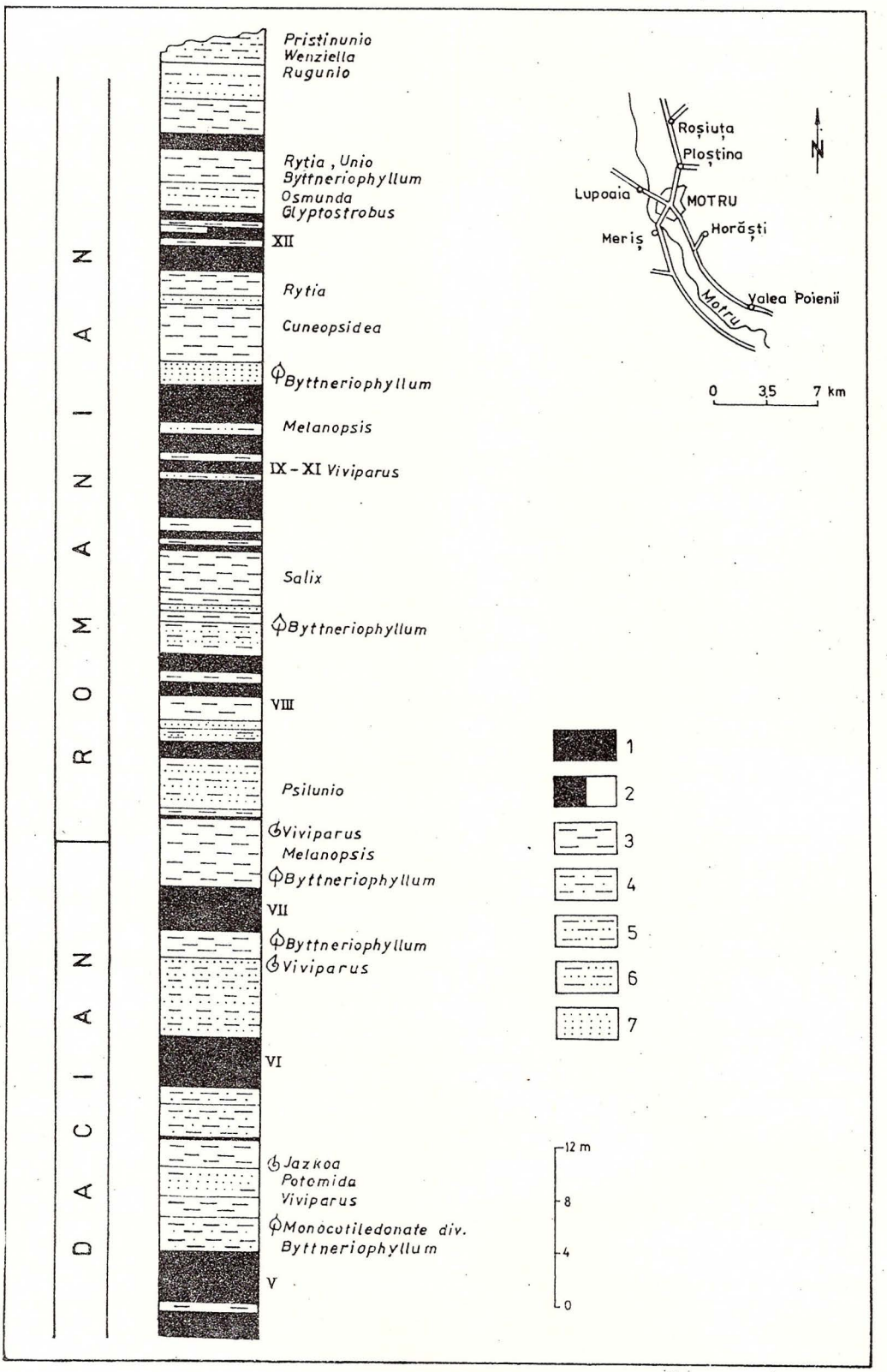

Fig. 11 – Stratigraphic column of the Dacian and of the Romanian, Lupoaia Quarry. 1, coal; 2, clayey coal; 3, clay; 4, silty clay; 5, sandy clay; 6, clayey sand; 7, sand.

succession of the Pliocene deposits from the Lupoaia quarry comprises a part of the Getian in the base, which is discontinuously overlain by Romanian deposits.

As regards the macrofloral content, in the prevailingly pelitic Pliocene deposits from the Lupoaia quarry numerous accumulations of fossil vegetal remains were identified as follows: *Osmunda regalis, Glyptostrobus europeus, Glyptostroboxylon tenerus, Sequoia abietina, Pinus* sp., *Salix pliocaenicus, S. fragilis, S. alba, S. grandifolia, Byttneria phylluii tiliaefolium, B. giganteum, Stratiotes dacicus, Tropa* sp., *Phragmites oeningensis, Typha latissima, Carex* sp., *Potamogeton* sp., *Nuphar* sp., etc.

Beisdes the leaf imppressions and compressions or seeds, a few levels with fossil forests consisting of *Glyptostrobus* and, probably, even of *Byttneriophyllum*, were identified, the latter forming forests in the hanging wall of the coal strata VII and X from the northern front of the quarry.

The systematic taphonomic investigations pointed out accumulations of vegetal remains with an obvious autochthonous (euautochthonous) position, which allowed the identification of some paleophytocoenoses typical of the Pliocene coal generating swamps such as the paleophytocoenoses with: *Bythneriophyllum tiliaefolium; Glyptostrobus europaeus; Glyptostrobus-Bythniophyllum; Salix* div. sp. – *Bythneriophyllum; Sequoia obieforma; Stratiotes dacicus; Ph. oeningensis* ± *Typha latissima.*

The existence of these paleophytocoenoses, and of course of the fossil forests, shows that during the accumulation of the parent vegetal material of coals the swamp vegetation had a concentric zonality depending on the depth of the waters and on their hydrological regime (duration and period of floods in the various seasons).

Concerning the gitological aspects, there are nine coal strata (V–XIII) which belong to the Motru coal complex, the most developed one in the western part of the Oltenia coal basin.

These are generally compound coal strata consisting of an alternation of decimetric to metric coal beds, separated by 0.05–0.3 m thick intercalations. Especially the lower coal strata (V–VIII) are very often rich in xylitic coal (over 30 %) and often xylite (5 %) lithotypes. Another lithotype is fusinite, which occurs, however, very rarely (below 1 %), consisting of fossil "charcoal". The frequency of the levels with such fusinite is rather high, which indicates that the fires were numerous in the Pliocene forests from the western part of the Dacic Basin.

In places there are distinct beds, especially in the case of stratum VIII, which constantly consists of three beds, each showing often an undulated aspect. Sometimes 2–3 strata form a complex, as in the case of strata IX–XI in the northern part of the quarry, where the complex reaches over 11 m in thickness.

11. Lower and Middle Pontian on the Coşuştea Valley (Ilovăţ Village)

(Fig. 12)

The Lower Pontian (Odessian) deposits in the Coşuştea Valley (Ilovăţ village) overlie the Upper Meotian (Moldavian) or the Sarmatian ones that are exposed at the confluence of the Coşuştea Valley with the Ogaşul lui Marte small valley. There are yellowish-brownish, usually micaceous, argillaceous sands with irregular intercalations of sandy clays with calcareous laminae, in which forms attesting the Upper Meotian were found: *Congeria (Mytilopsis) panticapea panticapea* ANDRUSOV, *C. (Andrusoviconcha) navicula* ANDRUSOV.

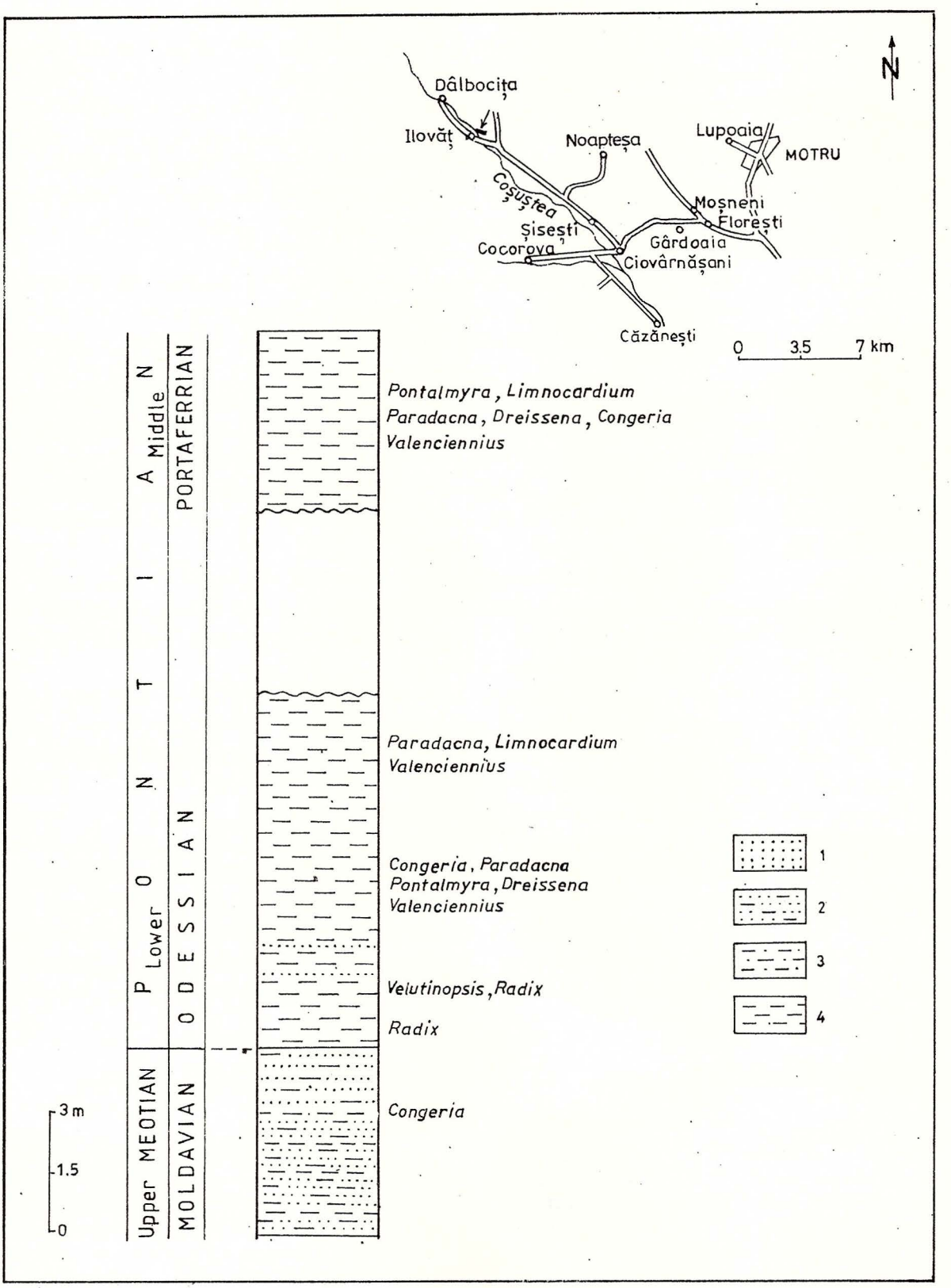

Fig. 12 – Stratigraphic column of the Meotian and of the Pontian, Coşuştea Valley, Ilovăţ village. 1, sand; 2, clayey sand; 3, sandy clay; 4, clay.

The Lower Pontian (Odessian) has in its lower part thin argillaceous sands succeeded by greyish clays devoid of stratification, with a few very thin argillaceous intercalations. Greyish-brownish, vaguely stratified clays rest above, presenting secondary gypsum crystals, greyish, light-greyish, locally greyish-brownish, unstratified, conchoidal clays. In the lower part of the succession there are mainly specimens of *Radix, Velutinopsis* and *Valenciennius* as follows: *Radix* aff. *kobelti* BRUSINA, *Velutinopsis* aff. *velutina* (DESHAYES), *V. codapavonis* MARINESCU, *Valenciennius* sp.

The richest fauna is to be found in the greyish, massive, conchoidal clays in the upper part, comprising: *Limnocardium (Zagrabicardium) riegeli* (M. HÖRNES), *L. (Hungaricardium) zagrabiense* (BRUSINA), *Paradacna abichi abichi* (R. HOERNES), *P. abichi abichiformis* (GORJANOVIC-KRAMBERGER), *P. okrugici* (BRUSINA), *Pontalmyra (Pontalmyra) otiophora* (BRUSINA), *Dreissena* aff. *corniculata* SABBA, *Congeria (Filicarina) digitifera* ANDRUSOV, *Valenciennius ellipticus* HANGANU, *V.* aff. *suchovae* TAKTAKISCHVILI.

Upstream, on the left bank of the Coşuştea Valley, near the bridge crossing it, the deposits from the basal part of the Middle Pontian (Portaferrian) are exposed. Here also the (greyish argillaceous), usually conchoidal, pelites, or tending to become slightly stratified, prevail. The mollusc fauna comprises: *Pontalmyra (Pontalmyra) budmani* (BRUSINA), *P. (P.) otiophora* (BRUSINA), *P. (P.)* aff. *otiosa* PAPAIANOPOL, *Limnocardium (Hungarocardium) zagrabiense* BRUSINA, *Paradacna abichi abichiformis* (GORJANOVIC-KRAMBERGER), *Dreissena simplex* BARBOT, *Valenciennius ellipticus* HANGANU.

These deposits lying in the westernmost part of the Dacic Basin comprise molluscs that indicate strong Pannonian influences.

The first Pontian (Odessian) deposits follow the Meotian terrains that comprise faunal elements pointing to a more pronounced desalination of the basin: they show an increase in salinity which, like that of the Portaferrian, is probably about 8 ‰.

Ostracoda Microfaunas
(determined by R. Olteanu)

Lower Pontian

Candona labiata (ZALANYI), *C. trapezoidea* (ZALANYI), *Pontoniella acuminata* (ZALANYI), *Leptocythere microlata* (LIVENTAL), *L. andrusovi* (LIVENTAL), *Pontoleberis pontica* (STANCHEVA), *Loxoconcha* aff. *ancilla* (STANCHEVA).

Middle Pontian

Pontoniella acuminata (ZALANYI), *P. hastata* KRSTIC, *Tyrrhenocythere* aff. *pontica* (LIVENTAL), *T.* aff. *truncata* (SCHNEIDER), *Loxoconcha djaffarovi* SCHNEIDER, *Bakunella dorsoarcuata* (ZALANYI), *Pontoleberis pontica* (STANCHEVA), *Mediocytherideis apatoica* (LIVENTAL), *M. praeapatoica* AGALAROVA, *Leptocythere arevina* LIVENTAL, *L. naca* (MEHES), *L. subcaspia* (LIVENTAL), *Cytherura pyrama* SCHNEIDER.

Spore-pollen content for the Lower Pontian
(determined by Liliana Stoian)

Of the 55 taxa identified the pollen belonging to the conifers *Abies, Pinus silvestris, P. haploxilon, Cathaya, Picea omorica* prevails. Some genera and species are less numerous as follows: *Sciadopytis verticillata, Cedrus, Pinus, Pinus cembra, Picea excelsa, Tsuga canodensis,*

Tsuga pattoniana, Tsuga ciliata, Quercus, Sequoia, Tilia, Alnus glutionosa, Carpinus, Corylus, Fagus, Ilix, Zygnema, Nyssa, Ericaceae, Cruciferae, Cornaceae, Labiatae, Onagraceae, Caprifoliaceae, Palmacea, Utricularia, Pedicularis, Sparganium, Gramineae.

The spores are present in the following genera and species:

Pteris, Isoites, Echinospora, Azolla, Polypodiaceae, Asmunda, Sporites, Verrucatosporites, Laevigatosporites, haardti, Trilites tortuosus, Neogenisporis, Spyrogyra.

Phytoplankton: *Cribroperdinium* sp., *Scrinoidinium* sp., *Pontiadinium inequicornutum, Impagidinium strialatum, Trichodinium bifurcatum, Gonyaulax.*

Spore-Pollen content for the Middle Pontian

28 taxa were identified, which belong to several genera and species as follows: *Anacardiaceae, Dipsacaceae, Polypodiaceae, Cornaceae, Fabaceae, Abies, Pinus haploxylon, Picea exelsa, Sciadopytis verticillata, Cathaya, Tsuga canadensis, Carpinus, Fagus, Sequoia, Sparganium, Zygnema, Nymphaea, Urticaceae, Pedicularis, Pterocarya stenoptera, Sporites, Pteris, Lycopodium.*

Phytoplankton: *Impagidinium, Cribroperdinium exilicristatum, Membranolimbus.*

12. Upper Pontian (Bosphorian) at Şişeşti (Coşuştea Valley)

(Fig. 13)

The fossiliferous deposits of the Upper Pontian (Bosphorian) are exposed behind the church from the Şişeştii de Jos village on an old country road which ascends to the hill on the left

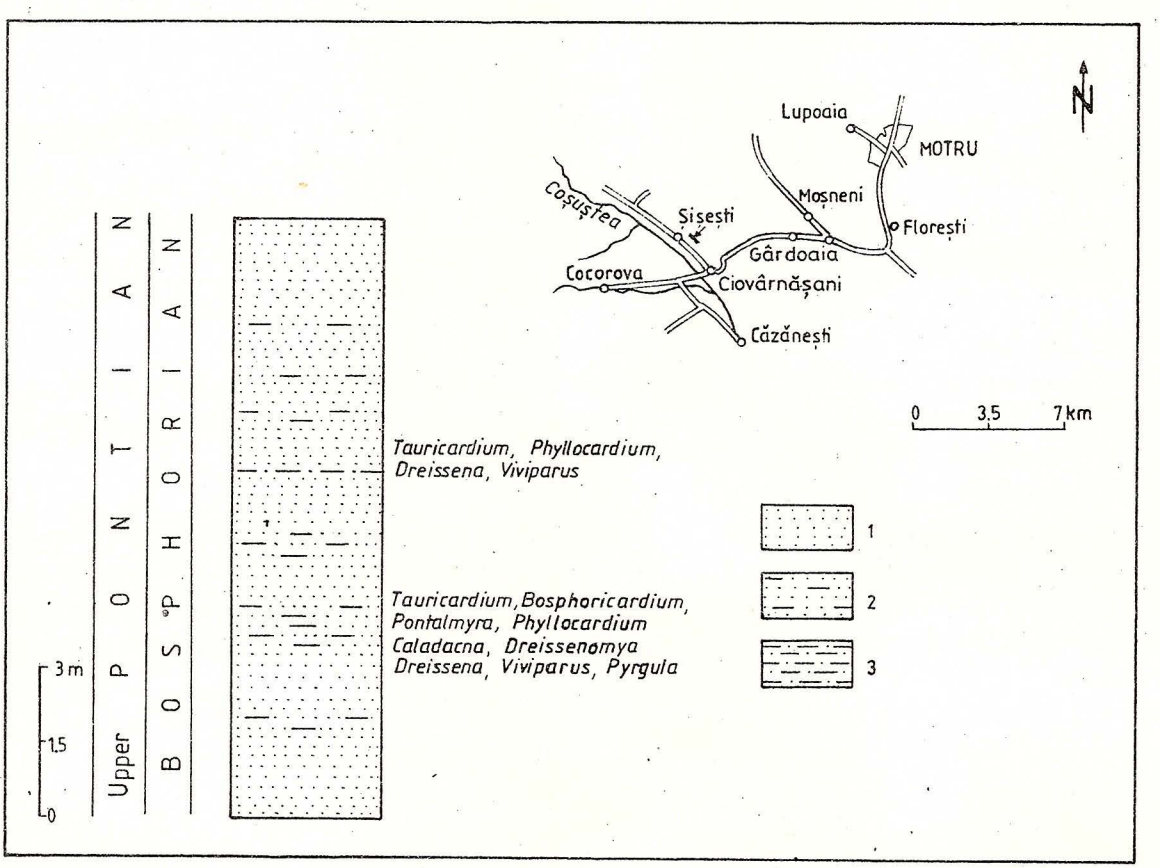

Fig. 13 – Stratigraphic column of the Upper Pontian (Bosphorian), Şişeştii de Jos village. 1, sand; 2, clayey sand; 3, sandy clay.

bank of the valley. Yellowish, fine- or medium-grained as well as argillaceous sands crop out, in which two lumachellic beds are to be found, comprising an extremely rich fauna characteristic of the Bosphorian: *Limnocardium (Tauricardium) petersi* (M. HÖRNES), *L. (T.) oviformis* EBERSIN, *L. (T.) minor* TCHELIDZE, *L. (Bosphoricardium) emarginatum* (DESHAYES), *Phyllocardium planum planum* (DESHAYES), *Caladacna steindachneri* (BRUSINA), *Chartoconcha bayerni* (R. HOERNES), *Pontalmyra (Pontalmyra) constantiae* SABBA, *P. (P.) sabbae* PAPAIANOPOL, *P. (P.) getica* PAPAIANOPOL, *P. (P.) immutata* PAPAIANOPOL, *P. (Sinupontalmyra) corbuloides* (DESHAYES), *Pseudocatillus subzlatarskii* EBERSIN, *Plagiodacna carinata* (DESHAYES), *P. tohanensis* PAPAIANOPOL, *Prosodacna (Prosodacna) semisulcata minor* EBERSIN, *Dreissena rostriformis rostriformis* (DESHAYES), *D. rostriformis vulgaris* ANDRUSOV, *D. rostriformis corniculata* SABBA, *Dreissenomya (Sinucongeria) aperta* (DESHAYES), *Viviparus glogovensis* SABBA, *V. motruensis* SABBA, *V. achatinoides* (DESHAYES), *V. papaianopoli* LUBENESCU, *Pyrgula archimedis* FUCHS *Micromelania fuchsiana* BRUSINA, *Zagrabica reticulata* SABBA, *Z.* aff. *naticina* BRUSINA.

The last mentioned fossiliferous sands are overlain also by yellowish, usually medium-grained, sands intercalated with argillaceous sands and devoid of molluscs.

The diversity of the Bosphorian fauna in this place indicates the existence of several conditions favourable to its luxuriant development, among which salinity, the small water depth and a good aeration should be mentioned. The deposits belong to the Valea Boerească Formation, the fauna they contain being characteristic of the so-called "beds with *Phyllocardium planum planum*" that make up a continuous horizon in the western part of the Dacic Basin, where they are developed in a basin of mixed-mesohaline type (values of 5–7 ‰).

Ostracoda Microfauna
(determined by R. Olteanu)

Bakunella dorsoarcuata (ZALANYI), *Candona labiata* (ZALANYI), *C. lobata* (ZALANYI), *C. balcanica* (ZALANYI), *Pontoleberis pontica* (STANCHEVA), *Pontoniella acuminata* (ZALANYI), *P. saggitossa* KRSTIC, *Leptocythere olivina* (LIVENTAL), *Loxoconcha djaffarovi* SCHNEODER, *Cytherissa bogatschovi* LIVENTAL, *C.* aff. *plana* KLAIN, *Tyrrhenocythere filipescui* (HANGANU), *T.* aff. *taurica* (SINEGUB).

Study of quartz grains
by C. Costea

Morphoscopy of the quartz grains according to Crofts' (1974) comparative scale:
- sphericity between spherical and subacute;
- roundness between subangular and subrounded.

Exoscopy (media crossed by the quartz grains):
- torrential, glacial, deltaic, eolian, torrential, intertidal, infratidal.

13. Upper Badenian and Lower Sarmatian on the Morilor Valley
(Fig. 14)

The upper part of the Upper Badenian (Kossovian) deposits, the so-called "*Spirialis* Marls" crop out in the lower part of the succession exposed downstream the Morilor Valley, in the upstream margin of the Colibaşi village. They consist of greyish sandy clays, which, beside *Spiriatella*, contain also a rich foraminiferal assemblage that constitutes a fossiliferous horizon very rich in *Velapertina*.

The Badenian deposits are succeeded by the Lower Sarmatian (Volhynian) ones which contain centimetric beds, in places slightly sandy, of greyish clays in the base. The clays are banded due to the white calcareous laminae (Valea Morilor Formation). The fauna of this basal packet includes the following molluscs: *Mohrensternia sarmatica* (FRIEDBERG), *M. inflata* (ANDRZEJOWSKI), *Ervilia dissita* (EICHWALD).

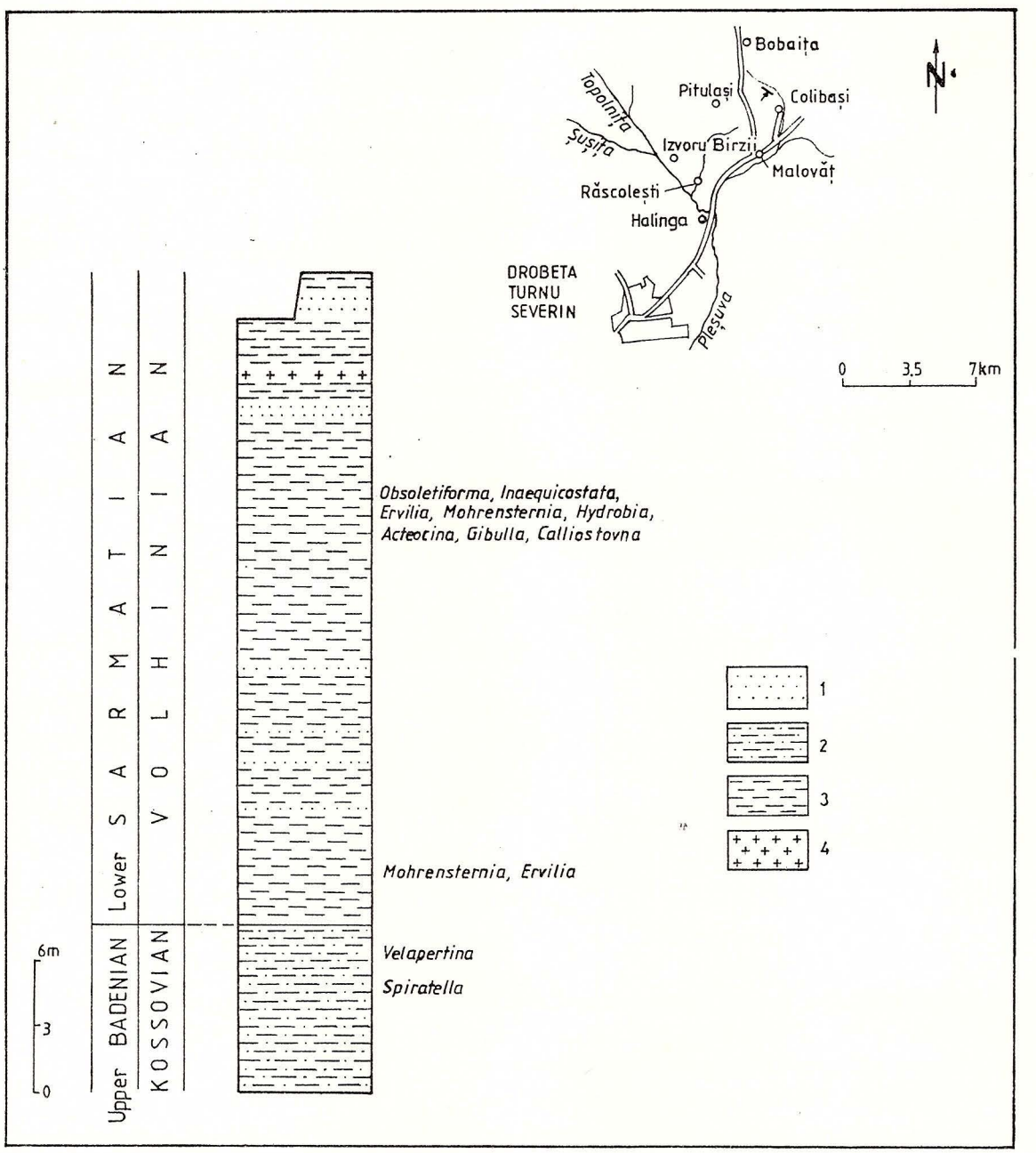

Fig. 14 – Stratigraphic column of the Badenian and of the Sarmatian, Morilor Valley. 1, sand; 2, sandy clay; 3, clay; 4, tuff.

There follow accumulations which are very rich in molluscs, locally constituting fossiliferous levels or being widespread throughout the clay mass. These include: *Musculus sarmaticus* (GATUEV), *Ervilia dissita* (EICHWALD), *E. podolica* (EICHWALD), *Mactra (Sarmatimactra)* aff. *vitaliana* D'ORBIGNY, *Inaequicostata politioanei* (JEKELIUS), *I. suessiformis* (JEKELIUS),

I. pia (ZHIZHCHENKO), *Chartocerdium* aff. *subfittoni* (ANDRUSOV), *Obsoletiforma (Obsoletiforma) vindobonensis* (LASKAREV), *O. (O.) obsoleta* (EICHWALD), *O. (O.) ghergutai* (JEKELIUS), *O. (O.) pseudosoceni* (JEKELIUS), *Gibbula picta* (EICHWALD), *Calliostoma angulata* (EICHWALD), *C. ringeiseni* JEKELIUS, *Mohrensternia inflata* (ANDRZEJOWSKI), *M. sarmatica* (FRIEDBERG), *M. angulata* (EICHWALD), *Mohrensternia pseudoinflata* (HILBER), *M. hydrobioides* HILBER, *Hydrobia elongata* (EICHWALD), *H. stagnalis* (BASTEROT), *H. andrussowi* HILBER, *Pirenella picta* (BASTEROT), *P. mitralis* (EICHWALD), *Duplicata (Duplicata) duplicata* (SOWERBY), *D. (D.) opinabile* (KOLESNIKOV), *Acteocina lajonkaireana* (BASTEROT), *A. sinozowi* (KOLESNIKOV), *Retusa truncatula* (BRUGUIÈRE).

A tuffitic, benthonitized bed consisting of lenses that do not exceed 80 cm in thickness comprises the richest fossiliferous accumulations in its upper part. These deposits are well exposed almost along the whole valley.

The fauna characteristic of this stratigraphic interval is typically brackish, indicating a salinity of about 16–18 ‰ (Mixed-mesohaline type).

Nannoplankton Spirialis Marls
(determined by M. Mărunţeanu)

The nannoplankton content of the "*Spirialis* Marls" from the Valea Morilor section can be assigned to the Discoaster exilis – NN_6 Zone (standard zonation, Martini, 1981) namely to its upper part, in the *Cyclolithella annula* Subzone (Gheţa in Dumitrică et al., 1975) due to the occurrence of *Scopholithus fossilis* and *Calcidiscus pataecus* together with *Triquetrorhabdulus negesus*.

The calcareous nannofossil assemblage consists of: *Braavudosphaera bigelowii* (GRAN BRAARUD), *Calcidiscus leptoporus* (MARAY BLACKMANN), *Calcidiscus macintgrei* (BAKRY, BRÄNNIMANN), *Calcidiscus pataecus* (GARTNER), *Coccolithus pelagicus* (WALLICH), *Coccolithus miopelagicus* BYKRY, *Cyclothella annula* (COHON), *Coronocyclus nitescens* (KOMPTNER), *Discoaster broaweri* TAN, *Discoaster exilis* MARTINI et BRAMLETE, *Discoaster variabilis* MARTINI et BRAMLETE, *Helicosphaera carteri* (WALLICH), *Helicosphaera wallichi* (LEHMANN), *Helicosphaera stolis* THEODORIDIS, *Holodiscolithus macroporus* (DEFLANDRE), *Pontosphaera discopora* SCHILLER, *Pontosphaera multipora* (KAMPTONER), *Reticulofenestra pseudoumbilica* (GARTNER), *Cyclicergolithus horidonus* (ROTHEE HAY), *Rhabdosphaera claviger* (MURRAY et BLACKMANN), *Rhabdolithus peculi* BONA et KERNERNE, *Sphenolithus abies* DEFLANDRE, *Sphenolithus noriformis* (BRÖNNIMANN et STRADNER), *Scapholithus fossilis* DEFLANDRE, *Syrocolithus dalmaticus* (KAMPTNER) and *Triquetrorhabdulus rugosus* BRAMLETTE et WILCOXON.

It has been noticed that the *Calcidiscus pataecus* nannofossil occurs only towards the terminal part of the *Spirialis* Marls.

The NN_6 Zone confirms the Upper Badenian age of the "*Spirialis* Marls".

In the Valea Morilor Beds, developed on the same section, nannoplankton assemblages were found only in the base, namely in the *Mohrensternia* and *Ervilia* levels. The calcareous nannofossils are rich in individuals and poor in species. The explosions of *Broarudosphaera bigelowii* (GRAN et BRAARUD), *Calcidiscus leptoporus* (MURRAY et BLACKMANN), *Calcidiscus macintyrei* (BUKRY et BRÄNNIMANN), *Reticulofenestra pseudoumbilica pseudoumbilica* (GARTRA), *Reticulofenestra pseudoumbilicata gelida* (GEITZENAUER) beside *Coccolithus pelagicus* (WALLICH), *Holodiscolithus mocroporus* (DEFLANDRE), *Pontosphaera multipora* (KAMPTNER), *Calcidiscus potaecus* (GARTNER), *Coccolithus miopelagicus* BUKRY, *Helicosphaera carteri* (WALLICH), *Rhabdolithus poculi* BONA et KERNERNE, *Rhabdosphaera pannonica* BALDI-BEKE are

characteristic of the Sarmatian deposits developed in the Pannonian Basin. The lack of the nannofossils specific for a certain zone makes it impossible to place this assemblage in the standard scale (Martini, 1971). However, the development of *Rhabdolithus poculi* and *Coccolithus pataecus*, beside the first occurrences of *Umbilicosphaeri jafari* MÜLLER as well as the lack of *Calcidiscus leptoporus antrovalis* (STRADNER & FUCHS) would suggest the placing of the hosting assemblage in the NN_7 Discoaster kugleri Zone because in the rest of the Dacic Basin such assemblages alternate with those characteristic of the NN_7 Zone. Therefore it can be stated that also with respect to the calcareous nannoplankton, at least the lower part of the Valea Morilor Beds belongs to the Lower Sarmatian (Volhynian).

Study of quartz grains
by C. Costea

Morphoscopy of the quartz grains according to Crofts' (1974) comparative scale:
– sphericity between very spherical and subspherical;
– roundness between very angular and subangular.
Exoscopy (media crossed by quartz grains):
– volcanic, torrrential, deltaic, intertidal, infratidal.

14. Middle Romanian at Podari (Jiu Valley)
(Fig. 15)

By the richness and diversity of its faunas the section at Podari is one of the most representative sections of the Middle Romanian from the Dacic Basin.

It is situated south of Craiova, on the right side of the Jiu Valley, in the northern margin of the Podari village.

Information on the mollusc faunas at Podari was provided by Sabba Ştefănescu (1986), Ionescu-Argetoaia (1918), Pană et al. (1981), Papaianopol (1994).

In the lower part of the succession, exposed on the Jiu Valley, there are greyish-bluish clays that are non-fossiliferous here.

There follow fine-, medium- or coarse-grained (12–15 m), in places slightly cemented sands, with cross-bedding and fine gravel. These sands contain a fauna clearly dominated by gasteropods. There were determined: *Viviparus bifarcinatus* (BIELZ), *V. stricturatus* NEUMAYR, *V. contiqus* SABBA, *V. transitorius* SABBA, *V. mehedintzensis* LUBENESCU, *V. turgidus jianui* SABBA, *Melanopsis (Melanopsis) rumana* TOURNOUËR, *M. (M.) correcta* SABBA, *M. (M.) sandbergeri* NEUMAYR, *Melanopsis (Lyrcaea) slavonica* NEUMAYR, *Stenothyrella olteniae* PANĂ, *Emmericia candida* NEUMAYR, *Amphimelania fossariformis* (TOURNOUËR), *Bulimus (Bulimus) podarensis* PANĂ, *Theodoxus slavonicus* (BRUSINA), *T. quadrifasciatus* (BIELZ), *T. boteani* (PORUMBARU).

The above-mentioned sands are succeeded by fine grey, in places slightly cemented sands (4–5 m) with sandy clay interbeds. These deposits contain a rich mollusc fauna as follows: *Psilunio (Psilunio) breastensis* (IONESCU-ARGETOAIA), *P. (P.) craiovensis* (TOURNOUËR), *P. (P.) ottiliae* (PENECKE), *P. (P.)* aff. *biplicatus* (BIELZ), *P. (Cyclopotomida) munieri* (SABBA), *Cuneopsidea beyrichi* (NEUMAYR), *C. magna* ANDREESCU, *C. zitteli* (PENECKE), *C. sculpta* (BRUSINA), *Rugunio condai* (PORUMBARU), *R. mojsvari* PENECKE), *R. turburensis* (FONTANNES), *R.* aff. *lenticularis* (SABBA), *R.* aff. *grandis* LUBENESCU, *Rytia brandzae* SABBA, *R. bielzi* (CZEKELIUS), *R. slavonica* (M. HÖRNES), *R. valachica* LUBENESCU, *R. conemenosi* (BRUSINA), *R.* aff. *motruensis* (IONESCU-ARGETOAIA), *Sulcopotomida cymatoïdes* (BRUSINA), *S. herjei* (PORUMBARU), *S. porumbarui* (TOURNOUËR), *Wenziella subclivosa* (TEISSEYRE), *Wenziella clivosa* (BRUSINA), *W. ponderosa* (WENZ), *W.* aff. *acuta*

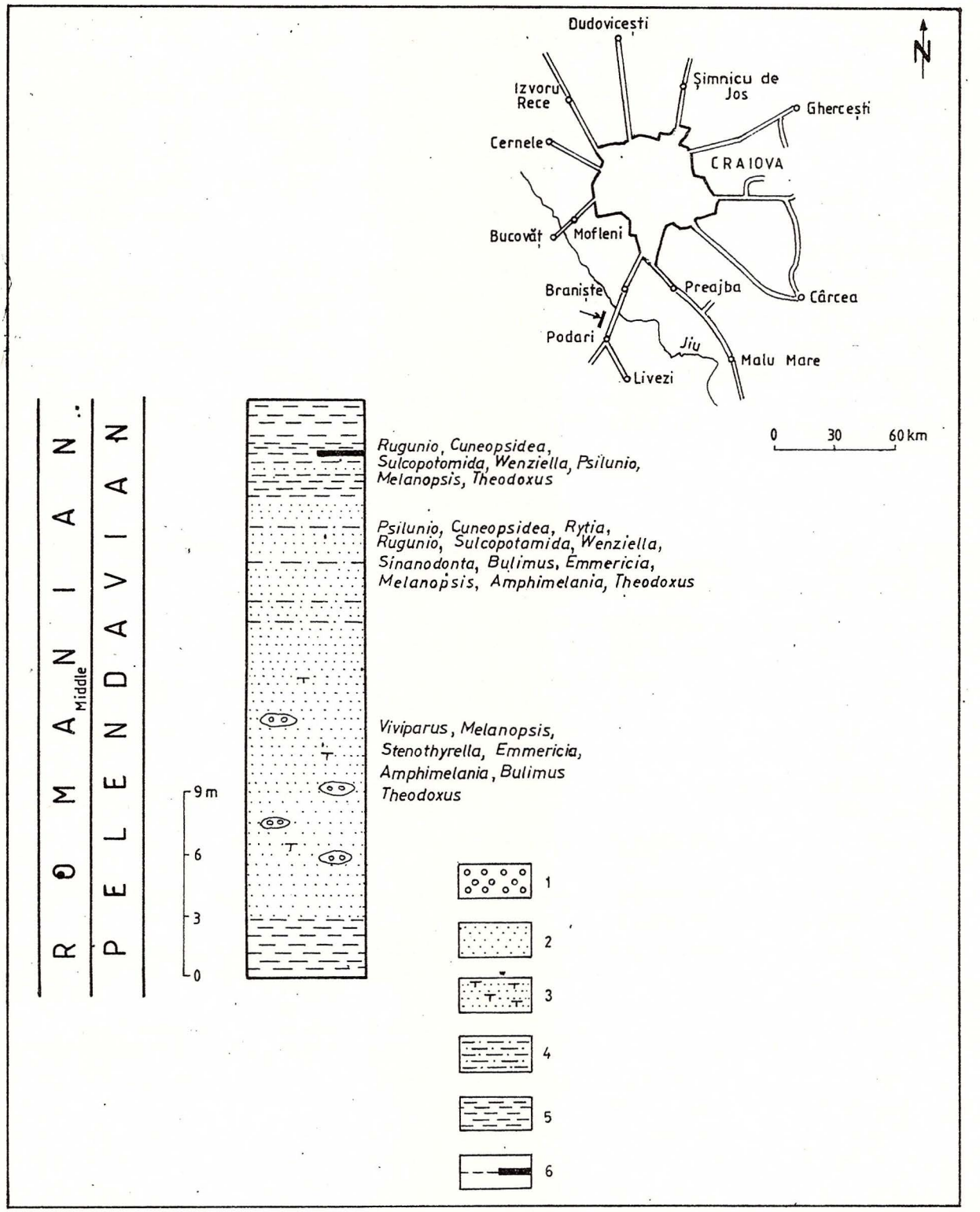

Fig. 15 – Stratigraphic column of the Middle Romanian (Pelendavian), Podari village. 1, gravel; 2, sand; 3, slightly consolidated gritty sand; 4, sandy clay; 5, clay; 6, coal clays.

IONESCU-ARGETOAIA, *Pseudohyriopsis problematica* (COBĂLCESCU), *Sinandonta podarensis* PAPAIANOPOL, *Dreissena polymorpha* PALLAS, *Pisidium slavonicum* NEUMAYR, *P. clessini* NEUMAYR, *Viviparus craiovensis* (TOURNOUËR), *V. mammatus* SABBA, *V. turgidus* (BIELZ), *V. turgidus jianui* SABBA, *Amphimelania fossariformis* (TOURNOUËR), *Stenothyrella olteniae* PANĂ, *Bulimus (Bulimus) podarensis* PANĂ, *Melanopsis (Melanopsis) rumana* (TOURNOUËR), *M. (M.) pterochila* BRUSINA, *M. (M.) onychia* BRUSINA, *Valvata (Cincinna) sibiensis* NEUMAYR, *V. (C.) crusitensis* FONTANNES, *Emmericia candida* NEUMAYR, *Theodoxus scriptus* (SABBA), *Th. licherdopoli* SABBA, *Th. quadrifasciatus* SABBA, *Th. capillaceus* (BRUSINA), *Th. pilidei* (TOURNOUËR).

The upper part of the succession is marked by the presence of sands and greenish clays with a coaly clay intercalation. The mollusc fauna comprises: *Rugunio condai* (PORUMBARU), *R. turburensis* (FONTANNES), *R. mojsvari* (PENECKE), *Rytia brandzae* SABBA, *R.* aff. *slavonica* (M. HÖRNES), *Cuneopsidea beyrichi* (NEUMAYR), *C.* aff. *zitteli* PENECKE, *Sulcopotomida cymatoides* (BRUSINA), *Wenziella ponderosa* (WENZ), *Psilunio (Psilunio) craiovensis* (TOURNOUËR), *Viviparus mammatus* SABBA, *Melanopsis (Melanopsis) pterochila* BRUSINA, *M. (M.)* aff. *sandbergeri* NEUMAYR, *Theodoxus quadrifasciatus* BIELZ, *Th. scriptus* SABBA.

References

Alexeeva, L. I., Andreescu, I., Bandrabur, T., Cepalîga, A., Ghenea, C., Mihăilă, M., Trubihin, V. (1983) Correlation of the Pliocene and Lower Pleistocene Deposits in the Dacic and Euxinic Basins. *An. Inst. Geol. Geofiz., Congr. al XII-lea Asoc. Geol. Carp.-Balc.*, LIX, p. 143–151, Bucureşti.

Andreescu, I., Papaianopol, I. (1970) Biostratigrafia depozitelor sarmaţiene dintre văile Milcov şi Râmnicu Sărat. *Stud. cerc. geol. geofiz. geogr. (geologie)*, 15, 2, p. 499–512, Bucureşti.

— , **(1972)** Contribuţii la stratigrafia Dacianului şi Romanianului din zona de curbură a Carpaţilor Orientali. *D. S. Inst. Geol.*, LVIII, (1971), 4, Stratigrafie, p. 131–156, Bucureşti.

— , **(1972 a)** Faciostratotipul Malvensianului din zona de curbură a Carpaţilor Orientali. *D. S. Inst. Geol.*, LVIII/4 (1971), p. 157–176, Bucureşti.

— , **(1972 b)** Limnocardiidès quaternaires de la zone de courbure des Carpates Orientales (Roumanie). *Rev. roum. géol. géphys. géogr. (géologie)*, 16, 2, p. 107–120, Bucureşti.

— , **(1975)** Romanian. Stratotypes of Mediterranean Neogene Stage. *Publ. House Slov. Acad. Sci.*, 2 Veda, p. 131–138, Bratislava.

— , **Papaianopol, I. (1975)** Dacian. Stratotypes of Mediterranean Neogene Stage. *Publ. House Slov. Acad. Sci.*, 2, Veda, p. 131–138, Bratislava.

— , **Rădulescu, C., Samson, P., Cepalîga, A., Trubihin, I. (1981)** Chronologie (Mollusques, Mammifères, Paléomagnetism) des formations plio-pléistocènes de la zone de Slatina (Bassin Dacique). *Trav. Inst. Spéol. "E. Racovitza"*, XX, p. 127–137, Bucureşti.

— , **(1981)** Middle-Upper Neogene and Early Quaternary Chronostratigraphy from the Dacic Basin and Correlations with Neighbouring Areas. *Annal. Géol. des Pays Hellenique, Hors Série*, IV, p. 129–138, Athens.

— , **(1983)** Biochronology and Chronostratigraphy of the Upper Pliocene and Lower Pleistocène in the Dacic Basin. *An. Inst. Geol. Geofiz.*, LIX, p. 153–160, Bucureşti.

— , **(1984)** Paleogeographic significance of Sarmatian congerias from the Dacic Basin. Univ. of Bucharest, 75 years of the Lab. of Paleont., Special vol., p. 219–228, Bucharest.

— , **Ţicleanu, N., Pană, I., Pauliuc, S., Pelin, M., Barus, T. (1985)** Stratigraphie des dépôts pliocènes à charbons zone est d'Oltenie (secteur Olt-Jiu). *Anal. Univ. Bucureşti, Geologie*, XXXIV, p. 87–96, Bucureşti.

— , **Rădan, S., Rădan, M. (1986)** Magnetostratigraphy of the Dacian-Romanian deposits of the Lupoaia Quarry. *D. S. Inst. Geol. Geofiz.*, 70–71, (1983; 1984), 1986, p. 219–226, Bucureşti.

Bandrabur, T. (1971) Geologia câmpiei dunărene Jiu şi Olt. *Stud. tehn. econ. Inst. Geol.*, J. 9, 146 p., Bucureşti.

Cârâc, D. (1959) Zăcămintele de lignit dintre Motru şi Coşuştea. *Stud. tehn. econ.*, A 5, p. 11–25, Bucureşti.

Ciocârdel, R. (1949) Regiunea petroliferă Berca-Beciu-Arbănaşi. *Stud. tehn. econ.*, A 4, p. 1–32, Bucureşti.

— **(1950)** Le Néogène de la partie méridionale du département de Putna. *An. Com. Geol.*, XXIII, p. 5–121, Bucureşti.

Dumitrică, P., Gheţa, N., Popescu, Gh. (1975) Date noi cu privire la biostratigrafia şi corelarea Miocenului mediu din aria carpatică. *D. S. Inst. Geol. Geofiz.*, LXI/4 (1973–1974), p. 65–84, Bucureşti.

Eberzin, A. G., Motaş, I. C., Macarovici, N., Marinescu, Fl. (1966) Afinităţi pannonice şi euxinice ale Neogenului superior din Bazinul Dacic. *Stud. cerc. geol. geofiz. geogr. (geologie)*, 11, 2, p. 463–481, Bucureşti.

Enciu, P., Andreescu, I. (1990) Stratigraphy of Pliocene-Pleistocene deposits from south-western Dacian Basin (Jiu-Desmăţui Interfluve). *D. S. Inst. Geol. Geofiz.*, 74/4 (1987), p. 141–156, Bucureşti.

Filipescu, M. G. (1934) Cercetări geologice între valea Teleajenului şi valea Doftanei (jud. Prahova). Tipografia F. Göbl Fii, s.a., 167 p., Bucureşti.

Ghenea, C. (1968) Studiul depozitelor pliocene dintre valea Prutului şi valea Bîrladului. *Stud. tehn. econ. Inst. Geol.*, J 6, 137 p., Bucureşti.

— **, Andreescu, I., Bandrabur, T., Cepalâga, A., Mihăilă, N., Trubihin, V. (1982)** Bio- and magnetostratigraphic Correlation on the Pliocene and Lower Pleistocene Formations of the Dacic Basin and Braşov Depression (East Carpathians). *D. S. Inst. Geol. Geofiz.*, LXVI, (1979), 4, Stratigrafie, p. 139–156, Bucureşti.

Gillet, S. (1943) Les Linocardiides des couches à Congéries de Roumanie. *Mém. Inst. Géol.*, IV, 111 p., Bucureşti.

Hanganu, E. (1966) Studiul stratigrafic al Pliocenului dintre văile Teleajen şi Prahova (Regiunea Ploieşti). *Stud. tehn. econ. Inst. Geol.*, J 2, 127 p., Bucureşti.

— **, Papaianopol, I. (1976)** Les subdivisions du Dacien fondées sur les associations de malacofaune et d'ostracofaune. *Bul. de la Soc. belge de Géologie*, 85, 1–2, édité en mai 1977, p. 63–88, Bruxelles.

— **, Papaianopol, I. (1982)** Associations significatives du Pontien du Bassin Dacique (Roumanie). *Bul. de la Soc. belge de Géologie*, 91, 1, p. 51–59, Bruxelles.

— **, Papaianopol, I. (1984)** Sur la biostratigraphie du Pontien entre la vallée de Buzău et la vallée d'Olt (Dépression Subcarpatique, Munténie). Univ. Bucharest, 75 yars of the Laboratory of Paleontology, Special volume, p. 247–260, Bucharest.

Huică, I. (1977) Studiul geologic al depozitelor miocene şi pliocene dintre valea Sohodol şi valea Blahniţa, jud. Gorj (Depresiunea Getică). *An. Inst. Geol. Geofiz.*, LI, p. 5–68, Bucureşti.

Iliescu, O., Pavnotescu, V., Paraschivescu, C., Nedelcu, C. (1978) Contribuţii privind stratigrafia depozitelor pliocene dintre valea Ialomiţei şi valea Dîmboviţei. *D. S. Inst. Geol. Geofiz.*, LXIV (1976–1977), 5, Tectonică şi Geologie Regională, p. 37–51, Bucureşti.

Ionescu Argetoaia, I. P. (1918 a) Pliocenul din Oltenia (cu o hartă geologică scara 1: 500 000 şi cu 20 figuri în text). *An. Inst. Geol. Rom.*, VIII (1914), p. 26–382, Bucureşti.

Jeanrenaud, P. (1963) Contributions à l'étude des couches à faune d'eau douce du Sarmatien de la Plate-forme Moldave. *Anal. Şt. Univ. "Al. I. Cuza"*, Sect. II, 9, p. 39–57, Iaşi.

Jojea, T. (1948) Note sur quelques fossiles provenant d'un banc de gypse de Salcia (départ. de Prahova). *Comptes Rendus des Séances*, XXX (1941–1942), p. 136–140, Bucureşti.

Krejci-Graf, K., Wenza, W. (1931) Stratigraphie und Paläontologie des Obermiozäns und Pliozäns der Muntenia (Roumänien). *Zeitscrift. der deutschen Geol. Gessel.*, 83, 2–3, p. 65–163, Berlin.

— **(1932)** Parallelisierung des südosteuropäischen Pliözans. *Sonder. aus der Geol. Rundschau*, XXIII, 6, p. 300–339, Berlin.

Liteanu, E. (1955) Fauna dacianã de la Zăvalu. *Bul. Şt. Acad. R.P.R.*, VII, 3, p. 763–768, Bucureşti.

— **, Roşculescu, E., Feru, M., Andreescu, I. (1968)** Succesiunile litologice şi fauna de moluşte care caracterizează limita Pleistocen - Pliocen din zona Pleşcoi (valea Buzăului). *Stud. cerc. geol. geofiz. geogr. (geologie)*, 13, 2, p. 539–545, Bucureşti.

— **, Feru, M., Andreescu, I., Bandrabur, T. (1971)** Cercetări geologice în regiunea Buzău de la contactul morfologic al colinelor cu câmpia. *Stud. tehn. econ. Inst. Geol.*, E 9, p. 7–29, Bucureşti.

Lubenescu, V., Marinescu, Fl., Pavnotescu, V. (1974) Comentarii asupra faunei cu congerii din Bessarabianul superior de la valea Sării (Depresiunea Subcarpatică a Moldovei meridionale). *D. S. Inst. Geol.*, LX/4 (1972–1973), p. 131–138, Bucureşti.

— **, Diaconu, M., Ştefănescu, C., Radu, A., Diţa, Şt. (1986)** Date preliminarii asupra Neogenului din forajele dintre văile Teleorman şi Vedea (Platforma Moesică). *D. S. Inst. Geol. Geofiz.*, 70–71/4, (1983; 1984), p. 283–287, Bucureşti.

— , **Nicolaescu, V. (1987)** Observations sur le Romanien situé entre la vallée de Ialomiţa et la vallée de Prahova. *D. S. Inst. Geol. Geofiz.*, 72–73/3, (1985, 1986), p. 63–70, Bucureşti.

— , **Nichiforescu, H. (1987)** Contributions à l'étude des formations pliocènes à charbon et des formations pléistocènes des forages exécutés dans la Dépression Getique aux environs de la localité de Bălceşti. *D. S. Inst. Geol. Geofiz.*, 72–73/4, (1985; 1986), p. 127–134, Bucureşti.

— , **Diaconu, M., Radu, A., Ştefănescu, C., Cornea, C. (1987)** Stratigraphie des dépôts néogènes de Plateforme Moesienne (secteur Drăgăneşti Olt-Roşiori de Vede-Alexandria). *D. S. Inst. Geol. Geofiz.*, 72–73/4 (1985; 198), p. 115–126, Bucureşti.

Macarovici, N. (1961) Observaţii stratigrafice pe structura Berca-Arbănaşi (cu privire specială asupra limitelor Dacianului). *Stud. cerc. geol.*, VI, 3, p. 387-403, Bucureşti.

— , **Motaş, I. C., Contescu, L. (1967)** Caractères stratigraphiques et sédimentologiques des dépôts sarmato-pliocènes de la courbure des Carpates Orientales. *Anal. Şt. Univ. "Al. I. Cuza"*, (Serie nouă), Sect. II (Şt. nat), b, Geologie-Geografie, XIII, p. 47-60, Iaşi.

Marinescu, Fl. (1964) Propuneri cu privire la orizontarea Ponţianului din partea occidentală a Bazinului Getic. *Stud. cerc. geol. geofiz. geogr. (geologie)*, 9, 1, p. 73–80, Bucureşti.

— **(1967)** Preciziuni asupra stratigrafiei Portaferrianului din vestul Bazinului Dacic. *D. S. Inst. Geol.*, LII/2, (1964–1965), p. 104–113, Bucureşti.

— **(1969)** Precizări stratigrafice privind Sarmaţianul şi Meoţianul din nordul Olteniei. *D. S. Inst. Geol.*, LIV/3, (1967), p. 153–161, Bucureşti.

— **(1972)** Două faune cu congerii din Miocenul terminal al Bazinului Dacic. *D. S. Inst. Geol.*, LVIII/3 (1971), p. 69–92, Bucureşti.

— , **Motaş, I. C., Andreescu, I., Gheorghian D., Gheorghian M., Mîrza I., Orăşanu T., Papaianopol I., Popescu Gh., Rusu A., Suraru N. (1972)** Guide de l'excursion de la V-e Réunion du grupe de travail pour la Paratethys. Néogène de la dépression de Transylvanie, du Banat et du Bassin Dacique. *Inst. Géol., Guide de l'excursion*, 9, 112 p., Bucureşti.

— **(1974)** Congeria subrhomboidea Andrusov în Portaferrianul Bazinului Dacic. *D. S. Inst. Geol.*, LX/3 (1972–1973, p. 85–95, Bucureşti.

— **(1978)** Stratigrafia Neogenului superior din sectorul vestic al Bazinului Dacic. Edit. Acad. R.S. R., 155 p., Bucureşti.

— , **Ghenea, C., Papaianopol, I. (1981)** Stratigraphy of the Neogene and the Pleistocene Boundary. *Guide to Excursion*, A, 6, Guidebook Series, nr. 20, 111 p., Bucharest.

— , **Papaianopol, I. (1987)** Formation à charbon du Dacien de la Dépression Gétique (Oltenia). *D. S. Inst. Geol. Geofiz.*, 72–73/4 (1985; 1986), p. 135–164, Bucureşti.

Martini, E. (1971) Standard Tertiary and Quaternary calcareous nannoplankton zonation Proceed. II Plankt. Conf. 1970 (Farinacci ed.), 2, p. 739–785, Roma.

Mărunţeanu, M., Papaianopol, I. (1994) Associations de nannoplancton dans les dépôts sarmatiens de Munténie (Bassin Dacique, Roumanie). *The Miocene from the Transylvanian Basin-Romania (Symposium)*, p. 47–54, Cluj-Napoca.

— , **Papaianopol, I. (1995)** L'association de nannoplancton dans les dépôts romaniens situés entre les vallées de Cosmina et de Cricovu Dulce (Munténie, Bassin Dacique, Roumanie). *Rom. J. Paleontology*, 76, Bucureşti.

Mihăilă, N. (1969) Romanianul, termen stratigrafic final al Neogenului şi stratigrafia sa din sectorul Rîmnicu Vîlcea–Vîlsăneşti. *D. S. Inst. Geol.*, LIV (1967), partea a 3-a, p. 163–172, Bucureşti.

— **(1971)** Stratigrafia depozitelor pliocene şi cuaternare dintre valea Oltului şi valea Vîlsanului (sectorul Rîmnicu Vîlcea-Curtea de Argeş-Vîlsăneşti). *Stud. tehn. econ. Inst. Geol.*, J, 7, 145 p., Bucureşti.

Motaş, I. C. (1960) Ponţianul din Bazinul Rîului Alb-Valea Dîmboviţei. *Bul. Inst. Petrol, Gaze, Geologie*, VI, p. 27–37, Bucureşti.

— , **Marinescu, Fl. (1971)** L'évolution et les subdivisions du Sarmatien dans le Bassin Dacique. *Bul. de la Soc. Géol. de Hongrie*, 101, 2–3, p. 240–243, Budapest.

— , **Papaianopol, I. (1972)** Biostratigrafia succesiunii Meoţianului-Pleistocen dintre Călugăreni şi Vadu Săpat (jud. Prahova). *D. S. Inst. Geol.*, LVIII (1971), 4, Stratigrafie, p. 221–244, Bucureşti.

— , **Marinescu, Fl., Popescu, Gh. (1976)** Essai sur le Néogène de Roumanie. *An. Inst. Geol. Geofiz.*, L, p. 127–147, Bucureşti.

— , **Papaianopol, I. (1977)** Les associations des mollusques index dans le Néogène supérieur du Bassin Dacique. *Rev. roum. géol. géophys. géogr. (géologie)*, 21, p. 79–92, Bucureşti.

— , **Papaianopol, I. (1984)** Considérations sur les faunes daciennes inférieures (gétiennes) du Bassin Dacique. *Rev. roum. géol. géophys. géogr. (géologie)*, 28, p. 73–82, Bucureşti.

Nedelcu, I., Mateescu, E. (1965) Cercetări geologice în zona "muscelelor" cuprinsă între valea Vîlsanului şi valea Oltului (reg. Argeş). *D. S. Inst. Geol.*, LI (1963–1964), Partea I, p. 295–314, Bucureşti.

Nichiforescu, H., Lubenescu, V., Panaitescu, P., Panaitescu, M. (1986) Le Romanien moyen (Pelendavien) de la partie centrale de la Dépression Gétique. *Rev. roum. géol. géophys. géogr. (géologie)*, 30, p. 101–104, Bucureşti.

— , **Lubenescu, V., Panaitescu, P., Panaitescu, M. (1987)** Date noi privind Romanianul din bazinul Cernei (afluent al Olteţului). *Stud. cerc. geol. geofiz. geogr. (geologie)*, 32, p. 118–125, Bucureşti.

Nicolaescu, V., Lubenescu, V., Iavorschi, M., Ionescu, Şt., Damian, R. (1980) Contribuţii la cunoaşterea biostratigrafiei depozitelor Neogenului superior din regiunea valea Ialomiţei şi valea Cricovului Dulce. *D. S. Inst. Geol. Geofiz.*, LXV (1977, 1978), 4, Stratigrafie, p. 133–146, Bucureşti.

Nicolescu, Şt. Mauriciu (1964) Studiul Miocenului şi Pliocenului din regiunea Cislău-Salcia-Lapoş. *An. Com. Geol.*, XXXIII, p. 237–278, Bucureşti.

Niţă, Pion, P. (1958) Contribuţii la stratigrafia Pliocenului dintre văile Topolniţa şi Coşuştea. *Stud. cerc. geol.*, III, 3–4, p. 245–262, Bucureşti.

Pană, I. (1966) Studiul depozitelor pliocene din regiunea cuprinsă între valea Buzău şi valea Bălăneasa. *Stud. tehn. econ. Inst. Geol.*, J 1, 136 p., Bucureşti.

— , **Müntz, K. (1966)** Date noi asupra Dacianului de pe valea Sărăţelului (sectorul Valea Verzii). *Rev. Petrol şi Gaze*, 17, 4, p. 167–173, Bucureşti.

— , **Bönig, H., Botez, R. (1968)** Elemente noi în fauna levantină din regiunea Buzău. *Petrol şi Gaze*, XIX/11, Bucureşti.

— , **Rădulescu, I. (1970)** Stratigrafia regiunii Pîrscov-Plopeasa. *Stud. cerc. geofiz. geogr. (geologie)*, 15, 1, p. 175–191, Bucureşti.

— , **(1971)** Lithofacies et facies paléontologiques dans la région de la courbure des Carpates Orientales. *Föld. Közl. Bul. Soc. Géol. Hongrie, Colloquium on the Neogene, Budapest*, 101, 2–3, p. 254–264, Budapest.

— , **Kruck, E. (1972)** Pliocenul din Dobrogea de sud-vest (Ostrov-Canlia-Oltina). *D. S. Inst. Geol.*, LVIII (1971), 4, Stratigrafie, p. 255–264, Bucureşti.

— , **Enache, C., Andreescu, I. (1981)** Fauna de moluşte a depozitelor cu ligniţi din Oltenia. 276 p., Craiova.

Papaianopol, I. (1974) Fauna cu congerii din depozitele Dacianului superior de la nord de Mizil. *D. S. Inst. Geol.*, LX (1972–1973), 3, Paleontologie, p. 127–158, Bucureşti.

— **(1974 a)** Faciesurile şi posibilităţile de corelare ale Ponţianului superior (Bosphorian) dintre valea Cricovul Sărat şi valea Tohănesca (jud. Prahova). *D. S. Inst. Geol.*, LX, 5 (1972–1973), Tectonică şi Geologie Regională, p. 61–74, Bucureşti.

— **(1976)** Faciesurile şi limitele Portaferrianului din zona cutelor diapire externe dintre valea Cricovul Sărat şi valea Unghiului (jud. Prahova). *D. S. Inst. Geol. Geofiz.*, LXII (1974–1975), 4, Stratigrafie, p. 245–263, Bucureşti.

— **(1976 a)** O faună bosforiană de tip Kamîşburun în partea orientală a Bazinului Dacic. *D. S. Inst. Geol. Geofiz.*, LXII (1974–1975), 3, Paleontologie, p. 108–123, Bucureşti.

— , **Hanganu, E. (1977)** Limita Dacian/Romanian în zona cutelor diapire externe valea Cricovul Sărat şi valea Tohăneasa (jud. Prahova). *Univ. Buc. Comunicări, Secţia geologie*, p. 193–205, Bucureşti.

— , **Motaş, I. C. (1978)** Marqueurs biostratigraphiques pour dépôts post-chersoniens du Bassin Dacique. *D. S. Inst. Geol. Geofiz.*, LXIV (1976–1977), 4, Stratigrafie, p. 283–294, Bucureşti.

— , **Olteanu, R. (1979)** Contributions à l'étude du Pontien supérieur (Bosphorien) dans la partie orientale du Bassin Dacique. *Rev. roum. géol. géophys. géogr. (géologie)*, 23, 2, p. 231–247, Bucureşti.

— **(1982)** Asupra stratelor cu Dosinia din zona cutelor diapire externe din Muntenia (sectorul dintre valea Cricovul Sărat şi valea Nişcovului). *D. S. Inst. Geol. Geofiz.*, LXVII (1979–1980), 4, Stratigrafie, p. 147–179, Bucureşti.

— , **Lubenescu, V. (1983)** Consideraţii asupra faunei complexului cărbunos al Dacianului din Depresiunea Getică (Oltenia). *Stud. cerc. geol. geofiz. geogr. (geologie)*, 28, p. 116–124, Bucureşti.

— , **Olteanu, R. (1986)** La faune bosphorienne de l'est de l'Oltenia. *D. S. Inst. Geol. Geofiz.*, 70–71/3, (1983, 1984), Paleontologie, p. 73–88, Bucureşti.

— **(1987)** Étude des congéries de petite taille de la partie basale du Méotien inférieur (Olténien) de l'est de Munténie (Bassin Dacique, Roumanie). *D. S. Inst. Geol. Geofiz.*, 72–73/3 (1985, 1986), p. 87–98, Bucureşti.

— , **Grigoraş, M., Popescu Ag., Olteanu R., Rogge E., Iva M., Costea C., Pîslaru T., Munteanu Em. (1987)** L'étude du Néogène supérieur de la partie orientale de la Plate-forme Moesienne (secteur d'entre la vallée de Neajlov et le Danube) à considérations sur le complexe houillier. *D. S. Inst. Geol. Geofiz.*, 72–73/4 (1985;1986), p. 209-260, Bucureşti.

— , **Marinescu, Fl., Popescu Ag., Rogge E., Costea C., Munteanu Em. (1987)** Paléogéographie du Pontien du Bassin Dacique insistant sur le développement du facies charbonneux. *D. S. Inst. Geol. Geofiz.*, 72–73/4 (1985, 1986), p. 261–275, Bucureşti.

— **(1989)** L'étude des Unionidés du Romanien inférieur (Pliocène) de la zone des plis diapirs externes de Munténie orientale (Bassin Dacique). *Mém. Inst. Géol. Géphys.*, 34, p. 5–55, Bucarest.

— **(1989 a)** L'étude des pachydacnes (Bivalvia, Limnocardiides) du Bassin Dacique. *Mém. Inst. Géol. Géophys.*, 34, p. 57–122, Bucarest.

— , **Rogge, E., Mărunţeanu M., Olteanu R., Roman Şt., Costea C., Nicolae V., Nicolae Gh., Grigorescu Gh., Macaleţ R., Diaconiţa D. (1990)** Cotribuţii la studiul formaţiunilor ponţiene şi daciene cu cărbuni dintre valea Ialomiţei şi valea Dîmboviţei (Muntenia, Bazinul Dacic). *D. S. Inst. Geol. Geofiz.*, 74/4 (1987), p. 55–95, Bucureşti.

— , **Mărunţeanu, M. (1993)** Biostratigraphy (Molluscs and calcareous nannoplankton) of the Sarmatian and Meotian in eastern Muntenia (Dacic Basin-Romania). *Zemni plyn a nafta*, 38, 1, p. 9–15, Hodonin.

— **(1993)** Les dépôts néogènes entre Slobozia et Ţăndărei (partie est de la Plate-forme Moesienne, Bassin Dacique). *Bul. Soc. Rom.*, 14, 4, p. 121–134, Bucureşti.

— , **Marinescu, Fl. (1995)** Lithostratigraphy and age of Neogene deposits on the Moesian Platform, between Olt and Danube Rivers. *Rom. J. Stratigraphy*, 76, p. 67–70, Bucureşti.

— , **Dumitrică, P., Olteanu, R., Macaleţ, R. (1995)** Neogene in the eastern part of the Moesian Platform (Dacic Basin, Romania). *Rom. J. Stratigraphy*, 76, p. 71–78, Bucureşti.

— **(1995)** Le genre Sinanodonta (Bivalvia, Unionidae) du Pliocen supérieur (Romanien moyen) du Bassin Dacique. *Rom. J. Paleontology*, 76, Bucureşti.

Pauliuc, M. (1960) Sarmaţianul şi Meoţianul de la Coada Malului. *Anal. Univ. Parhon (Geologie-Geografie)*, IX, 23, p. 75–83, Bucureşti.

— **(1964)** Date noi cu privire la fauna pliocenă din sud-vestul Depresiunii Şoimari. *Anal. Univ. Bucureşti, Seria Şt. Nat., Geol.-Geogr.*, XIII, 2, p. 47–64, Bucureşti.

— **(1975)** Variaţii de facies ale depozitelor sarmato-pliocene dezvoltate între valea Teleajenului şi valea Cricovul Sărat. *Anal. Univ. Bucureşti, Şt. Nat.*, XXIV, p. 97–102, Bucureşti.

Pauliuc, S., Negoiţă, F., Darwische, M., Andreescu, I. (1979) Stratigrafia depozitelor miocene din sectorul central al Platformei Moesice (v. Olt-v. Dîmboviţa). *Anal. Univ. Bucureşti, Geologie*, XXVIII, p. 65–77, Bucureşti.

— , **Andreescu, I., Barus, T. (1981)** Date noi privind posibilităţile de corelare a stratelor de lignit din regiunea cuprinsă între valea Jiului şi valea Motrului. *Anal. Univ. Bucureşti, Geologie*, XXX, p. 51–65, Bucureşti.

Pavnotescu, V., Andreescu, I. (1978) Asupra unor prosodacninae din Ponţianul de la Boteni (jud. Argeş). *Stud. cerc. geol. geofiz. geogr. (geologie)*, 23, 1, p.143–155, Bucureşti.

— , **Iliescu, O., Paraschivescu C. (1980)** Observaţii biostratigrafice asupra depozitelor neogen-superioare de la Boteni (jud. Argeş). *D. S. Inst. Geol. Geofiz.*, LXV (1977–1978), 4, Stratigrafie, p. 147–155, Bucureşti.

Schövert, E., Bandrabur, T. (1963) Date noi asupra Pliocenului din zona gurii Jiului. *Stud. tehn. econ. Com. Geol.*, E 6, p. 63–70, Bucureşti.

Stoica, C., Schovert, E. (1962) Neozoicul dintre valea Luncavăţului şi valea Govorei. *D. S. Inst. Geol.*, XLIII (1955–1956), p. 27–72, Bucureşti.

Ştefănescu, S. (1897) Étude sur les terrains tertiaires de Roumanie. Contribution à l'étude stratigraphique. Thèse, 178 p., Lille.

Tătărâm, N., Rado G., Pană I., Hanganu E., Grigorescu D. (1977) Dobrogea de sud în Neozoic; biostratigrafie şi paleogeografie. *Stud. cerc. geol. geofiz. geogr. (geologie)*, 22, p. 27–38, Bucureşti.

Teisseyre, W. (1907) Stratigraphie des régions pétrolifères de la Roumanie et les contrées avoisinantes. *Congr. Intern. du Pétrol*, III-e ses., p. 18–44, Bucarest.

— **(1908)** Uber die Meotische, Pontische und Dazische Stufe in der Subkarpaten der östlichen Muntenia. *An. Inst. Geol. Rom.*, II, p. 331–372, Bucureşti.

Ţudor, M. (1955) Stratigrafia şi fauna depozitelor tortoniene şi sarmaţiene dintre Jiu şi Olteţ. Edit. Acad. R.P.R., 118 p., Bucureşti.

— **(1963)** Contribuţie la cunoaşterea Sarmaţianului din regiunea Ruşavăţ. *Bul. Inst. Petrol Gaze şi Geologie*, X, p. 23–31, Bucureşti.

— **, Orbocea, M. (1979)** Badenianul şi Sarmaţianul de pe malul estic al văii Oltului. *Anal. Univ. Bucureşti, Geologie*, XXVII, p. 79–88, Bucureşti.

Wenz, W. (1942) Die Mollusken des Pliozäns der rumänischen Erdölgebiete Senkenbergiana, 24, 293 p., Frankfurt a Main.

Zberea, A., Lubenescu, V., Zberea, M. (1980) Biofaciesuri odessiene la vest de Olt. *D. S. Inst. Geol. Geofiz.*, LXV/4 (1977–1978), p. 183–190, Bucureşti.

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