

## „CANARALELE DUNĂRII”, AN EXCEPTIONAL HERITAGE – GEOSITES (FOSSILS COLLECTIONS) AND ARCHAEOLOGICAL SITES

MACOVEI Monica, NICOLAE Constantin, CRUȘOVEANU Simona, PERȘA Diana

**Abstract.** From the south, near the Oltina lake and up to the northwest of Hârșova, in the Baroi hill, there are numerous and wide openings of geological deposits, with remarkable paleontological values, but also archaeological sites of great importance. Most paleontological sites - some of which are specifically regulated by Law 5/2000 (as reserve), contain important international fossil associations, rare facies for certain geological “episodes”. Oltina, Alimanu, Cernavodă, Seimeni, Movila Banului, Topalu, Ghindărești, Celea Mare, Celea Mică, Dealul Cetății, Dealul Belciug and Dealul Baroi (with the two sites in extreme / former quarries - Abator and La Vii) with tributary valleys that open in addition fossiliferous formations. The fossiliferous associations together with various types of facies (epicontinental - reef, spongius-algal, algal, sponge atolls, neritic, etc.) that are found here are biostratigraphic landmarks for various geological stages (Callovian, Oxfordian, Lower Cretaceous) for Romania or internationally. The collections preserving the paleontological and archaeological heritage are the outcome of the efforts of many researchers, especially Romanians. They found some important “hosts” - museums where they are preserved (the National Museum of Geology, the Museum of Paleontology of the Al. I. Cuza University of Iasi, the Museum of the Paleontology Laboratory of the University of Bucharest and the Carsium Museum – Hârșova).

**Keywords:** paleontological site, Canaralele Dunării, holotypes, archaeological sites.

**Rezumat.** „Canaralele Dunării”, un patrimoniu excepțional – geosituri (colecții de fosile) și situri arheologice. De la sud, în apropierea lacului Oltina și până la nord-vest de Hârșova, în dealul Baroi, există numeroase și largi deschideri ale depozitelor geologice, cu bogății paleontologice remarcabile, dar și situri arheologice de mare importanță. Siturile paleontologice, în majoritate - parte legiferate în mod special în Legea 5/2000 (drept rezervații), conțin fie asociații fosile importante internațional, fie faciesuri rare pentru anumite „episoade” geologice. Oltina, Alimanu, Cernavodă, Seimeni, Movila Banului, Topalu, Ghindărești, Celea Mare, Celea Mică, Dealul Cetății, Dealul Belciug și Dealul Baroi (cu cele două situri în extreme/foste cariere – Abator și La Vii) cu văile tributare ce deschid, în plus, formațiunile fosilifere. Asociațiile fosilifere alături de diverse tipuri de faciesuri (epicontinentale - recifal, spong-algal, algal, atoli de spongieri, neritic, etc), ce sunt întâlnite aici constituie repere biostratigrafice pentru diverse etape geologice (Callovian, Oxfordian, Cretacic inferior), pentru România sau internațional. Colecțiile, ce conservă patrimoniul paleontologic și arheologic, reprezintă strădania a numeroși cercetători, mai ales români. Acestea și-au găsit câteva „gazde” importante – muzee unde sunt conservate (Muzeul Național de Geologie, Muzeul de Paleontologie Univ Al. I. Cuza – Iași, Muzeul Laboratorului de Paleontologie din Universitatea București și Muzeul Carsium – Hârșova).

**Cuvinte cheie:** sit paleontologic, Canaralele Dunării, holotipi, situri arheologice.

### INTRODUCTION

From the point of view of the past, both the immediate historical past and the geological past, from tens of millions of years ago, the Danube shore in the Dobrogea area preserves numerous and valuable evidences. “Canaralele Dunării” is a protected area in the region of the following towns: Hârșova-Topalu-Capidava-Ostrov region. The word 'canara' comes from Turkish or Bulgarian, and refers to a land form that is specific to Dobrogea, a deep valley with steep, rocky walls. These rocky heights were ideal strategic points for the location of ancient fortresses, so useful for the intensive trade carried out in those times, along the Danube, on the territory of Dobrogea (Lower Moesia). Regarding both domains (geological and historical) a lot of previous researches are described in various publications (a few examples: BLEAHU et al., 1976; SEGHEDI et al., 2018; BLEAHU, 2019; SEGHEDI & STOICA, 2011; MELINTE-DOBRINESCU et al., 2020; AILINCĂI, 2013; POLONIC, 1892-1959; NICOLAE, 2015, etc.)

### MATERIALS AND METHODS

We visited the presented sites in order to assess their current state of preservation, access roads, signaling and current threats. We consulted the legislation on protected areas, as well as the information existing on the internet sites of the National and Local Environment Protection Agencies and of the National Agency for Natural Protected Areas. Regarding the scientific information, we corroborated the observations made in the field with the existing bibliography.

### PALEONTOLOGICAL SITES

**Topalu Neojurassic Reef** (Fig. 2a) – (No. 2.352 in the Law 5/2000) extended over 4 km North of the village Topalu, between Cernavodă and Hârșova, on the right bank of the Danube. The main object of protection is represented by the biohermal constructions located near the village of Topalu (Fig. 2), but also the biostromal limestones, with a high content in various fossil organisms (BĂRBULESCU, 1974, 1976; ANDRĂȘANU et al., 1982.). The facies, biostratigraphy, paleoecology and paleogeography of the site have been intensively studied by several generations of researchers or students (details in MACOVEI et al., 2021).

**Cernavodă** (Fig. 2b) – (No. **2.354** in the Law 5/2000). The fossil site is a wall (40 m high), extending for about 1 km from the Cernavodă bridge to the South. The paleontological reserve is the best outcrop of the Lower Cretaceous deposits of the Cernavoda Formation (DRAGASTAN et al., 2014), with many facieses of marine shallow waters, rich in fossils (details in MACOVEI et al., 2021). **Movila Banului** (Fig. 3a) – (No. **2.370** in the Law 5/2000). North from the Seimenii Mari locality, nearby, on route DJ223 Cernavodă – Hârșova. It was proposed by Chiriac in BLEAHU (1976) for its unique preservation of fossils (phosphatized shells); Albian deposits here are of phosphatic gravels with decimetric sandstone interbeds covered by a thin clayey glauconitic sand and conglomerate of Cenomanian, with reworked fossils (details in MACOVEI et al., 2021).

**Seimenii Mari** (Fig. 3b) – (**2.355** in the Law 5/2000). Sarmatian deposits outcropping about 200 m wide and variable height, nearby the village. More fossiliferous levels (conquina) which attest the Kossovian age (details in MACOVEI et al., 2021).

**Aliman** (Fig. 4a) – (No. **2.351** in the Law 5/2000). Outcrop along the left bank of the Vederoasa Lake. Valanginian limestones rich in fossils (big gastropods) (details in MACOVEI et al., 2021).

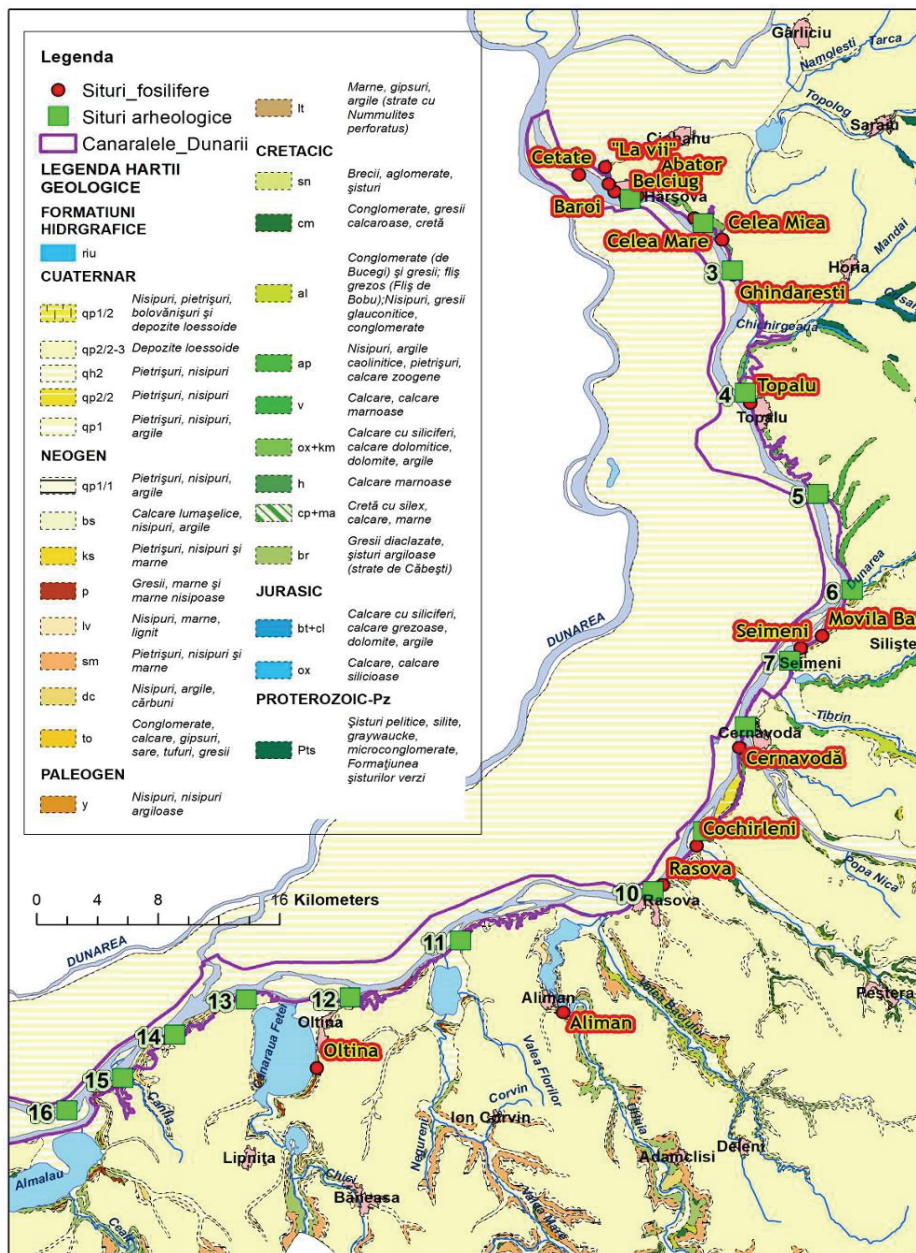


Figure 1. Map with location within „Canaralele Dunarii” of the paleontological sites on the geological map 1: 1.000.000 (SÂNDULESCU et al., 1978) and archeological sites marked with green squares: 1.Hârșova, 2.Celea Mare, 3.Ghindărești, 4.Topalu, 5.Capidava, 6.Dunărea, 7.Seimenii, 8.Cernavoda, 9.Cochirleni, 10.Rasova, 11.Dunăreni, 12.Oltina, 13.Satu Nou, 14.Izvoarele, 15.Canlia, 16.Păcuil Lui Soare.



Figure 2. Overview of the sites exposed in the right bank of the Danube: (a) Topalu site, (b) Cernavodă site.



Figure 3. (a) Movila Banului – phosphatised fossils and ammonites with partially preserved shells; (b) Seimeni Mari outcrop, near the village – blocks of conquina limestones.



Figure 4. (a) Aliman site detail; (b) Ghindărești beach with pebbles and fossils (sponge) and (c) ammonite external mold; (d) Ghindărești fossiliferous limestones on the Danube right bank.

**Ghindărești** (Figs. 4b-d) (new reserve proposal) – cliffs at the Monument and northward, in the base of this are open the Casimcea Formation deposits. From the cliffs to the nearby beach (100 m long) a package of thin layers of yellowish limestones opens, on approximately 1.50 m of thickness. They contain fossils that are extracted and eroded permanently by the river, ammonites and sponges, of medium or large size. The presence in this package of *Epipeltoceras bimammatum* and *Ochretoceras marantianum* index fossils (*Bimmamatum* Zone - BĂRBULESCU, 1974) is evidence for the Upper Oxfordian. These layers are overlain by a more hard white limestone and decimetric layers; it contains rare fossils (brachiopods and bivalves) (details in BĂRBULESCU, 1974; AVRAM et al., 1997; DRAGASTAN et al., 1998; GRIGORE et al., 2014).

**Cochirleni** (Figs. 5a-c) (new proposal) – near the village Cochirleni there are three outcrops of the Cochirleni Formation (Albian), with the stratotype in the bank of the Danube River, between Hinog Valley and downstream to the confluence with Cochirleni Valley (AVRAM et al., 1988). The secondary outcrop for this formation is in the North-West of the Ivrinezu Mic village, on the left slope of Cochirleni Valley (between Peștera and Cochirleni); the third one is in the right bank of Donau, upstream from the Cochirleni resurgence. These detritic deposits are of glauconitic sands and sandstones, or microconglomeratic; at levels, convolute structures and thin marly layers are present. Only in the outcrops near the Danube River can we find the later (Miocene) deposits of Seimeni (Kossovian) and Cotu Văii (Basarabian) formations, which are transgressive and represented by calcarenites, calcirudite and sands highly rich in mollusk shells (coquina of molds more often). The assemblages contain many species of bivalves and gastropods which confirm the ages (details in CHIRIAC, 1960, 1970; AVRAM et al., 1988; 1993; ANDREESCU & MUNTEANU, 1996; DINU et al., 2007).



Fig. 5. Cochirleni site: (a) Overview of the southern part of this site; (b) Coquina with *Mactra* and gastropods (c) detail of the wall.

**Rasova** (Figs. 6a, b) (new proposal) – outcrop of the Cernavodă Formation (Aliman Subformation) with limestones (biocalcarene). Are rich in fossils (corals, bivalves and other). Their age is Berriasian – Valanginian. Overlain by the Miocene limestones of Seimeni Formation, rich in mollusk shells and thick deposits of Quaternary loess. This small outcrop on the right slope of a small valley, northern from the Rasova village, can be easily accessible from the county road (DJ223) and used for geotouristic purposes.

**Oltina** (Fig. 6c) (new proposal) – outcrop of the Oltina Formation (Pliocene) on the south-eastern shore of the Oltina Lake. Few cliffs whose basis includes the sandstones of the Cochirleni Formation, eroded, are overlaid by transgressive deposits with thin pebbles, silts and marls. They contain rich fossil fauna with ostracods and mollusk shells (species of *Pontalmyra*, *Phyllocardium*, *Congerina*, *Viviparus*, etc from Pontian). The succession is completed by Dacian and Romanian deposits (silty clays, sands and pebbles) with mollusk assemblage (species of *Prosodacna*, *Pachydacna*, *Zagrabica*) and Romanian deposits (lacustrine limestones, bentonitic clays and silts) (PANĂ & KRUCK, 1972; TĂTĂRĂM et al., 1977; DINU et al., 2007).



Figure 6. Rasova site - (a) Outcrop view; (b) Detail of the wall with fossils (coral). (c) Oltina site overview.

**The Baroi Hill** and „**La vii**” Hill, „**Baroi**” and „**Abator**” (Figs. 7a; b) - the highest hill in the region (Peak 87 m), with an elongated shape, close to the Danube River and separated by a deep valley (on a fault) from the most western hill - ‘**La Vii**’, all built up from Middle and Upper Jurassic carbonatic deposits. These two hills are open naturally (river erosion) or in few small quarries (especially La Vii Hill or the south-eastern part of Baroi – Abator quarry) (Figs. 7a-b). The Middle Jurassic deposits are comprised here in the Tichilești Formation, represented by coarse calcarenites (yellowish in color), poorly stratified, with lens of siliceous concretions and fossil debris – pectinids, belemnites, ammonites (*Macrocephalites* type), stems of crinoids and radioles of echinoids, brachiopods. The documented ages were from Bathonian (in the base) and more of Callovian (Lower one) (BĂRBULESCU, 1974; DRAGASTAN et al., 1998).

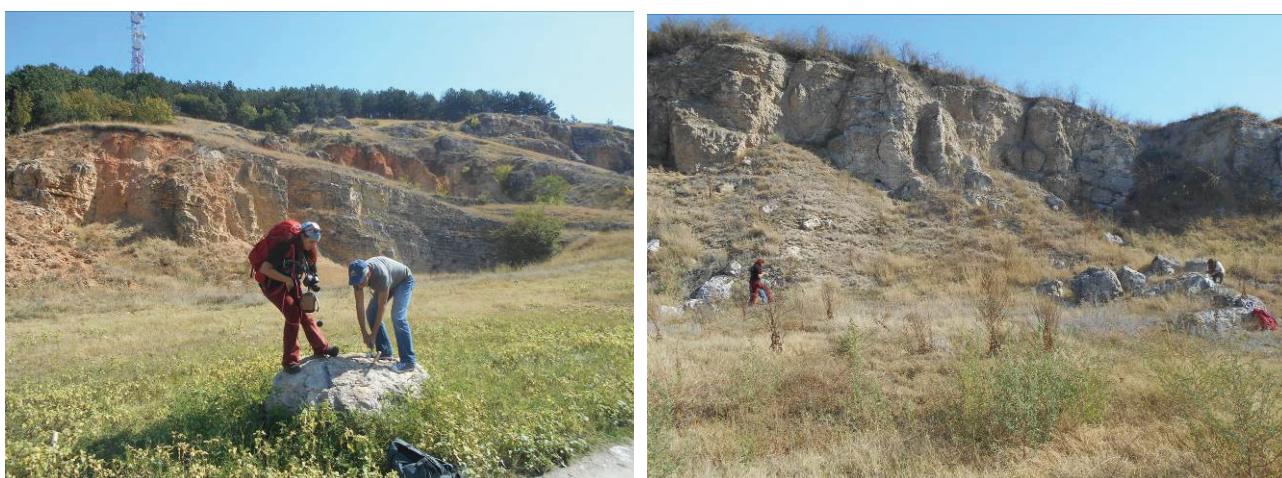


Figure 7. (a) Baroi outcrop; (b) Abator outcrop.

In the northwestern (La Vii), we find the open Casimcea Formation lime deposits (Middle-Upper Oxfordian and Lower Kimmeridgian); the limestones here have a “porcelain” appearance. Fossils are rare as small ammonites, bivalves, belemnites (*Hibolites*). Lower Cretaceous detrital deposits (red and green clays, sands and gravels) are

overlain on the top. To the south-east of the Baroi region (“Abator quarry”), the Callovian deposits are overlain by limestone of the Casimcea Formation, i.e. Lower Oxfordian in age, documented by a characteristic fossil assemblage (with *Parawedekindia arduenensis*) (details in SIMIONESCU, 1909; ANTONESCU, 1929; BĂRBULESCU, 1961, 1963, 1964, 1974, 1979, 1999; AVRAM et al., 1997; DRAGASTAN et al., 1998; GRIGORE et al., 2014; DUMITRAȘ et al., 2019; MACOVEI et al., 2020).

**Belciug Hill** (Fig. 8a) – it represents a small hill of limestones with very nice karstified side modeled by the Donau River, westward from the Cetate Hill. The grey or white limestones of the Casimcea Formation (Lower-Middle Oxfordian) contain rare fossils at some levels (crusty sponges, small ammonites or echinids). The characteristic of these deposits consists in large levels with cherts with great density and stratiform (details in GRIGORE et al., 2014; DUMITRAȘ et al., 2019).



Figure 8. Examples of fossils from the collection of the Paleontology Laboratory – University of Bucharest: *Perisphinctes cotovui* (Middle Oxfordian, Valea Cechirgea), *Septaliphoria moravica* (Lower Kimmeridgian, Bratul Veriga at North from Topalu), *Pseudocoenia radiensis* (Oxfordian, Topalu).

**Cetate Hill with the Fortress** (Fig. 9a) – is one of the most spectacular outcrops from all natural cliffs which preserves an open atoll reef (of sponges) structure similar to those from the Dobrogea Gorges, used as the main harbor fortification. This hill was legislated as an archeological site: “Canaralele din Portul Hârșova”/ “Hârșova Harbor Cliffs” (Law); in the last years, a geological team from GIR documented this and as a geological/paleontological site and was proposed to be a natural reserve (GRIGORE et al., 2014; DUMITRAȘ et al., 2019). The entire hill structure pertains to the same Casimcea Formation which opens Oxfordian deposits, rich in fossils (details in BĂRBULESCU, 1974; AVRAM et al., 1997; DRAGASTAN et al., 1998; UNGUREANU & BARBU, 2004).

**Celea Mică quarry** – on the right bank of the Danube River, two quarries have been opened (“Celea Mică” and “La kilometru”), the Middle-Upper Oxfordian deposits of the Casimcea Formation. The access is difficult due the still operational two quarries. The limestones, here, more or less stratified, contains rare fossils but, in most cases, of large size (sponges, ammonites, pectinids, etc.) (details in BĂRBULESCU, 1974; AVRAM et al., 1997; DRAGASTAN et al., 1998; GRIGORE et al., 2014; DUMITRAȘ et al., 2019).

**The Celea Mare abandoned quarry** - in the former quarry from the Danube River’s right bank we find the Casimcea Formation deposits which consist here of yellowish - brown Oxfordian limestone. Silex and rare fossils (ammonites, brachiopods, sponges and other) are also present here (details in BĂRBULESCU, 1974; AVRAM et al., 1997; DRAGASTAN et al., 1998; GRIGORE et al., 2014; DUMITRAȘ et al., 2019).

**Collections and Fossils Heritage** – The history of studies and collections begins at the end of the nineteenth century with the fossils collected by Vasile Cotovu, and continue with the studies of Victor Anastasiu (1898), Ion Simionescu (1907 +1909) and Gheorghe Macovei, in the same period. Later, another period of detailed studies was covered by Aurelia Bărbulescu (1961, 1964, 1974, 19), Mircea Chiriac, Dan Patrușiu, Emil Avram, Ioana Pană, Theodor Neagu, Ovidiu Dragastan (1998) and Radu Pascu; all of them also compile personal collections conserved in some museums: National Museum of Geology, Collection of Paleontology Laboratory - University of Bucharest, Paleontological Museum of UAIC – Iași, Museum of Natural Sciences Constanța. The first paleontological exhibition (with more than 2000 fossils) in a museum was realised by Prof. Vasile Cotovu in the ‘Dobrogea Regional Museum’ in Hârșova, opened on May 1, 1904 by King Carol I and Queen Elizabeth. This museum in Hârșova was twice destroyed and remade; it was reopened in 2006, as a branch of the museum in Constanța - MINAC), in the presence of King Mihai and Queen Ana, with a new paleontological collection “Victorița Nicolae” (a dedicated teacher of geography who had donated an impressive collection of fossils from the region) (details in GRIGORE et al., 2014).

From among the representative fossils, we must remind the ones discovered here (*Holotypes*), especially by the first researchers in the region (Antonescu, Cotovu, Simionescu), with great importance for international stratigraphy (ARKEL, 1956): *P. (Arisphinctes) cotovui* Simionescu, *P. (A.) treptensis* Simionescu, *Perisphinctes (Dichotomoceras) romanicus* Simionescu, *P. (D.) consociatiformis* Simionescu, *P. (Dichotomosphinctes) dobrogensis* Simionescu, *Decipia ernesti paucicostata* (Simionescu), *D. pseudobreviceps* (Simionescu), *D. topalensis* (Simionescu), *Juralina topalensis* (Simionescu), *Placothyris carsiensis* (Simionescu), *Rouillieria dobrogiaca* (Simionescu), *Cidaris*

*dobrogensis* Simionescu, *Pleurotomaria cotovui* Simionescu, *Tremaiction phylloideum* Antonescu and other (more than 25 new species) (details in GRIGORE et al., 2014).

**ARCHAEOLOGICAL SITES** (SUCEVEANU & BARNEA, 1991; NICOLAE, 2013; NICOLAE et al., 2009; BERCIU, 1961; OPRİȘ et al., 2020; LISTA MONUMENTELOR ISTORICE DIN ROMÂNIA, 2016, ȚENȚEA et al., 2019; LUNGU et al., 2012; see figure 9).

List of known archaeological sites in the Danube Channels Reserve:

1. HÂRȘOVA (Fig. 9a). The present town developed on the ruins of the Roman, 10<sup>th</sup> century Byzantine, 13<sup>th</sup> century Genoese and Ottoman fortifications (15<sup>th</sup>-19<sup>th</sup> centuries), near which rural and urban settlements and necropolises developed. The ruins of the Roman fortress Carsium (1<sup>st</sup>-7<sup>th</sup> century AD) – Fig. 7c, the medieval fortress (10<sup>th</sup>-13<sup>th</sup> century) and the Ottoman fortress (15<sup>th</sup>-19<sup>th</sup> century) can be found on the “Fortress Hill”. Roman and medieval necropolises can be found on the surface of the town. About 1 km upstream, there is a Getic settlement. The tumulus necropolis of the settlement extends far to the north. On the banks of the Danube, in the Dijmahala district, is the Neolithic settlement (tell). There are also fortifications, settlements and necropolises from the Bronze Age, Hallstatt, Latène (2<sup>nd</sup>-1<sup>st</sup> millennium BC), Early Middle Ages (Dridu culture, 9<sup>th</sup>-11<sup>th</sup> centuries) and Ottoman period (15<sup>th</sup>-19<sup>th</sup> centuries). A very interesting artifact is the bronze mask presented in figure 9b.

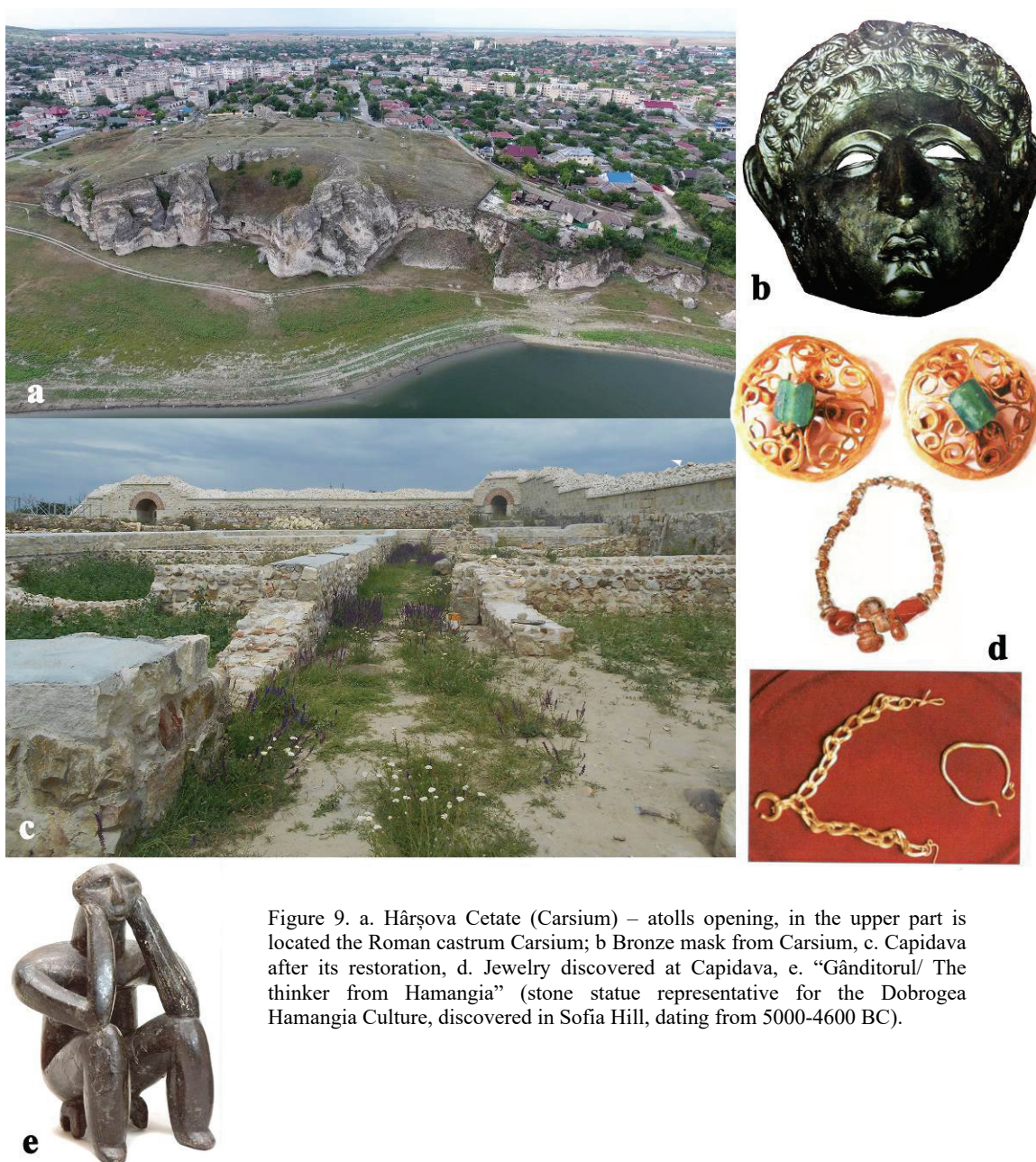


Figure 9. a. Hârșova Cetate (Carsium) – atolls opening, in the upper part is located the Roman castrum Carsium; b Bronze mask from Carsium, c. Capidava after its restoration, d. Jewelry discovered at Capidava, e. “Gânditorul/ The thinker from Hamangia” (stone statue representative for the Dobrogea Hamangia Culture, discovered in Sofia Hill, dating from 5000-4600 BC).

2. CELEA MARE. Between the hills of “Celea Mare” and “Celea Mică”, at the point “La Lac”, there is a Bronze Age settlement, remains of buildings from the Roman-Byzantine period and a medieval-timurid settlement (9th-11th century). On both hills, there were watchtowers in the Roman period.

3. GHINDĂREȘTI. 2 km south of the village, on the bank of the Danube, at the point “La Tunel”, several archaeological sites have been identified: a Neolithic settlement (4th millennium BC), a Bronze Age settlement (3<sup>rd</sup>-2<sup>nd</sup> millennium BC), a Hallstatt settlement (early Iron Age (1150-450/400 BC) and a Roman settlement (1<sup>st</sup>-6<sup>th</sup> century AD). To the north-west of the village, at the point “La Cetate”, there is a Roman fortification (1<sup>st</sup>-6<sup>th</sup> century AD).

4. TOPALU. At the point “La Cetate” or “Topalu Rock”, 4 km north-west of the village, traces of a Roman fortification have been known since the end of the 19<sup>th</sup> century. This limestone massif is also part of the geological reserve “Topalu Neojurassic Reef”. The archaeological site has been severely affected by limestone quarrying.

5. CAPIDAVA (Fig. 9c). The archaeological site (artifacts presented in figure 9d) is located on the bank of the Danube, with direct access to DJ 223. The Capidava fortress was built at the beginning of the 2<sup>nd</sup> century and rebuilt at the end of the 3<sup>rd</sup>-early 3<sup>rd</sup> century, 4<sup>th</sup> century, and later in the 6<sup>th</sup> century. In the 7<sup>th</sup> century the Roman-Byzantine fortress ceased its activity. Between the 9<sup>th</sup> and 11<sup>th</sup> centuries, a settlement developed on the surface of the fortification with bordered areas defended by an earthen stonewall. In the second half of the 11<sup>th</sup> century, the settlement was destroyed. Other archaeological sites can be found in the surrounding area. At the point “La Grajduri” there is a flat necropolis with deposits between the 4<sup>th</sup> and 11<sup>th</sup> centuries, as well as a tumulus necropolis. In the point “Vlah-Canara” a villa rustica (Roman farmhouse) from the 2<sup>nd</sup>-3<sup>rd</sup> centuries B.C. has been identified. In the surrounding area there is a necropolis from the Roman period. To the west of the fortress, in the bend of the Danube, on the water's edge, there is an Early Iron Age settlement (Hallstatt- 1150-450/400) and a LaTène settlement (450/400-early Christian era).

6. DUNĂREA. Two archaeological sites are attested within the village, on the Danube bank: a rural settlement of the Roman period (1<sup>st</sup>-4<sup>th</sup> century BC), and a LaTène necropolis (Daco-Getic culture, 4<sup>th</sup>-3<sup>rd</sup> century BC).

7. SEIMENI. Between the villages of Seimenii Mari and Seimenii Mici, on the banks of the Danube, on a promontory, the remains of a Roman fortification were visible at the end of the 19<sup>th</sup> century. The excessive anthropization of the area has led to the disappearance of the traces. Today, the route of the defensive ditch to the north is barely discernible. In Seimenii Mici, on a terrace of the Danube, there is a fortified settlement dating from the 9<sup>th</sup>-11<sup>th</sup> centuries. Several ancient tumuli are visible on the surface of the village. A 9<sup>th</sup>-10<sup>th</sup> century settlement is located between the Domneasca Mare and Domneasca Mică fishponds.

8. CERNAVODĂ. On the banks of the Danube there are several archaeological sites, including two of exceptional value. On and around the Sofia Hill, in the northern part of the town, there is a necropolis as well as a Neolithic settlement and a settlement from the transitional period to the Bronze Age. From the Neolithic necropolis, several hundred graves with spectacular inventory have been excavated. Two statues stand out, “The Thinker” and “The Seated Woman”. The ruins of the fortress of Axiopolis can be found 3 km to the south, opposite Hinog Island. Here several levels of culture from the 4<sup>th</sup> century BC to the 7<sup>th</sup> century are identified. Along the road towards Cochirleni is the necropolis of the Roman fortress. Near the fortress, the 10<sup>th</sup>-century stone wave is identified. At the foot of the old bridge over the Danube, in the steep limestone bank, traces of the old stone quarry that operated from the Roman period until the 10<sup>th</sup> century are preserved.

9. COCHIRLENI. To the north and north-west of the village, on the Danube bank, begin the small and large earthen valleys dating from the Roman-Byzantine period (6<sup>th</sup> century) and the early medieval period (10th century). 2 km north-west of the village, on the Danube bank, near the two valleys, is a fortification of the Roman-Byzantine period (4th-6th centuries) called by the locals “the Fortress of the Forest”.

10. RASOVA. The locality is a complex site. At the point “Malul Roșu, on the Danube bank, 1.5 km north-east of the village and north of DJ 223, there are several archaeological sites: a Hallstatt settlement (6<sup>th</sup> century BC), a Roman settlement and a medieval-Timurid settlement (8<sup>th</sup>-10<sup>th</sup> century). 2.5 km east of the village, above the “Caramancea” valley”, there are several fortifications of the Roman period (1<sup>st</sup>-4<sup>th</sup> century B.C.). In the point “Pescărie”, which was known in the interwar period under the name of “Dealul Cetate”, there are settlements of the Roman and early medieval period. Here there was a station of the shipwrights based at Noviodunum (Isaccea). Ancient tumuli are visible on the territory of the commune. In Rasova is identified, according to some researchers, the ancient fortress Flaviana.

11. DUNĂRENI. 5 km to the northeast of the village, on the Danube bank, there is the “Muzait Hill”. Here is the ancient fortress of Sacidava. The plateau of the hill is basically an archaeological site with a complex stratigraphy: a Getic fortification (Latène), an early Roman castrum (2<sup>nd</sup>-3<sup>rd</sup> century BC) and a Roman-Byzantine fortification (4<sup>th</sup>-6<sup>th</sup> century). Part of the courtiers are visible today. A medieval settlement can also be found on Muzait Hill. At the point “Bratca”, on the shore of the Danube Lake, there is a Roman fortification (2<sup>nd</sup>-6<sup>th</sup> century) and a medieval-Timurid settlement (7<sup>th</sup>-10<sup>th</sup> century), and in “Gura Zăvalului” there is a Getic settlement (Latene) and a tumulus necropolis (4<sup>th</sup>-1<sup>st</sup> century BC).

12. OLTINA. 4 km west of the village, on a plateau on the high bank of the Danube, called “Capu' Dealului”, the Altinum fortress was active between the 4<sup>th</sup> and 6th centuries. It was a small fortification, reinforced with stonewalls and a defensive moat, the headquarters of the military fleet of Moesia Secunda. In the early Middle Ages, this area was occupied by a fortified settlement. Research has brought to light several testimonies from the last periods of settlement



here (9<sup>th</sup>-12<sup>th</sup> and 15<sup>th</sup>-18<sup>th</sup> centuries). Material from the metal age or Getic ceramic fragments can be found as well. At the exit of the Oltina commune, close to “Debarcader”, there are “ceramic kilns” from the Roman-Byzantine period.

13. SATU NOU. On the territory of the locality, there are several archaeological sites from the Second Iron Age 3<sup>rd</sup> century BC to the 12<sup>th</sup> century. 3 km north of the village, at the point “Valea lui Voicu” there is a Getic fortification (fortified settlement “dava”); further up, at the point “Vadul Dacilor” there is another Getic fortification of the type “dava” from the 2<sup>nd</sup> century BC.; 6 km from the village, a little closer to Oltina, there is a fortified settlement with habitation levels from the 4<sup>th</sup> to the 12<sup>th</sup> century; “La armane”, there is a cremation necropolis (9<sup>th</sup>-10<sup>th</sup> century), and “La Cetate”, 3 km north of the village, on the bank of the Danube, at the point “Capul Dealului”, a fortified settlement from the 10<sup>th</sup>-11<sup>th</sup> centuries.

14. IZVOARELE. On the Danube bank, downstream from the village, at the point “Cale Gherghi”, several archaeological sites have been identified: a Getic fortification (“dava”) from the 3<sup>rd</sup>-1<sup>st</sup> centuries B.C.; the Roman fortress Sucidava (2<sup>nd</sup>-6<sup>th</sup> century B.C.) which appears in ancient sources; a fortification and a settlement from the Middle Ages.

15. CANLIA. There are two archaeological sites on the Danube in the village. At “Gura Canliei” on the promontories “Dealul Usat” and “Ghivizlicul Mare” the following are found: a Hallstatt settlement (1150-450/400 B.C.); a Getic settlement (Latène 450/400-early Christian era); a Roman settlement and a burial and cremation necropolis (sec. A Byzantine fortification (10<sup>th</sup>-11<sup>th</sup> century) and four settlements have been identified in the Dervent Hill; Neolithic (7<sup>th</sup>-3<sup>rd</sup> millennium BC), Bronze Age (2200-1100 BC), Iron Age (Hallstatt and LaTène -1150-early Christian era) and Roman (1<sup>st</sup>-6<sup>th</sup> century BC).

16. PĂCUIU LUI SOARE. The Byzantine fortress is located on the island of the same name (com. Ostrov). It was built in the second half of the 10<sup>th</sup> century. Only part of the walls remains because of the unstable ground. The lowering of the Danube at the beginning of this century uncovered part of the walls under the alluvium. About 10-15% of the monument remains today.

## CONCLUSIONS

The “Canaralele Dunării” are also a “Natura 2000” protected site, the area is easily accessible both by car and on the Danube, and that recommends it for the organization of thematic tours aimed at developing the region, a sustainable exploitation of a great and diverse potential. The scientific approach is complex, with three types of protected/protectable areas (biological, geological – stratotypes and holotypes as the examples from fig. 8, archaeological – Dobrogea hosted the famous “Gânditorul/ The thinker from Hamangia” – figure 9e) often overlapping (nine of the 16 archaeological sites also have a paleontological correspondent, in the same perimeter or nearby); school-type sites can be proposed for study by specialists, future specialists and young enthusiasts. The protection stipulated in the law needs to be clear in the field; the Baroi, Abator and Cochirleni geological-paleontological sites are examples of those not comprised yet in the laws.

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Macovei Monica<sup>1</sup>, Nicolae Constantin<sup>2</sup>, Crușoveanu Simona<sup>1</sup>, Perșa Diana<sup>1</sup>

<sup>1</sup>Geological Institute of Romania, 1 st Caransebeș Street, 012271 – Bucharest, Romania.

<sup>2</sup>Carsium Museum, 27A Revoluției Street, 905400 – Hârșova, Romania.

E-mails: macovei.monica@yahoo.com ; rusu.mona82@gmail.com;

persa.diana@yahoo.ro ; ct.nicolae@yahoo.com

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