Cover illustration: thin sections of a pebble from a beach – peculiar pebble from special beach - *Schlotheimophyllum patellatum* from Gotland, Sweden, Ireviken beach; transverse and longitudinal sections, x2.
Sosnowiec, 27th December 2018.

Dear Friends & Colleagues, Dear Readers!

* Francesca Bosellini, interim President of the IASFCP, and Markus Aretz, IASFCP Secretary announce important changes (see p. 5); the official webpage of the IASFCP has been launched in December 2018 at [https://www.cnidaria.nat.uni-erlangen.de/IASFCP](https://www.cnidaria.nat.uni-erlangen.de/IASFCP)
* the 13th International Symposium on Fossil Cnidaria and Porifera will be held in Modena, Italy, September 3-6, 2019 (see p. 7)
* the present issue, *FC&P42*, contains current reports and bibliographic notes presented at [kse.wnoz.us.edu.pl/iascp](http://kse.wnoz.us.edu.pl/iascp) in 2018
* let me heartily thank all persons who helped in gathering data for *FC&P42*
* let me hope the *FC&P43*, although possibly not officially affiliated to IASFCP, will be ready in the end of December 2019...
* I wish you a Merry Christmas and many publications and citations in 2019!
* let all of us meet in Modena in September 2019!

Tomasz Wrzołek.
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Dear Members of IASFCP,

2018 has been another eventful year for our Association. Following the sudden death of our president, Michaela Bernecker, in late 2017, the task of modernizing the IASFCP has been taken over by the incoming President Francesca Bosellini (Modena) and the Secretary Markus Aretz (Toulouse).

One major event of this year was the launch of the new website of the Association. Michaela had initiated this project and an ad-hoc committee composed of Francesca Bosellini, Markus Aretz, Tomasz Wrzolek, Wolfgang Kiessling and Kenneth Johnson continued it. The website of the Association is now hosted at the University of Erlangen (http://www.cnidaria.nat.uni-erlangen.de/IASFCP). It replaces the old website hosted at the University of Silesia.

The task of maintaining an attractive, dynamic and up-to-date website can only be achieved with the input from the entire membership. So please send regularly news about your personal research or other relevant topics for our Association to our news correspondent Tomasz Wrzolek (tomasz wrzolek@us.edu.pl) who we thank for the long time he successfully edited the newsletter and kept updated the website.

The new website will also replace the newsletter. In our understanding the website is a dynamic structure, which will evolve with time. It is not only the website of the Association, but as a member also your website! All suggestions for new things or sections, missing links, which could be implemented into the website are welcome (please send these to Markus Aretz: markus.aretz@get.omp.eu). We are also currently working on ideas to be more present in social medias and we will
provide you with more information on this in the next months.

2019 will be an important year for IASFCP. The 13th symposium of the Association will be held in early September in Modena. We hope that most members will attend and present the latest and most exiting results of their research on corals, sponges, and reefs. You can find detailed information on the conference website: http://www.13thfossilcnidaria.unimore.it.

During the symposium the Association will also hold its General Assembly. We will have to make decisions about the future of the IASFCP and, as discussed during the last general assembly at Muscat, we have to decide about changes of the statute. The officers are currently working on a proposal for a revised statute, which will be sent to all active members of the Association several weeks in advance of the General Assembly. In order to do this, we need to update the membership directory! In the second half of January 2019 you will receive an electronic message detailing the procedure.

Best Wishes and a Happy New Year!

Francesca Bosellini and Markus Aretz
13th IASFCP Symposium / Modena / September 2019
an invitation and the first circular / F. Bosellini, 27th August 2018

Dear Colleagues,

We are pleased to announce the 13th International Symposium on Fossil Cnidaria and Porifera, to be held in Modena, Italy, on September 3-6, 2019.

For the first time organized in Italy, the Symposium aims to bring together participants from all over the world to discuss and share the most recent advances of studies on fossil corals and sponges, coral reefs and associated biota. The theme for the upcoming Symposium "LOOKING BACK TO SEE AHEAD" highlights the importance of the fossil archives to understand response of the biosphere to long term environmental perturbations. We promote interdisciplinary approaches from a body of interested paleontologists, biologists but also scholars in other disciplines, and aim to push new boundaries for coral science.

Attached to this email please find the FIRST CIRCULAR (http://www.13thfossilcnidaria.unimore.it/wp-content/uploads/2018/07/13thFCPCfirstcircular.pdf). All the information and the following updates can be found also on the meeting website: http://www.13thfossilcnidaria.unimore.it

It would be very important to have some feedback of your interest to participate to the meeting before 30 November 2018:
- please fill the RETURN FORM at this link: https://docs.google.com/forms/d/e/1FAIpQLSceC8RW-IPZOt2tOzulRQwtgN6os5sj_kWFPd1AZ0S-XurrZA/viewform?usp=sf_link
- or return by email the attached pdf form to: info.13thfossilcnidaria@unimore.it
Save these dates in your calendar and don’t hesitate forwarding this information to other potentially interested colleagues and students.

We are looking forward to welcoming you in Modena!
On behalf of the Organizing Committee,

Francesca Bosellini (Chair)

OBITUARIES / BIBLIOGRAPHIES

Arnost GALLE (1942-2018)
paleontological bibliography / Tomasz Wrzolek

Presented are 56 papers authored or co-authored by our late Colleague, 52 of these listed by the FC&P newsletter, four added kindly by Jindra Hladil; papers are sorted firstly in chronological and secondly in alphabetical order.


GALLE A. 1976. Rugose coral *Petraiella* in the Famennian (Upper Devonian) of Bohemia. *Vestnik Ustredniho Ustavu Geologickeho* 51, 4:
GALLE A. 1976. Favositids of the basal Zlichov Limestone (Lower Devonian) of Bohemia. Casopis pro mineralogii a geologii 21, 4: 363-368. [FC&P 06_1: 22]


MAREK L., GALLE A. 1976. The tabulate coral Hyostragulum, an epizoan with bearing on hyolithid ecology and systematics. Lethaia 9, 1: 51-64. [FC&P 05_1: 33]


**GALLE A. 1995.** The *Breviphrentis*-dominated coral faunule from the Middle Devonian of Moravia, Czech Republic. *Vestnik Ceskeho geologickeho ustavu* 70, 2: 59-70. [FC&P 24_2: 82]


**GALLE A., HLADIL J., ISAACSON P.E. 1995.** Middle Devonian biogeography of closing South Laurussia-North Gondwana Variscides: Examples from the Bohemian Massif (Czech Republic), with emphasis on Horni Benesov. *Palaios* 10: 221-239. [FC&P 24_2: 77]


**GALLE A., PROKOP R.J. 2000.** Complex parasitism and symbiosis of crinoid, subepidermal parasite, and tabulate coral, Lower Devonian
(Pragian), Barrandian, Czech Republic. *Vestnik Ceskeho geologickeho ustavu* 75: 441-444. [FC&P 38_1: 21]


**CEJCHAN P.A., HLADIL J., GALLE A. 2008.** Growth patterns of stromatoporoids as possible indicators of broad palaeoenvironmental


Rocks, 28th November-4th December 2010, Guilin, China; Meeting Programme and Abstracts [D. Chen & A. C. da Silva (eds.)]: 4-5; Beijing. [FC&P 36: 127]


**Helfried Mostler (1934 – 2017)**


**1990 Mostler H.** Mikroskleren von Demospongien (Porifera) aus dem


[see also https://de.wikipedia.org/wiki/Helfried_Mostler]

**Freek RHEBERGEN (1933-2018)**

paleontological bibliography
by Tomasz Wrzolek

* the present list is based on a memory page of Freek Rhebergen ([https://mrheberg.home.xs4all.nl/porifera.html](https://mrheberg.home.xs4all.nl/porifera.html)), containing 60 records; those most important to our readers, 41 in number, are presented below; the photograph is by courtesy of Martin Rhebergen

** Freek published many valuable papers, also in recent years, and one can only regret that we will not see more of them...

*** let us hope his research will be continued by his co-authors and new
for me it was a special experience to find so many valuable papers on erratic material... with thousands of specimens analyzed, with deep knowledge of existing - and sometimes of eroded in the past - source areas...

Thank you Freek, we will be missing you!

1994

In the border-region of the Netherlands and Germany and near Zwolle four specimens of anthaspidellid sponges, embedded in silicified ordovician limestone, have been collected in the last years. Both authors regard the occurrence of the three specimens of *Aulocopium aurantium* and one of *Hudsonospongia cf. cyclostoma* as a matter of importance, the specimens being the only known ones among about 2.600 inventoried specimens of *Aulocopium* in Dutch collections. They hope to gain more information about the accompanying fossils by new reports from collectors. [English summary of a paper in Dutch]

1996

An inventory of over 12.000 erratic Ordovician sponges, collected in the Lower-Pleistocene fluvial sediments in the NE Dutch-German border region, has been drawn up and the results have been statistically processed. The fauna, representing at least 27 species, is compared with those of the island Sylt (24.300 specimens), the Lausitz (430) and the island of Gotland (300). The species *Astylospongia praemorsa, Syltrochos pyramidoidalis, Carpospongia conwentzi, Diotricheum vonhachtei* and their genera show remarkable differences in frequency. The occurrence
of two species, *Streptosolen* sp. Ulrich & Everett 1889 and *Nevadocoelia pulchra* Bassler 1927, is reported. So far their occurrence in this region and probably in Europe has been unknown. It is quite unlikely that the Ordovician deposits in the Baltic Sea or the Gulf of Bothnia are the source rocks of the predominating Upper-Ordovician sponges, among other things because of the few species as well as the small numbers of specimens found in these areas in relation to the numerous erratic sponges. During the Ordovician the above-mentioned areas were marine epicontinental basins. They were situated on a latitude too high for a tropical fauna and probably have been influenced by an E-W cold sea current. The authors suppose the sponges, as well as the contemporaneous tabulate corals, stromatopores and other fossils in the "lavenderblue" silicifications, to originate mainly from tropical shelves along the northern coasts of the palaeocontinent Baltica or possibly from Siberia. [English abstract of a paper in Dutch]


In an earlier paper (*Grondboor en Hammer* 1994) the results of counts on 16.000 erratic Ordovician silicified sponges from the Braderup kaolinsands of Sylt have been reported. The sponges are present in a number of local collections. Additionally an inventory has been made of 8.000 sponges from a collection kept at Hamburg University. Of the known 35.600 specimens, divided over at least 25 species, more than 24.300 specimens have been processed statistically. In this paper the species *Rhopalocoelia* cf. *R. clarkii* Raymond & Okulitch, 1940 is reported as a new European erratic sponge. Taking into consideration the paleobiogeographic development of the paleocontinent Baltica, the sponges are supposed not only to originate from the Baltoscandinavian/Finnish continental basin, but mainly from the old shelves along the paleocontinent Baltica or Siberia. [English abstract of a paper in Dutch]
1997


Among the thousands of erratic silicified sponges from sandpits with Lower Pleistocene fluvial arenaceous deposits in the Dutch-German border region two species of Ordovician chiastoclonellid sponges have been recognised. The author reports the occurrence of 9 specimens of *Chiastoclonella* sp. Rauff 1895 and of 14 specimens of *Syltispongia ingemariae* van Kempen 1990. Most specimens in private collections have been collected already many years ago, but went unrecognised until now. The author expects more reports from collectors as a result of this paper. [English abstract of a paper in Dutch]


Among the nearly 40,000 investigated erratic Ordovician sponges in Europe the authors report the occurrence of 5 specimens of *Astylospongia gothlandica* 'Schlüter 1884, probably being a constant formvariation of *Caryospongia diadema* (Klöden) Rauff 1893. It is remarkable that this form occurs among 350 known erratic specimens collected at Gotland and has not been recognised yet among the tens of thousands of sponges from other localities. The authors want to be sure whether this constant formvariation of *Caryospongia gothlandica* has been overlooked in Dutch and German collections, or has to be considered as a formvariation exclusively occurring at Gotland. The authors are asking private collectors and institutes to check their specimens of Caryospongia diadema and to report them any positive


1999


2000


A new anthaspidellid sponge is described from the commonly named kaolinsand exposed in sandpits in Wenningstedt/Braderup on the island of Sylt. *Schismospongia syltensis* gen. n. sp. n. has a skeleton of dendroclones, which shows similarities with that of representatives of the family Anthaspidellidae, but differs from all other genera presently known in the arrangement of the canal system, as well as in its environmental preference for living in natural clefts.


Erratic Ordovician sponges (Porifera) from Gotland in the collections of the Swedish Museum of Natural History in Stockholm and the Natural Museum in Visby were subject of an inventory, the results of which are presented in this paper. The sponges are part of an extensive and diverse
Upper Ordovician sponge fauna that lived partly in tropical shelf areas and partly in a continental basin of the palaeocontinent Baltica. As a result of their transportation most of these sponges are isolated silicified bodies without adhering sediment. Since no major Ordovician sponge fauna has been found in solid rocks of Baltoscandia, the source area of these erratics is unknown. The sponges from Gotland were deposited during the Weichselian glaciation. They have been compared with erratic Ordovician sponges from Germany, The Netherlands, and Poland by a quantitative method of research. Generic composition of the sponge association from Gotland is identical to that from Sadewitz/Sawidowice (Poland), which was deposited during the Saalian glaciation. There is also a similarity to the majority of sponges in the Dutch/German border region that were deposited in glaciofluvial sediments during the Menapian (Early Pleistocene). The characteristics of the sponges from the Lausitz area (Germany) and from the Isle of Sylt (Germany), which were deposited in Middle Miocene and Late Pliocene time, respectively, are different. A supposed bipartition of these associations is discussed and related to the palaeogeography and palaeoecology in the Late Ordovician. Extinction of the Baltic sponge fauna is possibly related to the glaciations during the Hirnantian (Late Ordovician). The importance of this fossil sponge fauna is emphasized.

2001
RHEBERGEN F., EGGINK R., KOOPS T., RHEBERGEN B.
2001. Ordovicische zwerfsteensponzen. Staringia 9; Grondboor en Hamer 55, 2 (?): 144 pp, 68 figs, 43 pls. [reported by FC&P30, 2: 37]
Over many years more than 60.000 silicified Ordovician erratic sponges from the palaeocontinent Baltica have been collected in some areas in Northern Europe. Especially in the Netherlands some hundred enthusiastic amateur geologists have stored about 20.000 specimens in their private collections or housed them in museums. However, appropriate literature to identify them properly is not readily available. Either the literature is too old to be loaned out by museums or institutes,
or it is inaccessible to the average amateur, due to both the scientific level and the need to read foreign languages. The purpose of this volume is first of all to provide a guide, a manual for Dutch (and German) amateurs. This atlas also serves other purposes: It is also meant to give an overview of the current knowledge of this subject at a time that sponges are the subject of extensive research. Besides, there is presently a concentration of knowledge, experience and availability of the material. The third purpose is to draw the attention of sponge specialists throughout the world to the extensive and varied sponge assemblages from Baltica. It is remarkable that in the 19th century German sponge specialists, such as Roemer, Rauff and von Zittel, were leading the research and even examined American sponges. After that generation only a few European palaeontologists continued these investigations. Over the years American specialists dominated sponge research. Perhaps as a result of this development Baltic sponges were gradually left out of palaeontological focus. Perhaps this atlas will stimulate renewed interest in these varied, sometimes wonderfully preserved, erratic sponge assemblages. [introduction to English summary]

2002

Astylospongia gothlandica Schlüter, 1884 was considered by Rauff (1893) and later authors as synonymous with Caryospongia diadema (Klöden, 1834). However, recent examination of the holotype and of several identical specimens found as erratics has revealed an internal skeletal and canal structure basically different from that of both the genus Astylospongia, and other genera of the family. Therefore, the new genus Caryoconus is introduced. Caryoconus gothlandicus (Schlüter, 1884) differs from all of the other transported sponge pebbles in its very restricted distribution, in that this species was found only on Gotland. A
Silurian age was established on microfossils that occur with some of the sponges. This contrasts to all of the other numerous erratic sponge species, which originated from Late Ordovician beds. Because of this, it is concluded that representatives of Caryoconus gothlandicus came from an unknown, most probably restricted source area different from the source area of the numerous erratic sponge species from older strata.

2003

2004

Until now hemispherical astylospongiid sponges were invariably referred to as Caryospongia juglans var. basiplana Rauff. Renewed investigations have now shown that part of the material should be assigned to a new genus and species, Tympanospongia vankempeni, which is characterised
by a system of very irregular canals. These flat-based sponges originate from the Baltic region and occur in two assemblages of silicified Late Ordovician sponges known exclusively as erratics from The Netherlands and northern Germany. These fossils were transported by the River Eridanos, a former drainage system from the Baltic region that filled the North European Basin during the Miocene to Early Pleistocene. Specimens of *Tympanospongia vankempeni* gen. et sp. nov. also occur in the Upper Pleistocene of Gotland, Sweden. The new sponge described herein principally differs from other genera of the Astylospongiidae found frequently in the erratic sponge assemblages by its irregular system of apochetes which ramify and anastomose commonly.

2005


**RHEBERGEN F. 2005.** Sponges (Porifera) from Silurian strata on Gotland, Sweden. *GFF* **127**, 3: 211-216; [https://doi.org/10.1080/11035890501273211](https://doi.org/10.1080/11035890501273211)

[keywords: Porifera, Demospongea, Heteractinida, Calcarea, Polyactinellidae, phobetractinid spicules, Silurian, Gotland, paleoecology] Bodily preserved sponges as well as isolated spicules are described from Silurian strata on Gotland, Sweden. Pyritized and calcareous specimens
of *Hindia sphaeroidalis* Duncan, 1879 occur from the Lower Visby (Llandovery) to Hemse Formation (Ludlow). Among isolated spicules, octatines of *Astraeospongium patina* Roemer, 1861 are predominant. Calcareous spicules of *Phobetractinia polymorpha* Reif, 1968, *Dvorcia mira* Nekvasilova & Stemprokova, 1960, probably *Reifelia diffissa* Mostler, 1996, as well as isolated tricranoclones of *Hindia*, and spicules of unidentified taxa are reported for the first time.

2006
The assemblage of erratic Ordovician sponges from Baltica collected in the NE-part of The Netherlands and adjacent German border area demonstrates striking similarities with those of North-America (Laurentia), China, Argentina and Australia. However, extensive investigations show distinct characteristics of each of the associations. Until recently, the anthaspidellid *Zittelella*, which is common in Middle-Ordovician strata of North America, had not been recognized in the Baltic assemblage. The first specimen, a silicified erratic sponge body from Gotland, Sweden, has been recognized in the collections the Museum of Evolution, Uppsala University (Sweden), which was followed by some more erratic specimens from The Netherlands. [the English summary of Dutch text]

2007
RHEBERGEN F. 2007. Revision of the species *Astraeospongium patina* Roemer, 1861, based on Ordovician bedrock specimens from Estonia. *GFF* 129, 1: 17-22; [https://doi.org/10.1080/11035890701291017](https://doi.org/10.1080/11035890701291017)
Specimens of *Astraeospongium patina* Roemer, 1861 from Lower-Middle Ordovician ( Arenig-Llanvirn) and from Upper Ordovician (Caradoc)
deposits in Aluvere and in the Maardu region, Estonia, are described, demonstrating the validity of the species. These are the first bodily preserved specimens reported from Baltic bedrock, and the oldest representatives of the Astraeospongiidae known to date. Previous reports by Roemer (1861), Kiaer (1908) and Reitner (1992) are discussed, and a comparison of *A. patina* Roemer, 1861 with *A. meniscum* (Roemer, 1848) is given. Spicules in comparable parts of *A. patina* are considerably smaller (about 1 mm) than in those of *A. meniscum* (6-7 mm).

**RHEBERGEN F. 2007.** The Ordovician sponge *Palaeomanon cratera* (Roemer, 1848) as an erratic on Gotland (Sweden). *GFF* **129**, 1: 23-29; [https://doi.org/10.1080/11035890701291023](https://doi.org/10.1080/11035890701291023)  [keywords: Porifera, Astylospongiidae, Ordovician, erratics, Baltica, Laurentia, Gotland, palaeobiogeography]

Recent cataloguing of collections of Late Ordovician erratic sponges from Gotland (Sweden) in Swedish museums has revealed the presence of *Palaeomanon cratera* (Roemer, 1848), previously known only from Silurian strata in Tennessee (USA) and the Northwest Territories (Canada). The species forms part of a rich sponge assemblage occurring on Gotland, representing one of three associations in north and northwest Europe, and originating from unknown source areas in Baltica. Palynomorphs extracted from adhering sediment document a Late Ordovician (Ashgill) age; thus, they are the oldest representatives of the species known to date. Naturally, this has implications for the palaeobiogeography of Palaeomanon, in relation to faunal exchange between Baltica and Laurentia; a possible migration from Baltica to Laurentia is discussed.

RHEBERGEN F. 2007. Baltic Ordovician compound sponges as erratics on Gotland (Sweden), in northern Germany and the eastern Netherlands. *Geologie en Mijnbouw* 86, 4; DOI: 10.1017/S0016774600023581

Compound orhocladine sponges are unusual in the Early Palaeozoic. In Europe, silicified material of Late Ordovician age has hitherto been referred to as *Aulocopium aurantium* Oswald, 1847 and the invalid *Aulocopium compositum* Conwentz, 1905. An examination of new material has resulted in the recognition of a new genus, *Hydraspongia*, with two new species, *H. polycephala* and *H. erecta*, and a third new species, *Perissocoelia megahabra*, to which most specimens can now be assigned. These taxa form part of rich erratic sponge assemblages, which originate from unknown source areas in the Baltic, and have been collected in northern and western Europe from fluvial sandy deposits of the Eridanos River system, which drained the Baltic area from the Middle Miocene to Early Pleistocene.

2008


Al meer dan honderd jaar zijn ze bekend: verkiezelde sponzen met meerdere koppen, als zwerfstenen van onbekende herkomst en doorgaans beschouwd als enkele van de vele vormen van *Aulocopium*. In vier Zweedse musea liggen buitengewoon mooie exemplaren, ooit verzameld op Gotland, maar nooit beschreven. Deze sponzen zijn de afgelopen jaren onderwerp van studie geweest, samen met exemplaren in Nederlandse en Duitse verzamelingen, afkomstig uit het WWWgebied en van Sylt (Afb. 1). De meeste ervan zijn ondergebracht in drie nieuwe

2009
**RHEBERGEN F. 2009.** Ordovician sponges (Porifera) and other silicifications from Baltica in Neogene and Pleistocene fluvial deposits of the Netherlands and northern Germany. *Estonian Journal of Earth Sciences* **58**, 1; **DOI: 10.3176/earth.2009.1.03**
Fluvial deposits of Miocene to Early Pleistocene age in Germany and the Netherlands were laid down in the delta of the Eridanos River System, but the exact provenance of this material continues to be a subject of discussion. The aim of the present study is twofold. Firstly, a comparison of Ordovician sponges in these deposits with those from northern Estonia and the St Petersburg region (Russia) demonstrates that these erratics originated from the drainage area of the Pra Neva, a tributary of the Eridanos. Secondly, the importance of Late Ordovician silicified boulders, which yield forms of preservation that are unknown in comparable fossils, preserved *in situ*, is outlined. Some recommendations for future studies are made.

2011

[keywords: Porifera, spicules, Dictyospongioidea, acanthohexactine, Baltica, erratic]
A new species of complex hexactinellid sponge, *Haljalaspongia inaudita*, is described from fluvially transported blocks found in northwestern Germany, near the Dutch border, but which probably originated from the eastern Baltic region. The heavily folded wall is composed of multiple spicule layers, including dermal and gastral layers of acanthohexactines, and a central layer of sub-parallel monaxons. The monaxial layer is lined on one side by a reticulate array of smooth monaxons. The sponge is difficult to assign to any known fossil or recent group, but shares some features with the dictyospongioid family Docodermatidae.

The type and only specimen of *Fibrocoelia tubantiensis* van Kempen, that was housed in the palaeontological collection of the Geological Institute of the University of Amsterdam, has been reposited in the Netherlands Centre for Biodiversity - Naturalis, Leiden, the Netherlands. *Syltrochos pyramidoidalis* von Hacht, placed in an uncertain order and family by Finks & Rigby, is revised on the basis of new material. This has revealed that the skeleton is composed of spheroclones, so that the species has to be assigned to the Astylospongiidae von Zittel. The species name *Carpospongia langei* von Hacht is invalid, being a junior synonym of *Carpospongia pogrebowi* Asatkin.

2012

Ordovician sponge associations from strata of the Haljala Stage (CII-DI) in Estonia and the St. Petersburg region are briefly described. Composition and age show strong similarities with part of the erratic sponge associations, i.e. astylospongiids that were deposited fluvially during Miocene and Pliocene times in northern Germany and the Netherlands,
as part of the so called 'blue' sponge assemblage, which is always connected with the erratic assemblage of 'lavenderblue cherts'. In contrast, anthaspidellids, such as *Aulocopium aurantium*, which predominate in the erratic assemblages, are nearly absent in those from Baltic strata. The species *Carpospongia langei* von Hacht, 1994 is invalid since it is a junior synonym of *C. pogrebowi* Asatkin, 1949. Suggestions for future investigations are presented in the end. [English abstract of German text]

**RHEBERGEN F. 2012.** Ordovicische sponzen uit vast gesteente in Estland en bij St. Petersburg en hun relatie tot "onze" zwerfsteensponzen. *Grondboor en Hamer* 66, 3: 294-300. [not seen]

**RHEBERGEN F. 2012.** Hexactinellide sponzen in Ordovicische "baksteenkalk". *Grondboor en Hamer* 66, 6: 438-443. [not seen]

Lavenderblue cherts form a characteristic part of the quartz sands, which were deposited during Tertiary and Early Pleistocene times into the Northwest European Basin by the Baltic River System. The present study deals with several aspects of the lavenderblue cherts: their typology, provenance, ways and trajects of transport, and the forms of silicification manifest in them. The focus is on lavenderblue cherts collected from deposits in the County of Bentheim (Niedersachsen, Germany) and the adjacent eastern part of the Netherlands. The lavenderblue cherts are compared with other Ordovician silicified erratics of the same area. Fossils and lithological features indicate that the lavenderblue cherts mainly originate from two Ordovician periods, the Middle Sandbian Haljala and Keila stages (CIII - DII) and the Upper Katian Pirgu stage (Flc). The unique character of the lavenderblue cherts is evident from their
flora and fauna, which are rather distinct from those in coeval, brown silicified types of limestone, such as brick-like limestones, brown Pirgu limestone and öjlemyr flint. [initial part of an extensive summary]

2014

KOOPS T., RHEBERGEN F. 2014. De 'Pindaspons' en een nieuw 'lavendelblauw' gezelschap van Krijtspazen. *Grondboor en Hamer* 68, 1: 12-17. [not seen]


The new anthaspidellid taxon *Brevaspidella dispersa* is erected for specimens recovered from the Late Ordovician sponge assemblages of the island of Gotland, Sweden and the Dutch-German border region. In the latter area, they are collected from Early Pleistocene fluvial deposits of the Baltic River System, whereas those from Gotland are part of Late Pleistocene glacial or fluvio-glacial deposits. The provenance of both assemblages is uncertain, but they probably originated from an Ordovician basin in the northern Baltic Sea or the Bothnian Gulf, west of Finland. As yet, *Brevaspidella dispersa* gen. et sp. nov. is restricted to the Gotland-German-Dutch sponge association and has not been found in the assemblage of nearly-coeval 'lavender-blue cherts' and 'blue sponges'. The new taxon is closely related to the genus *Anthaspidella*, but differs in the aquiferous system and in having a well developed concentrically wrinkled dermal layer.

A diverse assemblage of silicified sponges, including orchocladines, rhizomorines, stromatoporoids, hexactinellids and non-lithistid demosponges, has been collected from scree accumulations in a restricted area along the western coast of the Island of Gotland, Sweden. The assemblage comprises 29 species in 20 genera, 18 species of which have not previously been recorded from Baltica, together with several taxa in open nomenclature. This chapter discusses this sponge assemblage in detail. It first gives a brief introduction on the geological settings, and the material, repository, methods and terminology used for the study of the assemblage. The chapter discusses the sponge assemblage under various families, classes and orders such as Hexactinellida, Orchocladina, Stromatoporoidea, Rhizomorina and Streptosolenida.

2015

2016

[keywords: Silurian, Wenlock, Gotland, Porifera, Demospongea, Orchocladina]

A specimen of the orchocladinid sponge *Archaeoscyphia rectilinearis* de Freitas (1989) is presented here as the first representative of the Anthaspidellidae from Wenlock strata on Gotland (Sweden). Other coeval occurrences are not yet known from the Silurian of Baltica. This
specimen forms a link between the recently described sponge assemblage from Llandovery (Telychian) strata on Gotland and those from Wenlock to Ludlow strata from Arctic Canada. In addition, the specimen fills a gap in the fossil record of Silurian non-stromatoporoid sponges, which are poorly known worldwide.

2017


This study seeks to describe 'baksteenkalk', an erratic silicified bioclastic carbonate of the Upper Sandbian from the eastern part of the Netherlands. To date, baksteenkalk has received little attention among palaeontologists. This is to be regretted on two grounds. First, baksteenkalk contains a varied fossil flora and fauna comprising many species, several of which are not or only rarely found in coeval rocks. Second, owing to a complicated silicification process, fossils, in particular algae, have preserved exceptional anatomical details. [introductory part of an extensive abstract; list of taxa (usually identified to species level) of erratics studied, presented in table 2 of this paper, contains 11 algae, 28 trilobites, 25 articulate and 10 inarticulate brachiopods, 20 gastropods, 7 cephalopods, 3 bivalves, 3 rostroconchs, 1 monoplacophoran, 10 bryozoans, 8 echinoderms, 2 receptaculitids, 2 hyolitha, 4 machaeridians, 2 conulariids, ostracods (undifferentiated), 3 graptolites, undifferentiated cornulitids and tentaculitids, 2 problematica (Ancientia sp. and Tomaculum problematicum Groom 1902), 3 ichnofossils, and 6
sponges; among the latter listed are: an undetermined brachiospongioid sponge, *Haljalaspongia inaudita* Botting & Rhebergen 2011, *Hindia sphaeroidalis* Duncan 1879, hexactinellid spicules, monaxonoid ('root-tuft') spicules, and an undetermined chiastoclonellid sponge.

**Vlasta ZUKALOVA (1925-2018)**

memory and paleontological bibliography
compiled by T. Wrzolek and J. Hladil
portrait from a photo by J. Otava

The contribution is devoted to the 90th birthday anniversary of outstanding Moravian palaeontologist RNDr. Vlasta Zukalova who connected her professional carrier with the Brno Branch of the former institution Ústrední ústav geologický (Central Geological Institute; Czech Geological Survey in recent time). She studied especially the Devonian and Carboniferous stromatoporoidea and other groups of fossil fauna in limestone formations of the Moravian Palaeozoic. In the 70th years of the 20th century V. Zukalová had a unique possibility to elaborate palaeontological finds from many deep boreholes carried out for the oil industry in Moravia at that time. The article is complemented with the list of her publications in geological journals and report’s manuscripts deposited in the archives of Geofond, Prague. In the informal
commemorative final part of the article, her colleagues and co-workers have described their observations and experience connected with her cooperation or meeting. [original abstract]

[list of 31 published geological papers of Vlasta ZUKALOVA, presented below, was taken from the paper presented above; note also presence of numerous unpublished reports authored and co-authored by V. Zukalova, housed at Geofond Archives, Prague]


ZUKALOVA V. 1971. Stromatoporoidea from the Middle and Upper Devonian of the Moravian Karst. Rozpravy Ústredního ústavu geologického 37, 5: 1-143; Praha. [FC&P 39_1: 21]


Hodonín.

**ZUKALOVA V. 1981.** Rozšíření a stratigrafický význam stromatoporoideí a mikrofosílií v devonských vápencích (givetu a frasnu) v hlubokých vrtech jihovýchodne od Brna. *Knihovnicka zemního plynu a nafty* **2**: 37-57; Hodonín. [FC&P 11_2: 44]


**DVORAK J., FRIAKOVA O., KALVODA J., KUKAL Z., ZUKALOVA V. 1984.** Vývoj sedimentace behem svrchního devonu a spodního karbonu na vrtech Mokrá S1 a S2 v j. části Moravského krasu a jeho srovnání s okolím Hranic na Morave. *Casopis Slezského muzea v Opave, Série A, prírodní vedy* **33**: 205-216; Opava.


**NEWS & VIEWS**
Report from Poland / by Jerzy Fedorowski

Paper submitted

FEDOROWSKI J. XXXX. Early Bashkirian Rugosa (Anthozoa) from the Donets Basin (Ukraine), Part 7. Family Neokoninckophyllidae Fomichev, 1953; with a preliminary revision of Moscovian taxa. *Acta Geologica Polonica* XXX-XXX.
[keywords: Carboniferous (Pennsylvanian); Neokoninckophyllidae; emendation; phylogeny; palaeogeographical implications]

PRELIMINARY ABSTRACT: The Family Neokoninckophyllidae and its type genus *Neokoninckophyllum* Fomichev, 1939 (type species: *N. tanaicum* Fomichev, 1939) are discussed and emended. In addition, the genera *Orygmophyllum* Fomichev, 1953 and *Yuanophylloides* Fomichev, 1953, originally included in the Families Campophyllidae Wedekind, 1922 and Lophophyllidae Grabau, 1928, respectively, are emended as well and transferred to the Neokoninckophyllidae. Two early Bashkirian species, viz. *Yuanophylloides rectus* (Vassilyuk, 1983) and *Y. inauditus* (Moore and Jeffords, 1945), plus the Moscovian *Neokoninckophyllum* sp. nov. are described on the basis of new collections from the Donets Basin. *Neokoninckophyllum tanaicum*, *Yuanophylloides gorskyi* Fomichev, 1953 (both Moscovian in age) and *Y. cruciformis* Fomichev, 1953 (latest Bashkirian), are redescribed on the basis of peels taken from Fomichev's (1953) type specimens. Derivation of the Neokoninckophyllidae from the
Subfamily Dibunophyllinae Wang, 1950 is postulated and phylogenetic links within the former are hinted at. The occurrence of *Yuanophylloides inauditus* in both the Donets Basin and Western Interior Province of North America points to marine communication between those areas during the Bashkirian. The slightly earlier appearance of the oldest neokoninckophyllids in the Donets Basin, in comparison to North America (i.e., R1 vs R2 ammonoid biozones), documents the common roots and monophyletic development of the Neokoninckophyllidae in both areas.

Papers / research in progress

**FEDOROWSKI J., VASSILYUK N. P.** Early Bashkirian Rugosa (Anthozoa) from the Donets Basin (Ukraine). Part 8. The paper in its main part is devoted to the study on specimens derived from the lower Bashkirian strata, starting from one of the earliest limestone intercalations included in the Bashkirian. A new subfamily of an uncertain relationship is introduced for that group of taxa. A brief revision of the Family Kumpanophyllidae Fomichev, 1953, based on several specimens collected from the lower Bashkirian strata, supplements the study mentioned above. The paper will be submitted to *Acta Geologica Polonica*.

**FEDOROWSKI J., BAMBER E. W., RICHARDS B. C.** Temporary title: Rugosa (Anthozoa) from the Pennsylvanian Mattson Formation in the Liard Basin (Canada) and their bearing on the stratigraphy and the rugose corals paleobiogeography. Two new species included in the genera *Nemistium* Smith, 1928 and *Heritschioides* Yabe, 1950 are described from the strata and site as in the title. Specimens from the Mattson Fm. appear co-specific with some colonies derived from the late Serpukhovian - early Bashkirian strata of the Stikine terrane whereas the new species of *Heritschioides* closely
resembles some morphologically simple species of that genus described earlier from the Alexander terrane and Brooks Range (Alaska). The relationships mentioned allow some palaeogeographical considerations. Submission of the paper has not yet been decided.

**NEWS & VIEWS**

*Report from the United Kingdom / by Lewis Jones*

Dear all - writes Lewis - Thank you for welcoming me to your Association.

My name is Lewis Jones, and I am a second year PhD student working out of Imperial College London. My research largely focuses on the macroecological patterns of the scleractinian corals throughout the Mesozoic and Cenozoic. I utilise a range of statistical tools and Earth System Modelling to improve our understanding of the environmental controls on corals and the fossil/sedimentary record, examining for potential bias in the record of coral biodiversity on Earth. I believe my contact details will soon be added to the website, so if anybody has any questions or wishes to chat about my research area, please feel free to contact me.

I look forward to meeting you all in Modena next year.

Best,

Lewis Jones.
Porifera see also numerous papers in Rhebergen's bibliography

[keywords: Porifera, Hexactinellida, Reticulosa, Burgess Shale-type fauna, biogeography, Cambrian, Mexico]
A small assemblage of extremely well-preserved fragments of new sponges has been discovered in calcipelites of the middle Cambrian El Mogallón Formation in the Cerro El Mogallón section, near Arivechi in eastern Sonora, Mexico. The assemblage includes two new reticulosan species referred to Ratcliffespongia arivechensis sp. nov. and Valospongia sonorensis sp. nov., combined with disarticulated remains assigned to Kiwetinokia and additional, currently unidentifiable taxa. The new species represent the first records of these Cambrian genera from Mexico, although they are widely distributed at low latitudes, being previously best known from Utah but extending through Laurentia and South China. This middle Cambrian fauna indicates that there was considerable continuity of the deeper-water hexactinellid sponges between the warm peri-platform of Laurentia and the peri-continental Cambrian platform of Sonora. The new material supports the impression of extremely wide distribution of Cambrian sponge genera, with local diversification at species level within regions, in contrast to much greater generic-level endemism during the Ordovician Period.

[keywords: Porifera, Hexactinellida, Reticulosa, Carboniferous,
Mississippian, Argentina
A Mississippian hexactinellid sponge from western Argentina improves the extremely poor late Paleozoic sponge records from Gondwana. The sponge is included in the subfamily Thysanodictyinae of family Dictyospongiidae. The new genus and species *Minitaspongia parvis* is erected, and its well-preserved spicular structure is described in detail representing the first approximation of the spicule assemblage in Thysanodictyinae. The skeleton is clathrate, three-dimensional with at least two ranks of rectangular openings. This first report of this subfamily outside North America represents the best-known hexactinellid and the first dictyosponge record from the Carboniferous of Gondwana. Unlike the occurrences of Thysanodictyinae in North America, with thick skeletons linked to high-energy shallow water settings, *Minitaspongia* occurs in low-energy water siliciclastic settings related to a cold climate and glacimarine deposits. Accordingly, the complex wall structure of this sponge should not be invoked as a necessary adaptation to high energy and shallow water settings.


The first report of *Coeloptychium* from the Cretaceous of Liege-Limburg that we are aware of, is from 1859, hidden somewhere in a footnote. Here we report a handful of specimens from the Zeven Wegen Member (Gulpen Formation, Late Campanian) from the neighbourhood of Lixhe and Haccourt in the Belgian community of Liege. The specimens probably belong to two species, better said morphotypes: *C. deciminum* and *C. agaricoides*. The specimens are compared with reports from the Santonian and Campanian, especially in Münsterland and surroundings of Hannover in Germany and with Polish reports. [Dutch abstract translated by Jacob Leloux]
[keywords: Sphinctozoan, Upper Permian, southern Primorye]
A new sphinctozoan species, *Colospongia lenis* sp. nov., from the Upper Permian deposits of the southern Primorye (Nakhodka Reef, Bezymyannaya Mountain) is described.

[keywords: Sponge spicules, Cambrian (Series 3), Guzhangian, Greenland, Laurentia]
Disarticulated sponge spicules are described in two diverse assemblages from the Holm Dal Formation of North Greenland (Cambrian Series 3, Guzhangian Stage, *Lejopyge laevigata* Biozone). They compare most closely with contemporaneous spicules described from the Mindyallan Stage of Queensland, Australia. Although originating on separate palaeocontinents, the Laurentian and Gondwanan spicule assemblages accumulated in equatorial latitudes, demonstrating the potential stratigraphic and palaeogeographic utility of disarticulated spicules in the Cambrian. Samples from Gustav Holm Dal are dominated by robust acanthose pentactins with widely spaced spines also present in the solariform *Seqinegia bottingi* n. gen. n. sp. *Australispongia sinensis* Dong & Knoll, 1996, *Silicunculus australiensis* Bengtson, 1986 and *Silicunculus saaqquit* Peel, 2017 also occur but are not common. Samples from Navarana Fjord are dominated by tetractins and pentactins. *Speciosuspongia* cf. *wangcunensis* Chen & Dong, 2008 may be common. Tetractins of *Tallitaniqa petalliformis* n. gen. n. sp., *Kuonamia fusiformis* (Fedorov in Fedorov & Pereladov, 1987) and *Sisamatispongia erecta* n. gen. n. sp. are only recorded from Navarana Fjord.
The freshwater sponge species *Ephydatia* cf. *facunda* Weltner, 1895 (Spongillida, Spongillidae) is reported for the first time as a fossil from middle Eocene lake sediments of the Giraffe kimberlite maar in northern Canada. The sponge is represented by birotule gemmuloscleres as well as oxea megascleres. Today, *E. facunda* inhabits warm-water bodies, so its presence in the Giraffe locality provides evidence of a warm climate at high latitudes during the middle Eocene. The morphological similarity of the birotules to modern conspecific forms suggests protracted morphological stasis, comparable to that reported for other siliceous microfossils from the same locality.

Seven new deep-water Tetractinellida (Porifera: Demospongiae) from the Galápagos Islands - morphological descriptions and DNA barcodes. *Zoological Journal of the Linnean Society; doi 10.1093/zoolinnean/zlx110* (23 March 2018). The Galápagos Islands, positioned in the confluence of warm and coldwater currents in the Eastern Pacific, is well known for the high degree of endemism of its marine invertebrate fauna. This fauna has been studied extensively in recent years: the echinoderms, corals and other benthic cnidarians, but little is known about the deep- and shallow-water sponge faunas. To date, only 70 sponge species have been described from the Galápagos Islands, 37 of which are endemic. Of these 70 species, only one shallow-water species of desma-bearing Tetractinellida (Demospongiae), *Corallistes isabela*, has been reported. In 1995, Harbor Branch Oceanographic Institution, Florida, led an expedition around the Galápagos archipelago, focussed on the collection
of deep-water Porifera. Here, we describe seven new species and provide DNA barcodes for the tetractinellids from these collections. Phylogenetic relationships of these new species are discussed and compared with other material from the Caribbean, the Central and West Pacific Oceans. The new species represent five genera (*Craniella*, and desma-bearing Tetractinellida *Neophrissospongia*, *Corallistes*, *Racodiscula* and *Scleritoderma*). Phylogenetic reconstructions combining independent markers (mtDNA and rDNA) support the generic affiliation of these new species and confirm the separation of Eastern Pacific species from Caribbean and Central to West Pacific species.

SCHUSTER A., PISERA A., KELLY M., BELL L. J., POMPONI S., WORHEIDE G., ERPENBECK D. 2018. New species and a molecular dating analysis of *Vetulina* Schmidt, 1879 (Porifera: Demospongiae: Sphaerocladina) reveal an ancient relict fauna with Tethys origin. *Zoological Journal of the Linnean Society; doi 10.1093/zoolinnean/zlx114* (14 March 2018). *Vetulina* Schmidt, 1879 (Demospongiae, Sphaerocladina, Vetulinidae) currently constitutes the only living representative of a once diverse Mesozoic group. Molecular data place *Vetulina* as a sister taxon to freshwater sponges (Spongillida) despite different skeletal composition. To date, only three extant species of this desma-bearing 'rock sponge' have been described from the Caribbean and Indian Ocean, all with similar growth forms and spiculation, but different desma and surface details. Comparison of these genetically very similar species was not possible until the present study. The distribution of *Vetulina* is taken to be a consequence of the closure of the Tethyan Seaway in the Early Miocene, suggesting a more widely distributed population with its origin in the Tethys Sea. To support this hypothesis in a molecular palaeobiological framework, we first increased the taxon sampling by describing and sequencing two new species of *Vetulina* from the Bahamas and Philippines and report *Vetulina stalactites* from nine additional locations in the Tropical Western Atlantic. A robust, dated phylogeny was calculated from the combined dataset and amended by
five representative fossils. Our results point to an Eocene origin for *Vetulina*, even before the closure of the Tethyan Seaway in the Miocene, supporting the hypothesis that *Vetulina* presents a relict fauna with its origin in the Tethys Sea.


[keywords: Mitochondrial genomes, Molecular clock, next-generation sequencing, Demospongidae, Fossilized birth-death model, Porifera, Molecular dating]

**Background:** Approximately 80% of all described extant sponge species belong to the class Demospongidae. Yet, despite their diversity and importance, accurate divergence times are still unknown for most demosponge clades. The estimation of demosponge divergence time is key to answering fundamental questions on the origin of Demospongidae, their diversification and historical biogeography. Molecular sequence data alone is not informative on an absolute time scale, and therefore needs to be "calibrated" with additional data such as fossils. Here, we calibrate the molecular data with the fossilized birth-death model, which compared to strict node dating, allows for the inclusion of young and old fossils in the analysis of divergence time. We use desma-bearing sponges, a diverse group of demosponges that form rigid skeletons and have a rich and continuous fossil record dating back to the Cambrian (~500 Ma), to date the demosponge radiation and constrain the timing of key evolutionary events, like the transition from marine to freshwater habitats. To infer a dated phylogeny of Demospongidae we assembled the mitochondrial genomes of six desma-bearing demosponges from reduced-representation genomic libraries. The total dataset included 33 complete demosponge mitochondrial genomes and 30 fossils.

**Results:** Our study supports a Neoproterozoic origin of Demospongidae.
Novel age estimates for the split of freshwater and marine sponges dating back to the Carboniferous and the previously assumed recent (~18 Ma) diversification of freshwater sponges is supported. Moreover, we provide detailed age estimates for a possible diversification of Tetractinellidae (~315 Ma), the Astrophorina (~240 Ma), the Spirophorina (~120 Ma) and the family Corallistidae (~188 Ma) all of which are considered as key groups for dating the Demospongiae due to their extraordinary rich and continuous fossil history.

**Conclusion:** This study provides novel insights into the evolution of Demospongiae. Observed discrepancies of our dated phylogeny with their putative first fossil appearance dates are discussed for selected sponge groups. For instance, a Carboniferous origin of the order Tetractinellida seems to be too late, compared to their first appearance in the fossil record in the Middle Cambrian. This would imply that Paleozoic spicule forms are not homologous to post-Paleozoic forms.


**WOLNIEWICZ P. 2016.** Representatives of the family Actinostromatidae (Stromatoporoidea) in the Devonian of southern Poland and their ecological significance. *Geologos* 22, 3: 227-249. [https://doi.org/10.1515/logos-2016-0023](https://doi.org/10.1515/logos-2016-0023)

Stromatoporoids of the family Actinostromatidae are common constituents of Givetian to Frasnian (Devonian) organic buildups. The species-level structure of actinostromatid assemblages from the Devonian of southern Poland is described in the present paper, with special emphasis on ecological factors that influenced species
composition of the communities. Nine species of the genera *Actinostroma* and *Bifariostroma* are distinguished. Members of the family Actinostromatidae predominated in stromatoporoid assemblages within lower Frasnian carbonate buildup margins. The most diverse actinostromatid faunas were found within the middle Givetian Stringocephalus Bank, in the upper Givetian-lower Frasnian biostromal complex and in the lower Frasnian organic buildups. Species-level biodiversity was lowest within detrital facies which surrounded the Frasnian carbonate buildups. Species of *Actinostroma* with well-developed colliculi are commonest within the middle Givetian to early Frasnian coral-stromatoporoid biostromal complexes, whereas species with strongly reduced colliculi predominate early-middle Frasnian organic buildups. The skeletal structure of actinostromatids reflects environmental changes, documenting a transition from species with thin, close-set pillars and widely spaced laminae (common in the middle Givetian) to those with long, thick pillars and megapillars (in *Bifariostroma*), which were predominant during the early and middle Frasnian. The distribution of growth forms among species reveals a significant intraspecific variation. Species of *Actinostroma* can be either tabular or low domical, depending on the palaeoenvironmental setting. Thus, the present study confirms that stromatoporoid morphology was influenced by environmental conditions.
The genus *Rotalites* was established by Leleshus (1970: 97) for fossil Upper Silurian heliolitoids (Anthozoa) from Southern Tien Shan. However, the name is preoccupied by *Rotalites* Lamarck (1801: 401) of Foraminifera (Protista) (cf. Loeblich & Tappan, 1987). In accordance with the International Code of Zoological Nomenclature, *Chekhovichia* nom. nov. is proposed here as a replacement name for *Rotalites* Leleshus non Lamarck.


[keywords: Luxembourg, Oesling; Germany, western Eifel; Lower Devonian, Upper Emsian; Berlé Quartzites; benthic fauna, Bivalvia, Brachiopoda]

As a part of the research project "Paleontology of the Lower Devonian in Luxembourg" of the Musée National d'histoire naturelle Luxembourg the present paper deals with the Berlé-Quartzites (lowermost Upper Emsian). A large number of new finds permit a fundamental revision of the paleontological inventory of the Berlé-Quartzites. In the course of this study approximately 1400 objects were evaluated. In addition to historical, sedimentological and paleogeographical aspects a discussion of the fauna stands in the foreground of this contribution. As a main result, it could be shown that about one third of all recorded species appear for the first time with the onset of the Upper Emsian. [extracted from an English anstract; the systematical part contains descriptions mostly of shelly fauna (bivalves and brachiopods dominate), but also of
two corals: *Pleurodictyum* n. sp. cf. *problematicum* Goldfuss, 1829 (Taf. 2 Fig. 1-3) and *Aulopora* sp. (Taf. 2 Fig. 4-6); Table 18 in Appendix (pp 107-110) lists 4 coral taxa, besides the above mentioned also a rugosan *Hapsiphyllum* sp. and Tabulata fam. et gen. et sp. indet.]


[keywords: late early Permian, Jamal Formation, Iran, Gondwana, Tabulata]

Sevens species of tabulate corals, *Sutherlaandinia jamalensis* sp. nov., *Pseudofavosites exiguus* Flugel, 1972, *P. fusiforme* (Flugel, 1972), *Michelinia* sp. indet., *Gertholites? diversaporus* (Flugel, 1972), *G*. sp. indet., and *Thamnoptychia directa* (Flugel, 1972), are described from the Bagh-e-Vang Member (late early Permian) of the Jamal Formation of the Tabas area, East-Central Iran. The discoveries of *Sutherlandinia* and *Thamnoptychia* mark the first records of these genera in Iran. This assemblage inhabited the southern shelves of the Paleotethys along northern margin of Gondwana.


A rich fauna of *Pleurodictyum*-like corals is described from the Wiltz Beds (Lower to Middle Upper Emsian). It consists of three species of *Pleurodictyum*: *P*. n. sp.? cf. *giganteum* Kayser, *P. goldfussi* n. sp., *P. pruemensis* n. sp. Two others Micheliniidae are recorded: *Petridictyum*
sp. e.g. *erbslochensis* Plusquellec & Jahnke, 2007 nom. nud. and *Kerforneidictyum cf. oeslingensis* Plusquellec & Franke, 2010, as well as a Cleistoporidae: *Cleistodictyum* sp. cf. *C. porosum* Plusquellec, 1973. The fauna shows a clear renewal of the *Pleurodictyum*-like corals which are either represented by new species or by forms derived from the Lower Emsian ones. A relationship with the Daleje-Cancellata Event (DCE) is suggested.

The very rare hyostragulids from the Upper Emsian of the Eifel (Wiltz-beds) are described for the first time and two new taxa are erected, *Marekostragulum grafi* n. sp. and *Parostragulum problematicum* n. gen. n. sp. In the latter taxon, the development of wedge-like cavities between the basal plate of the encrusting coral and the substrate to which it was attached is suspected to explain the peculiar morphology of the proximal side. This hypothesis is supported by the study of the modalities of fossilization of some hyostragulids from the Massif Armoricain and Bohemia. The paleogeographic distribution of the hyostragulids in South Laurussia is somewhat expanded by the new occurrences but they appear more diversified and show a certain endemic character.

[keywords: Bifidomeria, Pleurodictyum, Roemeria, tabulate corals, Garra Formation, NSW, Early Devonian]
The tabulate coral *Pleurodictyum bifidum* Jones, 1944, from the Early
Devonian (Pragian or lower Emsian) Garra Formation of central New South Wales, Australia is revised on the basis of the holotype and three other specimens. It is selected as the type species of the new monotypic genus *Bifidomeria* (Family Roemeriidae), which differs from *Roemeria* in its strictly cerioid corallum, its bifid septal spines and aspects of its microstructure. Study of the detailed microstructure of two other tabulate corals from the Devonian of New South Wales has led to the following revised generic assignments: *Michelinia progenitor* Chapman, 1921, previously assigned to *Roemeripora*, is assigned to *Roemeria*, and *Holacanthopora clarkei* Wright & Flory, 1980 is assigned to *Michelinia*.


[keywords: Tabulata corals, Trachypsammiida, Conodonta, late Famennian, Early Carboniferous, Anti-Atlas Morocco, Harz Mountains, Rhenish Massif, Thuringian Mountains, Franconian Mountains, Sudetes Mountains, Ural]

The nearly forgotten Tabulata genus *Actinotheca* is described for the first time from southeastern Morocco (Tafilalt Platform, Anti-Atlas). *Actinotheca tenuicostata* (Münster, 1839) occurs in the *Gonioclymenia* Limestone (cephalopod facies) of the late Famennian. The conodont age is *Bispathodus costatus* Zone and perhaps *Bispathodus ultimus ultimus* Zone. This boundary interval - not yet precisely defined - between the *Clymenia* "Stage" and the *Wocklumeria* "Stage" yields a fauna with *Bispathodus ultimus bartzschi* Kononova & Weyer, 2013, recently discovered in Germany (Thuringian Mountains), and now duplicated in Morocco. The ahermatypic coral species is already known in Europe and western Asia; such late-latest Famennian specimens from Germany, Poland, and Russia are illustrated. *Pseudamplexus granulatus* Rozkowska, 1969 (Poland, misinterpreted as a Rugosa) and *Liratella miranda* Chudinova, 2001 (Kazakhstan) are junior synonyms of *Actinotheca tenuicostata*. The genus *Liratella* Chudinova, 2001 is
unnecessary, being absolutely identical with *Actinotheca*; and it is invalid, being preoccupied by *Liratella* Girault, 1913 (a recent Hymenoptera). *Actinotheca* survived the global Hangenberg Event at the Devonian-Carboniferous boundary. The type species *Actinotheca parallela* Frech, 1889 (Erdbach Limestone III, Rhenish Massif) becomes a synonym of *Actinotheca siemensii* (Frech, 1885) from the Harz Mountains (erroneously described as Frasnian, but according to new topotypes in reality from Viséan neptunian dykes within Frasnian Iberg Limestone); both are now dated as early-middle Viséan: *Scaliognathus anchoralis - Gnathodus bilineatus* Interregnum (*Pseudognathodus homopunctatus* Zone = *Gnathodus texanus* Zone). There is only a third record of equal age from England (Lancashire). For the moment, *Actinotheca* Frech, 1889 is nearest and obviously closely related to *Trachypsammia* Gerth, 1921 (Middle Permian) - in spite of the total absence of any such coral in Late Carboniferous and Early Permian times - and belongs to the family Palaeacidae Roemer, 1883 (with synonym Trachypsamiidae Gerth, 1921), which is classified within the superorder Tabulata as only member of the problematical order Trachypsammiida Montanaro-Gallitelli, 1955. Perhaps these taxa are not Zoantharia Blainville, 1830, but Alcyonaria Dana, 1846 (Octocorallia Haeckel, 1866).

Five types of assemblages composed of small, mostly undissepimented, deep-water Rugosa corals are known from the Emsian deposits of the Hamar Laghdad area (Morocco). The mud-mounds of Hamar Laghdad offered extraordinary environments for the development of rugose coral faunas. Some were connected with restricted venting and/or cryptic environments, but the elevated mudmounds themselves also acted as isolated "oases". These mounds provided favourable environmental conditions for coral colonization in an otherwise hostile, deeper environments, unfavourable even for a tolerant *Cyathaxonia* fauna. In the present paper, a peculiar rugose solitary coral with wall-free apex, *Wendticyathus nudus* n. gen. n. sp., is described.


[keywords: Cystiphyllid Rugosa, Gotland, *Halysites* biostrome, life strategies, rhizoid structures, Silurian]

An exceptionally well-preserved, unusual biostrome composed of the framebuilding cateniform tabulate coral *Halysites catenularius* (Linnaeus, 1767) bears an assemblage of the relatively large solitary cystiphyllid rugosan *Cystiphyllum visbyense* Wedekind, 1927. The corallites of solitary cystiphyllids are embedded within the ranks of the halysitid colonies, which developed on a soft, muddy substrate and in relatively turbid water. The cystiphyllid larvae successively settled mostly on the ranks of halysitid colonies and on colonies of the tiny phaceloid rugose
coral *Nanophyllum ramosum* Johannessen, 1995, whereas calice-in-calice recruitment was not successful for these cystiphyllid corals. Further growth of *C. visbyense* was supported by rhizoid structures, which were most frequently developed on the cardinal (convex) side of the corallite. The process of formation of the rhizoid structures is here discussed and explained in detail, showing that they were formed by the extension of the basal ectodermal tissue of the polyp. The cystiphyllids, which settled on the walls of living corallites of halysitid colonies, used sweeper tentacles to kill the smaller polyps of the colony to maintain the space around them and expand. Hence, they ultimately used the halysitid colonies only as a hard substrate to stabilize their position on the soft muddy sediment.


[keywords: Donets Basin; Rugosa (Aulophyllidae); Bashkirian; Taxonomy; Phylogeny; Relationships]

Seven genera (one new), belonging to four subfamilies, seven named species (six new), four species left in open nomenclature and two specimens included in this paper as unnamed Aulophyllidae are described from strata ranging from the lowermost Bashkirian Limestone DS1\10 to the lower Bashkirian Limestone F1. A new genus: *Voragoaxum* and six new species: *Dibunophyllum medium*, *Dibunophylloides columnatus*, *D. paulus*, *D. similis*, *Voragoaxum cavum* and *Rozkowskia lenta* are introduced. Comparison of the ontogeny of the earliest Bashkirian species of *Nina* Fedorowski, 2017a and *Dibunophylloides* Fomichev, 1953 suggest the derivation by descends of the Family Bothrophyllidae from the Subfamily Dibunophyllinae. This means the absence of true bothrophylla in the Mississippian strata of the Western European Province and, perhaps, in the contemporaneous strata of other areas as well. [corrected note for *FC&P*40: 43]
[keywords: Kyrgyzstan, "Lophophyllum", Rugosa, Lower Carboniferous, revision]

All specimens assigned by Gorskiy (1932) to the genus *Lophophyllum* Milne Edwards and Haime, 1850 are revised, redescribed and reillustrated. The corallite identified by him as a second, specifically indeterminate species of *Lophophyllum* sp. is here questionably included in *Amygdalophyllum* Dun and Benson, 1920. For the remaining specimens two new, unnamed genera are suggested. "*Lophophyllum* subtortuosum" Gorskiy, 1932 belongs to a new non-dissepimented genus of an unknown family. A possible relationship of Gen. nov. 1, sp. nov. 1 and the new Bashkirian genus from the Donets Basin (Ukraine) is proposed.

[keywords: Rugosa, Late Permian, Omolon Massif, Svalbard]

The unique large-sized solitary Rugosa of the upper Khivachian Stage in the Omolon terrane are a Late Permian psychrosphaeric fauna, originally situated in the North of Pangea in northeastern marginal basins of Angarida (boreal realm at latitude of 70°N). Faunistic relations are only indicated by the predominating species *Sochkineophyllum zavodovskyi* Sokolov, 1959, which is redescribed and removed to the recently introduced monotypic neighbouring genus *Fedorowskites* Chwieduk, 2013 from the Svalbard Archipelago (north of Lopingian Pangea at 45-50°N). Its type species *Fedorowskites spitsbergensis* Chwieduk, 2013 (Wordian-Capitanian) and *Sochkineophyllum turgidiseptatum* (Tidten, 1972) (Roadian-Capitanian) are illustrated by new Svalbard collections.
Fedorowskites survived at the late-Capitanian global Kamura-Event. The poor present knowledge about further northern Lopingian corals includes only Greenland and the European Zechstein-Basin, but there is no one species in common with the Omolon Massif. A new morphological term *lacunula interseptalis* is proposed for nearly forgotten skeletal elements, already described by Ludwig (1865) and Kunth (1869).


A relatively complete and thick lower through upper Devonian shallow marine sequence crops out in the vicinity of Qingmen Village in the suburb of Zhaotong, NE Yunnan Province, which yields abundant shallow water benthic fossils. The Qingmen section (including Fangyangchong) has become a reference Devonian section in the NE Yunnan due to its well established stratigraphic succession. Nevertheless, rugose corals have not been described until recently. The present paper is the third of the series of rugose corals studies, dealing with early Frasnian strata and rugose corals, with discussions on lithostratigraphy, correlation of coral faunas and their palaeobiogeography. The Upper Devonian sequence at Qingmen (Fangyangchong) is lithologically consistent with the Zaige Formation. This formation is mainly composed of dolomitic limestones and bears very few fossils. So that its geological age is not readily determined. Hence, the description and illustration of the rugose coral fauna from the base of the Zaige Formation of Qingmen (Fangyangchong) is of some importance. This fauna is composed of five genera and seven species, including *Sinodisphyllum simplex*, *S. variabile*, *Disphyllum catenatum*, *Hexagonaria magna*, *H. davidsoni*, *Temnophyllum poshiense* and *Truncicarinulum temeniophylloides*. These rugose corals overall suggest an early Frasnian age and a close biogeographic relationship between South China and western Canada.

*Pilophyllia* Ge and Yu, 1974 represents a major group of distinctive amplexoid corals in the Silurian, whose taxonomic relationships, species composition, and evolutionary trends remain contentious. A critical revision of type material and new specimens of several species (and subspecies) assigned to *Pilophyllia*, including the type species *P. involuta* Ge and Yu, 1974, provides solutions to some of these problems. *Pilophyllia* is revised to include only those forms characterized by a distinct peripheral stereozone and amplexoid major septa with club-shaped rhabdacanths set in thick lamellar stereomes. Other species, previously referred to *Pilophyllia* but having generally short septa with wedge-shaped rhabdacanths, are transferred herein to the new genus *Neopilophyllia* Wang. Both genera, together with other Silurian amplexoid rugosan genera such as *Amplexoides*, are referred to the new family Amplexoididae Wang, which is thought to be evolutionarily unrelated to the much younger (Devonian to early Carboniferous) amplexoid rugosan family Amplexidae Chapman, 1893. The first appearance of *Neopilophyllia* n. gen. in the middle Telychian, much later than that of *Pilophyllia* in the late Rhuddanian, probably marks a significant stage during the evolution of Silurian amplexoid corals.

Montlivaltia arcuata Beauvais, M. kaufmanni Koby, M. truncata (Defrance, 1817), Myriophyllia cf. propria Sikharulidze, Paraclausastrea vorarlbergensis Baron-Szabo, Peplosmilia stutzi (Koby), Placocoenia heimi (Koby) (new combination), Placophyllia dianthus (Goldfuss), Plesiomentlivaltia paucisepta (Koby) (new combination), Pleurophyllia schmidti (Koby) (new combination), P. tobleri (Koby), Polyphyllosseris icaunensis (d'Orbigny, 1850), Rhipidogyra cf. minima Koby, Stylangia cf. laddi Wells, Styлина pleionantha Meneghini, S. decipiens Étallon, S. cf. sparsa Trautschold, Stylosmilia alpina Koby, S. yabei Eguchi, Thecosmilia dichotoma (Koby), Th. sp., Trigerastraea gourdani (De Fromentel), and Vallimeandra cf. explanata (De Fromentel). Furthermore, five additional Berriasian coral faunas are reviewed and compared with the coral fauna of the upper Oehrli Formation. These five assemblages are from southern Ukraine (2 assemblages, consisting of five and 12 species, respectively), northern Tunisia (13 species), southern Spain (23 species), and central Tibet (11 species). Except for the faunas from central Tibet and northern Tunisia, the Berriasian coral assemblages are distinctly dominated by colonial species (70-95%); they represent largely isolated populations of mostly endemic species, and consist largely of genera that had already appeared in the Upper Jurassic (80-100%). On the species-level, however, with the exception of the coral assemblage of Spain, the Berriasian coral faunas are dominated by or completely consist of taxa that have their first occurrence in the Berriasian (54-100%). The Berriasian fauna of the upper Oehrli Formation described in this work contains nearly three times more species than found in the contemporaneous fauna of southern Spain which up to now was the largest known Berriasian fauna. Two of the upper Berriasian taxa described in the current work (Cycloria and Placocoenia) may be the first representatives of lineages that still occur today (Mussidae and Montastraeidae, respectively) as suggested by a recent study of the cox1 intron in modern corals.
For the first time, scleractinian corals are taxonomically described from Albian sediments of the Garschella Formation (lower Aptian-lower Cenomanian) of western Austria (Vorarlberg) and eastern Switzerland (Canton of Appenzell). Fifteen species belonging to eleven genera from seven families were determined: *Calamophylliiopsis compressa* (d'Orbigny), *C. cf. cervina* (Étallon), *Cladocora cf. brevis* Seguenza, *Podoseris elongata* Duncan, *P. mammiliformis* Duncan, *P. sp.*, *Synhelia gibbosa* (Münster, in Goldfuss), *Enallhelia cf. tubulosa* Becker, *Enallhelia sp.*, *Caryophyllia konincki* (Milne Edwards & Haime), *Stylocyathus cf. dentalinus* d'Orbigny, *Trochocyathus antsiranensis* Collignon, *Bathycyathus laevigatus* (Milne Edwards & Haime), *Fungiastrea cotteau* (De Fromentel), and *Stephanophyllia plattenwaldensis* n. sp. The coral fauna of the Garschella Formation is composed nearly equally of solitary (eight species belonging to six genera) and colonial forms (seven species belonging to five genera). With regard to the colonial corals, with the exception of one thamnasterioid (-submeandroid) species, only branching forms were found. Among the solitary corals cupolate, patellate, and conical growth types were present.


The genus *Favia* Oken, 1815, represents one of the most widely used taxa in scleractinian history but is formally unavailable because vol. 3 (Zoologie) of Oken's (1815) work Lehrbuch der Naturgeschichte, in which the name was first published, was rejected by the ICZN for nomenclatural purposes (Opinion 417, September 1956). De Blainville (1820, p. 293-294) was the first author who used the genus Favia in a valid work. Because no valid type species is available, the species...
Madrepora fragum Esper, 1795, is therefore designated herein as the type species of Favia. This taxon is chosen from the list of species which are given in de Blainville (1820, p. 293-294). Because both de Blainville (1820) clearly referred to Oken's (1815) work and M. fragum is designated as the type species of Favia, the genus Favia de Blainville, 1820, retains its genus concept sensu Oken.

BARON-SZABO R. C., FURRER H. 2018. Korallen (Anthozoa). [In:] Peter Kürsteiner & Christian Klug (Eds): Fossilien im Alpstein - Kreide und Eozän der Nordostschweiz (Appenzeller Verlag); pp 113-143. This chapter (written in German) gives a comprehensive overview of the scleractinian corals of northeastern Switzerland (Alpstein area) from both the Cretaceous (upper Berriasian-middle Maastrichtian; 57 species) and Middle Eocene (one species). In addition to the taxonomic part, the chapter deals with the history of scleractinian taxonomy, and gives information on general morphology, skeletal elements used for taxonomic identification, biology, and ecology of scleractinian corals. [short summary; Baron-Szabo]

GORKA M. 2018. (in press) Late Badenian zooxanthellate corals of the Medobory Hills (western Ukraine) and their environmental significance. Annales Societatis Geologorum Poloniae 88: xxx-xxx. [keywords: Corals, scleractinians, palaeoenvironment, Badenian (Middle Miocene), Ukraine] Zooxanthellate corals in the Badenian (Langhian to lower Serravallian) of western Ukraine occur in different lithofacies, but are most abundant in the upper Badenian coralgal reefs of the Ternopil Beds. The coral assemblage consists of five genera, with two predominant (Tarbellastraea and Porites) and three strongly subordinate (Favia, Heliastrea, Siderastrea). The present study is the first record of Heliastrea defrancei in the Fore-Carpathian Basin. The taxonomic composition of the corals indicates that their development occurred in conditions of some ecological stress, most probably connected with
climate (location at the northern limit of coral distribution) and sedimentary environment (possible influx of terrigenous material). The coral assemblage shows similarities to numerous fossil reefs of Miocene age from the Paratethyan and Mediterranean realms.

LÖSER H., STEUBER T., LÖSER C. 2018. Early Cenomanian coral faunas from Nea Nikopoli (Kozani, Greece; Cretaceous). Carnets de Geologie 18, 3: 23-121; Madrid; published online in final form (pdf) on April 1, 2018; DOI 10.4267/2042/66094
[keywords: Corals; Greece; Cretaceous; Scleractinia; taxonomy; new taxa]
A Lower Cenomanian marine succession rich in corals is reported from the western margin of the Pelagonian zone in central Greece. The succession starts with a coarse conglomerate followed by sandstone, nodular limestone and massive limestone. Fifteen levels contain corals with the nodular limestone being the most species-rich. As a total, 78 species in 46 genera are described. They belong to 15 superfamilies. Three genera and four species are described as new. The new genera belong to the families Hetereocoeniidae and Felixaraeidae, and the informal Plesiosmiliids. The record of six genera results in stratigraphical range extensions. The coral associations show more relationships to Lower than to Upper Cretaceous faunas. Thirty-nine genera already existed before the Cenomanian and 33 genera continued into the Middle Cenomanian, but only 19 genera persisted into the Turonian. The coral fauna has close palaeobiogeographic relationships with mainly Boreal or North Tethyan Cenomanian faunas such as those of the Aquitanian Basin, the Basque-Cantabrian Basin, or with faunas from the northern margin of the Rhenish Massif, but shares also species with the Upper Aptian to Lower Albian of the Bisbee Basin in North America and with faunas of the Lower to Middle Albian of the Northern Pyrenees. [New taxa: *Kozaniastrea* gen. nov. (monotypic; family Lamellofungiidae Alloiteau), type species *K. pachysepta* sp. n.; cerioid colony with very thick compact septa in a subregular hexameral symmetry - without
columella, pali and synapticulae - endotheca well developed - wall septothecal - budding intracalicinal, septal; ** Styloheterocoenia gen. nov. (family Heterocoeniidae Oppenheim), type species S. hellenensis sp. n. (included is also S. brunni sp. n.); a member of the family Heterocoeniidae with external pali (costal pali sensu Löser 2016) originating from the costae - septa thick, compact, in a regular septal symmetry in various systems (trimeral, tetramer al, hexameral), finely ornamented at their lateral faces - wall subcompact, septothecal - endotheca well developed - columella and synapticulae absent; *** Plesiolites gen. nov. (monotypic; Plesiosmiliids, informal group), type species P. winnii sp. n.; cyclolitid coral with compact septa, in a regular symmetry and a large lamell ar columella]

[keywords: Scleractinia, taxonomy, Peri-Tethyan basin, Middle Triassic, Upper Silesia, southern Poland]
About twenty species of scleractinian corals are known from the shallow marine epicontinental deposits (Middle Triassic: Anisian, Muschelkalk) of Kraków-Upper Silesia region. Four of them require taxonomic revision. On the basis of partly preserved micromorphological features and the microstructure of the skeletons two of them are corrected, i.e. Coelocoenia? assmanni Weissermel, 1925 and C. exporrecta Weissermel, 1925, from Kamień Śląski, near Opole (Upper Silesia). Coelocoenia? assmanni was incorporated into Eckastraea prisca (Weissermel, 1925), family Eckastraeidae Morycowa, 2006, in Morycowa and Szulc (2006) and C. exporrecta is assigned to a new genus Opolestraea nov. gen., family Eckastraeidae.

MORYCOWA E., RONIEWICZ E. 2016. Microstructural evidence of the stylophyllid affinity of the genus Cyathophora (Scleractinia, Mesozoic). Annales Societatis Geologorum Poloniae 86: 1-16 / doi:
The genus *Cyathophora* Michelin, 1843 (Cyathophoridae) is removed from the suborder Stylinina Alloiteau, 1952 and transferred to the Stylophyllina Beauvais, 1980. Morphologically, it differs from stylinine corals in that rudimentary septa are developed in the form of ridges or spines on the wall and may continue onto the endothecal elements as amplexoid septa. Relics of primary aragonite microstructure, preserved in silicified colonies of *Cyathophora steinmanni* Fritzsche, 1924 (Barremian-early Aptian) and in a calcified colony of *C. richardi* Michelin, 1843 (middle Oxfordian), indicate a non-trabecular structure of their skeletons. The sclerenchyme of radial elements is differentiated into fascicles of fibres, and in the form of fascicles or a non-differentiated layer of fibres, it continues as the upper part of endothecal elements and as the incremental layers of the wall. A micro-lamellation of the skeleton corresponds to the accretionary mode of skeleton growth found in Recent corals. A similarity between the septal microstructure of *Cyathophora* and that of the stylophyllid genera, the Triassic *Anthostylis* Roniewicz, 1989 and the Triassic-Early Jurassic *Stylophyllopsis* Frech, 1890, is interpreted as a result of their being phylogenetically related. The microstructure of the Jurassic *Stylina gaulardi* Michelin, 1843 has been considered for purposes of comparison. The systematics of the genus *Cyathophora* is formally revised with *C. richardi* Michelin reinstated as the type species.


[keywords: Late Jurassic; Corals; Systematic; Ecology; reef; Apennines] This work describes and analyzes an original collection of fossil corals from the *Ellipsactinia* Limestones (Kimmeridgian-Tithonian), exposed in
the Marsica area (central Apennines, Italy), focusing on taxonomy and paleoecology. 43 species grouped into 32 genera, 16 families and 9 suborders were identified. *Astreoidogyra giadae* nov. gen. nov. sp. (Rhipidogyridae) and *Clausastrea eliasovae* nov. sp. (Montlivaltiidae) are new taxa. Corals occur from the back reef to the reef crest, showing a marked zonation, expressed by a variation of coral cover and type, although the reef front and slope facies could not be sampled. The back reef is characterised by scattered medium-to-small colonies, with a relative high variety of colony shape, corallite arrangement types and high taxonomic diversity. *Stylosmilia, Calamophylliopsis, Intersmilia, Pleurophyllia, Bracthelia, Heliocoenia, Ogilvinella* occur here among others. The inner reef flat records the highest coral cover, with large robust branching, such as "*Pseudocoenia*, *Heliocoenia*, *Calamophylliopsis*, and large dome-shaped meandroid, such as *Psammogyra, Pruvostrastraea, Eugyriopsis*) colonies. Within the external reef flat and the reef crest the coral cover is low and the stromatoporoid-bearing mounds dominate on the isolated coral bioconstructions. Controlling factors as bathymetry, hydrodynamic disturbances, abrasive currents, background sedimentation and morphological irregularities of the depositional profile are considered to explain the observed coral zonation. High diversity and low dominance indices are interpreted to result from reef complex heterogeneity, which should have influenced the formation of different ecological niches and consequently the proliferation of a greater number of taxa in a relatively small area.


Scleractinian corals adapt to various substrate conditions with a variety
of growth morphologies and modes of life. The azooxanthellate solitary scleractinian *Deltocyathoides orientalis* exhibits slightly flattened, bowl-shaped corallites. This study describes in detail the modes of skeletal regeneration after fragmentation in association with exquisitely adaptive strategies of the corals for life on soft substrates. Larger fragments of individuals retaining almost two-thirds to five-sixths of the original skeletal area inherit the densely dilated, lower central skeleton, so as to keep a stable life position on soft substrates and regenerate the lost parts promptly. Even highly fragmented individuals preserving less than 10% of the original skeleton still regenerate and repair. Fragmented individuals with almost one-sixth to one-third original skeleton actively maintain a posture with the oral disc upward using movements of remaining tentacles. Damaged and missing soft tissues are then efficiently regenerated to form a mouth and gastrovascular cavity near the new centre of the corallum. Every regenerated individual reuses skeleton and soft tissues, and is capable of burrowing before the completion of growth morphology. The mode of regeneration characteristic of *D. orientalis* is thus effective and adaptive for maintenance of a stable life position on soft substrates for this solitary scleractinian. As fragmentation in deeper-water, soft-bottom settings is likely due to predation rather than turbulence, the rapid corallum regeneration and burrowing strategy may both represent adaptive strategies for life on soft substrates and exploitation of new niches, such as an infaunal mode of life, in a predator-rich environment.

[keywords: Cnidarian; Cambrian bioradiation; Polyp; Biomineralization; Deep water]

Lower Cambrian assemblages of phosphatic and chitinous tubular fossils of probable cnidarian affinities were recovered from the Yanjiahe, Shuijingtuo and Shipai formations in the Three Gorges area, South China. Terreneuvian *Cambrorhytium* cf. *C. major* co-occur with an unnamed taxon in the Yanjiahe Formation. They can be compared with specimens from the Ediacaran Miaohe Fauna in the Three Gorges area. The most abundant and diversified cnidarian assemblages, including *Cambrorhytium gracilis* n. sp., *Cambrorhytium* cf. *major*, *Cambrorhytium minor*, *Sphenothallus songlinensis*, *Sphenothallus taijiangensis*?, *Sphenothallus kozaki*?, *Cambrorhytium* sp., ?*Byronia* sp., and ?*Mackenzia* sp. are reported from the overlying, Cambrian Stage 3–4, Shuijingtuo and Shipai formations. These new fossils show previously unknown evidence for cnidarian affinities, such as an attachment disk, clonal clusters and probable budding structures. These diversified assemblages of probable cnidarian fossils further fill major gaps in the Cambrian record of stem metazoans and document associated early evolutionary patterns. In addition, our discovery suggests that along with sponges, these tubular fossils represent another important component of benthic ecosystems that colonized often dysoxic, deep-settings during the Cambrian explosion. The observed increases of average body-size and biomineralization among these probable cnidarians are tentatively linked to oxygenation of deep oceanic settings and appearance of predatory pressure during the Ediacaran-Cambrian transition, respectively.
ENGELKE J., ESSER K. J. K., LINNERT C., MUTTERLOSE J., WILMSEN M. 2016. The benthic macrofauna from the Lower Maastrichtian chalk of Kronsmoor (northern Germany, Saturn quarry): taxonomic outline and palaeoecologic implications. Acta Geologica Polonica 66, 4: 671-694. [among more than 1000 specimens studied from Kronsmoor the authors describe also sponges: *Ventriculites*? sp. (text-fig. 8A), three fragments, *Porosphaera globularis* (Phillips, 1829) (text-fig. 8B), 22 specimens, and corals: *Parasmilia excavata* (Hagenow, 1839) (text-fig. 8J1, 8J2), 41 specimens, and *Parasmilia centralis* (Mantell, 1822) (text-fig. 8I1, 8I2), two specimens]


Most Alcyonacea (subclass Octocorallia) have skeletons made up of small calcareous pieces called sclerites that are difficult to both preserve and recognize, which explains the scarce and irregular fossil record of the group. In this work, we study 56 geological samples bearing *Syringoalcyon*, a genus constituted by Alcyonacea represented by sclerites encrusting the outer walls and stolons of a syrigoporoid coral. These samples come from 18 Silurian to mostly Carboniferous localities in Canada, USA, Mexico, Morocco, Algeria, Spain, Iran, and China. A morphological and numerical study was carried out to determine the main morphological and palaeobiological features of the sclerites and the Alcyonacea itself and to establish a new genus for these sclerites. The study facilitated distinguishing four sclerite morphotypes (spindle, elongate spindle, club, and arrowhead). Live sclerites can be attached through biotic or abiotic linkages to biotic substrate patches by insertion or cementation. Spindle sclerites arranged in vertical fences are the most
common model, but other arrangements such as stacking or short horizontal fences have been observed even in a single specimen. The morphotypes, dimensions of the sclerites, substrates, and types of arrangement observed are well known in Recent Alcyonacea. According to the arrangements of the sclerites, the alcyonacean morphology was different depending on the shape and dimensions of the substrate. This Syringoporidae-Alcyonacea association is a good example of ecological engineering, but several data suggest that the relationship between these two corals was closer than just hard substrate colonization.


The early Cambrian Carinachitidae, a family in the subclass Conulata, are intriguing and important small shelly fossils. Their gently tapering, tube-shaped skeletons consist of convex faces separated from each other by broad, deep corner sulci, and they exhibit triradial, pentaradial, or predominantly tetraradial symmetry. However, the morphology of the aperture and the modes of growth of carinachitid skeletons as well as the anatomy of their soft parts are unknown. Examination of a single new, exceptionally well-preserved specimen of tetraradial *Carinachites spinatus* Qian, 1977, collected from the lower Cambrian Kuanchuanpu Formation in South China, reveals: (1) that its aperture is connected to a small mass of relic soft tissue and (2) that the apertural end of each of the four faces is developed into a subtriangular lappet or oral lobe that is smoothly folded toward the long axis of the tube, partially closing the tube aperture. Similarities between thorn-like spines on the faces and the oral lobes indicate that the transverse ribs were periodically displaced from the perradial portion of the aperture during formation of new ribs. In addition, the tube walls may have undergone secondary thickening during growth. The growth pattern of the tube and the spatial
relationships between the tube aperture and soft parts are analogous to those of co-occurring olivooids. These findings further strengthen the previously proposed hypothesis that coeval carinachitids, olivooids, hexangulaconulariids, and Paleozoic conulariids are closely related taxa within the subphylum Medusozoa. Finally, carinachitids most likely represent an evolutionary intermediate between olivooids and hexangulaconulariids.

HERNANDEZ MORALES H., LÖSER H. 2018. Revision of the family Helioporidae (Coenothecalia, Anthozoa; Cretaceous - Extant). Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen 287, 3: 351-363. The octocoral family Helioporidae (order Helioporacea) is revised on the basis of its type genus. The family, well known for the extant 'Blue coral' Heliopora coerulae, encompasses colonial corals whose skeletons are made of large monocentric skeletal elements that form the wall and the coenosteum. Its projections into the corallites form a kind of septa. Along with the extant genus Heliopora Blainville, 1830, the family encompasses the Cretaceous genera Dactylacis Orbigny, 1849, Eomontipora Gregory, 1932, Parapolytremacis Alloiteau, 1957, Polytremacis Orbigny, 1849, Proheliopora Kusmicheva, 1975, Pseudopolytremacis Morycowa, 1971, and Selidolithus Alloiteau, 1957. All genera are reviewed on the basis of type material of their respective type species, as far as possible. The present revision suggests a smaller number of genera for the Cretaceous than previously thought. All genera are considered synonymous with Heliopora, with the exception of Pseudopolytremacis and its junior synonym Proheliopora. Heliopora ranges from the Hauterivian to the present and Pseudopolytremacis from Barremian to Santonian.

LÖSER H. 2018, in press. Fossile Korallen aus Jura und Kreide. Aufbau, Klassifikation, Bestimmung und Fundmöglichkeiten. 2. Auflage. CPess Verlag, Dresden; VI + 198 pp. Coral reefs are complex ecosystems. Their main producers - the corals -
are more primitive organisms. Nevertheless they create complicated constructed skeletons presenting a wide range of shapes. For half a billion years exist corals, for about 250 million years the stony corals (Scleractinia) which colonize also today oceans. Changing environmental conditions forced the sensible organisms to create again and again new constructions resulting in a almost unlimited richness of forms through time. Not much is known about the relationship between the construction of the skeleton made of calcium carbonate and the biology of the living animal, mainly for groups which lived in periods long ago making classification and taxonomy difficult. This book will be help to work with Mesozoic corals (without Triassic) and gives in five large chapters (morphology; palaeoecology, diversity and evolution; sampling and examination; systematics and list of common genera; coral localities) insight in the most important aspects of a difficult organism group. The book is based on lecture material and is written for geology and biology students, as well for interested amateurs and biologists or geologists who want to gain insight in this invertebrate group. * In the second revised and enlarged edition of the book the systematic part was adapted to the new classification system proposed in 2016. The number of included genera increased and more than the half of the figures in the systematic part was replaced by better illustrations. The Late Cretaceous corals are better represented compared to the first edition.


The problematic calcified cnidarian *Cambroctoconus* is described from the Henson Gletscher Formation (Cambrian Series 2, Stage 4 - Series 3, Stage 5) of North Greenland, representing the first record from Laurentia of a genus otherwise recently described from China, Kyrgyzstan, and Korea. Internal molds produced by penetrative phosphatization mirror the pervasive pore system of the calice walls and septa. The pore system
is compared to the network of gastrodermal solenia that distributes nutrients between polyps and surrounding stolon tissues in present day octocorals. In conjunction with the octagonal form of the individual coralla and eight-fold symmetry of septa, the pore system promotes assignment of *Cambroctoconus* to the Octocorallia, a basal clade in cnidarian phylogeny. Octocorals ('soft corals') are diverse in present day seas, but have a poor fossil record despite the general development of distinctive calcareous spicules. [new taxa: Order Cambroctoconida new; *Cambroctoconus koori* new species]

The latest discovery of microfossils from the lower Cambrian (Fortunian Stage) Zhangjiagou lagerstätte in South China are presented. This lagerstätte is rich in exceptionally preserved microfossils, including embryos of *Olivoides multisulcatus*, *Olivoides mirabilis*, and *Pseudoooides prima*; hatched stages of *O. multisulcatus*, *O. mirabilis*, *Hexaconularia sichuanensis*, and *Quadrapyrgites quadratacris*; and cycloneuralians represented by *Eopriapulites sphinx*. The largest known fragment of *O. mirabilis* implies that its adult length can be more than 9.0 mm with at least 50 annuli, and the longest known specimen of *Q. quadratacris* has at least 18 annuli. These unusually large specimens refute the non-feeding larvae hypothesis for *Olivoides* and *Quadrapyrgites*. * Based on the current material, it is inferred that (1) early cnidarians have a high diversity in the Fortunian Stage; (2) *P. prima* might represent the embryonic stages of *H. sichuanensis*; (3) adults of *Olivoides* and *Quadrapyrgites* may have reached centimeter-scale dimensions with more than 50 annuli; (4) *Olivoides* and *Quadrapyrgites* may be better interpreted as coronate scyphozoans; (5) cycloneuralians also had a high diversity in the Zhangjiagou lagerstätte;
and (6) cycloneuralians might have originally been part of the early Cambrian meiofauna rather than belonging to the macrobenthos. Such ancestral cycloneuralians might have been *Eopriapulites*-like, possessing pentaradially symmetric, backward pointing, and internally hollow introvert scalids used as locomotory devices.

WEYER D. 2016. Solitary and/or colonial growth in the Palaeozoic superorder Heterocorallia Schindewolf, 1941 (Eifelian-Serpukhovian). *Paläontologie, Stratigraphie, Fazies* 23, *Freiberger Forschungshefte* **C550**: 59-101. [listed in *FC&P41*, p. 120, here supplemented by keywords and an abstract]

[keywords: Heterocorallia, Famennian, Morocco, paracolony]

The slowly growing evidence for colonial habit in the Palaeozoic Heterocorallia is supported by the first record of nearly complete colonies, found in the Upper Famennian of Morocco (Anti-Atlas, Tafilalt). Rich collections of *Oligophylloides* Rozkowska, 1969 allow the proposal of *Oligophylloides maroccanus* sp. nov., found in cephalopod limestones, where a thicket of about six colonies was observed (length 2.30 m, height 0.3-0.4 m, planar dendroid growth). The sessile benthonic genus lived rarely solitary, mostly colonial within one species population. These corals constructed a special type of colonies, starting with several (observed up to 16) protocorallites, which united their tissue without any genetic barrier. The new term paracolony is introduced for such coral colonies, which are also known among Rugosa, as demonstrated by the Lower Silurian *Schlotheimophyllum patellatum* (Schlotheim, 1820) from Gotland Island, Sweden. Obviously also the typical Viséan-Serpukhovian heterocorallian genera *Hexaphyllia* Stuckenber, 1904 and *Heterophyllia* McCoy, 1849 were both colonial and solitary, as indicated by their locally sediment-filling rich assemblages, already recorded in the literature. The worldwide usual, always strongly fragmented preservation could be caused by fish-like predators, feeding (perhaps similar to some recent parrot fishes) the unprotected soft parts, which covered greater parts of the distal Heterocorallia skeleton.

A large number of protoconulariid fossils were found in the lower Cambrian strata of Zhangjiagou Section in Xixiang, South Shaanxi. According to its overall morphological and the classification of protoconulariid fossils which belong to *Hexaconularia*. Predecessors made many classifications about *Hexaconularia*, but we reclassified it. There are two shallow and discontinuous corner grooves at the central face. This not only enriches the intraspecific characteristics, but also provides the basis for the evolution trend of shell. The same type as fossils described in this article have been reported by predecessors but from different places, thus it has important research meaning to the stratigraphic comparison.


Many fossils of Lagerstätte is found from the Kuanchuanpu Formation of lower Cambrian in Zhangjiagou section, Xixiang, Shaanxi Province. The precious three-dimensionally phosphatized specimens have important research meaning for the origin and evolution of early life. And it is the basis for biostratigraphic comparison at the pre-trilobites-era of early Cambrian. This paper mainly describes Lagerstätte and soft-bodied *Olivooides multisulcatus* Qian, 1977. This type of fossil was first reported in Kuanchuanpu Biota in Ningqiang, Shaanxi in 1977, which is the same type as fossils described in this article but from different places, thus it has important research meaning to the stratigraphic correlation.
According to new discoveries in Xixiang Biota, this paper compares and adds the characteristics and intraspecific variation of *Olivooides multisulcatus* Qian, 1977.

**BIBLIOGRAPHY / Reefs**

**BONUSO N., LOYD S., LORENTZ N. J. 2018.** Pioneer reef communities within a Middle Triassic (Anisian) to Upper Triassic (Carnian) mixed carbonate-siliciclastic ramp system from the Star Peak Group, South Canyon, central Nevada. *Palaeogeography, Palaeoclimatology, Palaeoecology* **503**, 15 August 2018: 1-12; [https://doi.org/10.1016/j.palaeo.2018.03.038](https://doi.org/10.1016/j.palaeo.2018.03.038)

[highlights] * we describe reef-building communities from a Middle to Late Triassic Nevada section ** biostromes and a reef mound characterize the reef structures *** different taxa dominate the successive reef structures **** flooding formed pavements and helped recruit encrusting/epifaunal invertebrates.


[keywords: Coral reefs, carbonate platforms, microframework, sedimentary breccia, Moravia, Jurassic, Cretaceous]
The Stramberk Limestone (Tithonian-lower Berriasian) was developed on a northerly located, isolated intra-Tethyan carbonate platform. It is composed of various facies that can be observed in olistoliths and blocks embedded in the Cretaceous flysch of the Outer Carpathians in Moravia (Czech Republic). Corals, microbialites, microencrusters and synsedimentary cements contributed on various scales to the reef.
framework. The importance of corals and some microencrusters to the formation of the Stramberk reef complex is well recognized, while other components received less attention in previous studies. Two end members of boundstone types are described from the Kotouc Quarry, near Stramberk. Boundstone type A is dominated by phaceloid (branching-type) corals, encrusted by microbialites and microencrusters, in particular photophile species ("Lithocodium-Bacinella", Koskinobullina socialis Cherchi et Schroeder, Iberopora bodeuri Granier et Berthou). Boundstone type B is composed of microencrusters, microbialites and synsedimentary isopachous fibrous cements, while corals are absent or subordinate. Microencrusters [Crescentiella morronensis (Crescenti), Labes atramentosa Eliásová, Perturbatacrusta leini Schlagintweit et Gawlick, Radiomura cautica Senowbari-Daryan et Schäfer, thin encrusting calcified sponges] are main biotic components of the microencruster-cement boundstone. Some identified microencrusters are known only or mostly from intra-Tethyan carbonate platforms. Except for C. morronensis, other common microencrusters in the coral-microbial boundstone (type A) are rare in the microencruster-cement boundstone (type B). The depositional setting of boundstone type A corresponds to a low-energy environment of an inner platform. Boundstone type B, until now not recognized in the Stramberk Limestone, was developed in a high-energy, upper fore-reef slope environment. Other important facies in the Kotouc Quarry are reef-derived breccias: matrix-supported breccia and clast-supported breccia with radiaxial-fibrous cement (showing some similarities to Triassic "evinosponges" cement), interpreted as being dominantly synsedimentary (pre-burial). The preliminary studies by the present authors, supported by observations under cathodoluminescence, highlight the significance of synsedimentary cementation for the formation of a boundstone framework (type B) and the stabilization of fore-reef, slope deposits.

[keywords: *Siphonodendron* biostrome; biostratigraphy; paleoecology, Mississippian; Northwest China]

Highlights: * for the first time a late Visean coral biostrome is described from the Eastern Tianshan, NW China; ** the *Siphonodendron* biostrome at Yamansu is unique for developing in an island arc setting; *** it indicates the expanded distribution of *Siphonodendron* biostromes into more temperate environments towards the pole; **** climatic improvement, changes in ocean currents, and fast growth rate of *Siphonodendron* enabled the spread of the biostrome.


[keywords: Middle Permian; Late Permian; Wuchiapingian; reef ecologic crisis; reef-building organisms; recovery]

Highlights: * diverse reef dwellers and constructors proliferated in the Tieqiao reef community; ** Tieqiao reef may show the final recovery of reef ecosystems after the GLB crisis; *** moderate temperature changes did not have a strong control on the Tieqiao reef; **** the reef began when δ13C finally stabilized following the GLB crisis; ***** post-extinction restoration of reef ecosystems was associated with sea-level fall.
Devonian reefs of north-western Gondwana represent the southernmost record of shallow-water coral reefs in the Palaeozoic. [...] Critical factors in the facies development and temporal changes in the character of reef building were the palaeobathymetry, dominant sedimentary and circulation regimes, level of wave energy, and, possibly, light availability. Distinctive features of the palaeoecology of Aferdou el Mrakib are the dominance of massive colonies of heliolitid tabulates and a subordinate role of massive stromatoporoids, both explained here primarily as a result of increased water turbidity in the high-latitude sedimentary basin. The growth of the high-latitude coral-stromatoporoid reefs in the south-eastern Rheic Ocean was favoured by a combination of the exceptionally warm climate and plate tectonic configuration typifying the Devonian. Of critical importance appears the palaeogeographic position of the Rheic, which resulted in the seawater circulation in the ocean being dominated by tropical water masses, with restricted inflow of cold water from the circumpolar oceanic circulation. [abridged extensive abstract; an appendix contains a list of numerous stromatoporoids and corals characteristic for various development stages of the Aferdou reef]

[highlights] * Sr isotope profiles are obtained for the Middle Permian
carbonates in Japan and in Primorye, Russia ** the collapse of the reef occurred during the Capitanian minimum *** the reef collapse coincided with the Capitanian global cooling.


[keywords: carbonates; corals; paleoecology; Paleogene; reefs; Romania; Transylvania]

Eocene-Oligocene reefs have been reported in Europe largely from the circum-Mediterranean region. In this paper, small coral reefs from the northwestern Transylvanian Basin (Romania) are described for the first time. They developed near the Eocene-Oligocene boundary, most probably during the Priabonian, and belong to northernmost outposts of the reef belt developed during this time in Europe. The studied sedimentary successions in Letca and Babeni-Cuciulat (Salaj County), up to 55m thick, belong to the Cozla Formation. The reefs occur within a shallow-water succession composed mostly of bedded limestones, dominated by bioclastic (coralline) packstones. Low-relief (constratal) reefs, locally up to 10-15m in thickness, are spaced cluster (matrix-supported) reefs. Scleractinian corals are common but poorly diversified (10 species and 8 genera). Branching ramose colonies, branching low-integrated phaceloid, and sheet-like (foliaceous) corals dominate. Neither lateral zonation nor vertical succession of reefs was recognized. Corals co-occur with encrusting and geniculate red algae, but they are of subordinate significance for a nonrigid reef framework. Branching corals baffled or trapped suspended carbonate mud that contributed to the reef growth and ongoing development of topographic relief. Associated fossils are of low to moderate diversity. A relatively low-energy environment, moderate to high sedimentation rate, and increased turbidity are inferred from carbonate muddy and fine-grained matrix, dominance of sediment-resistant corals, their morphology, common
occurrence in growth position, as well as low to moderate degree of bioerosion and encrustation. Transylvanian reefs in terms of poor coral diversity, matrix-supported texture, and turbid-water sedimentary setting show similarities with many coeval reefs from the circum-Tethyan area.

MARTINDALE R. C., FOSTER W. J., VELLEDITS F. 2019. The survival, recovery, and diversification of metazoan reef ecosystems following the end-Permian mass extinction event. *Palaeogeography, Palaeoclimatology, Palaeoecology* 513: 100-115; [https://doi.org/10.1016/j.palaeo.2017.08.014](https://doi.org/10.1016/j.palaeo.2017.08.014) (online since 7 August 2017)

[keywords: Triassic; paleoecology; reef gap; ocean acidification; platform margin reefs; photosymbiosis; Early Triassic] Highlights: * the end-Permian mass extinction was catastrophic for reef ecosystems; ** both small microbial-metazoan and metazoan reefs characterize the Early Triassic; *** shelf-edge reefs do not become re-established until the Illyrian-Ladinian interval; **** rifting was a key factor in the rise of shelf edges; ***** coral reef proliferation (Late Triassic) is linked with the evolution of photosymbiosis.


[keywords: Coral skeletons; Reef sediments; Reef diagenesis; Dissolution kinetics]

Ocean acidification is widely accepted as a primary threat to coral reef populations. Negative physiological effects include decreased calcification rates, heightened metabolic energy expenditure, and increased dissolution of coral skeletons. However, studies on the dissolution of coral skeletons structures under ocean acidification conditions and their implications on sediments remain scarce. In this
work, we examined skeletal dissolution kinetics from four of the most representative hermatypic corals of the Eastern Pacific coasts (*Pocillopora*, *Porites*, *Pavona*, and *Psammocora*). Samples were treated with a highly acidic solution for defined periods of time, and measurements of dissolved calcium ([Ca+2]) were used to evaluate the kinetics of coral skeleton dissolution. All genera tests except *Porites* showed a zero reaction rate. *Porites* exhibited a first-order reaction and a faster reaction rate than other genera. Compression strength tests and skeletal density did not correlate with reaction rate. *Pavona* showed greater structural strength. *Porites* were the most susceptible to acidic dissolution compared to other genera tested due to their morphology, i.e., possession of the largest surface area, suggesting a high vulnerability under low-pH conditions. The hierarchical response in dissolution kinetics among coral genera tested suggests that the most soluble coral might act as a buffer under ocean acidification conditions.

[keywords: Wuchiapingian, reefs, Zechstein, bryozoans, stromatolites, aragonite cementation, neptunian dykes, carbon and oxygen isotopes]

The Jablonna Reef, one of the reefs formed in Wuchiapingian time in the western part of the Wolsztyn palaeo-High (SW Poland), is characterized by quite irregular outlines and consists of three separate reef bodies (ca. 0.5-1.5 km² each; the thickness of the reef complex is usually >60 m). It is penetrated by four boreholes, which show two distinct phases of bryozoan reef development during deposition of the Zechstein Limestone. The first one occurred early in the depositional history and botryoidal aragonitic cementation played a very important role in reef formation. This phase of bryozoan reef development terminated suddenly; one possible reason was that a relative change of sea level -
first a fall and then a rise - disturbed the upwelling circulation. Consequently, bioclastic deposition predominated for a relatively long time until the second phase of bryozoan reef development occurred, but the latter was not accompanied by dubious early cementation. During this second phase, reticular fenestellid bryozoans were predominant. Subsequently, microbial reefs developed and abound in the upper part of the Zechstein Limestone sections. The general shallowing-upward nature of deposition in the Jablonna Reef area resulted in reef-flat conditions with ubiquitous, microbial deposits, in the central part of the Jablonna Reef. Then, the reef-flat started to prograde and eventually the entire Jablonna Reef area became the site of very shallow, subaqueous deposition. Five biofacies are distinguished in the Jablonna Reef sections: the Acanthocladia biofacies at the base, then mollusc-crinoid, brachiopod-bryozoan, Rectifenestella and at the top, stromatolite biofacies. They represent a shallowing-upward cycle, possibly with some important fluctuation recorded as the distinctive lithofacies boundary, corresponding to the Acanthocladia/mollusc-crinoid biofacies boundary. The 13C curves of the Jablonna 2 and Jablonna 4 boreholes permit correlation of the trends in the middle parts of both sections and confirm the strong diachroneity of the biofacies boundaries, with the exception of the roughly isochronous Acanthocladia/mollusc-crinoid biofacies boundary. The presence of echinoderms and strophomenid brachiopods indicates that until deposition of the lower part of the Rectifenestella biofacies, conditions were clearly stenohaline. The subsequent elimination of stenohaline organisms and progressively poorer taxonomic differentiation of the faunal assemblage are characteristic for a slight, gradual rise in salinity. The taxonomic composition of organisms forming the Jablonna Reef shows a similarity to reefs described from England and Germany, as well as the marginal carbonate platform of SW Poland. Filled fissures were recorded in the lower part of the Jablonna Reef. The aragonite cementation recorded in some fissure fillings implies that they originated in rocks exposed on the sea floor and are neptunian dykes.

[paper highlights: * glass ramps are shallow coastal depositional regimes dominated by siliceous sponges; ** sponge meadows were alternate stable states in contrast to carbonate factories; *** glass ramps were limited by silica flux and lack modern analogues; **** review of Phanerozoic cases reveals sponges’ environmental flexibility and ecological dominance]

SAN MIGUEL G., AURELL M., BADENAS B. 2017. Occurrence of high-diversity metazoan- to microbial-dominated bioconstructions in a shallow Kimmeridgian carbonate ramp (Jabaloyas, Spain). *Facies / online since 08 April 2017*

[keywords: Carbonate ramp; Reef; Kimmeridgian; Corals; Microbialites; Stromatoporoids]

The horizontal and vertical transitions of a wide range of bioconstructions are documented from the shallow domains of a Kimmeridgian carbonate ramp (Upper Jurassic) in the Jabaloyas area of NE Spain. The bioconstructions include microbial buildups, coral-bearing thrombolite buildups, coral-microbial buildups, branching coral patches, oyster patches, and stromatoporoid carpets. Buildups form stacked pinnacles up to 19 m thick, within a broad spectrum of coeval inter-buildup carbonate facies. Coral-bearing thrombolites are coincident with shallow-marine oolitic sands, indicating development during the initial platform flooding (unit 1). During the continued sea-level rise (units 2 and 3), coral-microbial buildups [encrusted by *Crescentiella (Tubiphytes)* and serpulids] were established from proximal to distal mid-ramp domains, and these showed an increasing proportion of microbial crust in distal domains. Inter-buildup oolitic facies sharply grade down-dip to hummocky cross-stratified intraclastic, peloidal, and skeletal deposits, mostly sourced from the coral-microbial buildups. The lower part of unit
4 was dominated by microbialites in the proximal areas, related to local fresh-water input causing seawater stratification and oxygen depletion. The upper part of unit 4 indicates an initial recovery of metazoan frame builders, with abundant branching corals. During the late regression (units 5 and 6), *Marinella lugeoni* red algae, oyster patches, and stromatoporoid boulders developed close to the shoreline in well-oxygenated waters with high nutrient content. The reported data contribute to the discussion of the optimal environmental conditions for each "bioconstruction window" in Jabaloyas, namely sediment and nutrient supply, water depth, water oxygenation, wave energy and light availability.

**SCHMITT D., GISCHLER E. 2017.** Recent sedimentary facies of Roatan (Bay Islands, Honduras), a Caribbean oceanic barrier reef system. *Facies 63*: 5 / online since 08 December 2016 [abstract added] [keywords: Caribbean; Barrier reef; Roatan; Carbonates; Sedimentary facies]

This project was developed to investigate systematically patterns of recent sedimentary facies around one of the rare Caribbean examples of an oceanic barrier reef system. Seventeen sediment samples collected around Roatan (Bay Islands, Honduras) range from fine to very coarse bioclastic sand. Sorting is either moderate or poor, which suggests a weak influence of transport processes. Occurrence and abundance of major grain types are principally comparable to other modern reefal systems; however, there are some differences in terms of absolute grain abundance. Corals and calcareous algae are very abundant in marginal reefal sediments where they reach average amounts of 24% and 32%, respectively. Lagoonal sediments contain on average 14% foraminifera, 15% molluscs, 16% Halimeda, and 31% fine material (<125 μm). Statistical analyses revealed five sedimentary facies including algal-rich rudstone, coralgal grainstone, mixed skeletal pack-floatstone and foraminiferal-molluscan wackestone. The facies distribution pattern results from the interplay of the ecology of carbonate-producers,
carbonate production and destruction, sediment stability, depositional energy, and reef morphology. Roatan is a mixed carbonate-siliciclastic system, although despite the proximity to a metamorphic island, the average content of siliciclastics in reefal (2%) and lagoonal (17%) sediments is not very high. The lack of higher amounts of siliciclastic material is attributed to the absence of permanent river systems and a high carbonate production rate. Non-skeletal grains (peloids) are common in protected areas of the Roatan marginal reefs, although ooids are rare in the system as a whole. Reduced skeletal grain formation and decreased sedimentation rate seem to be responsible for the peloid enrichment in areas near the reef-lagoon transition zone.

[keywords: boundstones; patch reef; community paleoecology; Shijiezigou; Upper Ordovician]
Highlights: * lithology and paleontological features of the Shijiezigou section are described; ** how to differ a coral reef from a coral-bearing open platform is clarified; *** presence of a topographic relief and lacking bedding planes are key features of a reef; **** according to the dominant organism, the four communities are recognized.

[highlights] * KD Ba/Ca vary significantly between massive Porites spp. coral genotypes ** seawater pCO2 affects KD Ba/Ca significantly in 1 of 3 coral genotypes *** KD Mg/Ca varies significantly between some duplicates of the same coral.


[keywords: Carboniferous, Coral, central Iran basin, Tethys, Paleobiogeography]

* Stratigraphic and geographic distribution of Iranian Carboniferous corals was affected by by tectonic movements and sea-level changes, ie both by local and by global events. During the Late Carboniferous (Namurian) the continental shelf of central Iran, then at the northern margin of Gondwana, was inhabited by 31 coral species belonging to 14 genera, with 81% of colonial and 19% solitary species. ** The paleobiogeographic study shows that although central Iran basin was geographically located during the Namurian in the southern part of northwestern Tethys (=Mediterranean basin), similarities of the coral faunas indicate affinity with the Uralian basin (Ural-Arctic) coral communities; these conclusions are also supported by biogeographic affinities of foraminifers, conodonts, brachiopods and crinoids.

[...] Strong marine connections among the WIS [Western Interior Seaway], the Gulf of Mexico, and the North Atlantic appear to have persisted at least until the end of the early Maastrichtian. A marine connection between the WIS and the Gulf of Mexico is projected to have lasted through the end of the Cretaceous. Closure of the WIS to the Arctic Ocean is projected to have occurred earlier and farther north than other models, which close the WIS to the Arctic Ocean through the formation of the Dakota Isthmus in the latest Maastrichtian. Closure of the WIS in Canada during the early late-Maastrichtian (*Hoploscaphites birkelundae* ammonite biozone) appears to have permitted the dispersal of land plants, such as *"Cissites" panduratus* and *Credneria protophyloides*, among landmasses previously isolated by epeiric seaways covering much of North America and western Greenland during the Late Cretaceous and is consistent with preexisting biostratigraphic constraints on the paleogeography of the WIS. [end-part of an abstract; corals are mentioned in the text; Löser]


The sponge body fossils from the Lutetian (Eocene) of Chiampo Valley in north-eastern Italy, Lessini Mountains, exhibit a high diversity. The fauna, comprising 32 species, was recently described in a systematic study based on museum material. Here we compare diversity measures and rank-abundance distributions between the museum material and new material from random surface collection at the original sampling site. Not surprisingly, we find that selectively collected museum material tends to have greater diversity and evenness than bulk field samples. Nevertheless, abundance rank-orders are maintained between samples. Bulk field sampling revealed hexactinellids to be strongly dominant over lithistids, which suggests a deep-water setting of greater than 200m water depth.


[highlights] * coral REE [rare earth elements] record can be applied as a proxy of local submarine groundwater discharge ** the correlation coefficients between coral REE and Ba were associated with the PDO [Pacific decadal oscillations] *** the surface currents from surrounding areas contribute to the surface seawater Ba.

Highlights: * Cd isotopic variations from the Meishan GSSP section were investigated; ** shift of Cd isotopes corresponds with each episode of mass extinction during the PTB; *** decline of marine primary productivity may result in mass extinction as revealed by Cd isotopes; **** Cd isotopes can be a proxy to reconstruct past ocean circulation and nutrient utilization.


Euendolithic microorganisms (boring endoliths) syn-vivo associated with modern corals are commonly reported, but their fossil record is extremely rare. This paper reports the new finding recognized in the colonial scleractinian coral Clausastrea saltensis from the Upper Barremian of Bulgaria. Large microborings (up to 50 μm, most ca. 15-25 μm in diameter) filled with calcite cement are distributed medially along coral septa of some corallites. Borings were produced by microeuendoliths growing from the skeleton interior outward during the life of the coral host. They are compared to traces produced by the recent oligophotic filamentous chlorophyte Ostreobium, which is known to be the most common skeleton-dwelling alga in modern living corals and regarded as neutral or beneficial to the coral. In terms of general morphology, diameter and distribution pattern, the borings are similar to those recently recognized in the Early Cretaceous microsolenid coral.

Aferdou el Mrakib, the largest carbonate buildup of the Moroccan Anti-Atlas, is known for its rich, Givetian fossil assemblage, dominated by corals. The core part of the reef was either removed by erosion, or pervasively dolomitized, with corals preserved mostly in the talus beds deposited in the fore-reef environment. This paper focuses on massive colonial tabulate corals, represented by *Heliolites porosus* and members of the genus *Favosites*, which constituted the largest tabulates of Aferdou el Mrakib and are frequently found in the reef-derived debris. The study reconstructs survival strategies of these corals based on an analysis of their morphologies, growth patterns, as well as records of interactions with other organisms. Both *H. porosus* and *Favosites* are represented predominantly by domal growth forms. As compared to the favositids, the coralla of *H. porosus* are considerably more abundant and attained notably larger sizes, with some of the colonies exceeding 1m in diameter. Even the largest coralla were in places found toppled and in upside-down positions, indicating their downslope transportation by gravity-flows, and possible periodic involvement of high-energy events. *H. porosus* commonly encrusted and was encrusted by other organisms. The encrustations usually coincide with very frequent, sediment-induced growth interruption surfaces found within the coralla. The growth interruption surfaces rarely preserve the original sediment, attesting the presence of mechanisms of sediment removal by the coral. Similar surfaces occur also in the *Favosites* coralla, but they are less common and often lined by distinct sediment intercalations. Few encrustations on *Favosites* were demonstrated to have happened post-mortem, while encrustations on *H. porosus* typically formed syn-vivo, as evidenced by the coral successfully overgrowing its epibionts. *H. porosus* was a resistant species, which could endure frequent episodes of sediment influx and defend itself from aggressive encrusters. *Favosites* colonies, in
turn, relied on selective settlement on more sparsely occupied substrates available in deeper parts of the Aferdou el Mrakib reef.


Expeditionary investigations carried out by GKC "Yuzhmorgeologiya" in 2000-2010 i.e. in the Pacific Ocean on board R/V "Gelendzhik" resulted in new materials that made it possible to reveal the features of morphological structure of Magellan seamounts and to elucidate the matter and paleontological character of the structural formation complexes of rocks from Early Cretaceous to Pleistocene inclusive. Analysis of macro- and microfauna in sedimentary rocks allowed us to distinguish the "transgressive" phases in development of the Guyot: Cenomanian-Turonian, Late Campanian-Maastrichtian, Late Paleocene-Middle Eocene and Late Cenozoic. There is Oligocene hiatus in all guyots of the Magellan Seamounts.

Highlights: * Archaeocyaths from the lower Cambrian of southwestern Mongolia were investigated; ** Archaeocyaths and associated small shelly fossils (SSFs) are phosphatized; *** the minerals in the assemblages suggest transportation to a low oxygen setting; **** analysis of these fossils links taphonomy to palaeoenvironment of preservation.


Two relatively large specimens of the rugosan *Lambelasma* sp. are fully intergrown with the bryozoan *Stigmatella massalis* colony. The intergrown specimen occurs in the Oandu Regional Stage (lower Katian) of Estonia and constitutes the earliest record of bryozoan-rugosan intergrowth from Baltica. Most likely this symbiotic association was accidental. Rugosans presumably benefitted from the bryozoan, which served as an anchor to stabilize them in hydrodynamically active waters. The lack of malformations and no decrease in the size of bryozoan zooids near the rugosans indicate a lack of negative effect of the rugosans on the bryozoan. Bryozoan-rugosan symbiosis is only known from the Ordovician of Baltica and Laurentia.
The earliest known rugosan-bryozoan intergrowth is reported from the early Katian of Estonia. A specimen of Orbignyella germana Bassler, 1911, from pelmatozoan-bryozoan-receptaculitid reefs of the Vasalemma Formation shows intergrowth with rugosans Lambelasma carinatum Weyer, 1993. The morphology of the bryozoan colony does not show any malformations or changes in zooid size near the embedded rugosans. It is likely that intergrowth between L. carinatum and O. germana was purely accidental. Relatively high population densities and restricted space for growth in the reef may have caused this intergrowth. Rugosans may have benefitted from this association in achieving a stable substrate in shallow and hydrodynamically active waters of the reef environment, whereas bryozoans obviously used corals as a substrate. Lambelasma may have been especially prone for intergrowth with bryozoans as it participates in three associations in the Late Ordovician of Estonia.

New information from boreholes at Lyneham and the construction of a relief road south of Royal Wootton Bassett has been combined with field mapping to produce the first synthesis of the transition between the Upper Jurassic shelf sediments of the Wessex Basin and the laterally equivalent clay facies sediments overlying the East Midlands Microcraton. Periodic uplifts of the Wootton Bassett High at the northern margin of the Wessex Basin saw the repeated attempts to spread clay facies sedimentation southwards into central and southern
Wiltshire frustrated by uplifts of the high. This resulted in periods of erosion followed by new episodes of shallow water shelf sedimentation succeeded by deeper water strata, these beds resting upon the eroded edges of the older sediments. [original abstract; coral taxa are mentioned in the text; Löser]


Highlights: * studied are epibionts from the Middle Devonian mesophotic reefs of Laskowa quarry, overgrowing alveolitid tabulates and chaetetid sponges; ** encrusting communities are characterized by modest diversity and high dominance; *** there is distinct polarization of cryptic vs open-surface encrusters; **** cryptic encrusters are mostly brachiopods (*Davidsonia*) and microconchids, open-surface dwellers are mostly auloporids; ***** these communities developed in a low-light and nutrient-poor paleoenvironment.


[keywords: Mesophotic coral ecosystems, Scleractinia, Cuba, Mexico]

After a pioneering study of Jamaican coral reefs, the Cuban archipelago was the second to be surveyed by SCUBA for scleractinian corals and reef life to a depth of 90m, sampling all phenotypes. Regrettably, the published data on the mesophotic coral ecosystems (MCEs) of Cuba, collected 1970 to 1973, have been ignored. This is also true for the published data on the MCEs of the Mexican Yucatan Peninsula, collected 1983 to 1984. These two investigations described immense areas exhibiting a rich continuum of coral life, from shallow reefs into MCEs without scleractinian faunal break, and no depth-specialists species
complex. Instead, a morphological changeover of three-dimensional corallum into two-dimensional corallum was observed and documented. The existing data on the Cuban and Mexican MCEs (now 45 and 34 years old, respectively) present a unique opportunity for long-term status and ecosystem trends analysis. MCEs require terminological clarification from collaborative efforts to effectively use the globally available data.

FOSSILS & DATABASES

Scleractinia Treatise (Part F) – update of April 2018

2018
Systematic descriptions of the Scleractinia family PACHYPHYLLIIDAE.
*Treatise Online* 105: pp 1-8, 4 figs, 2 tables. DOI:
https://doi.org/10.17161/to.v0i0.7551

The other chapters to be published in the series are:
Baron-Szabo & Cairns, Family Dendrophylliidae, in press
Baron-Szabo & Cairns, Family Oculinidae, in correction phase
Baron-Szabo & Cairns, Family Turbinoliidae, in preparation

Rosemarie Baron-Szabo, Smithsonian Institution
Bibliographic database of *Fossil Cnidaria & Porifera*

We present at [kse.wnoz.us.edu.pl/sql/index.php](http://kse.wnoz.us.edu.pl/sql/index.php) the bibliographic database of *Fossil Cnidaria & Porifera (FC&P)*; let us remind that FC&P was initiated by IASFCP in 1972 as a mean of presentation and dissemination of mostly bibliographical data concerning fossil (and living) corals and sponges and the related topics. Our database summarizes bibliographical contents of FC&P.


2018 - July: contents of *FC&P* 39-2, *FC&P* 40, and *FC&P* 41 has been added by T. Wrzolek and J. Krupa... The number of records is now 9170.

Katarzyna Zalecka & Tomasz Wrzolek

Bibliographic database of fossil corals & stromatoporoids

I have compiled a compressed ZIP file – writes Andreas MAY - "[MayLib_Literature_database_20170104.zip](http://MayLib_Literature_database_20170104.zip)" (8.270 KB) which contains the MayLib application and the most recent datafile file with references on Devonian matters, corals, extinction events, etc. It was created on January 4th, 2017. MayLib is a very small, efficient and comprehensive JAVA program that handles references to publications in any Unicode-compatible language. It is user-friendly and not only contains the basic functions of a bibliographic database, but also has some advanced features. MayLib stores the data in files with the extension .UCF.

The UCF datafile provided here is a list of references, which contains 511
periodicals and 4262 literature references. Of the literature references 3234 deal with Devonian matters, 1614 deal with corals and 274 deal with extinction events. A more detailed description is given in:


Best wishes,

*Andreas May / July 2018.*

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**EDITORIAL NOTE**

27th December 2018

*Edited by:* Tomasz Wrzolek / University of Silesia / Sosnowiec / Poland.

*Online version only:* saved and distributed as archival pdf file, it corresponds exactly to any previously printed issue of *Fossil Cnidaria & Porifera.*

*Size:* formatted as 100 pages of A5 format (printing area of ca 13x18,3 cm per page); the file is FC&P42.doc / FC&P42.pdf of 706 KB / 1,18 MB size.

*Distribution:* this issue and some archival ones are available at http://kse.wnoz.us.edu.pl/iascp.htm or directly from the Editor: tomasz.wrzolek@us.edu.pl ... :-)))

*Tomasz Wrzolek.*