UPPER JURASSIC HYDROZOA IN CENTRAL DOBROGEA (ROMANIA)

Dragica Turnšek[*] and *Aurelia Bărbulescu*[**]

With 3 textfigures and 8 plates

Contents

Locality and stratigraphy

In Central Dobrogea, the Jurassic deposits, which are disposed transgressively and unconformably on the Upper Proterozoic basement (green schists), are represented by the Upper Bathonian, Callovian, Oxfordian, and Kimmeridgian in an epicontinental facies. At the bottom of the series (Upper Bathonian, Lower Callovian), deposits are predominantly detrital, while in the upper, calcareous, part there are developed strong organogenic formations, i. e., limestones with spongiae in the Upper Oxfordian, coralligenous limestones in the Upper Oxfordian-Kimmeridgian.

By their exceptionally faunal abundance, the Upper Jurassic coralligenous formations in the western Central Dobrogea have attracted for a long time the attention of research workers; they particularly dealt with the fauna of mollusca, brachiopods, and echinoderms. Informations on coelenterata have been very summary so far: I. Simionescu (1910) mentioned 12 species of hexacorals, without describing them, in the Kimmeridgian limestones to the north of Topalu, while A. Bărbulescu

* Inštitut za paleontologijo SAZU, Ljubljana, Novi trg 3.
** Faculty of Geology-Geography, Bd. N. Balcescu 1, Bucharest.

(1964, 1965) reported from the same deposits two species of chaetetidae. Hydrozoa have been known so far only in the Upper Jurassic of northern Dobrogea, where M. Pompeckj (1897) and I. Simionescu (1911) mentioned at Cirlejari *Ellipsactinia* in association with polyparies, brachiopods, lamellibranchs. *Ellipsactinia* was recently collected in the same region together with *Phaneroptyxis*, brachiopods, lamellibranchs, from limestones referred to the Tithonian (Gr. Răileanu, D. Patrulius, M. Bleahu, S. Năstăseanu, 1968).

In the special literature there have been also mentioned two species of hydrozoa derived from Dobrogea, without any specification of the locality or stratigraphic level: *Actinostromarianina dehornae* Lecompte and *Steineria romanica* (Dehorne), which are deposited in the Munier Chalmas collection in Paris. This material, which originally was recorded

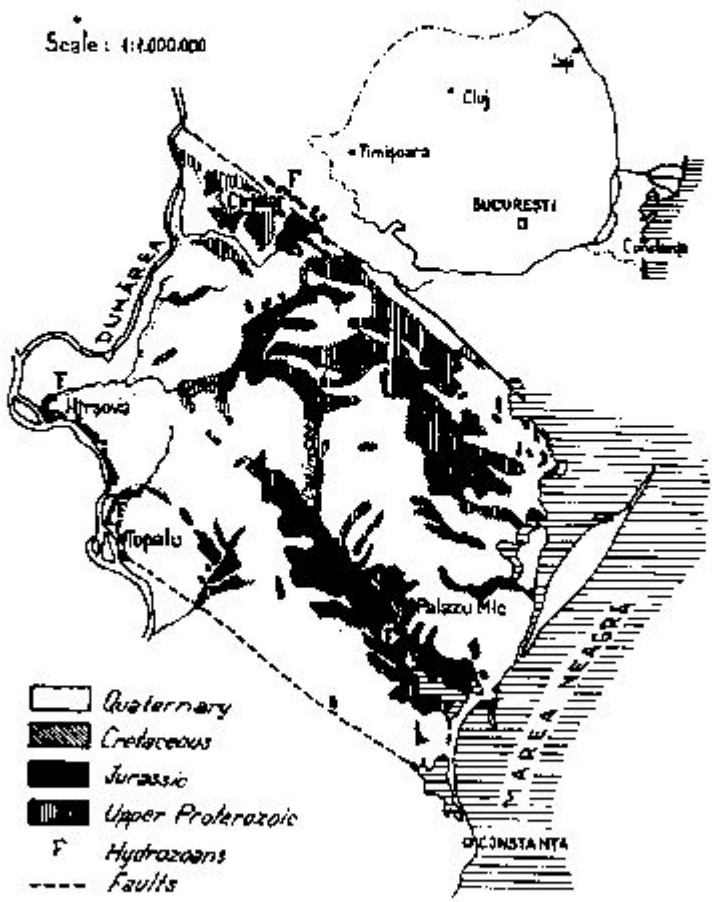


Fig. 1. Localities of hydrozoan fauna from Central Dobrogea

under the name of *Romanactis* and collected in Dobrogea, Romania, may be derived from the thesis material of V. Anastasiu who prepared the thesis on the geology of the Dobrogea under the guidance of M. Chalmas.

In the present note, we are adding to the hydrozoan fauna known till now in Dobrogea, another five species collected in several points in Central Dobrogea, a region in which their presence has not been recorded so far. The material, collected by A. Bărbulescu on the occasion of researches undertaken for the doctorate thesis, has been studied by D. Turnšek who determined:

Actinostromaria tokadiensis Yabe & Sugiyama
Hudsonella dobrogensis n. sp.
Milleporidium remeši Steinmann
Shuqraia heybroeki Hudson
Spongiomorpha aff. *globosa* Yabe et Sugiyama

Figure 1 shows the localities of the fossiliferous points from which originate the described fauna. It is worth noting that out of the five hydrozoan species four are derived from the third level of coralligenous limestones located in the syncline axis of the Jurassic deposits to the north of Topalu. In contrast with the lower coralligenous levels, in these limestones the coral faunas are prevailing against the other groups of organisms and show a remarkable abundance and variation. There are encountered various species of solitary, cylindrical or turbinated, polyparies (*Montlivaltia*, *Epistreptophyllum*), flabellate ones (*Rhipidogyra*), colonial with colonies the form of which is lamellar (*Thamnasteria*, *Microsolena*), massive, placoid or irregular (*Cyatophora*, *Stylina*, *Cryptocoenia*), branching, phacelloid (*Calamophylliopsis*), etc.[1]

This level of coralligenous limestones — in which the hydrozoa are localized — is underlain by stratified limestones and marly limestones containing an Ammonite fauna indicative of the Lower Kimmeridgian age: *Physodoceras contemporaneum* (Favre), *P. liparum* (Opp.), *Aspidoceras cyclotum* Neum., *Ataxioceras* sp. (fig. 2); hence the coralligenous limestones belong to the Lower Kimmeridgian.

Hudsonella dobrogensis n. sp. has also been found in the massive limestones at Dealul la Vii (to the north of Hirşova). These limestones are remarkable by a great uniformity of the coral fauna, being almost exclusively composed of branching colonies of *Calamophylliopsis* the branches of which are attaining as much as 1 meter in length. The coralligenous limestones are disposed in this point in stratified limestones with an Upper Oxfordian fauna (*Ochetoceras canaliculatum* (v. Buch), *O. hispidum* (Oppel), *Decipia ernesti* (Lor etc.), followed by stratified limestones with *Physodoceras liparum* (Opp.), *P.* sp. ex gr. *P. circumspinosum*, *Ataxioceras (Parataxioceras)* sp.

The *Shuqraia heybroeki* Hudson colonies are derived from a more eastern area of Central Dobrogea. They have been collected from the

[1] The coral fauna is under investigation

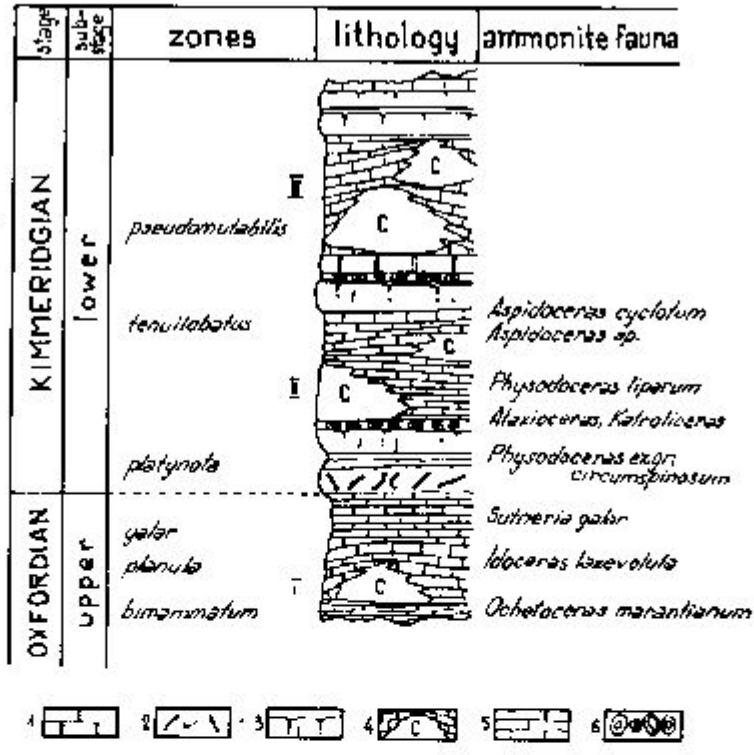


Fig. 2. Columnar section of the Upper Oxfordian and Kimmeridgian deposits from the Western Central Dobrogea; *1* dolomitic limestone; *2* bedded limestone with borings of lithophages; *3* thick bedded limestone with organic detritus; *4* coralligenous bioherm; *5* well bedded marls and pelitic limestone; *6* calcareous concretions

Upper Jurassic in the Casimcea Syncline, near the locality of Palazu Mic. At Palazu Mic, the coralligenous limestones are clearly distinctive from those found in the western part of Central Dobrogea, as they are predominantly made up of colonies of lamellar corals (*Meandraraea*, *Thamnasteria*) showing a parallel and horizontal disposition. They are well exposed in a quarry of 15 m. in height and more than 60 m. in length, and are impressing by the constancy of their lithological and palaeontological characters; besides the two mentioned coral genera, which are forming the bulk of the limestones, there are found, sporadically, massive colonies of madrepores, hydrozoa, big crinoid stalks in a reef facies, rare lamellibranchs (Pectinidae) and, towards the periphery of this bioherm, *Diceras*.

The age of the coralligenous limestones in this point is, in the absence of an Ammonite fauna, insufficiently accurate. They should represent approximately the stratigraphic equivalent of the coralligenous limestones in the western part of Central Dobrogea (Upper Oxfordian-Kimmeridgian)

as, according to M. Chiriac, in the Casimcea no Jurassic deposits are known which would be younger than the Kimmeridgian.

Conclusions. The hydrozoan fauna in Central Dobrogea is originating from the organogenic reef limestones in which corals are the prevailing element, while hydrozoa are only sporadically encountered. Hydrozoa show a certain variety and frequency in the third level of coralligenous limestones at Topalu. They are distinguished here by a greater number of colonies, particularly *Actinostromaria tokadiensis* Yabe et Sugiyama which has been found in the central zone of the coralligenous limestone body.

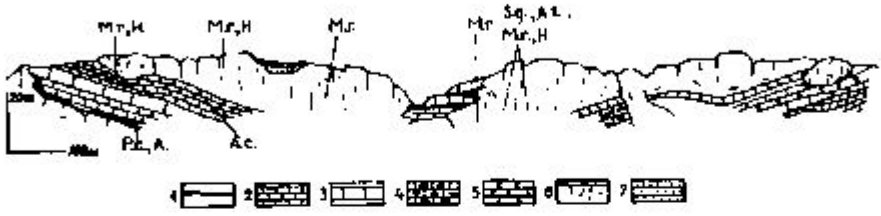


Fig. 3. Jurassic coralligenous limestone and associated sediments exposed in the axis of syncline at north of Topalu (Central Dobrogea); *1* marls; *2* well bedded pelitic limestone; *3* thick bedded limestone with organic detritus; *4* limestone with cherts; *5* dolomitic limestone; *6* coralligenous limestone; *7* glauconitic sandstone (cretaceous); Ammonite fauna: P. c. = *Physodoceras contemporaneum* (Favre) A. c. = *Aspidoceras cyclotum* Neum; *A.* .= *Ataxioceras*; Hydrozoan fauna: M. r. = *Milleporidium remesi* Stein.; H. = *Hudsonella* n. sp.; S. g. = *Spongiomorpha* aff. *globosa* Yabe & Sugiyama; A. t. = *Actinostromaria tokadiensis* Yabe & Sugiyama

The Lower Kimmeridgian age of the coralligenous limestones with Hydrozoa has been accurately defined by the relations to the stratified limestones containing an Ammonite fauna of Upper Oxfordian-Lower Kimmeridgian age.

Systematic palaeontology

Hydrozoa

Familia: Actinostromariidae Hudson 1959

Genus: *Actinostromaria* Dehorne 1920

Actinostromaria tokadiensis (Yabe et Sugiyama)

Plates 1—2

1935 *Actinostroma tokadiensis* n. sp., Yabe & Sugiyama, p. 175, Pl. 17. Fig. 4—5, Pl. 18. Fig. 2.

1964 *Actinostromaria tokadiense*, Flügel, p. 219, T. 11, Fig. 3.

1965 *Actinostromaria tokadiensis*, Fenninger et Hötzl, p. 12.

1966 *Actinostromaria tokadiense*, Flügel et Hötzl, 104—107, T. 15. Fig. 1—2.

Description: There have been treated 6 colonies, from which 5 thin-sections have been made.

Coenosteum is of semicircular and columnar shape, with a diameter of 2 - 5 cm. Reticulum consists of horizontal and vertical elements. Concentric lamellae predominate and extend through the whole coenosteum parallel to the surface. Vertical elements are always perpendicular to lamellae, and irregularly aranged in coenosteum. In some places they are many in others few. Between elements there are interspaces and rare longer coenosteal tubes. Astrorhizal systems absent. Microstructure is orthogonal, in some places it is unclear. The axial dark line is very wide, fibres are short.

Dimensions: The thickness of horizontal lamellae 0.13—0.18 mm. of vertical elements 0.15—0.23 mm. There are 4—5 lamellae and 5—7 vertical elements at the distance of 2 mm.

Comparison and remarks: Romanian specimens in reticular structure wholly correspond to the samples described as *Actinostromaria tokadiensis*. In microstructure they may be compared with *Ellipsactinia micropora*. They have wide dark line in skeletal elements that is more common in the genus *Ellipsactinia* than in the genus *Actinostromaria*. But owing to the typical reticular structure I include them to the *Actinostromaria*.

Actinostromaria tokadiensis has very developed horizontal lamellae. Flügel (1964) even says, that these specimens are outwards similar to the representatives of the genus *Burgundia*, from that they differ only in microstructure. The type of reticulum reminds us of the species *Actinostromina germovsheki*, but the latter have astrorhizae. There is also known the species *Actinostromaria cretacica* (Turnšek, 1968), which has well developed horizontal lamellae, but it is much smaller than our specimens, and is known only from the Upper Cretaceous beds.

Distribution: Until now this species has been known from large teritory of Mesozoic Tethys. It has been first described from the Torinosu limestone in Japan (Yabe & Sugiyama, 1935), then by Flügel (1964) from the Upper Jurassic limestone of Plassen in Austria, and from the Kimmeridgian beds of East Spain (Flügel et Hötzl, 1968). Romanian specimens of *Actinostromaria tokadiensis* are all from the Lower Kimmeridgian strata of Central Dobrogea, from the locality N of Topalu (XIII-3-B, XIII-3-E, XIII-3-G, XIII-3-H).

Familia: Parastromatoporidae Hudson 1959

Genus: *Hudsonella* Turnšek 1966

Hudsonella dobrogensis n. sp.

Plates 3—5

Derivatio nominis: the species is named after the province Dobrogea, where it had been found

Holotypus: specimen nr. XIII-3-D

Locus typicus: N of Topalu, Central Dobrogea
Stratum typicum: Lower Kimmeridgian
Paratypi: VI-17, 35, XIII-3-E

Diagnosis: *Hudsonella* with radial growth, latilaminar reticulum, dense uneven skeletal elements, and large astrocorridor systems.

Description: Microstructure is clinogonal with short fibres. Coenosteum is globular, cylindrical, sometimes with mamelons. Vertical elements predominate. They are thick, uneven, and together with transverse offsets build dense vermiculate reticulum. In all the coenosteum concentric belts with dense and a little thiner reticulum alternate, that causes the coenosteum being latilamellate. Between the skeletal elements there are small interspaces. Coenosteal tubes do not occur. Astrosystems are of astrocorridor type in vertical section. Some axial astrorhizal tubes extend radial through the whole coenosteum from the basis to the surface. In latilamellae with sparse reticulum astrorhizae extend more in the horizontal direction. In transverse section there are large astrorhizae with long lateral tubes, which reach the tubes of the neighbouring astrorhizae.

Dimensions: The diameter of colonies 1—5 cm. The thickness of skeletal elements 0.1—0.17 mm., the width of interspaces 0.05—0.15 mm., of astrorhizae 0.2 mm. The width of the whole astrorhizae in transverse section 1 cm., the distance between two neighbouring centres of astrorhizae 0.9—1.0 cm.

Comparison: The new species may be compared with the type species *Hudsonella atticensis*. It differs from it in the following: vertical elements of the new species are more winding and discontinuous, all the skeleton is more massive than in the type species because the interspaces are small, and the coenosteal tubes do not occur. There is also diference in astrorhizae. They are of astrocorridor type, but they have in transverse section more astrorhizal tubes. Outwards these tubes diverge. The number of astrorhizal tubes in new species is 30 to 40 and more, in the species *H. atticensis* only 20.

Distribution: The specimens of the new species have been found at the localities N of Topalu and at Dealul la Vii, N of Hîrşova, in Central Dobrogea. They are of Upper Oxfordian and Lower Kimmeridgian age.

Familia: Milleporidiidae Yabe et Sugiyama 1935

Genus: *Milleporidium* Steinmann 1903

Milleporidium remeši Steinmann

Plate 6

1903 *Milleporidium remeši*, Steinmann, p. 2, T 1. Fig. 18, T. 2.
1956 *Milleporidium remeši*, Hudson, 716—718, Pl. 75. Fig. 5—8 (con. syn.).
1961 *Milleporidium remeši*, Bachmayer et Flügel, 131—133, T. 16. Fig. 3—6, T. 17. Fig. 4 (con. syn.).

Description: 5 coenostea from the romanian material belong to this species, that differ a little in size and shape.

Three coenostea with Nr. VI-20 are rodlike, with a diameter of 20 mm. In them 2—3 centres of growth may be observed. Specimens with Nr. X-8 and XIII-3-A are globular with one centre of growth, with a diameter of 50 mm. Vertical and horizontal elements are well developed, and predominate here one and there another. Coenosteal (zooidal) tubes are equally arranged through the whole coenosteum, what can be noticed also in transverse section. Axial reticulum does not differ essentially from the peripheral one. Dimensions of the coenosteum and skeletal elements correspond to all the previous descriptions. Microstructure is clinogonal with short fibres.

Distribution: Till now this species has been known from the Tithonian strata in Stramberg and Ernstbrunn, and from the Upper Jurassic beds in Hungaria (Bachmayer et Flügel, 1961). The romanian specimens have been found in the locality northern of Topalu, Central Dobrogea in the Lower Kimmeridgian beds.

Genus: *Shuqraia* Hudson 1954

The author proposes, the species *Parastromatopora inouei* Yabe et Sugiyama to be allocated to this genus. The explanation in text under Remarks.

Shuqraia heybroeki Hudson

Plates 7—8

1954 *Shuqraia heybroeki*, Hudson, 214—216, Pl. 6. Fig. 1—6, Textfig. 2.

Description: An exact description of the genus *Shuqraia* has been given by Hudson (1954, 213). Microstructure is clinogonal with short fibres, somewhere unclear.

The specimens from Dobrogea have all the characteristics of the genus. These are three colonies (Nr. 294) of cylindrical and branching form, with a diameter of 10 to 20 mm. They have axial and peripheral reticula, axial reticulum being broader than peripheral. Vertical elements predominate, but they are curved and often interrupted. They enclose interspaces and tubes of various form, which are a little wider than the thickness of skeletal elements. Skeleton is thicker only in peripheral reticulum. Tabulae are very rare, astrorhizae do not occur. There are no coenosteal lamellae, there appear only shorter offsets, which reach most the distance of two interspaces.

Dimensions: the thickness of skeletal elements 0.17—0.25 mm., the width of interspaces 0.25—0.30 mm. in axial reticulum, in peripheral reticulum the proportion in just opposite. Skeletal elements are here thicker than interspaces. There are 8 elements and interspaces in 2 mm., approximately.

Comparison and remarks: Our specimens differ from Hudson's description in having less tabulae and a little larger coenosteum, however, these differences are allowed in specific variability.

Actinostromaria tokadiensis (Yabe & Sugiyama)
N. of Topalu, Central Dobrogea, Lower Kimmeridgian
Vertical (bellow oblique) thin section, XIII-3-F, × 8

Fig. 1—5 *Actinostromaria tokadiensis* (Yabe & Sugiyama)
N of Topalu, Central Dobrogea, Lower Kimmeridgian

1 Vertical (nellow partly oblique) thin section of the coenosteum. XIII 3 F, × 4

2 Radial (partly oblique) thin section of the coenosteum. XIII-3-Ba, × 4

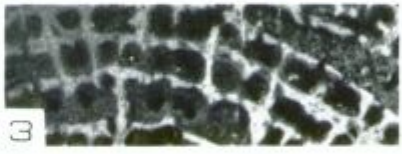
3 Part of vertical reticulum, thin section XIII-3-Bb, × 6

4 Microstructure showing the wide axial dark line and lighter orthogonal fibres. Thin section XIII-3-F, × 75

5 Microstructure, thin section XIII-3-B, × 35

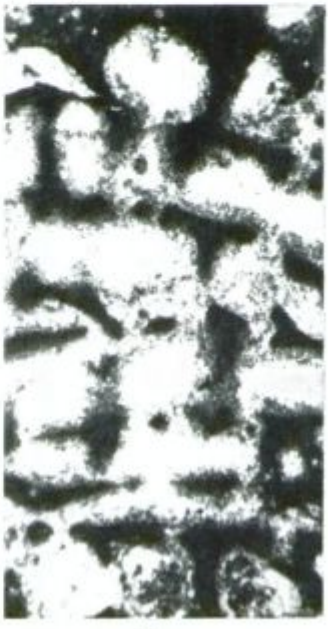
1

2



3

4



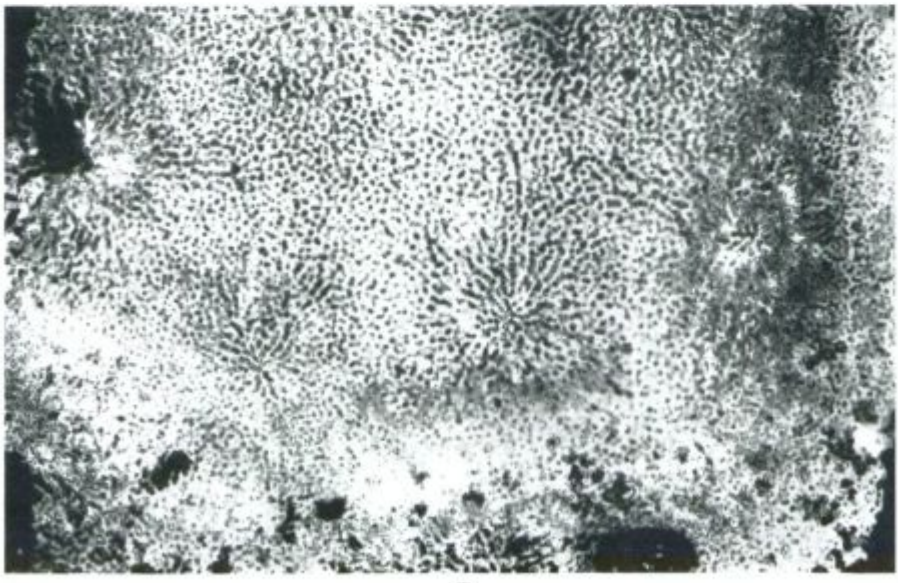
5

Fig. 1—2 *Hudsonella dobrogensis* n. sp.
N of Topalu, Central Dobrogea, Lower Kimmeridgian

1 Radial thin section showing vertical astrocorridors and latilamellate belts. XIII-3-Da, × 4. holotype

2 Transverse thin section, showing vermiculate reticulum and large astrorhizae. XIII-3-Db, × 4, holotype

1



2

Fig. 1–4 *Hudsonella dobrogensis* n. sp.
N of Topalu, Central Dobrogea, Lower Kimmeridgian

1 Vertical thin section, XIII-3-Da, holotype, × 8
2 Transverse thin section, XIII-3-Db, holotype, × 8
3 Microstructure, thin section XIII-3-Da, × 75
4 Microstructure, thin section XIII-3-Da, × 35

1

2

3

4

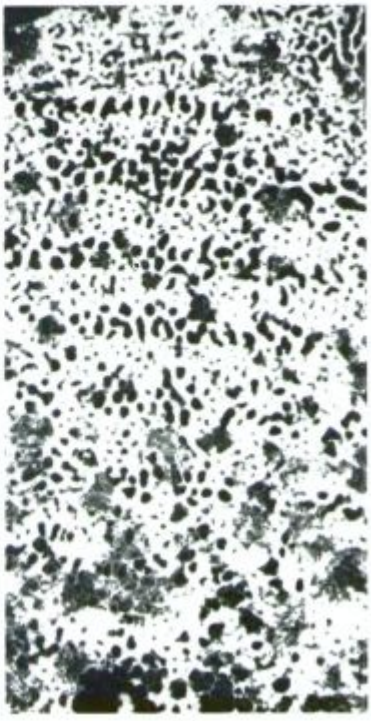
Fig. 1—3 *Hudsonella dobrogensis* n. sp.

1 Vertical thin section, vertical astrocorridors not cut. VI-17a. N of Topalu, Lower Kimmeridgian, × 6

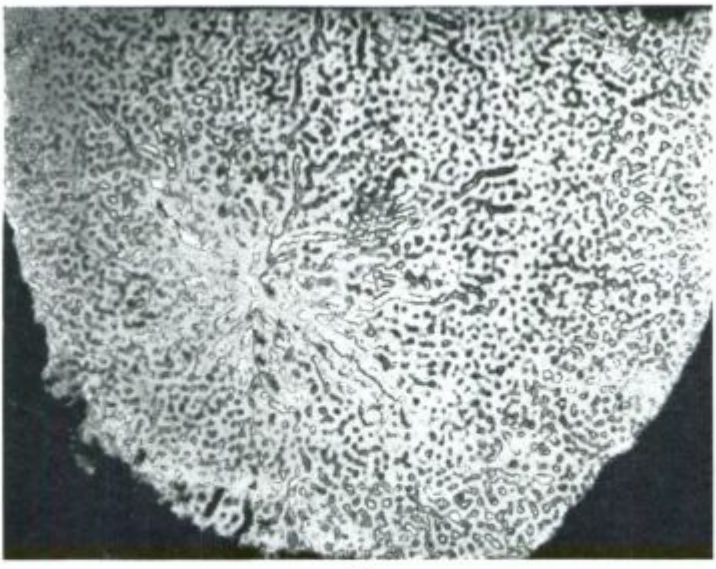
2 Vertical thin section, showing latilaminar bells, astrocorridors not cut. 35 a, Dealul la Vii, N of Hîrşova, Central Dobrogea. Upper Oxfordian, × 6

3 Transverse thin section showing vermiculate reticulum with large astrorhizae. VI-17b, × 6

1

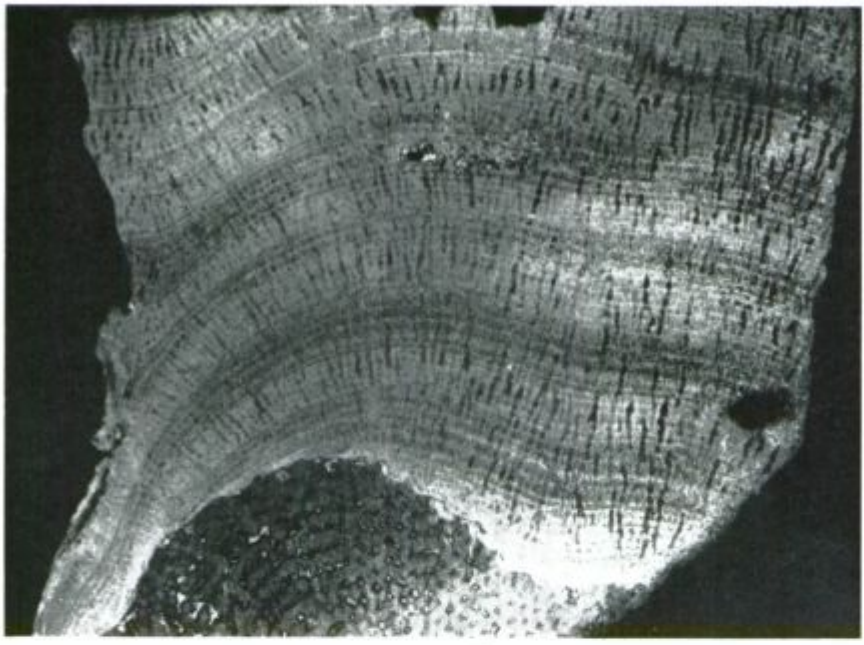


2

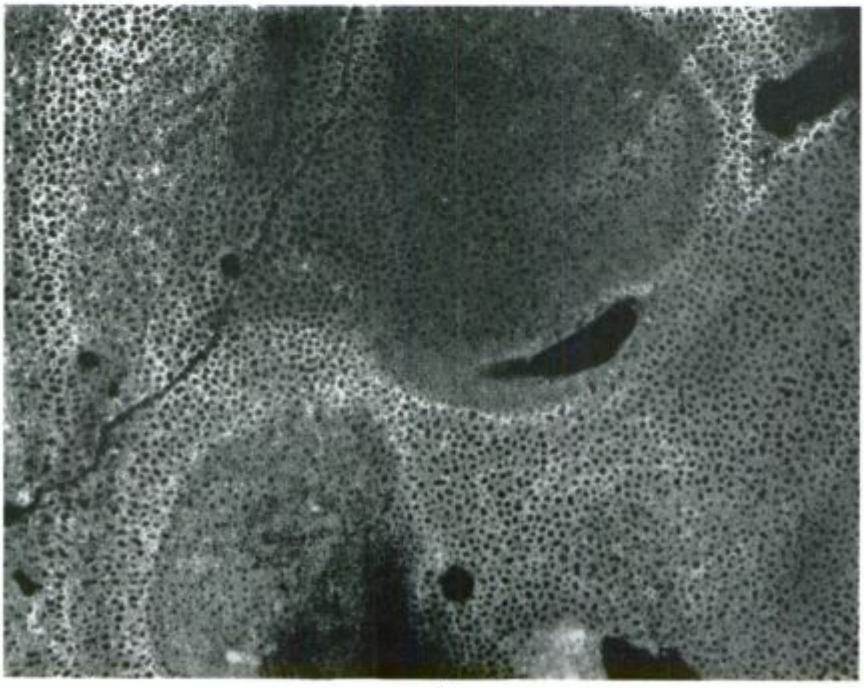


3

Fig. 1—2 *Milleporidium remesi* Steinmann
N of Topalu, Central Dobrogea, Lower Kimmeridgian
1 Vertical thin section, VI-20-Aa, × 8
2 Transverse thin section, VI-20-Ab, × 8



1

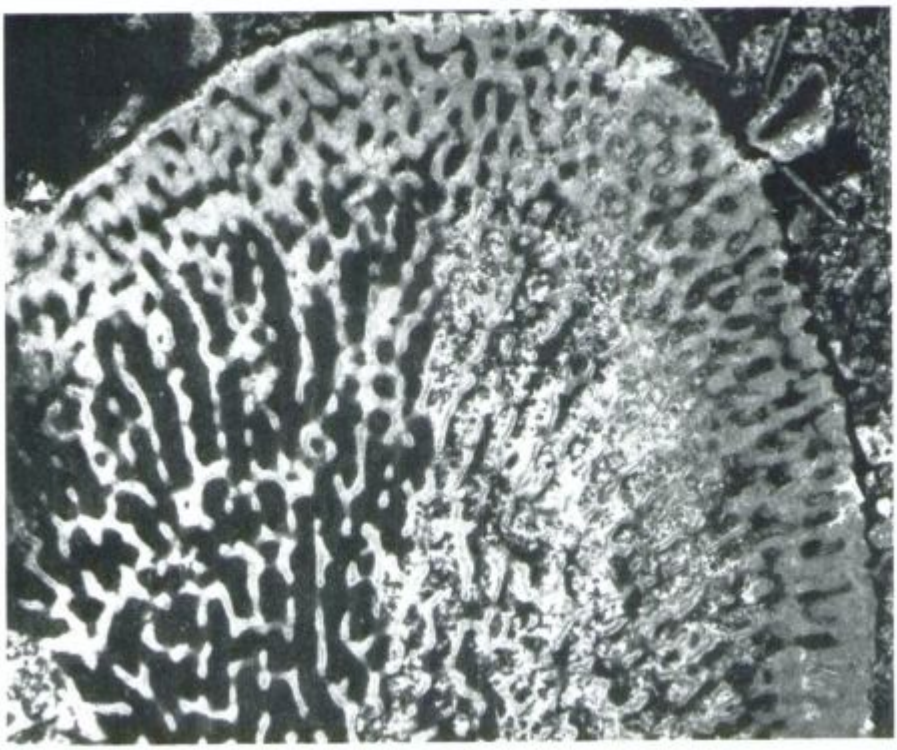


2

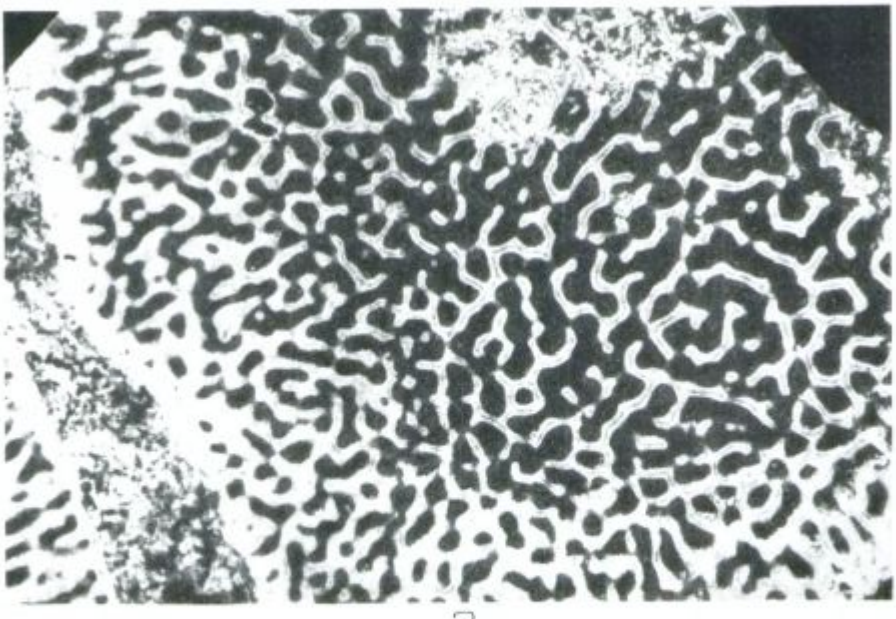
Fig. 1—2 *Shuqraia heybroeki* Hudson
Palazu Mic, Central Dobrogea, Upper Oxfordian-Lower Kimmeridgian

1 Radial thin section, showing axial and peripheral reticula. 294-Aa, × 8

2 Transverse thin section, showing wide axial and narrow peripheral reticula. 294-Ab, × 8



1



2

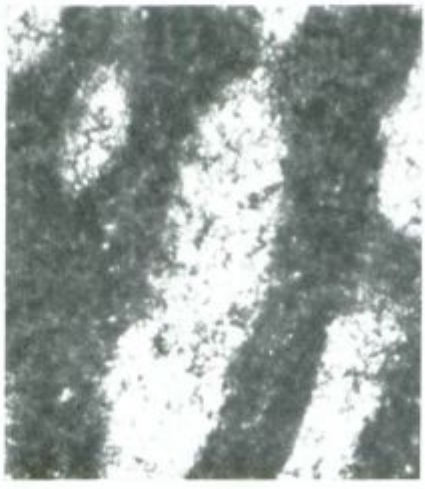
Fig. 1—5 *Shugraia heybroeki* Hudson
Palazu Mic, Central Dobrogea, Upper Oxfordian-Lower Kimmeridgian
1 Radial thin section, 294-Aa, × 4
2 Transverse thin section 294-Ab, × 4
3 Part of radial reticulum, thin section 294-Ac, × 8
4 Microstructure (axial reticulum), 294-Aa, × 35
5 Microstructure (peripheral reticulum), 294-Ab, × 75

1

2

3

4



5

Hudson (1954, 214) warned of the great likeness between the species *Parastromatopora memorianaumanni* and *P. inouei* with *Shuqraia heybroeki*. The first description of the species *P. inouei* also mentiones that coenosteum is cylindrical, with axial and peripheral reticula and that the appearance of astrorhizae is not sure (Yabe et Sugiyama, 1935). These characteristics are closer to the genus *Shuqraia* than *Parastromatopora*. Besides this, at *P. inouei* long vertical elements are absent, running through the whole coenosteum, what is the characteristic of the genus *Parastromatopora*. All the mentioned properties allow us to allocate the species *Parastromatopora inouei* to the genus *Shuqraia*. But the species *Parastromatopora memorianaumanni* in its irregular reticulum more approaches the genus *Cladocoropsis*.

The species *Shuqraia heybroeki* is very similar just to the species "*Parastromatopora*" *inouei*, anyhow, it differs in having wider axial reticulum. In peripheral reticulum of the species *S. heybroeki* the skeletal elements get thickened, in the species *S. inouei* they are more uniform in the whole coenosteum.

Distribution: The species *S. heybroeki* till now has been known from the Shuqra limestone of Southern Arabia (Aden), which belongs to the lower part of Upper Jurassic strata.

In Romania this species has been found in the locality Palazu Mic in Central Dobrogea in beds ascribed to the Upper Oxfordian and Lower Kimmeridgian age.

Familia: Spongiomorphidae Frech 1890

Genus: *Spongiomorpha* Frech 1890

Spongiomorpha aff. *globosa* Yabe et Sugiyama

1931 *Spongiomorpha (Heptastylopsis) globosa*, Yabe et Sugiyama, p. 105, Pl. 35, Fig. 1—3.

non 1935 *Spongiomorpha* cf. *globosa*, Le Maitre, p. 35, Pl. 4, Fig. 1—3.

1966 *Spongiomorpha globosa*, Flügel et Hötzl, 112—113, T. 18, Fig. 1—3.

Description: Coenosteum is nodular. Reticulum consists of vertical elements which are thickened at individual distances. Two neighbouring thickenings joined together, form some transverse elements. When the thickenings are cut, round openings can be noticed, and we may conclude, that they were hollow.

In transverse section astrorhizal systems are to be seen, with approximately 16 channels. They look like coral septae, and outwards resemble the coral genus *Actinaraea*.

Dimensions: The thickness of vertical and horizontal elements is 0,12—0.18 mm. There are 7 skeletal elements in 2 mm. Interspaces are extraordinary thin, and they reach the length only of two interspaces. At thickenings they are usually interrupted. In some places interspaces extend also in horizontal direction. Also the hollow openings of skeletal elements give an appearance of interspaces. When such neighbouring openings join, a certain transverse grooves are formed.

Distribution: This species has been known untill now from the Torinosu limestone in Japan, and from the Lower Kimmeridgian beds of East Spain. Romanian specimens are all from the locality northern of Topalu in Central Dobrogea, and belong to the Lower Kimmeridgian age.

Correlation of the hydrozoan localities

The Upper Jurassic hydrozoans from Dobrogea are few in number, nevertheles, they represent and complete the typical hydrozoan association, which has been found in numerous findingplaces in the large territory of the Tethys. It can be compared with similar fauna in Portugal (Dehorne, 1920), in East Spain (Flügel et Hötzl, 1966), in Plassen and Tressenstein (Flügel, 1964, Fenninger & Hötzl, 1965), in southern Slovenia and Dinarides (Turnšek, 1966, 1968), in Middle East (Hudson, 1954, 1956), and also in Japan (Yabe et Sugiyama, 1931, 1935).

In palaeontological respect this association is mainly formed of the species of the families Parastromatoporidae and Milleporidiidae, therefore it has been named "parastromatoporidian type of hydrozoans". In this parastromatoporid association appear as regular companion also the representatives of the group Spongiomorphoidea, and the species of the genus *Actinostromaria*. The latter actually belongs to Actinostromariidae, but no one Jurassic species of the genus *Actinostromaria* has been found in the localities of the other actinostromaridians.

Almost all mentioned findingplaces of "parastromatoporid" hydrozoan association are of Oxfordian and Kimmeridgian age.

If we want to correlate the hydrozoan localities exactly, we must compare the findingplaces of all the individual species which have been found in Dobrogea.

Actinostromaria tokadiensis has been known so far from the Kimmeridgian strata of East Spain, in Upper Jurassic of Plassen, and in Torinosu limestone in Japan with a "parastromatoporid association".

The species *Hudsonella dobrogensis* has been first described in Romania. It is typical "parastromatoporid hydrozoon", and its new finding only complets the mentioned hydrozoan type. The allied fauna (*Hudsonella, Dehornella, Parastromatopora*) is well extend in the region from Portugal to Japan.

Until now *Shuqraia heybroeki* has been discovered only in Shuqra limestone in southern Arabia in the strata of the Lusitanian — Kimmeridgian age. Similar milleporidiid hydrozoans occur in almost all Tethys territory.

Milleporidium remeši is in the hydrozoan association in Dobrogea peculiarity. Although the various species of the genus *Milleporidium* have been found in "parastromatoporid" association, the species *M. remeši* has been so far known only from the typical localities of the actinostromaridian and sphaeractinidian hydrozoans in Stramberk and Ernstbrunn, where it has been ascribed to the Portlandian age.

In the Romanian findingplaces the species of the genus *Cladocoropsis* have not been found, though they are very frequent in Austria, Dinarides and in Middle East. Therefore the association in Dobrogea could be partly compared with the middle faunistical region in Slovenia, where parastromatoporid and milleporidiid hydrozoans appear among abundant corals, but *Cladocoropsis* is absent (Turnšek, 1966).

The treated hydrozoan fauna from Dobrogea, although it does not represent the whole hydrozoan association of this region, gives us new completions to the knowledge of hydrozoan fauna in Dobrogea, and elsewhere too. We may expect that the further inwestigations will discover still other species.

REFERENCES

Anastasiu, V. 1898, Contribution a l'étude géologique de la Dobrogea. Thèse, Paris.

Bachmayer, F. et Flügel, E. 1961, Hydrozoen aus dem Oberjura von Ernstbrunn (Niederösterreich) und Stramberg (ČSR). Palaeontographica, *116*, A, Stuttgart.

Bărbulescu, A. 1964, Stratigraphic study of the Jurassic in the region included between the localities of Hîrşova-Tichileşti-Băltăgeşti-Topalu (Central Dobrogea). Doctorate thesis, Bucureşti.

Bărbulescu, A. 1965, Asupra prezenţei Chaetetidelor în jurassicul din Dobrogea. An. Univ. Bucureşti (St. Nat., Geol. Geogr.), *14*, Bucureşti.

Chiriac, M. 1968, Nota explicativă pentru harta 1:200 000, Constanţa. Com. Stat. Geol. Inst. Geol., Bucureşti

Dehorne, Y. 1920, Les Stromatoporoidés des terrains secondaires. Mém. Carte géol. France, Paris.

Fenninger, A. & Hötzl, H. 1965, Die Hydrozoa und Tabulozoa der Tressenstein- und Plassenkalke (Ober-Jura). Mitt. Mus. Bergb. Geol. Technik, *27*, Graz.

Flügel, E. 1964, Ein neues Vorkommen von Plassenkalk (Ober-Jura) im Steirischen Salzkammergut, Österreich, N. Jb. Geol. Paläont. Abh., *120*, Stuttgart.

Flügel, E. & Hötzl, H. 1966, Hydrozoen aus dem Ober-Jura der Hesperischen Ketten (Ost-Spanien). N. Jb. Geol. Paläont. Abh., *124*, Stuttgart.

Hudson, R. G. S. 1954, Jurassic Stromatoporoids from Southern Arabia. Notes et Mém. Moyen-Orient, *5*, Paris.

Hudson, R. G. S. 1956, Tethyan Jurassic Hydroids of the Family Milleporidiidae. Journ. Paleont., *30*, U. S. A.

Lecompte, M. 1952, Revision des Stromatoporoides mesozoiques des collections Deborne et Steiner. Bull. roy. sci. nat. Belg., *28*, 53, Bruxelles.

Le Maitre, D. 1935, Spongiomorphides et Algues. Description des Spongiomorphides et des Algues. Notes Mém., *34*, Étud. Pal. sur le Lias du Maroc, Rabat.

Pompecky, J. F. 1897, Paleontologische und stratigraphische Notizen aus Anatolien. Zeitsch. deutsch. geol. Ges., *1*, Stuttgart.

Raileanu, Gr. et Patrulius, D. et Bleahu, M. et Nastaseanu, S. 1968, Aspects fundamentaux de la géologie du mésozoique de Roumanie. An. Com. d'Etat Géol., *36*, Bucarest.

Simionescu, I. 1910, Straturile jurasice dintre Hîrşova şi Boasgic. An. Inst. geol. Rom., *3*, Bucureşti.

Simionescu, I. 1911, Jurasicul de la Cirjelar (Dobrogea). An. Inst. geol. Rom., *4*, Bucureşti.

Steinmann, G. 1903, Nachträge zur Fauna von Stramberg. II. *Milleporidium*, eine Hydrocorallinc aus dem Tithon von Stramberg. Beitr. Pal. Geol. Österr.-Ungar. Orients, 15, Wien und Leipzig.

Turnšek, D. 1966, Zgornjejurska hidrozojska favna iz južne Slovenije. Razprave Slov. akad. znan. umetn. IV. razr., 9, Ljubljana.

Turnšek, D. 1968, Hidrozoji in korale iz jurskih in krednih skladov v južnozahodni Jugoslaviji. Razprave Slov. akad. znan. umetn. IV. razr., 11, Ljubljana.

Yabe, H. et Sugiyama, T. 1935, Jurassic Stromatoporoids from Japan. Sci. Rept. Tohoku Imp. Univ. Japan, 2. ser. (Geology), 14, 2 B, Sendai and Tokyo.

Yabe, H. et Sugiyama, T. 1931, On some Spongiomorphoid Corals from the Jurassic of Japan. Sci. Reports Tohoku Imp. Univ. 14, 2 A, Tokyo and Sendai.