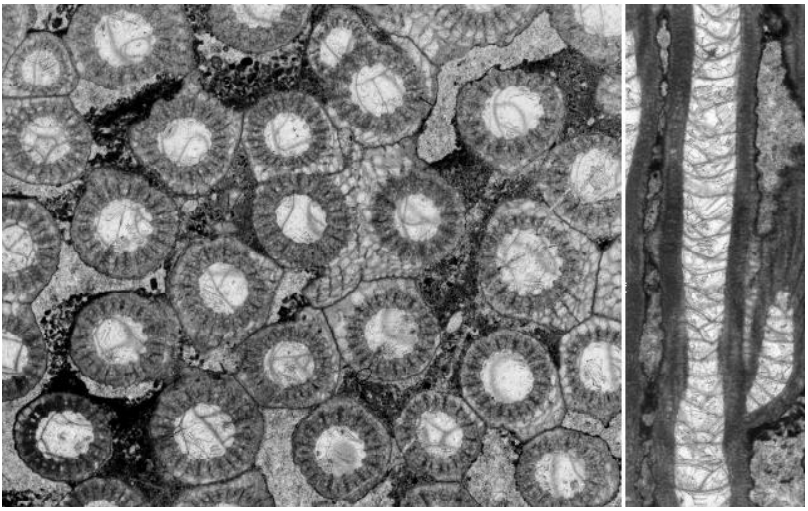
Fossil
Cnidaria & Porifera



Vol. 36
Sosnowiec 2010
ISSN 0943-1829

EDITORS OF *Fossil Cnidaria & Porifera*

Tomasz Wrzolek
tomasz.wrzolek@us.edu.pl

Ian Somerville
ian.somerville@ucd.ie

TREASURER

VACANCY !!!

CORRESPONDENTS

America, Central and South - Carl W. Stock, George D. Stanley
Australia - Gregory Webb
Austria, Switzerland - Bernhard Hubmann
Belgium, Netherlands - Edouard Poty
Bulgaria, Czech Republic, Greece, Hungary, Romania, Slovenia, Turkey - Arnost Galle
Canada - Graham A. Young
Czech Republic - Arnost Galle
China - XiangDong Wang, XunLian Wang
CIS / former Soviet Union - Irina Yu. Bugrova, Maria Hecker
France - Jean-Pierre Cuif, Bernard Lathuiliere
Germany - Michaela Bernecker, Dorte Janussen
Greece - Arnost Galle
Hungary - Arnost Galle
Ireland - Ian Somerville
Italy - Sergio Rodriguez
Japan - Yoichi Ezaki
Netherlands - see Belgium
Poland - Boguslaw Kolodziej
Portugal - Sergio Rodriguez
Romania - Arnost Galle
Russia - see CIS
Scandinavia - Mari-Ann Motus
Slovenia - Arnost Galle
Spain, Portugal, Italy - Sergio Rodriguez
Switzerland - see Austria
Turkey - Arnost Galle
United Kingdom - John Nudds
USA, Central and South America - Carl W. Stock, George D. Stanley

CONTENTS

Newsletter Editors & Correspondents	**2**
Contents	**3**
Bibliographers – IASFCP page – letter from the Editors	**4**
Instructions to Correspondents	**5**
Correspondents	**6**
Officers & Council Members for term 2007-2011	**7**
XI Symposium of IASFCP / letter of the Organizers	**8**
NEWS & VIEWS	
Stromatoporoids and like organisms	**9**
Australia	**10**
Britain & Ireland	**11**
Canada	**12**
France	**14**
Mexico	**16**
Poland	**17**
Spain	**25**
USA	**26**
BIBLIOGRAPHY	
- Porifera - Stromatoporoidea - Archaeocyatha	**27**
- Rugosa	**48**
- Tabulata	**74**
- various Palaeozoic corals & stroms	**78**
- Scleractinia	**84**
- Octocorallia	**110**
- reefs	**112**
- various topics	**122**
- biographies	**137**
Scleractinian systematics conference	**137**
Scleractinian & Poriferan Treatises	**139**
Virtual Museum – Websites – Treasurer wanted	**141**
Announcements	**142**
Addresses changed & new	**143**
Editorial Note	**144**

BIBLIOGRAPHERS

Archaeocyatha - E. Moreno-Eiris
Stromatoporoids - Carl W. Stock
Porifera s. str. - D. Janussen
Pre-Carboniferous Rugosa - M. Coen-Aubert
Carboniferous / Permian Corals - G. Webb
Tabulata / Heliolitida - Kl. Oekentorp
Mesozoic / Cenozoic Corals - H. Löser

IASFCP PAGE

Although not quite official, this is hosted by the University of Silesia, Poland, at **http://kse.wnoz.us.edu.pl/iascp.htm** and is more or less frequently updated by Tomasz Wrzolek (tomasz.wrzolek@us.edu.pl), with kind and continuous help of Wojciech Krawczynski; the page contains, besides current reports, also Statutes of the IASFCP and updated list of e-addresses of IASFCP Members and Sympathizers.

LETTER FROM THE EDITORS

Dear Friends and Colleagues,

The present issue, *FC&P* **36** is published on-line first… It will be printed and distributed if we get your fees... :-)

Sincerely yours,

Tomasz Wrzolek **Ian Somerville**

Cover illustration:
the neotype of *Smithicyathus lacunosus* (Gürich, 1896); GIUS 401PG 51B; as designated by Wrzolek 2007 (*Acta Paleontologica Polonica* **52**, 3, p. 618); from Psie Gorki in Kielce (Holy Cross Mts, Poland), set F, Upper Frasnian; magnified x 4.

INSTRUCTIONS TO CORRESPONDENTS

Help the editor(s) of *Fossil Cnidaria & Porifera* and try to adopt these few simple principles:

1) RTF format, please – try to make it as simple as possible!
2) Times New Roman, 12 points, single space;
3) **boldface** for **author(s)**, **date** of publication and volume **number**;
4) *italics* for *journal titles* (do not abbreviate! DO NOT ABBREVIATE JOURNAL TITLES unless absolutely necessary - it may happen indeed that lengthy journal title will suppress whole bibliographic note);
5) no extra formatting, please! **please! please!!! pleeeeease!!!!!** PLEASE, avoid any hidden formats, special diacritical marks and all these lovely surprises...
6) the editor(s) give the final touch and make the layout decisions; your reports may be fragmented according to chapters as presented in previous *FC&P* volumes or as at **http://kse.wnoz.us.edu.pl/iascp.htm**; this may change from volume to volume, as necessity dictates, i.e. changing data volume in various fields of your (our!) research;
7) the results of editorial work are presented promptly on-line at the site named above and then the correspondents are expected to make their corrections and return them to the editor(s) prior to printing…
8) the editor(s) indicate authorship of contributions either at headlines or after particular entry;
9) [square brackets] are used to do this in the latter case, also in case of non-original remarks and comments;
10) please have a look at the entries of the other authors and consider what can be improved in your reports… IF POSSIBLE PLEASE SUPPLY NOTES WITH KEYWORDS AND ABSTRACTS... DO NOT HESITATE TO ABBREVIATE LENGTHY SUMMARIES... YOUR COMMENTS ARE WELCOME [in square brackets!];
11) please send info on PUBLISHED papers, not "in preparation", "submitted", "in review", etc. - we will wait patiently... If necessary give short notes on these projects to „news and views";
12) avoid abstracts, posters, etc. in bibliographies (to "news & views" please!).

Thank you! [Tomasz Wrzolek]

CORRESPONDENTS of *FC&P*

Bernecker, Michaela
bernecker@pal.uni-erlangen.de

Bugrova, Irina Yu.
bugrova@GG2686.spb.edu

Coen-Aubert, Marie
Marie.Coen-Aubert@
naturalsciences.be

Cuif, J.-P.
jean-pierre.cuif@u-psud.fr

Ezaki, Yoichi
ezaki@sci.osaka-cu.ac.jp

Galle, Arnost
Galle@gli.cas.cz

Hecker, Maria
maria.hecker@skynet.be

Hubmann, Bernhard
bernhard.hubmann@uni-graz.at

Janussen, Dorte
Dorte.Janussen@senckenberg.de

Kolodziej, Boguslaw
boguslaw.kolodziej@uj.edu.pl

Lathuiliere, Bernard
Bernard.Lathuiliere@
g2r.uhp-nancy.fr

Löser, Hannes
loeser@paleotax.de

Moreno-Eiris, Elena, Dr
eiris@geo.ucm.es [?]

Motus, Mari-Ann
motus@gi.ee

Nudds, John
John.Nudds@man.ac.uk

Oekentorp, Klemens
oekento@t-online.de

Poty, Edouard
E.Poty@ulg.ac.be

Rodriguez, Sergio
sergrodr@geo.ucm.es

Somerville, Ian
ian.somerville@ucd.ie

Stanley, George D.
george.stanley@umontana.edu

Stearn, Colin W.
cwstearn@golden.net

Stock, Carl W.
cstock@geo.ua.edu

Wang, Xiangdong
xdwang@nigpas.ac.cn

Wang, Xunliang
wxl@cugb.edu.cn

Webb, Gregory E.
ge.webb@qut.edu.au

Young, Graham A.
gyoung@cc.manitoba.ca

THE ASSOCIATION

Officers & Council Members for term 2007-2011

President: Olga L. Kossovaya / Russia

Vice Presidents

Nancy Budd / USA, Markus Aretz / Germany Ewa Roniewicz / Poland, Gregory Webb / Australia, Stephen Kershaw / UK

Secretary: Tomasz Wrzolek / Poland

Council Members / Correspondents

Australasia and others - 5 votes
1 vote (Australia) - **Gregory Webb**
2 votes (Japan) - **Isao Niikawa**, **Akihiro Kano**
2 votes (China) - **XiangDong Wang**, **Xun-Lian Wang** (PR China)

The Americas - 3 votes
1 vote (Canada) - **Graham A. Young**
2 votes (USA, Central and South America) - **Carl W. Stock**, **George D. Stanley** (USA)

Europe I - 6 votes
1 vote (Belgium, Netherlands) - **Edouard Poty** (Belgium)
2 votes (France) - **Jean-Pierre Cuif**, **Bernard Lathuiliere**
1 vote (Spain, Portugal, Italy) - **Sergio Rodriguez** (Spain)
2 votes (UK, Ireland) - **Ian Somerville** (Ireland), **John Nudds** (UK)

Europe II - 4 votes
1 vote (Austria, Switzerland) - **Bernhard Hubmann** (Austria)
2 votes (Germany) - **Michaela Bernecker**, **Dorte Janussen**
1 vote (Scandinavia) - **Mari-Ann Motus** (Estonia)

Europe III - 4 votes
1 vote (Bulgaria, Czech Republic, Greece, Hungary, Romania, Slovenia, Turkey) - **Arnost Galle** (Czech Republic)

1 vote (Poland) - **Boguslaw Kolodziej**
2 votes (CIS / former Soviet Union) - **Irina Yu. Bugrova**, **Maria Hecker**

XI Symposium of IASFCP / Liege / August 2011

Liege, December 8th 2010

Dear Colleagues,

The Organizing Committee is pleased to invite you to attend the 11th Symposium of the International Association for the Study of Fossil Cnidaria and Porifera which will be held in the University of Liege (Belgium), on August 22-26, 2011.

This congress offers young and established scientists an opportunity to experience state of the art results and share their researches on fossil cnidaria and porifera, with a special view on Phanerozoic palaeoecology, palaeogeography and bio-constructions. Oral and poster presentations will take place over the 5-days congress with many opportunities to meet and discuss with colleagues. Fossil cnidaria and porifera, as well as their use in palaeoecology, palaeogeography and stratigraphy will be discussed during the field trips organized in Southern Belgium, Southern Germany, Northern and Eastern France.

Detailed information on the symposium, registration, field trips and Liege are provided within the **second circular** (available from page of the University of Liege, see below, or from the IASFCP page). Please state your interest to attend the meeting by returning the attached return form. Many information are available on the congress website: **www2.ulg.ac.be/paleont**. We hope to see you at Liege,

the Organizing Committee:

Edouard Poty, **Markus Aretz**, **Sandrine Delculée** and **Julien Denayer**

NEWS & VIEWS

Stromatoporoids and like organisms / Carl W. Stock

Peter Harries / Tampa, Florida, USA

A paper authored by Jared R. Morrow (deceased) of San Diego State University, Peter Harries, and Joseph Krivanek will be submitted very soon, based on a lower Famennian (Upper Devonian) stromatoporoid reef in the Dugway Range of western Utah. All of the stromatoporoid species reported by Colin W. Stearn from the Famennian Wabamum reefs of Alberta are also present in Utah, along with a species of *Amphipora*. The genera of stromatoporoid survivors in Dugway Range, although fairly minor constituents of Frasnian reef communities, belong to long-ranging clades, and may represent "extinction-resistant" taxa that flourished, albeit locally, following the F-F mass extinction, conclude the authors.

Andreas May / Madrid, Spain

Andreas May is continuing, together with Sergio Rodriguez (Madrid), his research on the Lower Devonian limestones of Sierra Morena (Southern Spain). Actually he is investigating Pragian stromatoporoids from a locality called "Zujar". The relatively diverse stromatoporoid fauna contains *Plectostroma*, *Syringostromella zintchenkovi* (Khalfina, 1960), *Habrostroma* and other genera. The *Habrostroma* probably is *Habrostroma centrotum* (Girty, 1895).

Rob Riding / Knoxville, Tennessee, USA

Robert Riding is working with Qi Feng (China University of Geosciences, Wuhan) on a Famennian carbonate mound in Sichuan. In addition to various calcimicrobes they found some stromatoporoids.

Joseph St. Jean / Chapel Hill, North Carolina, USA

The entire stromatoporoid collection of Joseph St. Jean was donated in December 2007 to the Yale Peabody Museum in New Haven, Connecticut. This includes all published specimens of the late J. J. Galloway, St. Jean, and the late Paul K. Birkhead, plus several unpublished collections. New specimen numbers have not yet been published. Interest parties should contact curator Susan Butts at the YPM **susan.butts@yale.edu.**

Carl Stock / Tuscaloosa, Alabama & Conifer, Colorado, USA
Several projects are in progress. First is part of the hypercalcified sponge part of the Treatise on Invertebrate Paleontology, specifically involving stromatoporoid paleobiogeography and the stromatoporoid order Actinostromatida. Carl Stock and Judy Burry-Stock are preparing a paper on the systematics and geographic distribution of the Lower Devonian (Lochkovian) stromatoporoid *Habrostroma* in North America. Stock, Alan Pedder, and Michael Murphy are writing a paper on the biostratigraphic and paleobiogeographic implications of rare stromatoporoids from the Lower Devonian (Emsian) and Middle Devonian (Eifelian) of from the Great Basin of Nevada. Stock and Heldur Nestor are working on the first of a series of papers on Lower Silurian (Llandovery) stromatoporoids from the United States, this one on the Hendricks Formation (Aeronian) of northern Michigan. Subsequent papers will describe Llandovery faunas from Alabama, Oklahoma, Missouri, Iowa, Ohio, and New York.

Ron West / Manhattan, Kansas, USA
Ron West is involved with quite a few parts of the new Treatise. Chapters 2A, Introduction to the Fossil Hypercalcified Chaetetid-Type Porifera (Demospongiae); General Features, 2B, Functional Morphology of the Chaetetid-Type Porifera, 2C, Classification of the Chaetetid-Type Porifera (Past and Present); 2D, Evolution of the Chaetetid-Type Porifera; 2E, Paleoecology of the Chaetetid-Type Porifera; and 2F, Paleogeography and Biostratigraphy of the Chaetetid-Type Porifera, by West, are currently in the final editing stage. Revisions of the sections of Chapter 4 on the Systematic Descriptions of the Hypercalcified Extant, and Fossil Chaetetid-Type and Post-Devonian Stromatoporoid-Type Demospongiae, by West et al., are ready for submission to the Treatise editors.

News & Views / Australia / Gregory Webb

The Australian contingent is hoping to become more active in 2011. We think that we will grow as a Society with a major push to increase membership, as Brisbane will host the 34th International Geological Congress in 2012 (5-10 August) and there will be a session on Fossil Reefs; additionally, the 12th International Coral Reef Symposium will be held in

Cairns from 9-13 July, 2012. So please think about attending one of those meetings in Australia in 2012.
John S. Jell continues work through retirement at the University of Queensland in Brisbane.
Luke Nothdurft has Australian Research Council funding to study how climate change may be affecting early coral diagenesis.
Gregory E. Webb (your struggling correspondent), will take up the Dorothy Hill Chair at the University of Queensland in 2011 and continues work on coral and reef diagenesis.

News & Views / Britain and Ireland / Ian Somerville

Christian Baars (Cardiff) is working on Carboniferous rugose corals from Barry, South Wales, focusing in particular, on the genus *Cyathoclisia*.
Ken Johnson (BNHM, London) is working on Miocene corals of Indonesia.
John Nudds (Manchester) is currently reviewing data in Johnson & Nudds (1975) on diurnal growth rings on *Siphonodendron*, utilising digital imaging and non-manual counting techniques using 'matlab' software.
Ian Somerville (Dublin) is currently working on 4 projects: * Rugose coral biostromes in Upper Viséan Glencar Limestone of NW Ireland (with Pedro Cozar, Markus Aretz and Hans-Georg Herbig [2 papers completed: Somerville et al. (2009), *Proc. Yorks. Geol. Soc*. **57**: 165-192; * Aretz et al. (2010), *Palaeogeog, Palaeoclim, Palaeoecol*. **292**, 3-4: 488-506;
* Carboniferous coral faunas from Adarouch area (North central Morocco) with Ismail Said, Sergio Rodríguez, Pedro Cózar and Paula Medina-Varea: 1 paper in press: Rodríguez, et al., *Neues Jahrbuch für Palaeontologie*, 1 paper submitted; * Carboniferous coral faunas from Khenifra area (central Morocco) with Ismail Said, Sergio Rodríguez and Pedro Cózar: 3 papers in preparation (2 published abstracts in III Congres Ibérica de Paleontologia, *XXVI Jornados de la Sociedad Espanola de Paleontología* pp. 261-268);
* Carboniferous coral succession in the Assa area, southern Morocco (North Tindouf Basin) with Sergio Rodríguez, Ismail Said, and Pedro Cózar (1 paper in preparation).

News & Views / Canada / Graham Young

Paul Copper / Laurentian University
Working with **Ross McLean**, **Copper** has almost finished a monograph on the Silurian rugosans of Anticosti. With **Heldur Nestor**, he is also doing the aulacerids, which were left out of the recent stromatoporoid monograph.
* paper in press: **Copper P. 2010.** Banks Island: Frasnian (Late Devonian) reefs in northwestern Canada. In: D. Hopley (ed.): Encyclopedia of modern coral reefs; Springer. [expected publication in December 2010]

Owen Dixon / Ontario
* manuscript submitted: **Dixon O. A. et Jell J. S.** Heliolitine tabulate corals from Late Ordovician and possibly Early Silurian allochthonous limestones in the Broken River Province, Queensland, Australia. (anticipated submission to *Alcheringa* by December 2010)
* work in progress: **Dixon O. A.** Heliolitine corals from Lower and Upper Silurian basin slope strata on Ellesmere Island, Nunavut, Canadian Arctic. (systematic paleontology and stratigraphy)

Bob Elias & Graham Young / U. of Manitoba & Manitoba Museum, Winnipeg
* **Lori Stewart** is completing a M.Sc. thesis on the stratigraphy, paleoenvironments, and paleoecology of a coral-bearing, Upper Ordovician section in central Manitoba. **Matt Demski** has started a M.Sc. thesis on the Ordovician-Silurian boundary and associated coral faunas in the Williston Basin area of Manitoba and Saskatchewan. Together, these are the first studies of the uppermost Ordovician and O-S boundary in this region to integrate isotopic data with litho- and biostratigraphy.
* **Elias**, **Young**, **Dong-Jin Lee** (Andong National University, Korea), and **Boo-Young Bae** (Gwacheon National Science Museum, Korea) have completed a major paper on "Coral biogeography in the Late Ordovician (Cincinnatian) of Laurentia." It will be published in a Geological Society Memoir on Early Palaeozoic Palaeobiogeography and Palaeogeography.
* At the International Palaeontological Congress in 2010 (London, England), **Elias**, **Dong-Jin**, and **Boo-Young** gave the following presentation: "Did storms have a role in the great Ordovician

biodiversification event? Evidence from corals in a Laurentian storm-swept epicontinental sea." At the same meeting, **Young** presented a poster on "Late Ordovician lagerstatten in Manitoba, Canada" by **Young**, **David Rudkin** (Royal Ontario Museum), **Michael Cuggy** (University of Saskatchewan), and **Edward Dobrzanski**, **Sean Robson**, and **Deborah Thompson** (all from the Manitoba Museum).
* In 2009 at the North American Paleontological Convention (Cincinnati, USA), **Elias** gave a talk on "Survival strategies and diversification of liberosessile solitary corals in the North American Late Ordovician epicontinental sea", and displayed a poster on "Affinity of problematic Ordovician coralline fossil Amsassia from Shaanxi, north-central China" by **Ning Sun** (Andong National University), **Dong-Jin**, **Elias**, and **Xiangdong Wang** (Nanjing Institute of Geology and Paleontology, China). **Young** spoke about "Marginal importance: the potential contribution of shoreline environments to our understanding of Ordovician biodiversity" by **Young** and **David Rudkin** (Royal Ontario Museum); see also 3 recent publications authored and co-authored by **Elias** and/or **Young**, printed in *Palaeoworld* **19** (Proceedings of Xth Fossil Cnidaria & Porifera Symposium), and presented in bibliographic section of the iasfcp page.

Ross McLean / Calgary
McLean is nearing the end of a large manuscript co-authored with **Paul Copper** on the early Silurian rugose corals of Anticosti Island, Quebec. Ross hopes to get it submitted to *Palaeontographica Canadiana* around the middle of 2011.

Brian Pratt / University of Saskatchewan, Saskatoon
Pratt continues his work on Early Cambrian corals and archaeocyaths from the Canadian Rocky Mountains, Early Ordovician corals from western Newfoundland, Late Ordovician calcisponges from the Saskatchewan subsurface, and on the paleoecology of a variety of Paleozoic reefs.

Colin Stearn / Ontario
I am reviewing proof of the text on stromatoporoids of Volume E4 on Hypercalcified Sponges of the Treatise on Invertebrate Paleontology which

is making some progress towards publication under the guidance of **B. Webby**.

News & Views / France / Bernard Lathuiliere, Jean Vacelet

Present activity of **Jean Vacelet** is mainly on the taxonomy of Recent sponges, especially carnivorous sponges (Cladorhizidae) from the deep Pacific. The chapter on living hypercalcified Sponges, with **Philippe Willenz** and **Willard Hartman**, of the Treatise on Invertebrate Paleontology, vol. 4, coordinated by **Barry Webby**, is in the process of publication.

Papers in press, abstracts, etc

Gazave E., Lapébie P., Renard E., Vacelet J., Rocher C., Ereskovsky A., Lavrov D.V. et Borchiellini C.: Molecular Phylogeny Restores the Supra-Generic Subdivision of Homoscleromorph Sponges (Porifera, Homoscleromorpha). *PloS One*.

Gretz M., Lathuiliere B. et Martini R. 2010. Coraux hettangiens de l'extreme: une réponse a la crise de la limite Trias-Jurassique? Réunion spécialisée SGF en hommage a S. Elmi: peuplements et environnements jurassiques, Lyon (France), 22-24 avril 2010, pp 59-60. [abstract, available at http://www.g2r.uhp-nancy.fr/annuaire/lathuiliere3.html; Lathuiliere]

Ise Yuji et Vacelet J.: New carnivorous sponges of the genus *Abyssocladia* (Demospongiae, Poecilosclerida, Cladorhizidae) from Myo-jin Knoll, Izu-Ogasawara Trench. *Zoological Science*.
[key words: deep sea, diversity, new species, oligotrophic, Pacific, Porifera, ROV]
Two new species of carnivorous sponges of the genus *Abyssocladia* are described. These sponges were collected from Myo-jin Knoll, Izu-Ogasawara Arc, northwest Pacific. Direct and detailed morphological observation revealed functional differentiation of sponge body and differentiation of spicule distribution. *Abyssocladia natsushimae* sp. nov. is distinct within the genus in mop-like gross morphology, large size of the body, and soft tissue packed with numerous microspined microstrongyles. *Abyssocladia myojinensis* sp. nov. is characterized by possession of both

typical abyssochelae and palmate abyssochelae. This is the first record of the genus from Japan, which suggests high diversity of carnivorous sponges on the oligotrophic bottom of the deep west Pacific.

Lathuiliere B. 2010. Faune corallienne des récifs toarciens du Moyen Atlas Marocain, premiere approche. Réunion spécialisée SGF en hommage a S. Elmi : peuplements et environnements jurassiques, Lyon (France), 22-24 avril 2010, pp 67-68. [abstract, available at http://www.g2r.uhp-nancy.fr/annuaire/lathuiliere3.html; Lathuiliere]

Olivier N., Colombié C., Pittet B. et Lathuiliere B. (in press): Microbial carbonates and corals on the marginal French Jura platform (Late Oxfordian, Molinges section). *Facies*.

Pisera A. et Vacelet J.: Lithistid sponges from submarine caves in the Mediterranean: taxonomy and affinities. *Scient. mar*.
[key words: Porifera, lithistids, new species, Mediterranean Sea, submarine caves, biogeographic affinities, fossilized sponges]
Several lithistid sponges are described from Mediterranean caves, occurring in the north-western and Adriatic basins. In the Corallistidae, *Neoschrammeniella bowerbanki* and *Neophrissospongia nolitangere* are recorded for the first time from the Mediterranean, whereas *Neophrissospongia radjae* n. sp. and *Neophrissospongia endoumensis* sp.nov. are described as new. In the Theonellidae, the common sponge previously identified as *Discodermia polydiscus* is described as *Discodermia polymorpha* n. sp. Fossil specimens from the 3PP cave are tentatively attributed to *Neoschrammeniella bowerbanki*. The distribution and affinities of this lithistid fauna is discussed.

West R., McKinney F. K., Fagestrom J. A. et Vacelet, J.: Biological interactions among extant and fossil clonal organisms. *Facies*.
[key words: Fusion, Clone, Terminology, Characteristics]
Biological interactions among clonal marine organisms are an important aspect of their behavior and are important in the construction of biological reefs. The interactions addressed here are among crustose and erect coralline algae, sponges, corals, and bryozoans and may involve clones of

the same species (conspecific), or different species (heterospecific). Conspecific interactions may be either between modules or clones that are produced asexually from one propagule, genetically identical, or between clones that are sexually produced from two or more propagules that may or may not be genetically identical. Juxtaposed genetically identical clones generally fuse whereas non-identical clones may or may not fuse, depending on their relatedness and histocompatibility. Most heterospecific clonal interactions are spatially competitive and result in overgrowths or stand-offs. Clone fission/fragmentation may occur as a result of biotic or abiotic processes that initially degrade but may eventually restore or even enhance ability to gain space and/or nutrients. Self-overgrowths also occur, usually over dead, diseased, or senescent parts of the same clone. [Lathuiliere]

News & Views / Mexico / Hannes Löser

Hannes Löser moved definitely to Mexico where he obtained a fixed position as researcher and lecturer at the Universidad Nacional Autónoma de México (UNAM). He is based in Hermosillo (Sonora, NW Mexico). His current research is focused on Jurassic and Cretaceous coral faunas from all over the world, at the moment mainly from France, Iran, Mexico, and Spain. From January to November 2009 Löser spends a sabbatical year in Germany (Munich). In print (2009) is his book on Jurassic and Cretaceous corals (in German), based on his lecture material and dedicated to undergraduate students and amateurs[March 2009].
Soon to be published [June 2009] is a book by Hannes Löser entitled "Jurassic and Cretaceous Corals - Morphology, classification, determination, and localities" [see **Löser H. 2009**. Fossile Korallen aus Jura und Kreide. Aufbau, Klassifikation, Bestimmung und Fundmöglichkeiten - in Scleractinia bibliography chapter] for students, interested biologists and geologists, as well as fossil collectors. The book has 216 pages and 279 figures (15 in colour; 440 single figures at all) and is published in the German language. The size is 270x190mm. Hard cover. ISBN 978-3-931689-12-4. Subscription price 28 Euro if ordered before September, 1, 2009. More information and text examples: http://www.cp-v.de/books/kfke.htm. [June 2009].

News & Views / Poland / Bogdan Kolodziej

Jerzy Fedorowski (Poznan) has been awarded *Doctor Honoris Causa* of the Adam Mickiewicz University in Poznań. The Senate of the University has honoured his distinguished scientific activity and important contribution to development of his *Alma Mater*.

Boguslaw Kolodziej (Krakow) and co-workers finalize their project on taxonomy and palaeoecology of Barremian-Aptian corals from Bulgaria and Romania.

Jaroslaw Krupa (Katowice) cleans and updates the Virtual Paleontological Museum of the University of Silesia. The VMP has got lately some extra space at our server so there will be no more difficulties in getting access to scans in the Museum. [Wrzolek]

Galina Melnikova (Tajik Academy of Sciences, Dushanbe) visited in 2010 the Institute of Palaeobiology (Warszawa). It was a successive visit in frame of co-operation with **Ewa Roniewicz** (Warszawa) on Lower Jurassic (Hettangian-Sinemurian) scleractinians from the Pamirs. Till now the following papers on Early Jurassic corals from the Pamirs have been published:

* **Melnikova G. K. 1975.** New Early Jurassic representatives of Amphiastraeina (Scleractinia) from the South-Eastern Pamirs. (In Russian). In: Voprosy Paleontologii Tajikistana, Dushanbe, pp. 108-120. [descriptions of new genera and species from the family Archaeosmiliidae Melnikova: solitary Archaeosmilia with *A. beata*, *A. duncani*, and phaceloid genus *Archaeosmiliopsis* with *A. densus*];

* **Melnikova G. K. et Roniewicz E. 1976.** Contribution to the systematics and phylogeny of Amphiastraeina (Scleractinia). *Acta Palaeontologica Polonica* 21: 97-114. [with the following new Lower Jurassic taxa of Pamirs: phaceloid *Intersmilia djartyrabatica* Melnikova, and *Prodonacosmilia* Melnikova with *P. dronovi* Melnikova];

* **Melnikova G. K. 1989.** On new finds of Early Jurassic scleractinians in the SE Pamirs. (In Russian). In: Novye vidy fanerozoiskoi fauny i flory Tajikistana, Dushanbe, pp. 71-83.

[new taxa: solitary *Cylindrosmilia* (recte *Cylismilia*) *brevis* and *C. longa* (Hettangian - Sinemurian); phaceloid *Proaplophyllia basardaraensis* Melnikova (Hettangian - Sinemurian); *Stylosmilia alitschurica* and *S. decemseptata* (Sinemurian); and new phaceloid genus *Pachysmilia* with *P. prima* (Sinemurian)];
* **Melnikova G. K., Roniewicz E. et Löser H. 1993.** New microsolenid genus *Eocomoseris* (Scleractinia), Early Lias-Cenomanian. *Annales Societatis Geologorum Poloniae* **63**: 3-12.
[with description of new genus *Eocomoseris* Melnikova et al. with two species *Eocomoseris ramosa* Melnikova and *E. lamellata* Melnikova from Hettangian - Sinemurian].

Elzbieta Morycowa (Krakow) is working on a paper dealing with Upper Jurassic corals from the Carpathian Foreland (core samples).

Ewa Roniewicz (Warszawa) is recently occupied with examination of two coral faunas: (1) North American Late Triassic corals from the Luning Formation, Pilot Mountains, Nevada, in co-operation with **G. D. Stanley**, University of Montana, Missoula; (2) Early Jurassic corals from the Pamirs, Tajikistan, in co-operation with **G. K. Melnikova**, Institute of Geology, Tajik Akademy of Sciences, Dushanbe. During a workshop connected with a revision of volume F Scleractinia of the Treatise on Invertebrate Paleontology (Smithsonian Institution, Washington, June 2009) she presented with **J. Stolarski** a presentation on Skeletal microstructure in investigations of coral history and construction of natural systematics. A spectrum of microstructures of fossil corals was shown using procedures of molecular biology in examination of diversity of Recent corals. To the website Corallosphere (http://www.corallosphere.org/) she has introduced a large part of Triassic coral genera known in the literature.

Tomasz Wrzolek (Sosnowiec) summarizes his project "Massive and submassive Phillipsastreidae of the Holy Cross Mts" in form of a memoir – it will contain data on over 400 unpublished specimens mostly of genera *Frechastraea* and *Scruttonia*, but also on Upper Frasnian species such as *Phillipsastrea ananas* and *Ph. progressa*; summarized will be data on hundreds of specimens already listed in earlier papers of Wrzolek; recently

quite a lot of people agreed to reproduce their illustrations for aims of this project; progress of work is rather slow, about 100 species is to be presented and some hard taxonomical decisions at genus and species level still have to be made... [Wrzolek]

Katarzyna Zalecka (Sosnowiec) in collaboration with **T. Wrzolek** continue their work on bibliography of *FC&P*... We have gathered so far bibliographic notes from 36 issues of *Fossil Cnidaria & Porifera*: almost 6 thousand records of papers and books on fossil corals, sponges, reefs, diagenesis, etc. Our database still needs verifications and corrections (never-ending task!), but we hope the database will be presented soon on-line, or on disk. [Wrzolek]

Mikolaj Zapalski (Warszawa) realizes the project "Growth dynamics of Palaeozoic corals".

papers in press from Poland

* **Fedorowski J.** The new Upper Serpukhovian genus Zaphrufimia and homeomorphism in some rugose corals. *Palaeontographica*.
A number of nondissepimented Viséan and Serpukhovian rugose coral species are morphologically linked to *Zaphrentites* Hudson 1941 and *Ufimia* Stuckenberg 1895. Separate taxonomic positions for these groups of species are suggested by differences in the microstructure of their septa and isolation in time and space of their types (Early Carboniferous of western Europe vs Middle Artinskian of the Ufa River area in Russia). The zaphrentoid early morphology, present in both lineages, is suggested to be the archetype for many Rugosa. Direct linking of the Early Carboniferous *Ufimia*-like corals to *Zaphrentites* suggests they evolved independently from *Ufimia* proper. Therefore they are assigned to the genus *Zaphrufimia*, newly introduced here. The probable derivation of this new genus suggests its relationship to the Stereolasmatina Hill 1981 but not to the Plerophyllina Sokolov 1960. Re-investigation of the lectotype of '*Zaphrentis*' *disjuncta* Carruthers 1910, from the Arnsbergian (Upper Serpukhovian) of Scotland, allowed '*Plerophyllum* (*Ufimia*)' *schwarzbachi* Schindewolf 1942 from both slightly older and equivalent strata of the Silesian Coal Basin to be placed in synonymy with that species. Three subspecies distinguished by

Schindewolf (1952) are revised and re-described, using both the original collection and newly investigated specimens from the Lower Serpukhovian of the Czech Republic. [original abstract; Kolodziej]

* **Fedorowski J. et Vassilyuk N.P.** Early Bashkirian Rugosa (Anthozoa) from the Donets Basin, Ukraine. Part 3. On the genera *Cyathaxonia* Michelin, 1847 and *Barytichisma* Moore and Jeffords, 1945. *Acta Geologica Polonica*.

The genus *Cyathaxonia* Michelin 1847 is determined to be one of only two possible genera belonging in the family Cyathaxonidae Milne Edwards et Haime 1850. This detailed study of a new species, *Cyathaxonia nodosa*, proves the origin of the columella independent of major septa, as demonstrated in crossed nicols. The inner margins of the major septa retreat from the corallite axis in the late neanic growth stage. The presence of a circulotheca is considered to be an important feature of this genus. *Barytichisma*, including a new species described here, *B. amplexoides*, is placed in the family Stereophrentidae Fomichev 1953, postulated valid by Fedorowski (in press). [original abstract; Kolodziej]

* **Roniewicz E.** Early Norian corals from the Northern Calcareous Alps, Austria, and the intra-Norian faunal turnover. *Acta Palaeontologica Polonica*. doi:10.4202/app.2009.0092

The first description of Early Norian corals from the Northern Calcareous Alps (Dachstein Plateau and Gosaukamm), Austria, is presented: 31 scleractinian species from 24 genera (including three corals not formally determined), and three hexanthiniarian species belonging to two genera. The stratigraphical position of the main part of the fauna discovered in the South Dachstein Plateau at the Feisterscharte is determined by means of the conodont *Epigondolella quadrata* (Lacian 1); single finds are from the horizons with *Epigondolella triangularis* and *Norigondolella navicula* (Lacian 3), and one close to the horizon with *Epigondolella* cf. *multidentata* (Alaunian 1). Rare corals from the Gosaukamm are from the Lacian 1 and Alaunian. Five species are described as new: *Retiophyllia vesicularis*, *R. aranea*, *Margarosmilia adhios*, *Hydrasmilia laciana*; one new genus and species from the family Coryphylliidae, *Margarogyra hirsuta*; one new genus and species, *Thamnasterites astreoides*, cannot be assigned to a family. Two hexanthiniarian species, *Pachysolenia cylindrica* Cuif and *Pachydendron microthallos* Cuif, known exclusively from the Tethyan

Lower Norian, represent stratigraphically valuable species. A regularly porous coral from the family Microsolenidae, *Eocomoseris*, which up to now has only been known from the Jurassic and Cretaceous, is here identified from the Triassic strata (originally described as *Spongiomorpha* (*Hexastylopsis*) *ramosa* Frech, 1890). Predominant taxa show solitary and phaceloid (pseudocolonial) growth forms and an epithecal wall; pennules-bearing corals are common. Carnian genera and genera typical of the Lacian and Lacian-Early Alaunian prevail; a hydrozoan genus, *Cassianastraea* Volz, has also been encountered as well as a scleractiamorph coral, *Furcophyllia septafindens* (Volz). The faunal composition contrasts with that of well known Late Norian-Rhaetian ones, the difference being observed not only at the generic but also at the family level. The post-Early Norian change in coral spectrum documents the turnover of the coral fauna preceding that at the Triassic/Jurassic boundary. [original abstract; Kolodziej]

* **Zapalski M. K. et Hubert B. L. M.** First fossil record of parasitism in Devonian calcareous sponges (stromatoporoids). *Parasitology*. doi:10.1017/S0031182010001071

Introduction. Palaeozoic calcareous sponges (stromatoporoids) are common bio-constructing fossils; they are sometimes found in association with helicoidal structures of unknown biological affinities. The interaction between the tube-forming organisms has usually been classified as commensalism. **Methods.** About 260 stromatoporoid skeletons from the Middle Devonian (Givetian) of the Mont d'Haurs section near Givet (Champagne-Ardenne, France) were thin-sectioned and analysed under transmitted light. **Results.** Approximately 10% of the examined stromatoporoids (mainly belonging to the genera *Actinostroma*, *Stromatopora* and *Stromatoporella*) contain tubes classified as *Torquaysalpinx* sp. The *Torquaysalpinx* organisms penetrated the skeletons of stromatoporoids in vivo (as evidenced by skeletal overgrowths); around the infesting organisms, growth bands are bent down. **Conclusions.** Diminished growth rates around the infesting organism demonstrate a negative influence on the host, similar to that seen in the modern demosponge–polychaete association of *Verongia–Haplosyllis*. This is demonstrated by changes in growth bands. As in the above-mentioned association, the endosymbiont might have been feeding directly upon the

tissues of the host. The *Torquaysalpinx* organisms were gaining habitat and possibly also food resources - for them this interaction was clearly positive. This long-term association can therefore be classified as parasitism. This is the first evidence for parasitism in Palaeozoic sponges. [original abstract; Kolodziej]

* **Zapalski M. K.** Tabulate corals from the Givetian and Frasnian of the Southern Region of the Holy Cross Mountains (Poland). *Special Papers in Palaeontology*. [Kolodziej]

Selected conference abstracts / Kolodziej

* **Johnson K., Stolarski J., Cairns S. D. et Budd A. F. 2009**. Corallosphere.org: biodiversity informatics for extinct and extant scleractinian corals. Ninth North American Paleontological Convention (NAPC 2009), June 21-26, Cincinnati, Ohio, USA.

* **Kolodziej B., Golubic S., Radtke G. et Bucur I. I. 2008**. Fossil record of microendoliths in living coral skeletons. In: The Second International Congress on Ichnology, Kraków, September 1-5, 2008, Abstract Book and the Intra-Congress Field Trip Guidebook, p. 64.

* **Kolodziej B., Idakieva V., Ivanov M. et Masse J.-P. 2009**. Unusual association of corals (Pachythecaliina) and small rudists from the Upper Barremian, Bulgaria. In: 8th International Symposium on the Cretaceous System, Plymouth, 6-12 September, 2009, pp. 160-161.

* **Kolodziej B., Idakieva V., Ivanov M. et Zlatarski V. 2009**. Palaeoenvironmental controls on development of coral bioconstructions from Barremian-Lower Aptian of Bulgaria. In: 8th International Symposium on the Cretaceous System, Plymouth, 6-12 September, 2009, pp. 159-160.

* **Luczynski P. 2008**. Storm generated stromatoporoid accumulations in shallow water carbonate succession of the Upper Silurian of Podolia, Ukraine; Abstract Volume. *26th IAS meeting/SEPM-CES SEDIMENT 2008, Bochum*, p. 175.

* **Stolarski J., Meibom A., Mazur M. et Phillips G. E. 2008**. Calcitic Scleractinian Corals: When, Where and Why. Joint Meeting of The Geological Society of America, Soil Science Society of America, American Society of Agronomy, Crop Science Society of America, Gulf Coast Association of Geological Societies with the Gulf Coast Section of SEPM.

Session No. 168 "Paleontological and Sedimentological Consequences of Calcite and Aragonite Sea Dynamics" Abstract. http://gsa.confex.com/gsa/2008AM/finalprogram/abstract_144263.htm.

* **21 Conference of Paleontological Section of Polish Geological Society**, was held in Zarki (Silesian-Cracow Upland, Poland), September 13-16 2010. The conference materials [in Polish]:
M. Zaton, W. Krawczynski, M. Salamon & A. Bodzioch (eds): Kopalne biocenozy w czasie i przestrzeni [fossil biocoenoses in time and in space; in Polish]; Wydzial Nauk o Ziemi Uniw. Slaskiego; Sosnowiec; 124 pp; the volume contains, among others, the following abstracts concerning the fossil corals and sponges:
* **Edward Chwieduk & Bogumil Nowak**: Zespoly koralowcowe i fauna im towarzyszaca w warstwach gornopaleozoicznych odsloniecia Kruseryggen (pd. Spitsbergen) [coral assemblages and accompanying fauna of Kruseryggen in S Spitsbergen]
* **Katarzyna Janiszewska & Jaroslaw Stolarski**: Korony glebin - o strukturze szkieletu koralowcow Micrabaciidae [crowns of the depths - skeletal structure of micrabaciid corals]
* **Michal Krobicki, Driss Sadki, Jan Golonka, Anna Plonka, Urszula Predki & Anna Rusin**: Budowle malzowe wczesnej jury marokanskiego Atlasu Wysokiego [bivalve buildups in the Lower Jurassic of Moroccan High Atlas]
* **Pawel Raczynski**: Cechsztynska rafa barierowa na Litwie [Zechstein barrier reef in Lithuania]
* **Pawel Raczynski, Dawid Bialek, Przemyslaw Sztajner & Dominik Zawadzki**: Wczesnokambryjskie budowle archeocjatowe w Sudetach [Lower Cambrian archaeocyathan buildups in the Sudetes]
* **Lukasz Rakowicz**: Strategie zyciowe organizmow epizoicznych na przykladzie fauny z Grzegorzowic (ems gorny, Gory Swietokrzyskie) [life strategies of epibionts exemplified by Upper Emsian material from Grzegorzowice, Holy Cross Mts]
* **Jaroslaw Stolarski & Katarzyna Janiszewska**: Aragonitowe koralowce kalcytowych morz [aragonitic corals of calcitic seas]
* **Dawid Surmik & Ewelina Borcuch**: Dewonskie skamienialosci rafowe z osadow polodowcowych kopalni piasku "Maczki-Bor" w Sosnowcu

[Devonian reef fossils from glacial deposits of Maczki-Bor sand pit in Sosnowiec]
* **Tomasz Wrzolek**: Koralowce czteropromienne dewonu swietokrzyskiego - historia biocenoz [Rugosa of the Holy Cross Mts - history of biocoenoses]
and in post-conference excursion guide:
* **Tomasz Wrzolek**: Odsloniecie wapieni dewonu w Dziewkach kolo Siewierza [outcrop of Devonian limestones at Dziewki by Siewierz] [Wrzolek]

* **Biology and paleobiology of coral reefs conference**, with presentations in Polish, was held in Warsaw on September 30th; materials of the conference [bilingual abstracts, in Polish and in English]:
G. Soszka (ed.): Biologia i paleobiologia raf koralowych / Biology and paleobiology of coral reefs; Wydzial Biologii Uniw. Warszawskiego, Edukacja Przyrodnicza "EL-I" PUH, Stowarzyszenie Rafowe; 20 pp; the volume contains the following presentations:
* **Stanislaw Skompski**: Karbonski etap rozwoju raf / Carboniferous stage of reef development
* **Tomasz Wrzolek**: Dewonskie Rugosa Gor Swietokrzyskich - wprowadzenie do tafonomii / Devonian Rugosa of the Holy Cross Mts - introduction to their taphonomy
* **Adam Bodzioch**: Najstarsze utwory rafowe mezozoiku / The oldest Mesozoic reef formations
* **Boguslaw Kolodziej**: Ewolucja bioerozji raf / Evolution of reef bioerosion
* **Ewa Roniewicz & Elzbieta Morycowa**: Triasowe koralowce Scleractinia z obszaru Polski / Triassic corals from Poland
* **Anna Kalinowska**: Miedzynarodowy rok roznorodnosci biologicznej - czy tylko dzisiejszych jej przejawow? / International year of biological diversity - or of its contemporary manifestation?
* **Aleksandra Jablonska & Piotr Jablonski**: Zagrozenia raf coralowych / Threats to coral reefs
* **Michal Ginter**: Chrzestnoszkieletowe z karbonskich platform weglanowych / Chondrichthyes from Carboniferous carbonate platforms
* **Jaroslaw Stolarski**: Aragonitowe koralowce w kalcytowych morzach /

Aragonitic corals in calcitic seas
* **Marek Koziol**: Uroki raf koralowych wod tropikalnych / Wonders of tropical waters coral reefs
* **Andrzej Jarzebowski**: Ryby koralozerne / Coral-eating fish
* **Grzegorz Soszka, Marek Koziol & Alicja Tomasiewicz**: Erozja raf koralowych w zapisie fotografii podwodnej / Coral reef erosion record in underwater photography
To note is a short concert of African music, presented by **Ricky Lion ensemble** during break-time of the Conference. All, or almost all the participants joined the artists singing and dancing... we were joined also by participants of a cryptographic symposium, held at the time in neighboring hall... [Wrzolek]

News & Views / Spain / Sergio Rodriguez

The research-group on Carboniferous of the Universidad Complutense de Madrid (**Sergio Rodríguez, Pedro Cózar, Diego García Bellido, Paula Medina-Varea, Alberto Gómez-Herguedas, Ismail Said and Ismael Coronado**) is working in the comparison of Mississippian Basins in Western Palaeotethys, in collaboration with **Ian Somerville** (U. College, Dublin) and **Daniel Vachard** (U. Lille). Their project includes research on Cnidaria, Porifera, Algae, Foraminifera, Conodonta, etc.; the main aim of this project is the comparison of stratigraphy and biodiversity in the Upper Mississippian of Ireland, Great Britain, France, Spain and North Africa.
Sergio Rodríguez and **Pedro Cózar** are working on the Devonian reef facies from Sierra Morena (SW Spain) in collaboration with **Esperanza Fernández** (U. León), **José Ignacio Valenzuela**, **Miguel Pardo** and **Liao Jau Chyn** (U. Valencia).
Sergio Rodríguez is working in collaboration with **Wayne Bamber** (Geological Survey Canada), on the corals from the Etherington Formation (Viséan-Serpukhovian). Such a research is included in a general study on the Etherington Formation in the Fernie area (**Barry Richards**, Geological Survey Canada and **Bernard Mamet** are also involved in the general part of this project).

News & Views / USA / George Stanley Jr.

Al Fagerstrom (Boulder, Colorado) and colleague **Ronald R. West** (Kansas State University) submitted a manuscript to *Facies*. It is currently under peer review. The title is: "Roles of clone-clone interactions in building reef frameworks: principles and examples".

Cal Stevens (California State University, San José) has finished his work on Permian corals in Nevada and California, publishing several papers during the past two years. This has resulted in a substantial increase in the number of taxa reported from this region. In 2009 he published two papers. One documented new occurrences of corals from the McCloud Belt, an exotic terrane in western North America (*Palaeontologia Electronica* **12**), and included several new species. The other dealt with new durhaminid corals from east-central California (*Journal of Paleontology* **83**), in which one new genus was described. In 2010 Stevens published three papers. In one he described several new species and one new genus, mostly from Nevada (*Journal of Paleontology* **84**). Two other papers dealt with distributions of corals and other taxa. One paper, concerned the geographic distribution of several Early Permian taxa, was published in *Palaeogeography, Palaeoclimatology, and Palaeoecology* **288**. The other, which appeared in Geomorphology and Plate Tectonics (Nova Science Publications), interpreted the location of terranes in western North America during the Permian.
Two projects are still pending. One, involving **Jerzy Fedorowski** and **Wayne Bamber**, will result in description of new Upper Carboniferous corals from Kuiu Island, Alaska. The other concerns several Upper Carboniferous corals from the eastern Klamath terrane, California, including a very unusual form presently being studied by **Jerzy Fedorowski**, which will be described with **Toshio Kawamura**.

George Stanley (University of Montana): I continue research on Triassic reefs and corals and sponge taxonomy. I am a Coordinator on the Scleractinia Treatise. Together with students I am investigating Upper Triassic reefs from Oregon and western Canada. My current research treats the evolution of early Mesozoic scleractinian corals as well as their

recovery following mass extinction. Research indicates that Mesozoic corals were photosymbiotic from their Middle Triassic appearance as calcified scleractinians. Other research interests are in Precambrian and Cambrian fossil Cnidaria. I am co-authored on a paper in *PloS One*, describing an amazingly well-preserved minute anemone bearing soft parts. Specimens studied by microtomographic (micro-CT) analyses come from the Early Cambrian of China. These micro-anemone represent the oldest stem hexacorallians directly comparable to extant counterparts.

BIBLIOGRAPHY
Porifera - Stromatoporoidea - Archaeocyatha

Aul J. L. 2010. Stromatoporoids and the Upper Devonian Alamo Impact Breccia in southeastern Nevada. Unpublished Master's Thesis, University of Alabama, Tuscaloosa, Alabama, viii + 63 p.
In addition to the species of stromatoporoids occurring in the Alamo Impact Breccia, noted under the next publication [Aul et al. 2010], the following species were found in the Guilmette Formation (lower Frasnian) below the Alamo: *Actinostroma* cf. *A. clathratum*, *Clathrocoilona* cf. *C. involuta*, *Stictostroma maclareni*, *Trupetostroma bassleri*, and *Arctostroma contextum*. [Stock]

Aul J. L., Stock C. W., Morrow J. R. et Sandberg C. A. 2010. Provenance and implications of stromatoporoids redeposited in Upper Devonian Alamo Impact Breccia, SE Nevada. *Geological Society of America Abstracts with Programs* **42**, 5: 173.
The Alamo Impact Breccia is found within the Frasnian-age Guilmette Formation. Chronostratigraphically it occurs with the *punctata* condont Zone. Stromatoporoids are the main booklist within the Alamo. Six species were found within the Breccia: *Hammatostroma albertans*, *Habrostroma turbinatum*, *Actinostroma* sp., *Atelodictyon* sp., *Hermatoporella* sp., and *Atopostroma distains*. The first five species are considered to be Frasnian and/or Givetian in age; however, *Atopostroma distains* is Emsian in age. The authors conclude that the bolide that caused the Alamo Breccia excavated as deep as Emsian. As Ordovician conodonts occur in the Alamo

as well, the authors further conclude that stromatoporoid-bearing strata older than Emsian do not occur in southeastern Nevada, and that because the Emsian strata in southeastern Nevada are unfossiliferous dolostones, the specimens of *A. distans* were transported into the area by tsunamis associated with the impact. [Stock]

Bialek D., Raczynski P., Sztajner P. et Zawadzki D. 2007. Archaeocyatha from the Wojcieszow Limestone. *Przeglad Geologiczny* **55**, 12, 2: 1112-1116. http://www.pgi.gov.pl/
This is an introductory presentation of Archaeocyaths found near Myslow in the Kaczawskie Mountains [Sudetes]. Estimating the exact age of the Archaeocyaths-containing Wojcieszów Limestone, has been a matter of dispute. Previously regarded as Cambrian, they were recognised as Silurian in 2000 (Skowronek & Steffahn). After more than 120 years of controversies this finding finally proves Early Cambrian age of this unit. Introductory taxonomic studies have shown similarity between Myslow Archaeocyaths - represented, among others, by genera *Dokidocyathella*, *Erismacoscinus*, *Afiacyathus*, *Leptosocyathus* and *Protopharetra* - and those from the Doberlug syncline (Germany). This dating is of great importance for establishing the lithostratigraphic column of the Kaczawa Mountains and Cambrian palaeogeographic reconstructions. [in Polish, original abstract; Kolodziej]

Cejchan P., Hladil J. et Galle A. 2009. Stromatoporoid skeletal growth as a quasi-periodic process. 10th Anniversary Conference of the Czech, Polish, and Slovak Paleontologists, October 13-15, 2009, Banská Bystrica, Slovakia. Poster Session Supplementary Paper 2. Banská Bystrica, Slovakia, 2 p.
A unique specimen of Givetian stromatoporoid *Actinostroma* … registered three accretional regimes: (1) two zones of the growth deceleration within one-year cycle, corresponding to Recent rhythms in the monsoonal realms, (2) regime with the single growth deceleration within the year's cycle, known for instance on the west coast of Atlantic, and (3) extremely varying regime, analogous to that in the realms of frequent storms, as known for instance from the neighbourhood of today's Japan. [results of research; Stock]

Consoli C. P, Pisera A. et Stilwell J. D. 2009. Siliceous Sponges of the Takatika Grit (Cretaceous-Paleogene), Chatham Islands, South Pacific. *Journal of Paleontology* **83**, **5**: 811-819. doi: 10.1666/08-120.1
Siliceous sponges are rare in the Cretaceous-Paleogene record, with only a handful of published accounts from the Southern Hemisphere. Variously preserved siliceous sponges, both Hexactinellida and Demospongiae, have been recovered from the Takatika Grit (Campanian-Danian), Chatham Islands, New Zealand. Hexactinellid sponges are represented by the Euretidae *Eotretochone australis* n. gen. and sp., *Pararete* sp., and Euretid gen. and sp. indet., *Auloplax*? sp. (Dactylocalycidae) and Tretodictyiid gen. and sp. indet., as well as by loose hexactines and fragments of dictyonal skeletons. Demosponges are represented only by loose spicules typical of Astrophorida, and perhaps lithistids. These fossils represent the first account of sponges of this age from the New Zealand region of the southwest Pacific. [original abstract; Kołodziej]

Da Silva A. C., Kershaw S. et Boulvain F. 2010. Stromatoporoid palaeoecology of the Frasnian (Upper Devonian) of southern Belgium. Third International Palaeontological Congress Programme and Abstracts, p. 135.
Stromatoporoid faunas from the Frasnian of southern Belgium are abundant in the carbonate platform and mound environments present in this area. Stromatoporoids dominate the large skeletal organisms, with their principal occurrence in biostromes and mound deposits. Stromatoporoid genera include *Actinostroma, Amphipora, Euryamphipora, Atelodictyon, Clathrocoilona, Idiostroma, Salairella, Stachyodes, Stictostroma, Stromatopora* and *Trupetostroma*. Comparable facies were observed in the carbonate platform and in the mound, so it appears that even if the mound and platform were independent, similar stromatoporoids occur in similar facies indicating a strong palaeo-environmental control. From the more distal to the more proximal, facies are: (1) outer platform or off-mound (shales, crinoidal packstones); (2) outer intermediate platform or deep mound (muddy facies with crinoids and reef-builders); (3) inner intermediate platform or shallow mound (muddy facies with algae) and (4) restricted platform or mound (laminites, mudstones, paleosols). Low profile stromatoporoids (dominated by *Stictostroma* and *Salairella*) are often

observed at the beginning of sequences, as stabilizers and in facies 1 and 2 (so they likely led to expansion of the carbonate factory). High domical stromatoporoids (dominated by *Actinostroma*, *Atelodictyon* and *Trupetostroma*) occur in facies 3 and 4, in association with branching stromatoporoids. Stromatoporoid growth forms seem to be related mostly to environmental parameters but there is also some taxonomic control. [Stock]

Ereskovsky A.V., Borchiellini C., Gazave E., Ivanisevic J., Lapébie P., Perez T., Renard E. et Vacelet J. 2009. The Homoscleromorph sponge *Oscarella lobularis*, a promising sponge model in evolutionary and developmental biology. *BioEssays* **31**: 89-97.
[key words: development; evolution; Homoscleromorpha; model species; Porifera; sponges]
Sponges branch basally in the metazoan phylogenetic tree and are believed to be composed of four distinct lineages with still uncertain relationships. Indeed, some molecular studies propose that Homoscleromorpha may be a fourth Sponge lineage, distinct from Demospongiae in which they were traditionally classified. They harbour many features that distinguish them from other sponges and are more evocative of those of the eumetazoans. They are notably the only sponges to possess a basement membrane with collagen IV and specialized celljunctions, thus possessing true epithelia. Among Homoscleromorphs, we have chosen *Oscarella lobularis* as a model species. This common and easily accessible sponge is characterized by relatively simple histology and cell composition, absence of skeleton, and strongly pronounced epithelial structure. In this review, we explore the specific features that make *O. lobularis* a promising homoscleromorph sponge model for evolutionary and developmental researches. [Lathuiliere]

Gandin A. et Debrenne F. 2010 Distribution of the archaeocyath-calcimicrobial bioconstructions on the Early Cambrian shelves. *Palaeoworld* **19**, 3-4: 222-241. (published on-line 21 September 2010), doi 10.1016/j.palwor.2010.09.010; ISSN 1871-174X
[key words: archaeocyaths; calcimicrobes; bioconstructions; Early Cambrian]
The differences and variety of structural, depositional, and compositional features observed in the Early Cambrian microbial-archaeocyath buildups

preserved in the present-day continents, suggest a direct correlation between the physico-chemical factors of deposition and the structural architecture of the buildups. This can be explained in terms of their palaeogeographic collocation on the shelves (depth, energy), and hence of the areal distribution of epeiric basins and perioceanic/pericontinental platforms.
Data on the analysis of biohermal communities and their architectures indicate that the relative development of the main reef-building components, as well as their evolution within the reef communities, reflects the dominant physico-chemical factors, mainly temperature and nutrient availability, and the physiography of the primary depositional setting. The bioaccumulations show different reef building styles, defined by the types of associated facies and by the early diagenetic features. They are represented by (i) mud-supported simple (Kalyptrae) to compound mounds locally with stromatactis-like cavities; (ii) dendrolitic bioherms and crustose buildups with large shelter cavities and low synoptic relief; (iii) cement-supported skeletal reefs with wave resistant frameworks often associated with oolitic shoals, and (iv) bioclastic sands, developed at photic and shallow sub-photic depths on low-angle/low-energy ramps (i-ii) or on high-energy conditions on platforms distally rimmed (iii) or occasionally swept by storm currents (iv). The results of the analysis provide information on the spatial conditions of the primary depositional settings of the first metazoan involved in reef building in the history of the Earth, and suggest that the architecture of the bioconstructions was controlled not only by the physiography of the depositional setting and global/astronomic climate but also by local climatic conditions constrained by the latitudinal distribution of the Early Cambrian continental blocks. [original abstract; Wrzolek]

Karimova F. S. et Lessovaya A. I. 2007. Ordovician System: stromatoporoids. *In* A.I. Kim, F.A. Salimova, I.A. Kim & N.A. Meschankina (eds.): Palaeontological Atlas of Phanerozoic Faunas and Floras of Uzbekistan, Volume I. Republic of Uzbekistan State Committee on Geology and Mineral Resources, Tashkent; pp 28-29, pl. 10, figs. 1-2.
Two species are described: (1) *Labechia regularis* Yabe & Sugiyama, 1930 from the Katian-age Archalyk Beds; and (2) *Plectostroma sumsarense*

Lessovaya, 1971. The occurrence of the latter is said to be the same as the holotype, which the authors say is from the Llandovery (Lower Silurian), a curious occurrence for an Ordovician stromatoporoid. [this and the following two papers are part of a two-volume set on the paleontology of Uzbekistan, published simultaneously in English, Russian, and Uzbek versions. Volume I, by far the larger of the two, is on the Paleozoic, whereas Volume II is on the Mesozoic and Cenozoic; Stock]

Karimova F. S. et Lessovaya A. I. 2007. Silurian System: stromatoporoids. *In* A.I. Kim, F.A. Salimova, I.A. Kim & N.A. Meschankina (eds.): Palaeontological Atlas of Phanerozoic Faunas and Floras of Uzbekistan, Volume I. Republic of Uzbekistan State Committee on Geology and Mineral Resources, Tashkent; pp 76-78, pl. 10, figs. 3-4, pl. 11, figs. 1-3.
Five species are described: (1) *Clathrodictyon vesiculosum* Nicholson & Murie, 1878 from the Upper Wenlock; (2) *Ecclimadictyon schalynicum* Lessovaya & Karimova, sp. nov. Upper Wenlock; (3) *Ecclimadictyon schachriomonum* Lessovaya, 1978 from the Llandovery-age Juzhnosumsar Formation; (4) *Densastroma podolicum* (Yavorsky, 1929) from the Wenlock-age Kuturak Formation; and (5) *Simplexodictyon podolicum* (Yavorsky, 1929) from the Wenlock. The illustrated specimen of *S. podolicum* appears to lack the wide medial light zone in the laminae, typical of the genus; however, the authors report that "a light strip 0.05-0.08 mm wide can be traced in the laminae" (p. 78). [Stock]

Karimova F. S. et Lessovaya A. I. 2007. Devonian System: stromatoporoids. *In* A.I. Kim, F.A. Salimova, I.A. Kim & N.A. Meschankina (eds.): Palaeontological Atlas of Phanerozoic Faunas and Floras of Uzbekistan, Volume I. Republic of Uzbekistan State Committee on Geology and Mineral Resources, Tashkent; pp 152-158, pl. 12, figs. 1-6, pl. 13, figs. 1-2, pl. 14, figs. 1-5, pl. 15, figs. 1-4.
Eighteen species are described from throughout the Devonian. Six are from the Lower Devonian: (1) *Actinostroma effectum* Lessovaya & Karimova, sp. nov. from the Lochkovian-age Bursykhirman Regional Stage; (2) *Hermatostroma bonem* Yavorsky, 1955 also from the Bursykhirman Regional Stage; (3) *Idiostroma marius* Lessovaya & Karimova, sp. nov.,

named in honor of Marius Lecompte, also from the Bursykhirman Regional Stage; (4) *Stromatopora* aff. *radiata* Yavorsky, 1967, also from the Bursykhirman Regional Stage; (5) *Gerronostroma perangustum* Lessovaya & Karimova, sp. nov. from the Emsian-age Norbonek Beds; and (6) *Amphipora anomalis* (Lessovaya, 1962) from the Lower Devonian-undifferentiated. Three are from the Givetian Stage of the Middle Devonian: (1) *Atelodictyon astrictum* Karimova, sp. nov. from the Auliekudzhumdy Formation; (2) *Stromatopora cooperi* Lecompte, 1952 also from the Auliekudzhumdy Formation; and (3) *Amphipora regularis* Lessovaya, 1962 from the Beshachshik Formation. Nine are from the Upper Devonian: (1) *Actinostroma orbiculatum* Karimova, 2002, from the Frasnian-age Kolsuyuk Formation; (2) *Trupetostroma nitida* Karimova, 2002 also from the Kolsuyuk Formation; (3) *Stachyodes fibrosum* Karimova 2002 also from the Kolsuyuk Formation; (4) *Amphipora corrupta* (Yavorsky, 1967) from the Frasnian-age Belikuduk Formation; (5) *Novitella tachussovensis* (Yavorsky, 1955) also from the Belikuduk Formation; (6) *Rosenella irregularis* Yavorsky, 1957 from the Famennian-age Dzhanahmet Formation; (7) *Parastylostroma rara* Lessovaya & Karimova, sp. nov. from the Famennian-age Aznek Formation; (8) *Pennastroma muruntaica* Lessovaya & Karimova sp. nov also from the Aznek Formation; and (9) *Anostylostroma dominatum* Lessovaya, 1986 from the Famennian-age Auliekudzhumdy Formation. [Stock]

Khromykh V. G. 2010. Evolution of Stromatoporoidea in the Ordovician-Silurian epicontinental basin of the Siberian Platform and Taimyr. *Russian Geology and Geophysics* **51**: 684-693.
Stromatoporoids were collected from 29 measured sections from along the Khakoma, Moiero, Moilerokan, Bugarikata, Yuktali, Bol'shaya, and Parmaya Rivers. This paper does not include descriptions of the stromatoporoids, but rather notes the stratigraphic occurrence and evolutionary relationships of the genera present. The author notes that correlation of strata at the Siberian localities with the new Ordovician stages is "fairly tentative" (p. 687). The emergence of new genera is noted by stage: * Darriwilian: *Priscastroma*, *Cystostroma*; * Sandbian: *Stromatocerium*, *Rosenella*, *Lophiostroma*, *Pachystylostroma*, *Labechia*; * Katian: *Aulacera*, *Nestoridictyon*, *Stratodictyon*, *Stelodictyon*,

Ecclimadictyon, *Dermatostroma*, *Taymyrostroma*; * Hirnantian: *Clathrodictyon*; * Aeronian: *Clavidictyon*, *Plectostroma*, *Mamellolabechia*; * Telychian: *Stromatopora*, *Vikingia*, *Parallelopora*, *Neobeatricea*, *Yabeodictyon*, *Yavorskiina*; * Sheinwoodian: *Plexodictyon*, *Parallelostroma*; * Gorstian: *Hermatostromella*. The author concludes that Ordovician stromatoporoid genera emerging in this basin indicate that the basin was one of the global centers of stromatoporoid origination. [Stock]

Lisy P., Cejchan P., Galle A., Filip J., Slavik L., Hladil J. et Babek O. 2010. Stromatoporoid growth-band series: optical logs as a scale for magnetic susceptibility sampling. In D. Chen, A. C. da Silva (eds.), IGCP 580 Meeting Applications of Magnetic Susceptibility on Paleozoic Rocks, 28th November-4th December 2010, Guilin, China. Meeting Programme and Abstracts, Beijing, p. 29-30.
The annual increments in skeletons of Devonian stromatoporoids are 1-8 (3-6) mm thick. The primary elements calcified during several days were thin and/or minute and correspond to immediate CaCO3 accretion rates 0.05-0.12 g/cm2/yr. Such accretion is one order of magnitude less than for present scleractinians but up to several orders of magnitude more than for present calcareous sponges. According to thousands of specimens assessed worldwide, there are no doubts that more than 90% of backreef Givetian and Frasnian stromatoporoids display a conspicuously developed seasonal bandings. [fragments of the abstract; Stock]

Luczynski P. 2008. Stromatoporoid shape and burial ratio changes during growth history and their methodological consequences in morphometrical analyses. *Lethaia* **39**, 4: 339-358. doi: 10.1080/00241160600876735
Eight Devonian stromatoporoids with clearly exposed arrangements of latilaminae were subjected to detailed morphometrical analyses. Distinctive sets of latilaminae were marked on photographs taken from polished specimens, which allowed reconstruction of their individual growth histories by presenting consecutive stages of their growth. The growth forms measured above the sediment surface and the overall shapes of the skeleton at a given time have proved to differ distinctly between each other throughout the growth history of these stromatoporoids. The morphometrical features of individual specimens (both of their growth

forms and of their whole skeletons) distinctly changed throughout their development. Changing environmental factors directly influenced the growth form above the sea floor, and each specimen shows its own specific history of growth form changes. Instead, overall shapes of the skeleton of most of the studied specimens changed in a similar general manner resulting from growth during sediment accumulation. Basing the palaeoenvironmental considerations only on the stromatoporoids' final shapes may thus be very misleading. It is therefore suggested that the ascription of a specimen to a particular morphometrical category should be based on the mode of its growth history represented by a curve recording the V/B changes (vertical height versus basal length) during consecutive growth stages. Certain sedimentary processes have their direct reflection in the mode of stromatoporoid growth, and are recorded by the attributes of the shape profile (V/B), and burial ratio (BR) curves, which allows deciphering such features as, for example, periodicity of sediment supply, substrate consistency and tempo of sediment cementation. This is particularly valuable when the deposits are recrystallized and the sedimentary structures are not visible. The paper also tests the applicability of the new definitions of the parameters describing the stromatoporoid shape introduced recently by the author. [original abstract; Kolodziej]

Luczynski P. 2008. Growth forms and distribution patterns of stromatoporoids exposed on Devonian palaeobottom surfaces; Holy Cross Mountains, central Poland. *Acta Geologica Polonica* **58**, 3: 303-320. http://www.geo.uw.edu.pl/agp/
Well preserved palaeobottom surfaces with stromatoporoids are exposed in two Devonian localities in the Holy Cross Mountains in central Poland: Skaly and Bolechowice-Panek quarries. The stromatoporoids were subjected to morphometric analysis and distribution studies. Stromatoporoids were studied hitherto only in vertical cross sections; the study of three-dimensional stromatoporoid domes has created a need to introduce a new set of parameters describing their shapes, which includes: horizontal length and width, vertical height, elongation ratio and elongation azimuth. In order to make the measurements made by various methods comparable, and thus to allow comparable interpretations, recalculation formulas have been presented. Comparison of the results obtained by the

two methods indicates that the measurements made in vertical cross sections substantially bias the dimensions and shapes of the stromatoporoids, which may influence stromatoporoid-based palaeoenvironmental reconstructions. The results of the measurements were interpreted in terms of palaeonvironmental conditions. In Bolechowice-Panek the stromatoporoids lived in a quiet shallow water setting with a low and stable sedimentation rate. In Skaly the stromatoporoids grew in a shallow subtidal setting and located themselves on parallel ripples, most probably to escape being buried by deposits accumulating in inter-ripple depressions. [original abstract; Kolodziej]

Luczynski P. 2009. Stromatoporoid growth orientation as a tool in palaeotopography: a case study from the Kadzielnia Quarry, Holy Cross Mountains, central Poland. *Acta Geologica Polonica* **59**, **3**: 319-340. http://www.geo.uw.edu.pl/agp/
Growth orientation of stromatoporoids has allowed reconstruction of the palaeotopographic position of a large Frasnian organic buildup exposed in the Kadzielnia Quarry in the Holy Cross Mountains, central Poland. Two main, mature stage, stromatoporoid growth modes have been discerned: erect and semi-buried. The growth orientations of the stromatoporoids were studied in 17 sections that expose four different facies in the quarry. The inclinations of the basal surfaces of specimens and direction of the growth axes were measured and compared in terms of different growth modes, facies and positions in the organic buildup. The results support the earlier opinions that the inclined contact between the Kadzielnia stromatoporoid-coral limestones and the detrital limestones is depositional and represents an inclined depositional surface, and that the Kadzielnia buildup developed in a calm water setting below the storm wave base on a slope or at its foot. General conclusions emerging from the studies are: 1) stromatoporoid growth directions hold a key to reconstructing ancient topography; 2) erect stromatoporoids that grew on inclined surfaces changed the growth axes to the vertical direction during their growth; and 3) stromatoporoid growth directions and particularly the changing mode of growth of erect forms support the view that Palaeozoic stromatoporoids acted photosensitively. [original abstract; Kolodziej]

Luczynski P., Skompski S. et Kozlowski W. 2009. Sedimentary history of Upper Silurian biostromes of Podolia (Ukraine) based on stromatoporoid morphometry. *Palaeogeography, Palaeoclimatology, Palaeoecology* **271**, 3-4: 225-239. doi: 10.1016/j.palaeo.2008.10.017
The sedimentary history of stromatoporoid biostromal accumulations reflecting various depositional conditions (autoparabiostromes and parabiostromes) is studied in two isochronous, Late Silurian carbonate sections of the Malynivtsy Formation from Podolia (western Ukraine, Kam'janec' Podil'skyj area). This study focuses on morphometrical analysis of massive stromatoporoids. Various stromatoporoid attributes, such as growth form, volume, surface character etc., are interpreted in terms of growth environments. Attributes of redeposited specimens are also analysed in terms of their susceptibility to exhumation and redeposition, and new criteria are presented in this matter. The exposed facies succession, which can be subdivided into three units: an oncolitic-fenestral complex and the stromatoporoid-coral complexes that underlie and cover it, represents the belt of shoals located at a considerable distance from shore, and its transition to a narrow zone of back-shoal tidal flats. The facies patterns proved to be strongly obscured by an intensive process of onshore redeposition of material during high energy episodes. These events caused exhumation and landward transport of stromatoporoids inhabiting soft-sediment bottoms of outer shelf areas, which were afterwards accumulated in parabiostromes in calm waters on lee side of a zone of shoals. The main process governing the distribution of redeposited stromatoporoids is fractional (weight) segregation. The high energetic events had less effect on stromatoporoid-coral autoparabiostromes that formed the zone of shoals, which were inhabited by stromatoporoids better adapted to permanent wave action, but nonetheless, they caused their partial reworking and depletion from those forms that did not resist redeposition, on the one hand, and supplementation by specimens derived from offshore areas, on the other. [original abstract; Kolodziej]

Machado G., Hladil J., Slavik L., Koptíková L., Moreira N., Fonseca M. et Fonseca P. 2010. An Emsian-Eifelian calciturbidite sequence and the possible correlatable pattern of the basal Chotec Event in western Ossa-Morena Zone, Portugal (Odivelas Limestone). *Geologica Belgica* **13**: 431-

446.
Stromatoporoids are part of the reef fauna. The stromatoporoid skeletons are said to be "fragmentary, broken into mm to dm sized parts" (p.436). Thirty-one species of stromatoporoids are listed (not described): *Actinostroma perspicuum* Nicholson, 1886; *Actinostroma* sp.; *Amphipora* sp; *Atelodictyon* sp.; *Atopostroma* sp.; *Bifariostroma* sp.; *Clavidictyon* sp.; *Dendrostroma* sp.; *Ferestromatopora* sp.; *Habrostroma* sp.; *Hermatoporella* sp.; *Hermatostroma* sp.; *Hermatostromella* sp.; *Labechia* sp.; *Parallelopora* sp.; *Plectostroma* sp.; *Pseudoactinodictyon* sp.; *Salairella* sp.; *Stachyodes* (*Sphaerostroma*) sp.; *Stachyodes* (*Stachyodes*) sp.; *Stictostroma* sp.; *Stromatopora* sp.; *Syringostromella* sp.; *Trupetostroma* sp.; and "about 7 difficultly classifiable taxa" (p. 43). [Stock]

Olszewska-Nejbert D. et Swierczewska-Gladysz E. 2009. The phosphatized sponges from the Santonian (Upper Cretaceous) of the Wielkanoc Quarry (southern Poland) as a tool in stratigraphical and environmental studies. *Acta Geologica Polonica* **59**, 4: 483-504. http://www.geo.uw.edu.pl/agp/index.html
Phosphatized sponges from the Santonian of the Wielkanoc Quarry are represented by 11 species of Hexactinosida and 16 species of Lychniscosida. The taxonomic composition is most similar to the *Micraster coranguinum* Zone fauna (Middle Coniacian–Middle Santonian) of England. Three preservational groups of sponges are distinguished: "white", "beige" and "dark". They are infilled by phosphatized foraminiferal/foraminiferal-calcisphere wackestone and are contained in the marly calcareous inoceramid packstone. The sponges indicate a calm and relatively deep (> 100m) life environment. After burial, phosphatization and exhumation, the fossil sponges were redeposited in Upper Santonian strata. The "white" and "beige" groups were displaced a very short distance or represent only lag deposits. The rolled and crushed sponges of the "dark" group were exhumed and phosphatized more than once. They could be redeposited (reworked) nearly in the same place and/or transported from some longer distances (but not from outside of the Cracow Swell). The phosphatized wackestone infilling the sponges, and the phosphatized clasts, are the only remains of the deposits, which formed on the Cracow Swell

after the late Early Coniacian but before the Late Santonian. [original abstract; Kolodziej]

Pisera A. et Bitner M. A. 2007. The sponge genus *Brachiaster* (Pachastrellidae, Demospongiae) and its first known fossil representative, from the late Eocene of southwestern Australia. *Alcheringa* **31**, 4: 365-373. doi: 10.1080/03115510701640629
The pachastrellid genus *Brachiaster* Wilson (Pachastrellidae, Demospongiae, Porifera) has had until now no known fossil representatives. Here we describe its first known fossil representative from the late Eocene of southwestern Western Australia, assigned to *Brachiaster claudelevii* sp. nov. *Brachiaster claudelevii* has well-developed axial canals in the mesotriders, which points to it being intermediate in character between the typical tetraxial desmas of lithistids, and tetraxial spicules of non-lithistid demosponges. This further supports the position of *Brachiaster* among the Pachastrellidae. The geographic and bathymetric distribution of the extant and newly described fossil representatives of *Brachiaster* indicates that the Eocene sponge described here is important in understanding the evolution of Indo-West Pacific sponges because it points to a long evolutionary history and complex biogeographic distribution of this lineage of pachastrellid sponges. [original abstract; Kolodziej]

Pisera A., Rutzler K., Kazmierczak J. et Kempe S. 2010. Sponges in an extreme environment: suberitids from the quasi-marine Satonda Island crater lake (Sumbawa, Indonesia). *Journal of the Marine Biological Association of the United Kingdom* **90**, 1: 203-212.
Sponges are rare in extreme environments, and very little is known about their adaptations to such settings. Evidence from two species in a marine-derived midwater stratified crater lake on Satonda Island (Sumbawa, Indonesia) suggests their production of gemmules (resting bodies), a rare trait in marine sponges but common in freshwater forms, may be a survival mechanism in the lake's harsh environment. With its epilimnion hydrochemistry characterized by changing alkalinity, salinity, and O2 levels over the region's wet and dry seasons, the lake sustains only a few marine macroscopic organisms, among them the suberitid sponges *Protosuberites lacustris* comb. nov. and *Suberites* sp. (Hadromerida:

Suberitida). Both species belong to the same group as sponges reported from other marine-derived lakes with strongly varying and extreme environmental (especially chemical) parameters. The morphological characters, taxonomic position, ecological adaptations, environmental conditions, and biota associated with the sponges in this ecologically unique site are presented here. [original abstract; Kolodziej]

Rigby J. K., Potter A. W. et Anderson N. C. 2008 Ordovician sponges from the Montgomery Limestone, Taylorsville area, northern Sierra Nevada, California. *Bulletin of Geosciences* **83**, 3: 299-310.
[key words: Ordovician, Montgomery Limestone, Sierra Nevada, California, *Girtyocoeliana*, *Amblysiphonella*, *Cliefdenella*, *Rigbyetia*, *Corymbospongia*]
The modest faunule of silicified fossil demosponges, documented here, was recovered from the Upper Ordovician Montgomery Limestone in the Taylorsville area, in the northern Sierra Nevada of northern California. Included are specimens of the ceractinomorph angullongiid *Amblysiphonelloidea tubulara* Rigby & Potter 1986, the girtyocoelliid *Girtyocoeliana epiporata* (Rigby & Potter 1986), the sebargasiid *Amblysiphonella* sp., and the cliefdenellids *Cliefdenella alaskaensis* Stock 1981, and *Rigbyetia obconica* (Rigby & Potter 1986). In addition, specimens of the vaceletiid *Corymbospongia adnata* Rigby & Potter 1986, are described and figured. The assemblage is closely related to faunules of sphinctozoan sponges earlier reported by Rigby & Potter (1986) from the eastern Klamath Mountains, to the west in northern California. [original abstract; Wrzolek]

Senowbari-Daryan B. et Stanley G. D. Jr. 2009 Taxonomic affinities and paleogeography of *Stromatomorpha* Smith, a distinctive Upper Triassic reef-adapted demosponge. *Journal of Paleontology* **83**, 5: 783-793.
[key words: *Stromatomorpha*, Hydrozoa, Porifera, Demosponge, Norian, Triassic, Alaska, California, Nevada]
Stromatomorpha californica Smith is a massive, calcified, tropical to subtropical organism of the Late Triassic that produced small biostromes and contributed in building some reefs. It comes from the displaced terranes of Cordilleran North America (Eastern Klamath terrane, Alexander terrane,

and Wrangellia). This shallow-water organism formed small laminar masses and sometimes patch reefs. It was first referred to the order Spongiomorphidae but was considered to be a coral. Other affinities that have been proposed include hydrozoan, stomatoporoid, sclerosponge, and chambered sponge. Part of the problem was diagenesis that resulted in dissolution of the siliceous spicules and/or replaced them with calcite. Well-preserved dendroclone spicules found during study of newly discovered specimens necessitate an assignment of *Stromatomorpha californica* to the demosponge order Orchocladina Rauff. Restudy of examples from the Northern Calcareous Alps extends the distribution of this species to the Tethys, where it was an important secondary framework builder in Upper Triassic (Norian-Rhaetian) reef complexes. Revisions of *Stromatomorpha californica* produce much wider pantropical distribution, mirroring paleogeographic patterns revealed for other tropical Triassic taxa. Review of Liassic material from the Jurassic of Morocco, previously assigned to *Stromatomorpha californica* Smith var. *columnaris* Le Maitre, cannot be sustained. Species previously included in *Stromatomorpha* are: *S. stylifera* Frech (type species, Rhaetian), *S. actinostromoides* Boiko (Norian), *S. californica* Smith (Norian), *S. oncescui* Balters (Ladinian-Carnian), *S. pamirica* Boiko (Norian), *S. rhaetica* Kuhn (Rhaetian), *S. stromatoporoides* Frech, and *S. tenuiramosa* Boiko (Norian). *Stromatomorpha rhaetica* Kuhn described from the Rhaetian of Vorarlberg, Austria shows no major difference from *S. californica*. An example described as *S. oncescui* Balters from the Ladinian-Carnian of the Rarau Mountains, Romania, is very similar to *S. californica* in exhibiting similar spicule types. However, because of the greater distance between individual pillars, horizontal layers, and the older age, *S. oncescui* is retained as a separate species. The net-like and regular skeleton of *Spongiomorpha sanpozanensis* Yabe and Sugiyama, from the Upper Triassic of Sambosan (Tosa, Japan), suggests a closer alliance with *Stromatomorpha*, and this taxon possibly could be the same as *S. californica*. [original abstract; Wrzolek]

Stearn C. W. 2010a. Systematic descriptions of the class and order uncertain: Family Disjectoporidae. Treatise Online No. 3, Part E, Revised, Vol. 4, Chap. 6, 11 p.

Eleven genera in this Permian-Triassic family are described. [Stock]

Stearn C. W. 2010b. Paleozoic Stromatoporoidea: general introduction. Treatise Online No. 5, Part E, Revised, Vol. 4, Chap. 9A, 3 p. [Stock]

Stearn C. W. 2010c. Microstructure and mineralogy of Paleozoic Stromatoporoidea. Treatise Online No. 6, Part E, Revised, Vol. 4, Chap. 9D, 25 p.
Chapter subheadings include: (1) introduction; (2) observations of microstructures; and (3) diagenesis and interpretation of microstructures. This chapter is profusely illustrated. [Stock]

Stearn C. W. 2010d. Morphologic affinities of Paleozoic Stromatoporoidea to other fossil and Recent groups. Treatise Online No. 7, Part E, Revised, Vol. 4, Chap. 9E, 9 p.
This chapter begins with an introduction, followed by summaries of other fossil groups compared to Paleozoic stromatoporoids: foraminifera; archaeocyatha and sphinctozoa; Chaetetida; Hydrozoa and disjectoporids; tabulate corals; scleractinia; Mesozoic stromatoporoid-like genera; and cyanobacteria. The author concludes that the relationship of stromatoporoids "with encrusting hypercalcified sponges is entirely convincing" (p. 7). [Stock]

Stearn C. W. 2010e. Functional morphology of the Paleozoic stromatoporoid skeleton. Treatise Online No. 8, Part E, Revised, Vol. 4, Chap. 9F, 26 p.
Chapter subheadings include: (1) introduction; (2) colonies or individuals; (3) spicules; (4) function of the skeleton as a whole; (5) skeletal fragments and propagation; (6) light dependence in stromatoporoids; (7) isotope fractionation; (8) growth rates and growth bands; (9) stromatoporoid skeletons, light dependence, and reef structure; (10) soft tissue within the skeleton; (11) basal skeleton secretion in living hypercalcified sponges; (12) growth modules of laminate stromatoporoids; (13) functions of specific structural elements; (14) mamelons; and (15) astrorhizae. [Stock]

Stearn C. W. 2010f. Diversity trends of the Paleozoic Stromatoporoidea. Treatise Online No. 9, Part E, Revised, Vol. 4, Chap. 11A, 5 p.
The author provides two figures illustrating the diversity of stromatoporoids, using Ordovician and Silurian series and Devonian stages. The first figure combines all stromatoporoid genera. Maximum genus diversity occurs in the Eifelian Stage of the Middle Devonian. For the Silurian, the Ludlow Series has maximum diversity, and for the Ordovician, it is the Upper Ordovician. The second figure treats the generic abundance on an order-by-order basis. The abundances are not calibrated on the length of a particular increment, so short intervals (e.g., Silurian Pridoli Series) tend to have low diversities. [Stock]

Stearn C. W. 2010g. Extinction patterns of the Paleozoic Stromatoporoidea. Treatise Online No. 10, Part E, Revised, Vol. 4, Chap. 11B, 17 p.
The author focuses on the Late Devonian near (Frasnian-Famennian) and total (Devonian-Carboniferous) extinction of stromatoporoids. Chapter subheadings include: (1) introduction; (2) physical evidence of Late Devonian conodonts; (3) Late Devonian decline of stromatoporoid diversity; (4) response of other taxa to Late Devonian events; (5) causes of Late Devonian extinctions; (6) bolide impact hypothesis; (7) anoxia, transgression, and regression; (8) glaciation in the Southern Hemisphere; (9) and global cooling. The Late Ordovician near extinction is completely ignored, as are other less dramatic extinctions suggested by other authors in the Silurian and Early Devonian. [Stock]

Stearn C. W. 2010h. Techniques of study: collection, preparation, and analysis of the Paleozoic Stromatoporoidea. Treatise Online No. 11, Part E, Revised, Vol. 4, Chap. 15A, 10 p.
This sort of useful information was missing from the first version of the Treatise on stromatoporoids (Lecompte, 1956). Chapter subheadings include: (1) field observations and collecting; (2) thin sections; (3) statistical evaluation of taxonomic differences; (4) cathodoluminescence; (5) scanning electron microscopy; (6) geochemistry; (7) isotope studies; and (8) photography. [Stock]

Stearn C. W. 2010i. Classification of the Paleozoic Stromatoporoidea. Treatise Online No. 12, Part E, Revised, Vol. 4, Chap. 15B, 9 p.
This is a summary on the order- and family-level of classification of stromatoporoids. Chapter subheadings include: (1) introduction; (2) Treatise classification; and (3) historical review. [Stock]

Stearn C. W. et Stock C. W. 2010. A list of upper Paleozoic-Mesozoic stromatoporoid-like genera; and excluded taxa. Treatise Online No. 2, Part E, Revised, Vol. 4, Chap. 5: 8 p.
Sixty-four genera of stromatoporoid-like forms ranging in age from Early Carboniferous to Late Cretaceous are listed. An additional 16 genera that have been excluded are also listed. [Stock]

Stock C. W. 2008. Stromatoporoid biostratigraphy of the Iowa Frasnian. *In* J.R. Groves, J.C. Walters & J. Day (eds): Carbonate Platform Facies and Faunas of the Middle and Upper Devonian Cedar Valley Group and Lime Creek Formation, Northern Iowa. 69th Annual Tri-State and Great Lakes Section-SEPM Fall Field Conference. Iowa Geological Survey Guidebook 28: 41-48.
Five lithostratigraphic units contain Frasnian stromatoporoids. Genera of stromatoporoids occurring in each unit are given in ascending stratigraphic order: * Idlewild Member of the Lithograph City Formation: *Hammatostroma*, *Atelodictyon*, *Petridiostroma*?, *Pseudoactinodictyon*, *Bullulodictyon*?, *Actinostroma*, *Clathrocoilona*, *Stictostroma*, *Trupetostroma*, *Hermatostroma*, *Arctostroma*, *Parallelopora*, *Habrostroma*, *Stachyodes*, and *Amphipora*; * Mason City Member of the Shell Rock Formation: *Hammatostroma*, *Atelodictyon*, *Actinostroma*, *Clathrocoilona*, *Stictostroma*, *Trupetostroma*, *Hermatostroma*, *Hermatoporella*, *Stachyodes*, and *Amphipora*; * Rock Grove Member of the Shell Rock Formation (known from one drill core): *Actinostroma*, *Clathrocoilona*, *Hermatoporella*, and *Stachyodes*; * Nora Member of the Shell Rock Formation: *Anostylostroma*?, *Actinostroma*, *Clathrocoilona*, *Stictostroma*, *Trupetostroma*, *Hermatostroma*, *Hermatoporella*, *Arctostroma*, *Stachyodes*?, and *Amphipora*; * Cerro Gordo Member of the Lime Creek Formation: *Clathrocoilona*, *Habrostroma*?; and * Owen Member of the Lime Creek Formation: *Gerronostroma*, *Clathrocoilona*,

Stictostroma, *Hermatostroma*, *Hermatoporella*, *Arctostroma*, *Habrostroma*?, new genus, and *Amphipora*. [Stock]

Ungureanu D. 2003. Paleoecology of Upper Jurassic Sponge Deposits in Western Central Dobrogea. Available on-line from *www.tesionline.com*; 108 pp.
[key words: sponges; Jurassic; Romania; paleoecology; taxonomy]
The present work is the first paleoecological and systematic study of the Upper Jurassic sponge deposits in Western Central Dobrogea. It is a brief synthesis of all the information published yet regarding that subject together with the author's research results, that completes the picture.
In Upper Oxfordian, on a slightly inclined slope-like sea floor, far from the Tethys Ocean northern shore, a great community of sponges has developed. It was a world of high diversity, part of the European Upper Jurassic Sponge Megafacies. Its remains are now enclosed in stromatolithic limestone of microbialithic origin. Even though studies had been carried out in time dealing with the ammonite or brachiopod fauna here, none of them had paid attention to the sponge association. That is the reason for the necessity of that study.
Presenting some similarities with the German or Polish Upper Jurassic sponge fauna, the sponge community in Dobrogea has some particular features that make that eastern part of the European sponge megafacies different from all the rest. The work tries to point out some of them, but not to complete the research, as the sponge fauna here needs revision. [original abstract; Wrzolek]

Ungureanu D. 2005. Faciesul cu spongieri din vestul Dobrogei centrale in Jurasicul superior - intrepretari paleoecologice [The facies with sponges in Western central Dobrogea during Upper Jurassic - paleoecological interpretations; in Romanian]. Available on-line from *www.tesionline.com*; 47 pp.
[key words: sponges; Jurassic; Romania; paleoecology; facies; reefs]
The present study deals with paleocological aspects of the Upper Jurassic sponge facies in the Western area of the central Dobrogea. There is also, an attempt to include the occurences of the facies in Dobrogea within the frame of the sponge reefs developed across Europe and beyond, marking a

global significance event at the end of Jurassic. An argumentation is also included for the place of the sponge reefs in Dobrogea within the geo-historical evolution of that kind of biological buildings. Finally, there are few comparisons between the sponge facies in Western Dobrogea and its fauna against the status of other occurrences along the siliceous sponge reef belt, in Germany, Poland, Spain. [original abstract; Wrzolek]

Ungureanu D. 2008. Paleontological Update of Dealul Melcilor (Brasov, Romania). *Acta Palaeontologica Romaniae* **6**: 375-384.
[key words: Brasov, sponge; Romania; *Colospongia*, Triassic]
The study is an approach of the Jurassic and Triassic deposits in Dealul Melcilor (Brasov), from the paleontological point of view. Specimens were collected during two field trips in 2005 and 2006. It is the first study dealing with the fauna there in the last 30 years, and after great landscape transformations. New organisms for the area are also mentioned within the fauna. A special attention is regarded to the Poriferans. A brief comparison with the St. Cassian type associations was made. [original abstract; Wrzolek]

Ungureanu D. et Barbu E. 2004. Endemic Features of the Upper Jurassic Sponges in the Western Central Dobrogea (Atarnati-Cechirgea Perimeter). *Acta Palaeontologica Romaniae* **4**: 493-502.
[key words: sponges; Jurassic; Romania; taxonomy; morphology]
In the Upper Oxfordian, central Dobrogea hosted the far eastern end of the Upper Jurassic Sponge Megafacies. Its closest relations are the occurrences in Poland and those in the Swabian Alb (Germany). The Oxfordian sponge fauna in Dobrogea is also most related with that in Poland and in Germany. However, in Dobrogea, the support of the faunal association was a slight slope, unlikely the rest of the European occurrences.
As the closest Upper Jurassic sponge communities were quite far, their weak influence allowed the development of some different sponge populations in the specific conditions of life here. The differences are mostly related to shape and size, and this study tries to present some of them.
Several genera are considered: *Laocoetis*, *Cribrospongia*, *Trochobolus*, *Cnemidiastrum* and *Melonella*. The *Cribrospongia phylloidea* (Antonescu

1928) species is particularly analyzed and it is suggested that it is only a variety of *Cribrospongia reticulata* (Goldfuss 1826), and not a separate one. It is, also, particularly analyzed the *Trochobolus dentatus* (Kolb 1910) species identified in that area.
Unfortunately, diagenetic conditions did not allow the conservation of the skeleton structure. That is why all taxonomical identifications of fossil sponges in Dobrogea, both previous and present ones are based entirely on the macroscopic morphologic descriptions. [original abstract; Wrzolek]

Vacelet J., Willenz P. et Hartman W.D. 2010. Living Hypercalcified Sponges. In: Treatise online Part E, Vol. 4: 1-16; Lawrence, Kansas; ISSN 2153-4012; see paleo.ku.edu/treatiseonline. [Lathuiliere]
Chapter subheadings include: (1) introduction; (2) morphological types compared with fossil analogs; (3) skeleton, microstructure, biomineralization process, and modes of preservation; (4) growth rate, longevity, and properties of the hypercalcified skeleton; (5) mode of life; (6) ecology and geographic distribution; and (7) classification and evolution. [Stock]

Webby B. D. (compiler) 2010 with contributions by **Debrenne F., Kershaw S., Kruse P. D., Nestor H., Rigby J. K., Senowbari-Daryan B., Stearn C. W., Stock C. W., Vacelet J., West R. R., Willenz P., Wood R. A. et Zhuravlev A. Yu.** Glossary of terms applied to the hypercalcified Porifera. Treatise Online No. 4, Part E, Revised, Vol. 4, Chap. 8: 21 p.
This glossary contains the definitions of 480 terms associated with the hypercalcified sponges. [Stock]

Wolniewicz P. 2009. Late Famennian stromatoporoids from Debnik Anticline, southern Poland. *Acta Palaeontologica Polonica* **54**, 2: 337-350. doi:10.4202/app.2007.0096
Famennian Stromatoporoidea from the *Quasiendothyra communis* Foraminiferal Zone and slightly younger strata from the Debnik anticline, southern Poland, form a succession of three consecutive assemblages. Assemblages 1 and 3 consist of representatives of the order Clathrodictyida, while assemblage 2 is dominated by the order Labechiida. The clathrodictyids are represented by the genus *Gerronostroma*, and labechiids

are represented by the genus *Stylostroma*. Species assigned here to the genus *Gerronostroma* show a network of amalgamated pillars in the central part of the columns, a feature regarded by previous authors as typical of the genus *Clavidictyon*. Two new species, S*tylostroma multiformis* sp. nov. and *Gerronostroma raclaviense* sp. nov., are described. Stromatoporoids from southern Poland differ from the Famennian fauna of western Europe, showing affinity to eastern European and Siberian Stromatoporoidea. [original abstract; Kolodziej]

Bibliography / Rugosa

Aretz M. 2010. Rugose corals from the upper Visean (Carboniferous) of the Jerada Massif (NE Morocco): taxonomy, biostratigraphy, facies and palaeobiogeography. *Palaontologische Zeitschrift* **84**, 3: 323-344. [key words: Visean, Rugose corals, Jerada Massif, Eastern Moroccan Meseta, Palaeobiogeography; doi 10.1007/s12542-009-0046-0]
The Visean succession of the Jerada Massif contains a relatively diverse rugose coral fauna, which comprises 12 genera. Only two of these (*Siphonodendron* and *Lithostrotion*) are reported to include more than one species. Most taxa show distinctive facies dependencies. Small solitary corals are found in shaly environments of the Oued Es-Sassi Formation. On the northern flank a coral patch reef formed on an oolitic shoal in the Koudiat Es-Senn Formation. Its core mainly consists of *Lithostrotion vorticale* colonies, whereas in its surroundings literally hundreds of specimens of *Siphonophyllia samsonensis* occur. Associated with these dominant taxa occur colonial and further large solitary taxa (*Palaeosmilia, Dibunophyllum*). *Tizraia* and *Pareynia* are restricted to microbial-dominated buildup facies. Their presence might be strongly controlled by the development of this buildup type, because further occurrences in Algeria. Morocco, and Belgium are all in the same facies. The coral fauna at Jerada is a typical Late Visean assemblage for the Western European Province. The Eastern Moroccan Meseta may be an important pathway within the province for the connection between the Central Saharan basins and NW Europe. The biostratigraphic ages of the coral fauna partly contradict ages based on carbonate microfossils: the coral ages are slightly older and typical Brigantian coral taxa are absent. [abstract; Wrzolek]

Aretz M. 2010. Habitats of colonial rugose corals: the Mississippian of western Europe as example for a general classification. *Lethaia* **43**, 4: 558-572. **DOI** 10.1111/j. 1502-3931.2010.00218.x
[key-words: classification, habitats, Mississippian, palaeoecology, palaeoenvironment, rugose corals]
Colonial rugose corals are a major constituent of shallow-water marine benthic communities in Mississippian times. The study of western European rugose coral habitats from the base of the Tournaisian stage to the Serpukhovian stage allows the recognition of four basic habitat types, which can be divided into a total of 11 subtypes. The classification is mainly based on field data, and thus rapidly applicable. Level-bottom communities in which large colony distances are characteristic (type A) represent the most basic community type; polyspecific (subtype Al) and monospecific (subtype A2) subtypes occur. Reduced colony distances result in the formation of coral meadows (type B), which either show homogeneous coral distribution (subtype Bl) or the development of patches (subtype B2). Coral biostromes (type C) represent a spectrum between hydrodynamically controlled biostromes (nothing in place, subtype Cl) and biologically constructed and controlled biostromes (subtype C2). The bulk of the biostromes represent mixtures of these two subtypes (subtype C3). Colonial rugose corals are widely encountered in Mississippian bioherms where they are dwellers (subtype Dl), form capping beds (subtype D2), support framework building along with other organisms (subtype D3) and form coral framework (subtype D4). The latter is probably the most uncommon of all subtypes in Mississippian times. The classification is widely applicable to other groups. [original abstract; Wrzolek]

Aretz M. et Herbig H.-G. 2010. Corals from the Upper Viséan of the southern Azrou-Khenifra Basin (Carboniferous, Central Moroccan Meseta). *Palaeoworld* **19**, 3-4: 294-305. (published on-line 21 September 2010) doi 10.1016/j.palwor.2010.08.003; ISSN 1871-174X
[key words: Corals; Upper Viséan; Central Moroccan Meseta; Facies dependency; Build-up facies; West European-North African faunal province]
This is the first taxonomic treatment of coral faunas from upper Viséan shallow-water limestones of the southern Azrou-Khenifra Basin (eastern

central Morocco). Corals recovered during reconnaissance work represent 8 genera and 11 species of rugose corals, 1 heterocoral species, and 3 tabulate coral taxa. The fauna is tentatively attributed to the late Asbian. *Siphonodendron scaleberense* is described from Northern Africa for the first time. Facies differentiations clearly control the coral distribution in the stratotype of the Bou-Rifi Formation near Sidi-Lamine. In the Tabainout Ridge, the massive build-up facies is almost devoid of corals except for specialised forms such as ?*Sutherlandia*. Bioclastic and oncolitic limestone facies below and above the build-up facies contain coral faunas, which differ in their compositions. The fauna of the Azrou-Khenifra Basin is part of the West European-North African faunal province. [original abstract; Wrzolek]

Berkowski B. 2008. Emsian deep-water Rugosa assemblages of Hamar Laghdad (Devonian, Anti-Atlas, Morocco). *Palaeontographica Abt. A.* **284**, 1-3: 17-68.
Four types of assemblages composed of small, mostly undissepimented, deep-water Rugosa corals, are described from argillaceous sediments of the Amerboh Group (upper Emsian) in the area of Hamar Laghdad (eastern Anti-Atlas, Morocco). During that time the sea-bottom of studied area was extremely diversified due to prior formation of numerous, up to 20-50 in high, closely spaced mud mounds. The formation of mud mounds was caused by earlier hydrothermal activity, which ended temporarily by the end of *inversus* conodont Zone time. Since that time elevated mud mounds and especially depressed spaces between the mounds were continuously buried by argillaceous sediments of the Amerboh Group. The process of burial has been finished by the end of the Emsian. These extremely diversified bottom morphologies created exclusive environments where exceptional assemblages of deep-water Rugosa corals developed. Four assemblages of Rugosa corals are distinguished from each other not only in species content and richness, but also in different types of life strategies in response to various environmental conditions. The richest assemblage (A) comprising of 15 species belonging to 10 genera, settled directly on the already lithified slopes of mud mounds. Assemblage (B) occurring in the same time, in depressed areas between the mounds, is composed of nine species belonging to seven genera. Subsequent assemblages, (C) on the

slopes, and (D) distanced from the mud mounds, developed within soft marly argillaceous deposits are less diversified and are composed of three species belonging to three genera and two species belonging to two genera respectively. These data show that the slopes of mud mounds acted as isolated "oases" with exclusively favourable environmental conditions for corals, and were surrounded by deep-water environments, unfavourable even for a relatively tolerant Laccophyllid fauna. Four new genera: *Erfoudia* n. gen., *Marocaxon* n. gen., *Berberia* n. gen., *Pentacyathus* n. gen. and 16 new species: *Enterolasma pachytheca* n. sp., *Sutherlandinia anna* n. sp., *Boolelasma magnum* n. sp., *Syringaxon exiguus* n. sp., *Syringaxon firmipes* n. sp., *Schindewolfia concors* n. sp., *Schindewolfia solida* n. sp., *Schindewolfia tenera* n. sp., *Catactotoechus instabilis* n. sp., *Erfoudia eisenmanni* n. sp., *Marocaxon subcylindricus* n. sp., *Marocaxon laticalix* n. sp., *Berberia kesskessi* n. sp., *Pentacyathus arduus* n. sp., *Pentacyathus tenuis* n. sp., *Pentacyathus variabilis* n. sp. are described. [original abstract; Kolodziej]

Berkowski B. et Belka Z. 2008. Seasonal growth bands in Famennian rugose coral *Scruttonia kunthi* and their environmental significance. *Palaeogeography, Palaeoclimatology, Palaeoecology* **265**, 1-2: 87-92. doi: 10.1016/j.palaeo.2008.04.018

Large colonies of rugose coral *Scruttonia kunthi* occuring in the upper Famennian of Sudetes (southern Poland) reveal distinct growth banding in their skeletons. They were investigated for internal structural characteristics and stable isotopic composition. The skeletal tissue consists of alternating light and dark bands which differ in thickness, density and morphology of structural elements, and in occurrence of corallite contraction and rejuvenescence. Darker parts with densely arranged thick skeletal elements are thin in comparison to lighter parts. In addition, they include frequently offsets and contraction of corallites. A couplet of dense and less dense bands is interpreted to represent most probably an annual cycle. The calculated growth rate for *Scruttonia kunthi* varied from 6 mm/yr to 12 mm/yr. Growth-band formation was influenced environmentally. Oxygen isotopic data provide an evidence that high-density bands were formed in the season of higher environmental stress, with relatively warmer temperatures and higher sedimentation rates. Carbon isotopic signatures are

very uniform, and thus enigmatic. They indicate that at least growth rate of the skeleton and seawater temperature had no influence on the coral δC13. [original abstract; Kolodziej]

Brownlaw R. L. S. et Jell J. S. 2008. Middle and Upper Devonian rugose corals from the Canning Basin, Western Australia. *Memoir of the Association of Australasian Palaeontologists* **35**: 1-126. [Coen-Aubert]

Chwieduk E. 2009. Early Permian solitary rugose corals from Kruseryggen (Treskelodden Fm., Hornsund area, southern Spitsbergen). *Geologos* **15**, 1: 57-75. http://www.geologos.com.pl/geologos15.html
A collection of solitary rugose corals collected from the Treskelodden Formation of the Kruseryggen Hill, Hornsund area, south Spitsbergen, consists of 30 specimens representing the Bothrophyllidae family with the genera *Bothrophyllum*, *Caninophyllum*, *Hornsundia*, and *Timania* (5 species), and an indeterminate family with the genus *Svalbardphyllum* (one species). These large, dissepimental forms, dating from the Early Sakmarian (Tastubian), indicate a warm-water environment. The lithology, the thickness of the succession, the reddish hue and the abrasion of the fossils indicate that the area of the inner Hornsund showed a relief that enabled considerable erosion of the elevated areas and redeposition of the fossils at remote locations. The changing morphology of this area during the Early Permian was probably influenced by synsedimentary block tectonics. [original abstract; Kolodziej]

Chwieduk E. 2009. Polish palaeontological research in the Arctic. *Geologos* **15**, 2: 133-143. http://www.geologos.com.pl/
The paper is a review of Polish palaeontological studies in the Arctic, including research of Carboniferous and Permian Rugosa and Tabulata. A list of new coral taxa described by Polish palaeontologists (or in collaboration with other specialists) is given. [Kolodziej]

Coen-Aubert M. 2009. Fasciculate rugose corals across the Early-Middle Frasnian boundary in Belgium. *Bulletin de I'Institut royal des Sciences naturelles de Belgique, Sciences de la Terre* **79**: 55-86.
[keywords: Rugose corals, Frasnian, Taxonomy, Stratigraphy, Belgium]

Disphyllum hilli Tsien 1970. *D. grabaui* Tsien 1970, *D. rugosum* (Wedekind 1922). *D. preslense* n. sp. and *Peneckiella discreta* n. sp. are described in detail and have been mostly collected in beds rich in fasciculate rugose corals, occurring in various areas of Belgium. The material investigated comes mainly from the *Palmatolepis transitans* and *P. punctata* conodont Zones, at the transition between the Early and the Middle Frasnian. The rugose corals identified herein allow also interesting regional correlations. *Disphyllum hilli*, *D. grabaui* and *Macgeea rozkowskae* Coen-Aubert 1982 are abundant at the base of the Moulin Lienaux Formation on the south side of the Dinant Synclinorium and at the base of the Lustin Formation on the north side of the same structural unit. *Disphyllum preslense* and *D. rugosum* are widely distributed in the middle part of the Bovesse Formation on the north side of the Namur Synclinorium, in the middle of the reefal limestones from the lower part of the Lustin Formation and in the middle part of the Pont de la Folle Formation which characterizes the northwestern part of the Dinant Synclinorium. *Peneckiella discreta* serves locally as basement for the small mounds observed at the top of the Moulin Lienaux Formation. *Hexagonaria mirabilis* Moenke 1954 and *Tabulophyllum mcconnelli* (Whiteaves 1898) are frequently associated at the base of the overlying Grands Breux Formation, at the top of the Pont de la Folle Formation, at the top of the reefal limestones from the Lustin Formation and at the base of the Huccorgne Formation capping the Bovesse Formation. [original abstract; Wrzolek]

Elias R. J. 2010. Stability strategies and hydrodynamic behavior of liberosessile solitary rugose corals (Ordovician; Red River-Stony Mountain Province, North America). *Palaeoworld* **19**, 3-4: 368-373. (published on-line 17 September 2010), doi 10.1016/j.palwor.2010.09.004; ISSN 1871-174X
[key words: Solitary corals; Corallum shape; Functional morphology; Paleobiology; Paleoecology]
In the Late Ordovician Red River-Stony Mountain Province of North America, four closely related genera of solitary rugose corals are represented exclusively by liberosessile species: *Salvadorea*, *Grewingkia*, *Deiracorallium*, and *Lobocorallium*. These rugosans benefitted from

innovative and in some cases unique strategies involving corallum form, which improved stability with respect to the substrate and currents, and took advantage of water flow during life. Trochoid form was a compromise for ensuring adequate stabilization of the corallum by sediment, while keeping the calice rim sufficiently elevated above the substrate. In life orientation with the convex cardinal side of the corallum facing down, triangulate and trilobate cross-sectional shapes offered resistance to lateral tipping or rotation. Depressed coralla resisted gravity-induced subsidence or tilting. With the convex side facing downcurrent, the streamlined shape of compressed and triangulate forms improved stability by reducing drag. Trilobate form may have had a drag-reducing "splitter plate" effect. Strategies for drag reduction were especially beneficial for corals inhabiting relatively high-energy environments, but the greatest significance may have been in reducing fatalities due to dislodgement during storms. The hydrodynamic behavior of coralla in life position, especially if leaning downcurrent, resulted in beneficial water flow. Vortices ascending from the substrate on the downcurrent side provided the polyp with water drawn from both the mainstream and the substrate surface. Such circulation facilitated feeding, enhanced the quantity and variety of food, and delivered other necessary substances. Wastes and gametes could be effectively expelled from the polyp and removed downcurrent without entrainment into the food-bearing flow. Functional analysis of the fascinating range of corallum forms in the Red River-Stony Mountain Province provides insight into paleobiology and paleoecology, which is applicable to many Paleozoic solitary rugosans. [original abstract; Wrzolek]

Fedorowski J. 2008. Early Carboniferous Chinese and Australian "*Siphonodendron*" (Anthozoa, Rugosa): ecological and geographical influence on taxonomy. *Geologos* **14**, 1: 3-17.
Normal marine salinity is the main limiting factor for the Subclass Rugosa. Water depth and temperature are less critical. Individual characteristics of specimens and some characteristics of species are, however, excellent environmental indicators. Being distributed exclusively by larvae, Rugosa required free distribution by means of marine currents, as well as midway areas suitable for settlement and metamorphosis of the larvae. Not distance but rather geography and midway environments are therefore the limiting

factors for their distribution, relationships and stratigraphic value. *Siphonodendron* and *Siphonodendron*-like ("*Siphonodendron*") corals are discussed as examples of morphological similarity, but not necessarily representing a phylogenetic relationship. The known homeomorphy of European and western North American *Siphonodendron* taxa (Fedorowski & Bamber 2007) may be extended on the European, some southern Chinese and all south-eastern Australian *Siphonodendron*-like corals, but only the Chinese and SE Australian forms may be truly related. The latter relationship would extend the boundaries of the Early Carboniferous Australian rugose coral province. The Late Tournaisian age of the earliest Australian "siphonodendrons" indicates an ancestry of the coral fauna within the province (SE Australia and S China). A mechanism for north-westward migration of this fauna, from SE Australia to S China, is not clear. [original abstract; Wrzolek]

Fedorowski J. 2009. Early Bashkirian Rugosa (Anthozoa) from the Donets Basin, Ukraine. Part 1. Introductory considerations and the genus *Rotiphyllum* Hudson, 1942. *Acta Geologica Polonica* **59**, 1: 1-37.
The present paper is the first in a series devoted to the Early Bashkirian Rugosa (Anthozoa) from the Donets Basin. The history of investigation and current status of Early Bashkirian stratigraphy is discussed in the context of the Donets Basin strata. Corals of that time interval are extremely rare worldwide and those from the Donets Basin have never been described in detail. Four of the five species described are new: *Rotiphyllum asymmetricum* sp. nov., *R. latithecatum* sp. nov., *R. simulatum* sp. nov., and *R. voznesenkae* sp. nov. Two species are left in open nomenclature. The synonymy, species content and critical review of species potentially belonging to the genus *Rotiphyllum* are reviewed. [original abstract; Wrzolek]

Fedorowski J. 2009. Early Bashkirian Rugosa (Anthozoa) from the Donets Basin, Ukraine. Part 2. On the genera *Axisvacuus* gen. nov. and *Falsiamplexus* Fedorowski, 1987. *Acta Geologica Polonica* **59**, 3: 283-317.
Five species belonging to two genera: *Falsiamplexus* Fedorowski, 1987 and *Axisvacuus* gen. nov. are described in detail and their species content and relationships are discussed. Both genera are perhaps related to *Rotiphyllum*

and were probably derived from it, but relationship of *Falsiamplexus* to *Bradyphyllum* Grabau, 1928 cannot be excluded. The new genus *Axisvacuus* is represented by four species, of which three are new: *A. verus* (type species), *A. extendus* and *A. semicirculatus*. Stratigraphic ranges of species described are compared to the western European and Russian standards (Table 1). Some possible palaeogeographic implications of the occurrence of *Axisvacuus postumus* (Smith, 1931) and *Falsiamplexus reductus* Fedorowski, 1987 are briefly discussed. [original abstract; Wrzolek]

Fedorowski J. 2009. Morphogenesis and taxonomic value of the circumaxial skeleton in Rugosa (Anthozoa). *Lethaia* **42**: 232-247.
[key words: circumaxial structures, microstructure, morphogenesis, Rugosa, coral taxonomy]
An elevated skeletal structure surrounding an empty axial area occurs in many unrelated taxa within the Rugosa. This structure, commonly termed the aulos, was first differentiated and described by Grabau in 1922. Most terms introduced by that author for individual morpholypes have not been accepted because the taxa he chose to illustrate the typical development do not correspond to his diagnoses. The morphogenetic study on some circumaxial structures in this paper points out differences in their origin, their predicted role in the physiology of the coral polyps. The study shows both the advantages and disadvantages of the use of these circumaxial structures in taxonomy. In addition to the term aulos, which was introduced by Smith in 1928, new terms i.e. circulotheca and columnotheca are here introduced for the circumaxial structures that also are newly proposed names, to allow distinguishing them from true axial structures. [original abstract; Wrzolek]

Fedorowski J. 2009. On *Pentamplexus* Schindewolf, 1940 (Anthozoa, Rugosa) and its possible relatives and analogues. *Palaeontology* **52**, 2: 297-322.
[key words: revision, Carboniferous, Permian, Rugosa, ampleximorphs, similarity/relationship]
Three ampleximorphic taxa are revised and their most important characters are discussed in terms of possible or apparent relationships. Re-

interpretation of its early ontogeny allows the assignment of *Pentamplexus* Schindewolf, 1940 to the family Polycoeliidae de Fromentel, 1861. *Stereolasma variabilis* Vojnovsky-Krieger, 1934 is established as the type species of *Vojnovskytes* gen. nov. It resembles the family Polycoeliidae in some characters and the Antiphyllidae Ilina, 1970 or the Laccophyllidae Grabau, 1928 in others. Thus, its family status is not established. Revision of the type material of *Fasciculophyllum tripus* Schindewolf, 1952 allows its inclusion within the new genus *Silesamplus*, probably related to the family Laccophyllidae Grabau, 1928. Amplexoid morphology is further shown to be inadequate for the establishment of relationships on the family or subfamily level. Early ontogeny is most important in that respect, but biform vs normal morphology in the tabularium and free vs contratingent development of minor septa must also be considered, where appropriate. [original abstract; Wrzolek]

Fedorowski J. 2009. Revision of *Pentaphyllum* De Koninck, 1872 (Anthozoa, Rugosa). *Palaeontology* **52**, 3: 569-591. [key words: Anthozoa, Carboniferous, *Cryptophyllum*, *Pentaphyllum*, redescription, revision] Lectotypes of *Pentaphyllum armatum* and *P. caryophyllatum*, both of De Koninck (1872) have been sectioned for the first time and are completely illustrated; both are preserved as silicified outer shells with inner structures dissolved. The morphology of the calices strongly suggests that they have different taxonomic positions. Thus, their synonymy, suggested by Schindewolf (1942), is rejected. *P. armatum*, selected as type species for the genus by Hinde (1890) possesses six, not five leading major septa. Consequently, all taxa except *Hexalasma* Soshkina, 1928, and perhaps *Pseudocryptophyllum* Easton, 1944, are unrelated to *Pentaphyllum*. It is proposed to restrict the name *Pentaphyllum* to the lectotype. The well established *Cryptophyllum* Carruthers, 1919, which includes *P. caryophyllatum* is considered valid. In addition to a brief analysis of Lower Carboniferous corals included here in *Cryptophyllum*, a few specimens from the British Tournaisian are described and illustrated to show morphological variability of specimens from the same bed. Review of earlier studies on these types of corals, discussion on the difference between zaphrentoid and cryptophylloid early ontogeny and its bearing on taxonomy, and description of taxa, are also included. [abstract; Wrzolek]

Fedorowski J. 2010. Does similarity in rugosan characters and their functions indicate taxonomic relationship? *Palaeoworld* **19**, 3-4: 374-381. (published on-line 17 September 2010), doi 10.1016/j.palwor.2010.09.002; ISSN 1871-174X
[key words: Rugosa; Functional analysis; Arrangements of septa]
Functional analysis of changes in shape and arrangement of septa in the genera *Zaphrentites*, *Caninia*, and *Ufimia* allows one to move slightly beyond the usual boundaries of description and to ask why the arrangement in *Zaphrentites* is permanent, but becomes radial in *Caninia* and bilateral in *Ufimia*? This may be explained in terms of changing function and biological role of major septa in the ontogeny.
The creation of open space to accommodate strongly developed mesenteries is proposed as an explanation for the shortening and radial arrangement of axially free septa in mature *Caninia*, whereas the development of a slit on an oral disc, increasing water flow through the gastro-vascular cavity, is postulated for *Ufimia*. Both solutions point towards increased effectiveness of feeding and oxygenation, necessary for the growing organism. Such a conclusion negates the simple application of a given arrangement of septa as an indicator of taxonomic relationship. [original abstract; Wrzolek]

Fedorowski J. 2010. Remarks on rugose coral taxonomy. *Palaeoworld* **19**, 3-4: 242-248. (published on-line 17 September 2010), doi 10.1016/j.palwor.2010.09.005; ISSN 1871-174X
[key words: Taxonomy; Rugosa; Protosepta; Biform tabularium]
Precise taxonomy is possible only when specimens are thoroughly investigated and checked against well known types. This simple procedure is not always followed and as a result, credible data are often lacking. Accuracy. To match his interpretation of calice morphology, Schindewolf (1942, pl. 33, fig. 2a-d, text-fig. 89a-d) inaccurately oriented transverse sections of *Pentamplexus simulator* Schindewolf, 1940. His errors were in part corrected by Weyer and Ilina (1979), but they also misidentified the counter protoseptum. Re-orientation of the original and two new thin sections allows that genus to be transferred to the family Polycoeliidae de Fromentel, 1860. Manipulation: Schindewolf's (1942) manipulation of the data on *Pentaphyllum* De Koninck, 1872 and *Cryptophyllum* Carruthers, 1919 resulted in an incorrect diagnosis, which was followed by many

students who introduced 49 species (Ilina, 1984). Despite its name and Schindewolf's (1942) description, the poorly preserved type of *Pentaphyllum* possesses six, instead of five, dominant septa in its calice. Lack of attention to detail: Biform morphology in the tabularium is not always recognized and is commonly incorrectly described, despite its importance as a factor in water distribution within the gastro-vascular cavity and its diagnostic value for taxonomy. Failure to recognize that feature can lead to incorrect classification up to the family level. [original abstract; Wrzolek]

Hecker M. R. 2010. Some aspects of evolution in the *Lonsdaleia* (*Actinocyathus*) *crassiconus* species-group. *Palaeoworld* **19**, 3-4: 316-324. (published on-line 21 September 2010), doi:10.1016/j.palwor.2010.08.007 [key words: Rugosa; evolution; Lower Serpukhovian; Moscow Basin] The *Actinocyathus crassiconus* species-group represents a separate trend of evolution within the rugose subgenus *Lonsdaleia* (*Actinocyathus*) (d'Orbigny, 1849). It is distinguished by consistently developed minor septa and by regular axial structures. In the Moscow Basin, this species-group comprises seven species, *A. crassiconus* (McCoy, 1849), *A. lativesiculosus* (Dobrolyubova, 1958), *A. sarytschevae* (Dobrolyubova, 1958), *A. subtilis* (Dobrolyubova, 1958), *A. gorskyi* (Dobrolyubova, 1958), *Actinocyathus* sp. A, and *Actinocyathus* sp. B. It ranges from the Mikhailov horizon (Brigantian) to the Protva horizon (lower upper Serpukhovian), and is especially characteristic of the Tarusa horizon (lowermost Serpukhovian) in the north-western part of the basin. Evolution in the group took place at the beginning of Mikhailov time and in Tarusa time and showed three trends: (i) increase in corallite size and number of septa; (ii) increase in number of septa and tabularia diameter; and (iii) a wide range of variability in septal number without important changes in tabularia diameter. *Lonsdaleia ornata* Dobrolyubova, 1958, *L. heckeri* Dobrolyubova, 1958, and *L. longiseptata crassicolumellata* Dobrolyubova, 1958 are synonymised with *Actinocyathus subtilis*, and *Lonsdaleia subcrassiconus subcrassiconus* Dobrolyubova, 1958 is with *Actinocyathus gorskyi*. [original abstract; Wrzolek]

Kido E. 2009. Silurian Holmophyllidae (Rugosa) from the Gionyama Formation of the Kurosegawa Terrane, Southwest Japan. *Palaeontological Research* **13**: 293-306. [Coen-Aubert]

Kido E. 2009. *Nanshanophyllum* and *Shensiphyllum* (Silurian Rugosa) from the Kurosegawa Terrane, Southwest Japan, and their paleobiogeographic implications. *Journal of Paleontology* **83**: 280-292. [Coen-Aubert]

Kido E. 2010. Silurian rugose corals from the Kurosegawa Terrane, Southwest Japan, and the first occurrence of *Neobrachyelasma*. *Journal of Paleontology* 84, 3: 466-476. [Coen-Aubert] doi: 10.1666/09-037.1
[key words: Gionyama Formation, Kurosegawa Terrane, *Neobrachyelasma*, Silurian rugose coral, paleogeography]
Four species of rugose corals (one new) are described from the Silurian of the Kurosegawa Terrane, Southwest Japan. They are *Neobrachyelasma japonica* n. sp., *Pseudamplexus* sp., *Amsdenoides* sp., and *Amplexoides* sp. aff. *A. chaoi* (Grabau, 1925). These species occur in the Middle Member of the Gionyama Formation, which is Late Llandovery to Early Ludlow in age. *Neobrachyelasma* is reported for the first time from Japan. This genus occurs in the Lower Llandovery to Upper Silurian of Japan, South China, Kazakhstan, and the Altai and might be distributed only in South China and Japan during the Late Llandovery. Its occurrence in Japan may support a paleogeographic proximity of 'Proto-Japan' and the South China Block during the Silurian. [original abstract; Wrzolek]

Liao W.-H. & Ma X.-P. 2008. The assemblage sequences and biogeographic provinces of the Eifelian rugose corals in near-shore facies from South China. *Acta Palaeontologica Sinica* **47**: 39-46. [in Chinese, with English summary; Coen-Aubert]

Liao W.-H., Ma X.-P. & Sun Y.-L. 2008. The Famennian rugose coral assemblages in near-shore facies from South China. *Acta Palaeontologica Sinica* **47**: 419-426. [in Chinese, with English summary; Coen-Aubert]

McLean R. A. 2010. Frasnian (Upper Devonian) colonial disphyllid corals from Western Canada. NRC Research Press, Ottawa, Ontario; 189pp.
Colonial rugose corals of the Family Disphyllidae occur abundantly in Frasnian (lower Upper Devonian) strata in western Canada. The branching genus *Disphyllum* is the most diverse, being represented by *D. fasciculum* (Meek), *D. rugosum* (Wedekind), *D. catenatum* Smith, *D. iowense* Sorauf, *D. fumosum* n. sp., and *D.* sp. cf. *D. major* Jia. The other branching genus recognized is *Pantophyllum*, and the species *P. camselli* (Smith) and *P. oliveri* n. sp. are described. The remainder of the described fauna are massive forms. *Argutastrea* is represented by a single species, *A. bompasi* (Smith). Four species of *Hexagonaria* are included: *H. davidsoni* (Edwards and Haime), *H. magna* (Webster and Fenton), *H. oweni* (Belanski), and *H. arietina* n. sp. The new genus *Whittakeria* comprises the type species, *W. schucherti* (Smith), together with *W. caurus* (Smith), while a single species of *Kuangxiastraea* is described, *K. mirabilis* n. sp. Biostratigraphic distribution of this assemblage is reviewed and related to the rugose coral faunal sequence and Montagne Noire conodont zonation previously applied in western Canada. Contrary to some earlier opinions, the Disphyllidae is shown to be unrelated to the Columnariidae, following new study of the holotype of the type species of *Columnaria*, *C. sulcata* Goldfuss. [original abstract; Wrzolek]

Ogar V. 2010. New data on the Carboniferous corals of the Donets Basin. *Palaeoworld* **19**, 3-4: 284-293. (published on-line 21 September 2010) doi 10.1016/j.palwor.2010.08.001; ISSN 1871-174X
[key words: Tabulata; Rugosa; Carboniferous; Donets Basin]
Additional data are given here on the taxonomic diversity and distribution of the Carboniferous rugose and tabulate corals of the Donets Basin (Ukraine). *Keyserlingophyllum obliquum* (Keyserling, 1846) was recorded in the Tournaisian part of the section for the first time. *Rotiphyllum omaliusi* (Milne-Edwards et Haime, 1851) and *Dorlodotia pseudovermiculare* (McCoy, 1849) were found in Tournaisian-Visean boundary deposits. *Zaphrentites parallelus* (Carruthers, 1910), together with *Sutherlandia* and *Cladochonus*, was discovered approximately in the mid-Visean. The tabulate coral *Volnovakhipora* n. gen. from the Tournaisian and the rugose coral *Arctophyllum lugankaensis* n. sp. from the

Gzhelian are established and described. [original abstract; Wrzolek]

Pedder A. E. H. 2010. Lower-Middle Devonian rugose coral faunas of Nevada: Contribution to an understanding of the "barren" E Zone and Chotec Event in the Great Basin. *Bulletin of Geosciences* **85**, 1: 1-26. ISSN 1214-1119 [Coen-Aubert]
[key words: Nevada, Devonian, corals, biozones, Chotec Event]
The "lower Middle Devonian" part of a coral zonation proposed for the region in 1974 comprised in ascending order D2 and D3 subzones and a "barren" E zone. In terms of the conodont zonation currently employed in Nevada, the D2 subzone is Emsian *gronbergi* and *inversus* zones. The original stratigraphic definition of the D3 subzone places it in the upper Emsian *serotinus* Zone on Lone Mountain, whereas the coral index defining the zone has been collected subsequently only from Eifelian upper *costatus* Zone beds. The original stratigraphic definition of the "barren" E zone places it in a lower part of the *costatus* Zone, above an inferred depositional break. Thus, as defined on Lone Mountain, the D3 subzone is slightly younger than the E zone. These zones are not barren. Revised taxonomy and age determinations of previously described species, coupled with new data from the southern Sulphur Spring and northern Antelope ranges, have revealed four successive coral assemblages ranging from *serotinus* to *costatus* Zone age. Differences between the second and third of these assemblages are particularly significant, and may be considered to represent a local manifestation of the Chotec Event. A detailed review of the genus *Synaptophyllum* shows it to be an Emsian endemic in the Maghrebo-European Realm, not an early Eifelian endemic in the Eastern Americas Realm. New taxa comprise a family, one genus and two species. *Romanophyllum paulyi* gen. et sp. nov., which possibly represents one of the last vestiges of the Pragian-Emsian Great Basin coral province, is assigned to the Romanophyllidae fam. n. *Xystriphyllum trojani* sp. nov. is described as an example of one of earliest ptenophyllid species to return to the Great Basin after the absence of the family from the region since late Lochkovian time. [original abstract; Wrzolek]

Poty E. 2010. Morphological limits to diversification of the rugose and tabulate corals. *Palaeoworld* **19**, 3-4: 389-400. (published on-line 18 September 2010), doi 10.1016/j.palwor.2010.09.006; ISSN 1871-174X [key words: Evolution; Rugose coral; Tabulate coral; Heterochrony; Morphological variability; Recovery]
At the family level, the evolution in the compound rugose corals is usually characterized by the progressive integration of corallites. This type of evolution corresponds to paedomorphic processes in the astogeny of colonies: the separation of the daughter polyp from the parent being progressively delayed as compared to the development of the other characters. At the end of the lineage, relations between mature polyps are similar to those existing in the first stages of the increase in the ancestor. Tabulate corals are strictly colonial and usually have connections between polyp cavities. They can develop colonies similar to those known in the compound rugose corals (fasciculate or massive), but also other forms (such as cateniform, ramose and coenenchymal). However, a relative separation of growth habit exists between rugose and tabulate corals from their radiation during the Ordovician. Besides the differences in colony shapes, corallite diameters are generally larger in the Rugosa than in Tabulata. Several crises affected Palaeozoic corals, and some of them caused the disappearance of major morphotypes. After these crises, neither the surviving tabulate nor the rugose corals gave rise to new taxa with these forms. The evolutionary processes in post-crisis coral recovery correspond mainly to heterochronic processes. These proceed within the limits of ontogenetic (or astogenetic) variability and do not allow innovations such as a type of colonial development that is not a usual type of increase within a taxon. Therefore, the replacement of extinct habits by an evolutionary convergence of taxa with other major habits does not occur in Palaeozoic corals. These evolutionary processes probably differ from those acting during an original evolutionary radiation. [original abstract; Wrzolek]

Rodriguez S. et Bamber E. W. 2010. Unusual offsetting in Serpukhovian (Lower Carboniferous) representatives of the rugose coral genus *Schoenophyllum* Simpson, 1900. *Palaeoworld* **19**, 3-4: 401-409. (published on-line 16 September 2010), doi 10.1016/j.palwor.2010.08.006; ISSN 1871-174X

[key words: *Schoenophyllum*; Canada; Serpukhovian; Offsetting; Paleobiology; Blastogeny]
Schoenophyllum has been described as a columellate, fasciculate genus in which the corallites bear slender lateral processes regarded as supporting structures or as tubules connecting adjacent corallites. Recent investigation of Serpukhovian specimens from the Etherington Formation and its lateral equivalents in western Canada has shown these lateral processes to be sub-horizontal to moderately elevated tubule-like structures forming the initial stages of new offsets and commonly containing tabulae. They locally reach and may interfere with the walls of neighbouring corallites, but remain structurally distinct from them and do not allow communication between parent and adjacent corallites. The initial, tubule-like stage is followed by a steeply elevated to vertical, sparsely septate stage in which the axial structure is developed as a prolongation of the cardinal septum. The origin and nature of the axial structure suggests assignment of *Schoenophyllum* to the family Petalaxidae. [original abstract; Wrzolek]

Rodriguez S. et Somerville I. D. 2010. Appearance of fasciculate rugose corals in the Visean and Serpukhovian: A review. *Palaeoworld* **19**, 3-4: 306-315. (published on-line 21 September 2010), doi: 10.1016/j.palwor.2010.08.009; ISSN 1871-174X
[key words: Fasciculate corals; Viséan; Serpukhovian; Microbial mounds; Environments; Evolution]
Appearances of new fasciculate rugose corals are especially abundant in the Visean-Serpukhovian interval. Fasciculate corals may have two different origins. (1) Development of colonialism from solitary corals (e.g., *Corwenia* from *Dibunophyllum*); (2) morphological changes of the established fasciculate taxa that produce new species or genera. Most new fasciculates occur in shallow-water carbonate shelf environments, but the first occurrence is not always easy to identify from published data. One of the typical environments for their first occurrence during the Visean was the top of microbial mud-mounds. The microbial mounds perhaps have provided isolated areas of shallower water above the sea bottom. These isolated elevated areas could have provided more favourable environments where pioneer coral colonies may have evolved. All Visean and Serpukhovian coral assemblages with new colonial corals are dominated by

phaceloid species. Consequently, the explanation should be rejected that new colonial corals occur only in empty ecological "niches". Most of these assemblages also contain solitary corals, including the ancestral "parent species".
All these observations pose new questions concerning the origin of the fasciculate colonial forms in rugosans. There are evidences that single specimens develop colonial forms as a response to environmental factors. Development of colonialism is possible for single specimens of some solitary genera. However, the capacity for developing persistent colonial growth forms depends on multiple factors, including genetic and environmental ones. [original abstract; Wrzolek]

Said I. et Rodriguez S. 2007. A new genus of coral (Rugosa), from Adarouch Area (Brigantian, NE Central Morocco). *Coloquios de Paleontología* **57**: 23-35. [Rodriguez]

Said I. et Rodriguez S. 2008. Descripción de los corales aulophyllidos del Viseense y Serpujoviense del área de Adarouch (Marruecos). *Coloquios de Paleontología* **58**: 13-40. [Rodriguez]

Somerville I. D. et Rodriguez S. 2010. A new genus and species of colonial rugose coral from late Tournaisian (Waulsortian) mud-mounds in Ireland: Its ecological associations and depositional setting. *Palaeoworld* **19**, 3-4: 414-425. (published on-line 16 September 2010), doi 10.1016/j.palwor.2010.08.008; ISSN 1871-174X
[key words: Rugose colonial corals; Mississippian; Systematics: Ecology; Mud-mounds; Ireland]
A new genus and species of fasciculate rugose coral, *Howthia suttonensis* Somerville and Rodriguez, has been recorded from Howth peninsula, County Dublin, Ireland, in Waulsortian mud-mound limestones of upper Tournaisian age. The new colonial genus is characterized by having an axophyllid axial structure, steeply inclined tabellae, and presence of interseptal and lonsdaleoid dissepiments. It evolved probably from a solitary *Axophyllum* by the development of peripheral offsets. This new taxon may have been an ecological pioneer adapting to a specialised niche near the top of a large Waulsortian mud-mound in shallower water than

most Waulsortian settings and, as such, may have provided a novel evolutionary opportunity. *Howthia suttonensis* is associated with *Amplexocarinia* and an unusual form of '*Fasciculophyllum*', both of which display budding and protocoloniality, as well as the fasciculate tabulate coral *Syringopora*. [original abstract; Wrzolek]

Stevens C. H. et Stone P. 2009. New Permian durhaminid cerioid corals from east-central California. *Journal of Paleontology* **83**, 6: 946-953. [key words: corals, Permian, California, Conglomerate Mesa, Owens Valley Group]
Permian colonial corals from Artinskian to Kungurian strata in the Conglomerate Mesa area, Inyo Mountains, east-central California, include five new species, one of which is assigned to a new genus. The new taxa are: *Malpaisia maceyi* n. gen. and n. sp., *Pararachnastraea bellula* n. sp., *P. delicata* n. sp., *P. owensensis* n. sp., and *Cordillerastraea inyoensis* n. sp. These species, several of which compare most closely with other Artinskian and Kungurian species from eastern Nevada and northern Mexico, represent three distinct stocks that differentiated on an isolated submarine uplift offshore from the main part of the Cordilleran carbonate shelf. [original abstract; Wrzolek]

Stevens C. H. 2009. New occurrences of Permian corals from the McCloud Belt in western North America. *Palaeontologia Electronica* **12**, 2: 6A: 16. [key words: Permian; corals; McCloud Belt, western North America; new species]
Previously unreported Permian rugose corals from several terranes considered part of the McCloud Belt are herein described and figured. These include two species from the Eastern Klamath terrane, one of which is described as new; four species from the Central Belt of the Northern Sierra Nevada, with two additional species thought to have been derived from that terrane; four species from the Bilk Creek terrane; and two species from the Harper Ranch subterrane of the Quesnel terrane, one of which is described as new.
Permian species of *Lytvophyllum*? and *Cystolonsdaleia* are now reported from almost all parts of the dispersed McCloud Belt, and *Heterocaninia*? is now known from the Bilk Creek terrane in addition to the Eastern Klamath

terrane. These newly reported occurrences strengthen the interpretation that these terranes were closely associated during Early Permian time. None of these genera, however, occur anywhere along the Pangaean margin of North America.
Conversely, *Protowentzelella* and *Tschussovskenia*, which are abundantly represented in Lower Permian rocks all along the western and northern margins of cratonal North America, are rare in rocks of the McCloud Belt. These faunal differences suggest that the terranes of the McCloud Belt lay far out in the Paleopacific Ocean, far west of cratonal North America during the Early Permian so that faunal exchange was minimal. [original abstract; Wrzolek]

Stevens C. H. 2010. Distribution of three key Early Permian fossil groups in western USA and northern Mexico and their relevance to interpretation of paleotectonic features along the southwestern margin of Laurentia. *Palaeogeography, Palaeoclimatology, Palaeoecology* **288**: 103-107.
[key words: Early Permian; Species groups; Paleotectonic features; Laurentia]
Three species groups, including two groups of corals and one of fusulinids, delineate the zone of favorable marine environments for these animals along the shelves bordering southwestern Laurentia during the Cisuralian (Early Permian). The three species groups are: the coral *Protowentzelella* group of late Asselian to early Sakmarian age, the fusulinid *Eoparafusulina linearis* group of late Sakmarian age, and the coral *Pararachnastraea illipahensis* group of late Artinskian to Kungurian age. Occurrences of these three species groups clearly outline most of the major paleotectonic features that were present along the southwestern margin of the Laurentian shelf at that time. The paucity of data in Mexico, however, leaves open the question of large-scale displacement on the Mojave-Sonora megashear, a feature proposed to cut across northern Mexico and southwestern USA, although the data presented here could be construed to suggest lack of significant displacement in post-Pennsylvanian time. [original abstract; Wrzolek]

Stevens C. H. 2010. New Early Permian colonial rugose corals from the central Cordilleran miogeocline, USA. *Journal of Paleontology* **84**, 3: 529-537.
[key words: Permian, colonial corals, USA central Cordillera]
Five new species of Early Permian (late Sakmarian to Kungurian) colonial corals from eastern Nevada and southeastern California, one assigned to a new genus, are described and illustrated. These include *Heintzella playfordi* n. sp. from the Arcturus Formation in Nevada and the Darwin Canyon Formation in California, *Paraheritschioides fergusonensis* n. sp. from the Ferguson Mountain and Bird Spring formations in Nevada, and *Wendoverella arca* n. gen. and n. sp., *Permastraea nevadensis* n. sp., and *Pararachnastraea moormanensis* n. sp. from the Pequop Formation in eastern Nevada. These new taxa are distinct from all previously described species, but most are related to other species in the North American miogeocline. *Wendoverella arca* n. sp., however, is unlike any other species described from North America but is quite similar to a Russian species, indicating faunal communication between the Ural Mountains and the Cordilleran miogeocline at least into Artinskian time. [original abstract; Wrzolek]

Stevens C. H. et Belasky P. 2010. Nature of Permian faunas in western North America: A key to the understanding of the history of allochthonous terranes. Geomorphology and Plate Tectonics [D.M. Ferrari & A.R. Guiseppi (eds)]: 275-310; Nova Science Publishers, Inc. [Stanley]

Stolbova V. P. 2007. Devonskiye rugozy poluostrova Podgornogo Novoy Zemli (kabaninskiy gorizont). *Trudy NIIGA-VNII, Okeangeologiya* **211**: 50-63. [in Russian; Coen-Aubert]

Tang L., He X.-Y. & Chen J.-Q. 2008. Revisions of genera and species of Silurian Stauriid corals from Yangtze Region. *Acta Palaeontologica Sinica* **47**: 427-443. [in Chinese, with English summary; Coen-Aubert]

Webb G. E. et Yancey T. E. 2010. Skeletal repair of extreme damage in rugose corals, Pella Formation (Mississippian, Iowa, USA). *Palaeoworld* **19**, 3-4: 325-332. (published on-line 16 September 2010), doi 10.1016/j.palwor.2010.08.005; ISSN 1871-174X
[key words: Rugosa; Palaebiology; Skeletal repair; Damage; Late Mississippian; Pella Formation]
Little is known about predation on rugose corals or the repair of damage to rugose coral skeletons. Here we describe a population of the solitary rugose coral *Amplexizaphrentis spinulosa* (Milne-Edwards and Haime, 1851) from the Late Mississippian Pella Formation in Keokuk County, Iowa, USA wherein ~30% of 135 specimens experienced sublethal damage resulting from compression apparently inflicted by fish or other large predators. Many corals were able to repair severe damage and re-establish a relatively normal morphology despite the loss of parts of the wall. Healed damage includes: (1) chips to the edge of the calice, (2) punctures in the wall, (3) lost sections of wall, (4) re-cemented sections of wall, some at odd angles, (5) changes in growth direction, and (6) rejuvenescence. Multiple episodes of damage and repair occurred in 5% of samples. More severe damage on the cardinal side in almost one-half of damaged samples may reflect structural weakness at the cardinal fossula relative to the counter side, but septa were broken in all positions in many samples. The pattern of alignment and preservation of broken plates in the calice suggests that soft tissues were better attached to the skeleton in a band relatively far above the calice floor. Better musculature also may have occurred in the same band. Where parts of the wall were broken free from septa that remained fixed at their axial ends, new wall was deposited as stereoplasm against and enveloping the adaxial ends of the original septa. Lost lengths of septa were replaced by adaxial growth. New septa were commonly contorted, presumably owing to deformation of surviving soft tissues that had lost structural support. Broken septa were generally healed, commonly with poor alignment. The high survival rate, even following multiple attacks, suggests that the soft tissues of the coral polyps were robust. The rarity of changes in growth direction following attacks suggests that the corals may have been more capable of righting themselves and re-establishing an optimum growth orientation than has commonly been suggested for solitary Rugosa. [original abstract; Wrzolek]

Weyer D. 2008. Revision des Ludwig/Kunth-Gesetzes zur Septeninsertion der Supraordo Rugosa (Anthozoa, Ordoviz-Perm). *Abhandlungen und Berichte für Naturkunde* **30**: 85-145. [Revision of the Ludwig/Kunth law of septal insertion in the superorder Rugosa (Anthozoa, Ordovician-Permian; in German with English sumary]
The outstanding feature of the Rugosa, their ontogenetic mode of septal insertion, is redefined, based on a new morphogenetic nomenclature of septa. External furrows of the archaeotheca show septal increase either by bifurcation (schizosepta), or by intercalation (intrasepta). The primary phylogenetic radiation in the Late Ordovician comprises the two hitherto accepted orders characterized by schizosepta (metasepta, catasepta), the Stauriida (probably ancestral, with minor septa near antiseptum), and the Cystiphyllida (without antiseptal minor septa); but there exists an additional, completely neglected order Pholidophyllida as a sister group whose major and minor septa are intrasepta (here named addisepta and kalasepta). [original English summary; Wrzolek, Coen-Aubert]

Wright A. J. 2006. New genera of Early Devonian calceoloid corals from Australia and France. *Palaeoworld* **15** (2006): 185-193.
Two new Early Devonian genera and species of the family Calceolidae, phylum Cnidaria, are erected; these are *Richtereola disruptus* n. gen., n. sp., from the Emsian (*perbonus* conodont zone) of the Taemas area, NSW, Australia and from the Emsian Izarne Formation (*gronbergi* conodont zone) of the Montagne Noire, southern France; and *Savageola unicus* n. gen., n. sp. from the Lochkovian (*eurekaensis* conodont zone) Mandagery Park Formation at Manildra, NSW, Australia. These taxa are essentially defined on opercular characters; well-preserved opercula are essential for confident generic assignment of calceoloid material. *Savageola* is known only from eastern Australia, but *Richtereola* is known from the Early Devonian of eastern Australia, southern France, South China (where it is represented by *Calceola sandalina naningensis*) and north Vietnam. [original abstract; Wrzolek]

Wright A. J. 2008. Emsian (Early Devonian) tetracorals (Cnidaria) from Grattai Creek, New South Wales. *Proceedings of the Linnean Society of New South Wales* **128**: 83-96.

The tetracoral species *Phillipsastrea scotti* sp. nov. and *Trapezophyllum grattaiensis* sp. nov. are described from strata assigned to the middle Emsian (*nothoperbonus* to *inversus* conodont zones: Early Devonian) part of the Cunningham Formation at Grattai Creek, west of Mudgee, N.S.W. For comparison with the former, *Phillipsastrea oculoides*, from the Early Devonian (late Pragian or early Emsian) Garra Formation in the Wellington area of N.S.W., is revised on the basis of the type material; new longitudinal thin sections show indisputable horseshoe dissepiments and trabecular fans in this species. [original abstract; Wrzolek]

Wright A. J. 2010. Septal architecture and palaeoecology of *Calceola* (Cnidaria, Calceolidae), with comments on the phylogeny of Devonian operculate tetracorals. *Memoirs of the Association of Australasian Palaeontologists* **39**: 159-176. ISSN 0810-8889; 2010-10-29.
[key words: *Calceola*, tetracoral, operculum, Devonian, septa, insertion]
In *Calceola sandalina* the full complement of counter major septa was established very low in the calyx, extending from the counter septum across to the edge of the counter face. At about mid-height of the calyx, a counter-lateral major septum was generated on either side of and from the counter septum. Serial minor septal insertion was initiated adjacent to the counter-lateral septa at a slightly later stage and continued throughout the subsequent ontogeny of the corallite, with minor septa (schizosepta?) arising on the median side of major septa and bifurcating from them. Alar fossulae are seen in the calyx of mature corallites, on the counter side of a low ridge near the lateral extremity of the inner surface of the counter face. Insertion of major septa in the alar fossula has been observed rarely on the external counter face of worn corallites. The median septum in the operculum of *C. sandalina* is a compound structure which incorporates adjacent minor septa.
In an Emsian(?) corallite of ?*Chakeola* sp. minor septa are derived from major septa, new-minor septa being generated on the outer side of major septa. This corallite also exhibits minor septa adjacent to the K septum, thus casting doubt on Birenheide's generalisation that the counter-lateral septa of *C. sandalina* are not separated from the counter septum by minor septa. In the Emsian *Chakeola whitehousei* minor septa are present adjacent to the counter septum of the operculum.

The distal, anteriorly facing, projecting peg of the K septum of the corallite articulated within the large socket in the opercular K septum, and subsidiary grooves and plates on the socket and septum further facilitated interlocking. Knobs and/or small lists are developed along the posterior edge of the operculum, in the shelf inside the counter edge; septal pegs developed by septa in the corallite were accommodated within this shelf. The opercular septal blades interlocked loosely between the anteriorly facing, distal parts of septa of the corallite.
Rare opercula show one or more (abortive?) attempts to overcome damage which led to displacement of the operculum relative to the corallite, and rejuvenescence is exhibited to various degrees in many opercula. One operculum was apparently broken (bitten?) in half as a juvenile, but was reconstructed to reach a mature form. Other specimens show epifauna, borings and bioerosion either on the external surface of the operculum or on the external cardinal surface of the corallite. 'Galls' on the inner opercular surface are interpreted as stereome deposited to seal off some type of internal parasite. In *C. sandalina*, tubules containing tabulae are located just inside the counter face, and may have served to house soft parts associated with the operculum. Changes of opercular septal morphology suggest that the phylogeny of Devonian genera of the Calceolidae is *Rhizophyllum* > *Savageola* > *Chakeola* > *Richtereola* and ultimately, > *Calceola*. [original abstract; Wrzolek]

Wright A. J., Coen-Aubert M., Bultynck P. et van Viersen A. R. 2010. New data on occurrences of the Devonian rugose coral *Calceola* in Belgium. *Memoirs of the Association of Australasian Palaeontologists* **39**: 121-129. ISSN 0810-8889; 2010-10-29.
[key words: Devonian, Eifelian, Givetian, rugose corals, *Calceola*, operculum, Belgium]
Opercula and corallites of *Calceola sandalina* from the late Eifelian and early Givetian (Middle Devonian) Hanonet Formation of Belgium are illustrated. The few previous illustrations of calceoloid corals from the Devonian of Belgium did not include opercula showing the genetically diagnostic morphological features, so for the first time the presence of the genus and species in Belgium is confirmed. One important corallite shows the alar septum and insertion of septa on the external surface of the counter

face adjacent to the alar septum. [original abstract; Wrzolek]

Yu Chang-Min 2007. Dimorphism in *Calceola sandalina* (Linnée 1771). Science in China Series D: Earth Sciences 50: 1761-1766. [Coen-Aubert]

Yu Chang-Min 2010. Further study on Devonian rugose coral *Heterophaulactis* Yu 1947 from Lower Emsian Yujiang Formation in Guangxi, China. [in English, with Chinese summary] *Acta Palaeontologica Sinica* **49**, 1: 29-43. [Coen-Aubert]
The Devonian rugose coral genus *Heterophaulactis* from Lower Emsian Yujiang Formation in Guangxi, previously not fully described, is thoroughly examined and described in this paper. The main characteristics of this genus are also diagnosed. Based on the characters displayed in the holotype and additional type materials, the description of its type species, *Heterophaulactis semicrassa* is made in detail with full illustrations. A new species of this genus, *Heterophaulactis yujiangense* sp.nov. is erected with detailed description and full illustration. The genus is compared with other relevant genera in different aspects. It is interesting to note that a number of genera from the Lower Devonian in western Qinling mountainous region are of close affinity to *Heterophaulactis*. Some species referred to those genera may be assigned to *Heterophaulactis*, indicating that the distribution of *Heterophaulactis* is not restricted in south China, but extended to northwest China. The family assignment of *Heterophaulactis* is discussed and concluded that *Heterophaulactis* may be derived from Silurian *Pycnactis - Phaulactis* evolutionary lineage. The Subfamily Miroelasmatinae Cao 1983 is emended to include *Heterophaulactis* and its relevant genera and the family assignment of this subfamily is herein switched from Family Halliidae Chapman 1893 by Cao et al. (1983) to Family Lykophyllidae Wedekind 1927. [original abstract; Wrzolek]

Bibliography / Tabulata

De Baets, K., Klug C. et Plusquellec Y. 2010. Zlichovian faunas with early ammonoids from Morocco and their use for the correlation of the eastern Anti-Atlas and the western Dra Valley. *Bulletin of Geosciences* **85**, 2: 317-352.
The article includes a description of *Michelinia mdaourensis* n. sp. and *Petridictyum* sp. with a detailed study of morphological variations of *M. mdaourensis* in which two extreme morphotypes are identified (namely *Michelinia*-like morphotype and *Kerforneidictyum*-like morphotype). A mode of growth similar to *Palaeacis snideri* is described. *M. mdaourensis* is a species systematically associated to the "worm" *Hicetes*. [Lathuiliere]

Dixon O. A. 2010. Fossilized polyp remains in Silurian Heliolites (Anthozoa, Tabulata) from Nunavut, Arctic Canada. *Lethaia* **43**: 60-72; 10.1111/j.l502-3931.2009.00173.x.
[key words: Canada, Heliolitidae, microspheres, Nunavut, silicified polyp remains, Silurian, Tabulata]
Calices within a substantially silicified corallum of *Heliolites garnieri* Dixon, 1996, from the lower part of the Barlow Inlet Formation (Ludlow) on south-western Devon Island, contain what appear to be the silicified remains of soft tissues of coral polyps. These remains apparently represent the peristomal portion of an oral disc, incorporating a symmetrical radial array of 12 spicules (intra-polyp sclerites), and a membrane-like, possibly epidermal structure. These remains, and more non-descript material in a few coralla belonging to two other species of *Heliolites*, occur at local intra-corallum discontinuities where polyps died, but the surrounding colony continued skeletal construction. Their preservation indicates that, before the organic remains were fully destroyed by decomposition, they were rapidly enclosed and sealed by precipitation of micro crystalline quartz or a precursor, and that the failed calices were capped rapidly by local construction of basal epitheca. Clusters of hollow microspheres were also preserved at these discontinuities, suggestive of micro-organisms with a predilection for sites of tissue decay; these microbial decay agents possibly helped to isolate microenvironments conducive to early precipitation of silica. [original abstract; Dixon]

Dixon O. A. 2010. Endobiotic Cornulitids in Upper Ordovician Tabulate Corals and Stromatoporoids from Anticosti Island, Quebec. *Journal of Paleontology* **84**, 3: 518-528.
Conoidal shells of *Cornulites celatus* n. sp. occur commonly within host coralla of *Propora conferta* Milne-Edwards and Haime, 1851, sensu lato, from the Laframboise Member of the Ellis Bay Formation (Ashgill: Upper Ordovician) at Pointe Laframboise on western Anticosti Island. Examples have also been found at the same locality in the tabulate corals *Paleofavosites* sp., *Acidolites arctatus* Dixon, 1986, and *A. compactus* Dixon, 1986, and the stromatoporoid *Ecclimadictyon* sp., but not in other associated tabulate coral species. Growth interference between the shells and their hosts indicates a commensal relationship. *C. celatus* apparently had a more limited paleoenvironmental range than its principal coral host species, which occurs abundantly elsewhere on the island without its endobiotic partner. The diagnosis of *Cornulites* is emended to include forms having a two-layered shell wall with a distinctive outer layer consistently preserved as prismatic calcite. This new species extends the known stratigraphic range of cornulitids in commensal relationships with corals and stromatoporoids from the Silurian back to the Upper Ordovician. [original abstract; Wrzolek]

Gourvennec R., Plusquellec Y., Pereira Z., Picarra J. M., Le Menn J., Oliveira J. T., Ramao J. et Robardet M. 2008. A reasssessment of the Lochkovian (Lower Devonian) benthic faunas and palynomorphs from the Dornes region (southern Central Iberian Zone, Portugal). *Communicas Geologicas* **95**: 5-25.
[key words: Brachiopods, Tabulata, Palynonmorhs, Lower Devonian, Lochkovian, Central Iberian Zone, Portugal]
A revision of benthic faunas and palynomorphs previously described from Dornes Syncline, southern Central Iberian Zone, Portugal, complemented with recent research, shows that the Serra de Luacao Formation is of Lochkovian age. The systematics of the benthic fauna, with clear Gondwana affinities, are described in detail. [original abstract; Oekentorp: described is the Tabulate coral *Ligulodictum ligulatum* (Plusquellec 1965)]

Ospanova N. K. 2010. Remarks on the classification system of the Heliolitida. *Palaeoworld* **19**, 3-4: 268-277. (published on-line 21 September 2010), doi:10.1016/j.palwor.2010.08.010; ISSN 1871-174X
[key words: Tabulate corals; Heliolitida; Classification; Coenenchyme; Phylogeny; Palaeozoic]
The concept of the sum of common features has been used in order to compare the Heliolitida with the Tabulata and Rugosa and determine the position of Heliolitida in the classification system of Palaeozoic corals. Such morphological characters as the number of septa, septa of the second order, epitheca, coenenchyme and multiplicity by four have been considered. Coenenchyme is present in many taxa and there are no more compelling reasons for the integration of Heliolitida and Halysitida than for the integration of Heliolitida with other taxa containing coenenchyme. The dynamics of some features shows that the differences between three main groups of Palaeozoic corals are within the limits of variation of relative organisms. A high degree of similarity testifies to the close relationship of the Heliolitida and the different qualitative and quantitative expression of similar features testifies to their early divergence from a common ancestor and subsequent independent evolution. Asto-phylogeny and morphological homogeny of all Heliolitida confirm their evolution as a separate, unitary group. Heliolitida is a monophyletic group of corals that is equal to the Tabulata and Rugosa in rank. A common origin requires that the orders should be united into one subclass Paleosclerocoralla of the class Anthozoa. [original abstract; Wrzolek]

Plusquellec Y. et Franke C. 2010. Présence précoce du genre *Kerforneidictyum* representé par *K. oeslingensis* n. sp. (Cnidaria, Tabulata) dans l´Emsien inférieur du Grande-Duché de Luxemburg. *Ferrantia* 58: 72-80; Luxembourg.
[key words: *Kerforneidictyum* (Cnidaria, Tabulata, Lower Devonian); Luxembourg (Oesling)]
A new species of *Kerforneidictyum*, *K. oeslingensis* n.sp., is described. It is mainly characterized by the following features: apical angle reaching up to 160 degrees, deep calices with numerous small spines roughly of the same size, setted in two rows or scattered on septal ridges which are wider than the interseptal furrows, no obvious cardinal ridge, tabulae scarce or

missing. The species has been collected in the lowermost Emsian of the Givonne-Eislek Anticlinorium in Luxembourg. It is 1) the first record of the genus in the Devonian of Luxembourg and 2) in the autochthonous part (SE Laurussia) of the Ardenno-Rhenish Mountains and 3) very likely the first - or one of the two first - representatives of the genus taking into account Gondwana and Laurussia. [original abstract; Oekentorp]

Zaika Y. 2010. Structure of the corallite wall of the Upper Ordovician and Silurian Favositidae (Tabulata) and its possible use in stratigraphic correlation. *Palaeoworld* **19**, 3-4: 256-267. (published on- line 21 September 2010), doi:10.1016/j.palwor.2010.09.015; ISSN 1871-174X [key words: Ordovician; Silurian; Arctic Region; Favositidae; Skeletal microstructure; Corallite wall]
Based on an analysis of the significant collections of Favositidae (tabulate corals) from the Upper Ordovician-Lower Devonian of the Taimyr Peninsula, Western Slope of the North Urals and the Tchernychev Uplift, this paper focuses on the macro- and micro-structure of the corallite wall. Seven structural types of the corallite wall have been recognized; some of them seem to have a definite stratigraphic range. The results contribute to the long-time discussion on the applicability of skeletal structure for systematics of the Favositidae, its evolutionary implications, and stratigraphic correlation. It has been held that the skeletal structure of the fossilized remains of Favositidae is inapplicable for such purposes because diagenetically, it is secondary, being a product of mineral replacement of the primary structure. In contrast, an assumption is made here that the "secondary" skeletal macro- and micro-structure may reflect in some way the "primary" skeleton. As a result, it is proposed that some evidence of evolution of the Favositidae may be obtained by evaluating the stratigraphic range of favositid representatives possessing different types of structure of the corallite wall. [original abstract; Wrzolek]

Zapalski M. K. 2009. Parasites in Emsian-Eifelian *Favosites* (Anthozoa, Tabulata) from the Holy Cross Mountains (Poland): changes of distribution within colony. *The Geological Society, London, Special Publications* **314** [Koenigshof P. (ed.): Case Studies in Palaeogeography and Palaeoecology]: 125-129. doi: 10.1144/SP314.6

Organisms of unknown biological affinities, assigned to the genus *Chaetosalpinx*, are known to infest Palaeozoic tabulate corals and stromatoporoids. Analysis of distribution of these parasites, performed on Emsian-Eifelian material of *Favosites goldfussi* (Anthozoa, Tabulata) from the Northern Region of the Holy Cross Mountains (Poland), shows that parasites were absent in the early astogenetical stages, and that during astogeny both the absolute number of parasites per colony and the number of parasites per polyp were increasing. The latter can reach 2.7 parasites per polyp. Preferred settling places are in corallite corners (junction of three individuals), but dense infestation also produced settlement in the corallite walls (between two individuals). Probable causes of the increase are insufficient protection by host's cnidae, insufficient immune system response, and parasite ability to adapt to the host's defences. [original abstract; Wrzolek]

Bibliography / various Palaeozoic corals & stroms

Fernández-Martínez E., Fernández L. P., Méndez-Bedia I., Soto F. et Mistiaen B. 2010. Earliest Pragian (Early Devonian) corals and stromatoporoids from reefal settings in the Cantabrian Zone (N Spain). *Geologica Acta* **8**: 301-323.
The oldest reefal episode in the Cantabrian Zone (earliest Pragian) consists of small biostromal patch reefs, mainly built by corals and stromatoporoids, and developed on a storm-dominated ramp. Four outcrops provide the stratigraphic framework in which these reef facies developed, and these permitted an interpretation of their depositional setting in terms of a relatively distal or protected shelf. Six species of stromatoporoids are described: *Labechiella* sp. 1; *Labechiella* sp. 2; *Intexodictyon perplexum* Yavorsky, 1963; *Plectostroma salairicum* (Yavorsky, 1930); *Habrostroma centrotum* (Girty, 1995); and *Parallelostroma foveolatum* (Girty, 1995). [extracted from the abstract; Stock]

Jian Han J., Kubota S., Uchida H., Stanley G. D. Jr., Yao X., Shu D., Li Y. et Yasui K. 2010. Tiny sea anemone from the Lower Cambrian of China. *PLoS ONE* **5**, 10: e13276. doi:10.1371/journal.pone.0013276
Abundant fossils from the Ediacaran and Cambrian showing cnidarian

grade grossly suggest that cnidarian diversification occurred earlier than that of other eumetazoans. However, fossils of possible soft-bodied polyps are scanty and modern corals are dated back only to the Middle Triassic, although molecular phylogenetic results support the idea that anthozoans represent the first major branch of the Cnidaria. Because of difficulties in taxonomic assignments owing to imperfect preservation of fossil cnidarian candidates, little is known about forms ancestral to those of living groups. We have analyzed the soft-bodied polypoid microfossils *Eolympia pediculata* gen. et sp. nov. from the lowest Cambrian Kuanchuanpu Formation in southern China by scanning electron microscopy and computer-aided microtomography after isolating fossils from sedimentary rocks by acetic acid maceration. The fossils, about a half mm in body size, are preserved with 18 mesenteries including directives bilaterally arranged, 18 tentacles and a stalk-like pedicle. The pedicle suggests a sexual life cycle, while asexual reproduction by transverse fission also is inferred by circumferential grooves on the body column.
The features found in the present fossils fall within the morphological spectrum of modern Hexacorallia excluding Ceriantharia, and thus *Eolympia pediculata* could be a stem member for this group. The fossils also demonstrate that basic features characterizing modern hexacorallians such as bilateral symmetry and the reproductive system, have deep roots in the Early Cambrian. [original abstract; Wrzolek]

May A. 2008. Corals (Anthozoa, Tabulata and Rugosa) and chaetetids (Porifera) from the Devonian of the Semara area (Morocco) at the Museo Geominero (Madrid, Spain), and their biogeographic significance. *Bulletin de l?Institut Scientifique, Rabat, section Sciences de la Terre* **30** (2008): 1-12.
[key words: Anthozoa, biogeography, Devonian, tabulate corals, Morocco, West Sahara palaeogeographic province]
http://www.israbat.ac.ma/spip.php?article=67 - free download is possible
The paper describes the three tabulate coral species *Caliapora robusta* (Pradáčová, 1938), *Pachyfavosites tumulosus* Janet, 1965 and *Thamnopora major* (Radugin, 1938), the rugose coral *Phillipsastrea* ex gr. *irregularis* (Webster & Fenton in Fenton & Fenton, 1924) and the chaetetid *Rhaphidopora crinalis* (Schlüter, 1880). The specimens are described for

the first time from Givetian and probably Frasnian strata of Semara area (Morocco, former Spanish Sahara). The material is stored in the Museo Geominero in Madrid. The tabulate corals and the chaetetid demonstrate close biogeographic relationships to Central and Eastern Europe as well as to Western Siberia. The fauna does not show any special influence of the Eastern Americas Realm. [original abstract; Wrzolek]

May A. et Pohler S. M. L. 2009. Corales y estromatopôridos de Devônico Inferior de los Alpes Cârnicos. *Comunicaciones de las XXV Jornadas de la Sociedad Espanola de Paleontologia*. Aunque en el Devonico Medio los arrecifes tenian una amplia distribucion (casi mundial), durante el Praguiense (Devonico Inferior), los arrecifes fueron escasos. En la formacion "Calizas de Hohe Warte" en el Macizo de Seewarte y Hohe Warte en los Alpes Cârnicos (Hubmann et al., 2003). en la frontera entre Austria e Italia esta represenatado uno de estos pocos arrecifes praguienses. Se estudia la formacion "Calizas de Hohe Warte" en los afloramientos situados en la base del acantilado de la Seewarte. Esta formacion representa al Praguiense y una parte del Emsiense inferior (Hubmann et al., 2003). La secuencia empieza con calizas de crinoideos; sobre ellas se desarrollan estructuras arrecifales; especialmente en la parte superior se observan arrecifes parches bien desarrollados. Los bioconstructores son estromatopôridos, corales tabulados, corales rugosos y *Fistullella undosa* Shuysky, que se interpréta como un hidrozoo problemâtico. La facies de las "Calizas de Hohe Warte" ha sido descrita por Pohler et al. (2007). A continuacion, se proporciona una lista con los fosiles identificados en las laminas delgadas:
corales tabulados: *Heliolites* aff. *werneri* Oekentorp & Brühl, 1999, *Helioplasma* aff. *aliena* Galle, 1973, *Favosites styriacus* Penecke, 1894, *Platyaxum* (*Roseoporella*) *altechedatense* (Dubatolov, 1959), *Scoliopora* (*Protoscoliopora*) *puberulus* (Janet in Dubatolov et al., 1968) (muy frecuente), *Coenites falsus* Dubatolov, 1963, *Aulopora* (*Mastopora*) sp.
corales rugosos: *Fasciphyllum* sp., *Stauromatidium* aff. *marylandicum* (Swartz, 1913), Cystimorpha indet.
estromatoporidos: *Actinostroma*? ex gr. *clathratum* Nicholson, 1886?, *Plectostroma latens* (Pocta, 1894) (muy frecuente), *Schistodictyon*? sp., estromatopôridos indet.

microproblematica: *Fistulella undosa* Shuysky, 1973 (muy frecuente), *Renalcis granosus* Vologdin, 1932. [Wrzolek]

Pickett J. W., Och D. J. et Leitch E. C. 2009. Devonian marine invertebrate fossils from the Port Macquarie Block, New South Wales. *Proceedings of the Linnean Society of New South Wales* **130**: 193-217. [keywords: chaetetids, conodonts, Devonian, Emsian, Givetian, Mile Road Formation, Port Macquarie Block, Rugosa, stromatoporoids, Tabulata, Touchwood Formation]
Two assemblages of rugose and tabulate corals, with accessory stromatoporoids and chaetetids, are described from the Touchwood and Mile Road Formations of the Wauchope - Port Macquarie district of northeastern New South Wales. Both assemblages are derived from allochthonous limestone clasts, except that the Mile Road fauna is accompanied at the same level by branching tabulate corals occurring in the matrix, indicating probable contemporaneity. The fauna from the Touchwood Formation indicates an Early Devonian (Emsian) age. Macrofossils from the Mile Road Formation indicate a broad Middle Devonian, probably Givetian age; conodonts accompanying the coral assemblage yield a precise age in the upper part of the early Givetian *varcus* Zone. Geographic affinities of the assemblages are typically eastern Australian, so that if terranes are represented in the block, these were not remote. Stratigraphic and structural relationships of the units are discussed. The name Mile Road Formation is formally defined. [original abstract; Wrzolek]
[listed, and mostly illustrated fossils, are: *Chaetetes* sp., *Coenostroma* sp., *Endophyllum* cf. *columna* Hill, *Acanthophyllum* sp., *Xystriphyllum* cf. *mitchelli minus* Parker, *Phillipsastrea* cf. *maculosa* Hill, *Sterictophyllum* sp., *Favosites salebrosa* Etheridge fil., *Pachyfavosites* sp., *Squameofavosites squamuliferus* Etheridge fil., *Cladopora* sp., *Thamnopora randsi* Jell & Hill, *Alveolites* sp. A, *Alveolites* sp. B, *Heliolites daintreei* group IV Jones & Hill, *Spongophyllum* sp., *Syringopora* sp., ?*Squameofavosites* sp., *Heliolites* sp., indet. cystiphyllid, indet. large solitary rugosan]

Zaika Yu. V. et Kruchek S. A. 2008. Upper Devonian (Frasnian) corals (Anthozoa) of Belarus. Part 1: systematic composition, stratigraphic distribution, palaeoecology. *Lithosphere* **2**, 29: 49-60.

The present paper describes the taxonomic composition, stratigraphic distribution and palaeoecology of Upper Devonian (Frasnian) Rugose and Tabulate corals (Anthozoa) of Belarus. Corals are widely distributed in carbonate rocks of the Pripyat Trough, Zhlobin Saddle and Orsha Depression, being especially abundant in the Buinovichi beds (Semiluki Formation, Middle Frasnian) and Ptich beds (Voronezh Formation, Upper Frasnian).

The following species have been recognized from the Semiluki Formation: *Aulopora schelonica aseptata* Zaika, subsp. nov., *Thamnopora cervicornis* (Blainv.), *Th. polyforata* (Schloth.), *Th. reticulata* (Blainv.), *Th. tumefacta* Lec., *Gracilopora vermicularis* (McCoy). *Scoliopora conferta albaruthenica* Zaika, subsp. nov., *Crassialveolties obtortus* (Lec.), *Cr. domrachevi* (Sok.), *Alveolites suborbicularis lamellosa* Lec., *Planocoenites medius* (Lec.), *Disphyllum pashiense* (Soshk.), *D. kostetskae* (Soshk.), *Thamnophyllum monozonatum* (Soshk.), *Pterorrhiza multizonata* (Reed) and *Pt. berdensis* (Soshk.). Another association consisting of *Peneckiella jevlanensis* (Bulv.), *P. achanaiensis* Soshk., *P. szulczewskii* Różk., *P. fascicularis* (Soshk.), *Aulopora soshkinae* Sok. and *Aulocystis tikhyi* Sok. is known from the Voronezh Formation.

It may be supposed that the majority of species mentioned above penetrated into Frasnian epicontinental basins of Belarus during Middle and Late Frasnian time through the seas of the Main and Central Devonian Fields, and, possibly, through the basin of the Doniets-Dnieper depression. Two local subspecies of *Aulopora schelonica aseptata* Zaika. subsp. nov. and *Scoliopora conferta albaruthenica* Zaika. subsp. nov. are indicative of some isolation of Frasnian faunas of the Pripyat Trough.

Different kinds of coral biofacies are typical of the Buinovichi and Ptich beds. Coral communities of Buinovichi time in the Pripyat Trough inhabited hard-bottom upfolds and formed tabulate-stromatoporoid buildups like biostromes and caliptras of several tens of centimetres thick. Ramose tabulate and rugose corals populated soft-bottom depressions. Coral-stromatoporoid buildups were much bigger in size in the Zhlobin Saddle and Orsha Depression, which may suggest the more dissected relief

of the sea bottom as compared with that of the Pripyat Trough. Also, massive cerioid colonies of unidentified rugose corals contribute significantly to coral-stromatoporoid organogenic building in the Orsha Depression.
Communities of fasciculate rugose corals and auloporoid tabulates inhabited soft-bottom surfaces in the Pripyat Trough during Ptich time. [original English summary; Wrzolek]

Zaika Yu. V. et Kruchek S. A. 2009. Upper Devonian (Frasnian) corals (Anthozoa) of Belarus. Part 2: Description of taxons. *Lithosphere* **1**, 30: 57-74.
This paper is the second part of the research into the Upper Devonian (Frasnian) corals of Belarus. Twenty five species and subspecies of the Tabulate and Rugose corals have been described and illustrated from the Middle-Upper Frasnian of the Pripyat Trough, Zhlobin Saddle and Orsha Depression for the first time. Two new subspecies identified may suggest some isolation of the fauna of the Frasnian Pripyat Paleobasin. Some major zoogeographical and paleoecological implications were outlined in the first part of the paper. [original English summary]
[the list of species is almost the same as in **Zaika et Kruchek 2008** (see above), with few exceptions: (1) *Thamnopora polyforata* (Schloth.) has been only figured, but without description; (2) one more subspecies *Alveolites suborbicularis suborbicularis* has been listed with mentioning its locality, but it is neither described nor figured; (3) one more species, namely *Ivdelephyllum*? sp. should be added to the second association from Voronezh Formation; summary and list of species supplied by Zaika]

Bibliography / Scleractinia

Benzoni F., Stefani F., Pichon M. et Galli P. 2010. The name game: morpho-molecular species boundaries in the genus *Psammocora* (Cnidaria, Scleractinia). *Zoological Journal of the Linnean Society* **160**: 421-456.
The morphometric and molecular boundaries between twelve *Psammocora* (Cnidaria, Scleractinia) nominal species were addressed. The type specimens of *Psammocora haimiana* Milne-Edwards & Haime 1851, *P. togianensis* Umbgrove 1940, *P. folium* Umbgrove 1939, *P. digitata* Milne-Edwards & Haime 1851, *Maeandroseris australiae* Rousseau 1854, *P. samoensis* Hoffmeister 1925, *P. superficialis* Gardiner 1898, *P. profundacella* Gardiner 1898, *P. nierstraszi* van der Horst 1921, *P. verrilli* Vaughan 1907, and *P. albopicta* Benzoni 2006, were analysed together with specimens from museum collections, including those depicted in widely cited taxonomic descriptions, and material collected for this study in different parts of the Indo-Pacific. Morphometric analyses of the dimensions of skeletal structures allowed the identification of groups of specimens with similar morphologies. Congruency between these groups and current species whose synonymies and descriptions were found in recent taxonomic references was, hence, investigated and the species revised. Finally, the phylogenetic relationships of a representative subset of specimens were reconstructed based on rDNA and COI, thus allowing a direct link between morphologic and genetic information. Incongruence between type of morphology and literature descriptions was evidenced for some widely recognised species. Based on this integrated approach, five species were unambiguously identified. [original abstract; Benzoni]

Brahmi C., Meibom A., Smith D. C., Stolarski J., Auzoux-Bordenave S., Nouet J., Doumenc D., Djediat C. et Domart-Coulon I. 2010. Skeletal growth, ultrastructure and composition of the azooxanthellate scleractinian coral *Balanophyllia regia*. *Coral Reefs* **29**, 1: 175-189. doi: 10.1007/s00338-009-0557-x
The biomineralization process and skeletal growth dynamics of azooxanthellate corals are poorly known. Here, the growth rate of the shallow-water dendrophyllid scleractinian coral *Balanophyllia regia* was evaluated with calcein-labeling experiments that showed higher lateral than

vertical extension. The structure, mineralogy and trace element composition of the skeleton were characterized at high spatial resolution. The epitheca and basal floor had the same ultrastructural organization as septa, indicating a common biological control over their formation. In all of these aragonitic skeletal structures, two main ultrastructural components were present: "centers of calcification" (COC) also called rapid accretion deposits (RAD) and "fibers" (thickening deposits, TD). Heterogeneity in the trace element composition, i.e., the Sr/Ca and Mg/Ca ratios, was correlated with the ultrastructural organization: magnesium was enriched by a factor three in the rapid accretion deposits compared with the thickening deposits. At the interface with the skeleton, the skeletogenic tissue (calicoblastic epithelium) was characterized by heterogeneity of cell types, with chromophile cells distributed in clusters regularly spaced between calicoblasts. Cytoplasmic extensions at the apical surface of the calicoblastic epithelium created a three-dimensional organization that could be related to the skeletal surface microarchitecture. Combined measurements of growth rate and skeletal ultrastructural increments suggest that azooxanthellate shallow-water corals produce well-defined daily growth steps. [original abstract; Kolodziej]

Budd A. F. 2010. Tracing the long-term evolution of a species complex: Examples from the *Montastraea* "*annularis*" complex. *Palaeoworld* **19**, 3-4: 348-356. (published on-line 17 September 2010), doi 10.1016/j.palwor.2010.09.001; ISSN 1871-174X
[key words: Reef coral; Cenozoic; Caribbean; Morphometries; Species; Evolution]
Recent molecular work has revealed numerous species complexes of scleractinian reef corals. Although species within complexes are distinct through much of their distribution, hybridization has been discovered at species margins, and has been hypothesized as playing an important role in mediating responses to changing environments. In the present study, I examine the long-term evolution of the *Montastraea* "*annularis*" complex over the past 5 million years to determine when speciation, extinction, and hybridization took place over the past 6.5 million years, with the eventual aim of understanding how these events corresponded with environmental changes in the Caribbean region. The material consists of colonies collected

in the Mio-Pliocene of the Dominican Republic and the Plio-Pleistocene of Costa Rica and Panama. Genetically characterized colonies from the Recent of Panama are included in the analyses for comparison. Species are distinguished in the fossil material using a landmark-based morphometric approach that focuses on the size and shape of architectural features within corallites in transverse thin sections. Evolutionary relationships among species are examined using phylogenetic analyses based on parsimony. Phylogenetic characters are derived from the results of multiple comparisons tests, which statistically evaluated differences among species using morphometric data.
The results show that the *Montastraea* "*annularis*" complex originated during late Miocene time, and consisted of >12 species during the Pliocene, with a maximum of 4-5 species co-occurring at any one time. The three modern species do not form a monophyletic group but belong to separate clades within the complex. The ranges of two of the three modern species may extend back to 2.9-3.5 Ma, indicating that they are survivors of the Plio-Pleistocene extinction event in which ~80% of Caribbean reef coral species became extinct. Morphologic differences among species (disparity) were higher during the Pliocene than they are today. [original abstract; Wrzolek]

Budd A. F. et Stolarski J. 2009. Searching for new morphological characters in the systematics of scleractinian reef corals: comparison of septal teeth and granules between Atlantic and Pacific Mussidae. *Acta Zoologica* **90**: 142–165. doi: 10.1111/j.1463-6395.2008.00345.x
Recent molecular analyses have challenged the traditional classification of scleractinian corals at all taxonomic levels suggesting that new morphological characters are needed. Here we tackle this problem for the family Mussidae, which is polyphyletic. Most of its members belong to two molecular clades composed of: (1) Atlantic Mussidae and Faviidae (except *Montastraea*) and (2) Pacific Mussidae (*Cynarina*, *Lobophyllia*, *Scolymia*, *Symphyllia*) and Pectiniidae. Other Pacific mussids (e.g. *Acanthastrea*) belong to additional clades. To discover new characters that would better serve as phylogenetic markers, we compare the skeletal morphology of mussid genera in different molecular-based clades. Three sets of characters are considered: (1) macromorphology (budding; colony form; size and

shape of corallites; numbers of septal cycles), (2) micromorphology (shapes and distributions of septal teeth and granules), and (3) microstructure (arrangement of calcification centres and thickening deposits within costosepta). Although most traditional macromorphological characters exhibit homoplasy, several new micromorphological characters are effective at distinguishing clades, including the shapes and distribution of septal teeth and granules, the area between teeth, and the development of thickening deposits. Arrangements of calcification centres and fibres differ among clades, but the fine-scale structure of thickening deposits does not. [original abstract; Kolodziej]

Budd A. F. et Wallace C. 2008. First record of the Indo-Pacific reef coral genus *Isopora* in the Caribbean region: Two new species from the Neogene of Curaçao, Netherlands Antilles. *Palaeontology* **51**, 6: 1387-1401.
The coral genus *Isopora*, a sister group of the modern dominant *Acropora* until now only known from the Pliocene to Recent of the Indo-Pacific, is recorded in the Caribbean for the first time. Two new species, *Isopora ginsburgi* and *Isopora curacaoensis*, are described from the Neogene Seroe Domi Formation of Curaçao, Netherlands Antilles. Study of large collections made systematically through the sequence indicates that *Isopora* first occurred in the Caribbean during the Mio-Pliocene, at approximately the same time as the origination of many modern Caribbean reef coral dominants including *Acropora cervicornis*. It last occurred in the region during the late Pliocene as part of a pulse of extinction, in which several genera that live today in the Indo-Pacific became extinct in the Caribbean. Throughout its Caribbean duration, *Isopora* co-occurred with the two abundant modern Caribbean species of *Acropora*, *A. cervicornis* and *A. palmata*. Comparisons with Neogene collections made elsewhere in the Caribbean indicate that *Isopora* was restricted in distribution to the southern Caribbean. *Isopora* species are viviparous, while *Acropora* are oviparous, and this difference in reproductive strategy may have played a role in the extinction of *Isopora* in the Caribbean. The occurrences of *Isopora* reported in this study are the oldest records to date of *Isopora* worldwide, and are important for understanding the biogeographic separation between reef coral faunas in the Caribbean and Indo-Pacific regions. [original abstract; Löser]

Carpentier C., Martin-Garin B., Lathuiliere B. et Ferry S. 2006. Correlation of reefal Oxfordian episodes and climatic implications in the eastern Paris Basin (France). *Terra Nova* **18**, 3: 191-201.
Oxfordian reefal episodes of Lorraine and Burgundy have a long time been considered as contemporaneous. Biostratigraphic data and sequential evolutions peculiar to each region indicate their structural autonomy during Oxfordian times. A north-south-oriented well-logging transect shows that, during the Middle Oxfordian, a shallow reefal platform developed in Lorraine while thin deeper deposits occurred in Burgundy. In spite of their different ages, reefal episodes of Middle Oxfordian in Lorraine and Upper Oxfordian in Burgundy exhibit a broadly similar vertical evolution of coral communities. During the Late Oxfordian, the contemporaneous occurrence of a diversified assemblage in the Burgundy region, a colder coral assemblage characterized by eurytopic genera and the decrease in seawater isotopic temperatures in Lorraine can be explained by a shift in trophic conditions, a climatic change related to structural rearrangements in this strategic place and a modification of oceanic circulations between the arctic and the Tethyan regions. [original abstract; Löser]

Chaix C. et Saint-Martin J.P. 2008. Les faunes de scléractiniaires hermatypiques dans les plates-formes carbonatées méditerranéennes au Miocene supérieur. *Geodiversitas* **30**, 1: 181-209.
This work consists in a systematic revision of upper Miocene Mediterranean hermatypic scleractinian corals, concerning the whole perimediterranean area. An abundant material allowed an accurate and reliable analysis of the taxonomic characters. Eighteen specific attributions, belonging to eight genera, are proposed. Nomenclatural revisions were required because of the abundant, dispersed and qualitatively diverse literature on this subject. Comparisons with older works were made dificult because of ancient identifications and datations by precedent authors. The biogeographic and stratigraphic distributions are detailed. Discussions about paleoecological features allow a better understanding of this coral fauna evolution, particularly regarding the so-called "salinity crisis" that affected the Mediterranean area at the end of the Miocene. [original abstract; Löser]

Cuif J.-P. 2010. The converging results of microstructural analysis and molecular phylogeny: Consequence for the overall evolutionary scheme of post-Paleozoic corals and the concept of Scleractinia. *Palaeoworld* **19**, 3-4: 357-367. (published on-line 17 September 2010), doi 10.1016/j.palwor.2010.09.003; ISSN 1871-174X
[key words: Coral phylogeny; Skeleton microstructure; Pachythecalids; Taxonomy; Evolution; Scleractinia]
During the last three decades, a series of paleontological and biological results have brought considerable changes to the long-standing question of a possible relationship between the Paleozoic and modern corals. Microstructural descriptions of samples from the alpine outcrops (Salzkammergut and Dolomites) along with new specimens from Turkey have shown first that the classical Wells' schemes have to be re-examined. Accordingly, several investigations based on molecular phylogeny have repeatedly led to the conclusion that, at the family level, the taxonomy inherited from Vaughan and Wells cannot be maintained. From an overall evolutionary viewpoint, agreement also exists between microstructural analysis and molecular phylogeny. A recently discovered Triassic family, the Pachythecalids, exhibits highly unexpected skeletal features and microstructures in both septa and walls. Additionally, structural relationships between walls and septa demonstrate a particular mode of growth, with ontogenic priority to the theca. Comparison of the corallite microstructures suggests that most of the Triassic fauna can be derived from this unique family by an evolutionary process during which the septal system became progressively prevalent upon the wall. This monophyly of the modern corals is also well supported by molecular phylogeny. The present concept of Scleractinia has to be re-examined because it cannot include neither Pachythecalids, probably related to the Late Permian Polycoelids, nor some other post-Paleozoic corals, including extant Guyniidae, with long recognized specific structural patterns. [original abstract; Wrzolek]

Eliasova H. 2008. Corals from the Stramberk Limestone (Silesian Unit, Outer Western Carpathians, Czech Republic). *Geologia* **34**, 3/1: 151-160.
The submitted contribution informs about the present-day situation of the coral fauna occuring in the Stramberk Limestone at the Kotouč Quarry near

Stramberk. 120 determined species belong to 50 genera that pertain to 7 suborders of the order Scleractinia. [original abstract; Kolodziej]

Erdmann S., Bellosi E. S. et Morra G. A. 2008. Una nueva especie de coral solitario (Scleractinia, Turbinoliidae) de la Formación San Julián (Oligoceno superior; SantaCruz) en su contexto estratigráfico y paleoambiental. *Revista del Museu Argentino de Ciencias Naturales* n.s. **10**, 2: 255-262. [Löser]

Fursich, F.T., Callomon, J.H., Pandey, D.K., Jaitly, A.K., 2004. Environments and faunal patterns in the Kachchh rift basin, western India, during the Jurassic. *Rivista italiana di paleontologia e stratigrafia* **110**, 1: 181-190. [Löser]

Fursich F. T., Oschmann W., Pandey D. K., Jaitly A. K., Singh I. B., Liu C. 2004. Paleoecology of Middle to Upper Jurassic Macrofaunas of Kachchh Basin, Western India: An overview. *Journal of the Palaeontology Society of India* **49**: 1-26. [Löser]

Gameil M. et Aly M.F. 2004. Aptian corals from Gabal Abu Ruqum, North Sinai, Egypt: taxonomy and adaptive morphotypes. In: 7th International Conference on the Geology of the Arab World, Cairo University, February 2004.
Colonial and solitary corals of variable morphotypes are abundant in the Aptian rocks of Gabal Abu Ruqum, North Sinai. A taxonomic study on these corals revealed the occurrence of 24 species 11 solitary and 13 colonial species. Six species are established as new: *Trochosmilia cretacea*, *Montlivaltia amini*, *Meandrastraea sinaiensis*, *Peplosmilia gawadi*, *Acrosmilia egyptiaca* and *Epistreptophyllum manzourensis*. The solitary corals belong to genera *Montlivaltia*, *Epistreptophyllum*, *Ellipsosmilia*, *Paracycloseris*, *Acrosmilia* and *Rennensismilia*. Ceratoid and trochoid forms with a narrow base and a curved corallite dominate in these corals. Most corallites are filled with fine sand grains or clogged with large forams (mainly *Orbitolina*). Discoid solitary corals are rare and are represented by *Paracycloseris* sp. The dominance of ceratoid and trochoid forms in addition to the small-sized and curved corallites reflects unfavorable

conditions with high terrigenous supply. On the other hand, colonial corals belong to the genera *Eugyra*, *Stylina, Thamnastrea*, *Fungiastrea*, *Leptoria*, *Actinastrea* and *Ellipsocoenia*. The colonial forms show a wide range of adaptation to the soft substrate with much terrigenous influx. Most forms are hemispherical to mushroom shaped with wide bases for stability. These forms usually have a long peduncle or are usually elevated above the substrate to avoid being buried by sand and mud. Only two species [*Eugyra* (*P.*) *rariseptata* and *Leptoria* sp.] have encrusting morphotypes. [original abstract; Löser]

Kiessling W., Roniewicz E., Villier L., Léonide P. et Struck U. 2009. An Early Hettangian coral reef in southern France: implications for the end-Triassic reef crisis. *Palaios* **24**: 657-671. doi: 10.2110/palo.2009.p09-030r
The oldest known Jurassic coral reef is exposed in the Ardeche region of southern France. This reef site, consisting of at least three reefal bodies, is of early Hettangian age and thus immediately postdates the end-Triassic mass extinction, which is well known for its catastrophic effect on reef building. Bulk carbonate carbon isotopes of the limestones below the reef are likely to record environmental perturbations subsequent to the mass extinction. The main reef is surprisingly well developed (20m in thickness, 200m in lateral extent) and composed of at least four genera and six species of corals ? not only holdover genera from the Triassic, but also one newly evolved genus (*Phacelophyllia*), contributed to reef construction. Just like their latest Triassic counterparts, the reef is dominated by phaceloid corals with a considerable contribution of microbialite. The reef predates similarly well developed structures by almost ten million years. The shelf setting of the reef renders it unlikely that refuges around oceanic islands are needed to explain survival of corals across the end-Triassic mass extinction. [original abstract; Kolodziej]

Kitahara M. V., Cairns S. D., Stolarski J., Blair D. et Miller D. J. 2010. A Comprehensive Phylogenetic Analysis of the Scleractinia (Cnidaria, Anthozoa) Based on Mitochondrial CO1 Sequence Data. *PLOS ONE* **5**, 7: e11490. doi:10.1371/journal.pone.0011490
Background: Classical morphological taxonomy places the approximately 1400 recognized species of Scleractinia (hard corals) into 27 families, but

many aspects of coral evolution remain unclear despite the application of molecular phylogenetic methods. In part, this may be a consequence of such studies focusing on the reef-building (shallow water and zooxanthellate) Scleractinia, and largely ignoring the large number of deep-sea species. To better understand broad patterns of coral evolution, we generated molecular data for a broad and representative range of deep sea scleractinians collected off New Caledonia and Australia during the last decade, and conducted the most comprehensive molecular phylogenetic analysis to date of the order Scleractinia. **Conclusions**: There was a striking discrepancy between the taxonomic validity of coral families consisting predominantly of deep-sea or shallow-water species. Most families composed predominantly of deep-sea azooxanthellate species were monophyletic in both maximum likelihood and Bayesian analyses but, by contrast (and consistent with previous studies), most families composed predominantly of shallow-water zooxanthellate taxa were polyphyletic, although Acroporidae, Poritidae, Pocilloporidae, and Fungiidae were exceptions to this general pattern. One factor contributing to this inconsistency may be the greater environmental stability of deep-sea environments, effectively removing taxonomic "noise" contributed by phenotypic plasticity. Our phylogenetic analyses imply that the most basal extant scleractinians are azooxanthellate solitary corals from deep-water, their divergence predating that of the robust and complex corals. Deep-sea corals are likely to be critical to understanding anthozoan evolution and the origins of the Scleractinia. [abbreviated abstract; Kolodziej]

Lathuiliere B. et Marchal D. 2009. Extinction, survival and recovery of corals from the Triassic to Middle Jurassic time. *Terra Nova* **21**: 57-66. Recognizing extinction events and determining their cause at the Triassic/Jurassic (T/J) transition and near the Pliensbachian–Toarcian (Lower Jurassic) boundary is a field of growing interest. We provide arguments for these events through a literature based new evaluation of coral diversity from Triassic to Dogger and a new palaeobiogeographical map. The T/J extinction of corals is clearly related to the breakdown of reef environments. Origination curves show that Hettangian (the lowest Jurassic stage) was not only a survival phase but already rather a recovery phase. Post-extinction evolution of reefs and their survival only in the

northernmost margin of the Tethys support the hothouse hypothesis for the T/J extinction event. During Pliensbachian, many new taxa appear, but mostly solitary corals, not really framebuilders. Many of these taxa do not occur anymore during the following stages. The new increase in diversity is related to the development of Bajocian (Middle Jurassic) reefs. [original abstract; Lathuiliere, Löser; pdf file available at http://www.g2r.uhp-nancy.fr/annuaire/lathuiliere3.html]

Lauridsen B.W., Gale A.S. et Surlyk F. 2009. Benthic macrofauna variations and community structure in Cenomanian cyclic chalk-marl from Southerham Grey Pit, SE England. *Journal of the Geological Society* **166**: 115-127.
[some corals (*Onchotrochus*, *Micrabacia*) are mentioned in this article; Löser]

Löser H. 2008. Early Cretaceous coral faunas from East Africa (Tanzania, Kenya; Late Valanginian-Aptian) and revision of the Dietrich collection (Berlin, Germany). *Palaeontographica* **285**, 1/3: 23-75, 5 pls.
The extensive vertebrate excavations of the Late Jurassic to Early Cretaceous around the Tendaguru hill in Tanzania in the early 20th century also yielded significant invertebrate faunas. The corals were first described by Dietrich (1926) and his work conformed to a remarkably high standard for his time. Since then, progress in examination methods and other criteria of coral classification has made a modern revision necessary. In addition, the stratigraphy of the coral bearing sediments has greatly improved over the past ten years, allowing a better palaeobiogeographic analysis. The present paper gives an introduction to the research history, discusses the various denominations of the lithostratigraphical units exposed in the Tendaguru area, and explains the progress of the stratigraphy of these units. Using both the original material described by Dietrich, as well as collection material that he did not describe, the corals of the Cretaceous are described and illustrated using new thin sections. Several corals from the Early Cretaceous of Kenya are also included. The Jurassic corals from the Tendaguru area have not been examined. In total, 15 species from the Late Valanginian to Early Aptian unit and 31 species from the Late Aptian are described. Two genera described by Dietrich that were largely forgotten

and many species established by him that were not precisely interpreted in later literature are revised here. *Camptodocis* replaces *Actinareopsis* Roniewicz, 1968, and *Metaulastrea* corresponds to the concept of *Amphiaulastrea* Geyer, 1955, which is considered a junior synonym of *Pleurostylina* and should no longer be used. Together, these revisions place the Cretaceous corals of the Tendaguru area in a modern taxonomic and palaeobiogeographic context. [original summary; Löser]

Löser H. 2008. A new solitary coral genus of the suborder Heterocoeniina (Scleractinia) from the Aptian (Cretaceous) of Spain. *Palaeontologische Zeitschrift* **82**, 3: 279-284.
The new scleractinian coral genus *Hexasmiliopsis* is described on the basis of material from the Early Aptian (Early Cretaceous) of Murcia (Spain). The new genus of the Heterocoeniidae family is characterised by its solitary growth form, a very strong main septum and the presence of apophysal septa. It is closely related to the genera *Hexasmilia* (phaceloid growth form), *Rodinosmilia* and *Tiarasmilia* (both without main septum). The genus is monospecific and represents only the type species, *Hexasmiliopsis saldanai*. [original abstract; Löser]

Löser H. 2008. Remarks on the genus *Hexasmilia* (Scleractinia; Cretaceous) and description of a new species from the Aptian of Spain. *Neues Jahrbuch für Geologie und Palaeontologie, Abhandlungen* **250**, 1: 45-52.
The morphological characteristics of the genus *Hexasmilia* de Fromentel, 1870 are analysed for the first time, using material from the type locality of the type species. The position of the genus within the Heterocoeniidae family (Heterocoeniina suborder) is confirmed. The genus differs from *Heterocoenia* by its phaceloid growth mode and the presence of apophysal septa. Up to now, *Hexasmilia* was believed a monospecific genus, but in addition to the type species, the genus includes the species *Hexasmilia pachythecalia* (Kuzmicheva, 1980), previously attributed to *Hexapetalum*. *Hexasmilia elmari* n. sp. from the Aptian of Spain is newly described and further material is presented in open nomenclature. The genus reaches from the Late Barremian to the Santonian. [original abstract; Löser]

Löser H. 2009. Revision of the Scleractinian coral genus *Diplocoenia* and re-description of the Cretaceous species. *Rivista italiana di paleontologia e stratigrafia* **115**, 1: 49-58.
The Cretaceous species of the coral genus *Diplocoenia* are revised, mainly on the basis of sample material. This genus is characterised by polygonal calices in a cerioid arrangement, compact septa in a regular symmetry and a dissepimental ring with the appearance of a second inner wall. Of the 18 Cretaceous species reported in the literature, five are confirmed, four are synonyms and nine do not belong to this genus. The species with the widest geographic and stratigraphic distribution is *Diplocoenia dollfusi* Prever, 1909, originally described from the Monti d'Ocre complex in the Abruzzen province. The genus occurs in the Cretaceous only in the central Tethys and in the Boreal, and ranges from the Middle Jurassic to the Aptian (?Early Albian). Only about 50 samples from the Cretaceous exist or are known from the literature, making *Diplocoenia* rather rare in the Cretaceous. [original abstract; Löser]

Löser H. 2009. Morphology, taxonomy and distribution of the Early Cretaceous coral genus *Holocoenia* (Scleractinia) and its first record in the Caribbean. *Revista mexicana de ciencias geológicas* **26**, 1: 93-103.
Although ten species are currently assigned to the Early Cretaceous coral genus *Holocoenia*, its characteristics are poorly known. Using both material from the type locality of the type species *Astrea micrantha* along with described and undescribed material from France, Mexico, Poland and Spain, the genus is revised. It has a cerioid form with small calices, compact septa, a styliform columella, and an incomplete septothecal to synapticulothecal wall. Provisionally, it is assigned to the family Thamnasteriidae, being closely related to *Mesomorpha* and *Thamnasteria*. The genera *Stereocaenia* and *Paretallonia* are considered junior synonyms of *Holocoenia*. According to the present revision the genus contains only two species, which range from the Valanginian to the Aptian. *Holocoenia micrantha* is restricted to the central Tethys whereas *Holocoenia jaccardi* extends geographically from South America (Aptian of Argentina) and southern North America (Aptian of Puebla, Mexico) to the eastern Tethys (Hauterivian of Georgia). The indication of the genus in the San Juan Raya area in Puebla is the first indication in Central America. While the genus

has been indicated in only eleven outcrop areas, making it rather rare, in many of these localities samples of *Holocoenia* are common. [original abstract; Löser]

Löser H. 2009. Fossile Korallen aus Jura und Kreide. Aufbau, Klassifikation, Bestimmung und Fundmöglichkeiten. CPress Verlag, Dresden, VI, 206 pp., 279 (15 colour) figures (440 single figures). ISBN 978-3-931689-12-4.
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. Much yet unpublished data on systematics, diversity and taxonomy makes the book up to date and might be interesting also for specialists. All drawn figures of the book are new; the majority of fossil thin sections has been not published before. The numerous illustrations of fossil corals have been selected from a pool of more than 4000 scanned thin sections and peels - material from the whole world, among them samples from countries as exotic as Iran, Jamaica, Japan or Tanzania. [summary; Löser]

Löser H. 2010. The Barremian coral fauna of the Serre de Bleyton mountain range (Drôme, France). *Annalen des Naturhistorischen Museums in Wien* **112**: 575-612.

The corals of the Serre de Bleyton mountain range are determined and described. The fauna consists of very small coral remains and fragments rarely exceeding one centimetre in size. It is clearly dominated by a few solitary and small phaceloid forms, while other growth forms are very rare. The fauna comprises 26 species in 16 genera of the suborders Amphiastraeina, Archeocaeniina, Caryophylliina, Faviina, Fungiina, Microsolenina, and Stylinina. With the exception of one *Amphiastrea* species, all corals have small to very small calices. The faunal composition is typical of Hauterivian to Early Albian coral faunas. Palaeobiogeographically they are related to Barremian-Aptian faunas of the Central Tethys and the western hemisphere. [original abstract; Löser]

Löser H. 2010. Revision of the Early Cretaceous coral genus *Felixigyra* and general remarks on the faviid hydnophoroid coral genera. *Rivista italiana di paleontologia e stratigrafia* **116**, 2: 177-188.
The Early Cretaceous coral genus *Felixigyra* Prever 1909 is revised on the basis of type material from Italy. *Felixigyra* has a hydnophoroid-meandroid colony organisation with conical monticules attached to each other. The very thick monticules are arranged in a way that calicular centres become apparent. The septa are compact and rhopaloid. The genus can be related to other genera of the Eugyridae family, but differs from them by its particularly developed monticules. It also shows certain resemblance to meandroid genera of the family Trochoidomeandridae. Of the six species originally assigned to *Felixigyra* only five are recognized, since the type of *Felixigyra crassa* is too poorly preserved to give a diagnosis. The remaining five species have almost no significant difference in calicular dimensions. In addition to the Italian material, one sample from the Early Cenomanian of Greece and one sample from the Early Albian of Mexico are also assigned to the genus. Material assigned to *Felixigyra* after Prever (1909) needs to be entirely reclassified to the genus *Eohydnophora*. [original abstract, Löser]

Löser H. 2010. Revision of the Cretaceous coral genus *Tiarasmilia* Wells, 1932 (Scleractinia). *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen* **258**, 2: 157-165.
The Early to early Late Cretaceous coral genus *Tiarasmilia* Wells, 1932 is

revised on the basis of the type species. The solitary coral is characterised by regular septal symmetry and the abundant apophysal septa that ornament the septa pairwise. The genus is re-assigned to the family Heterocoeniidae. The genus *Budaia* Wells, 1933 is considered to be a junior synonym of *Tiarasmilia*. Four *Tiarasmilia* species are recognised, the respective type species of *Tiarsmilia* and *Budaia*, and two as yet unnamed species for which not enough specimens were available to erect new taxa. [original abstract; Löser]

Löser H., Castro J.M. et Nieto L.M. 2010. A small Albian coral fauna from the Sierra de Seguilí (Alicante province, SE Spain). *Neues Jahrbuch fuer Geologie und Palaeontologie*, Abhandlungen **255**, 3: 315-326.
From the Early to Middle Albian of south-eastern Spain (Prebetic) a small coral fauna is reported. Five species are described. Four species belonging to the Leptophyllidae, Montlivaltiidae, and Cyathophoridae families are quite common in outcrops of an Aptian to Early Cenomanian age, mainly in the central Tethys and Western Hemisphere. One species belongs to the Hemiporitidae family and represents only the second colonial coral genus known from the Meandrinina suborder in the Early Cretaceous, the first being *Phyllocoenia*. A short account is therefore given of the suborder Meandrinina, its history, taxonomic composition and diversity through the time. Due to the low quality of the material and the availability of only one sample, the material is preliminarily assigned to the genus *Lamnastrea* Reig Oriol 1997, which is herein revised on the basis of thin sections obtained from the type of the type species. [original abstract; Löser]

Löser H., Stemann T. A. et Mitchell S. F. 2009. Oldest Scleractinian fauna from Jamaica (Hauterivian, Benbow Inlier). *Journal of Paleontology* **83**, 3: 333-349.
From the oldest Cretaceous marine sediments of Jamaica, the Copper Limestone within the Devils Racecourse Formation (Benbow Inlier, Clarendon Block), the oldest known coral fauna of the Caribbean is described. The small but diverse fauna encompasses 18 species in 17 genera of the suborders Amphiastraeina, Archeocaeniina, Heterocoeniina, Faviina, Fungiina, Microsolenina, and Stylinina. The fauna contains the first representatives of the suborder Amphiastraeina in the Caribbean and

the Americas. One genus of the family Amphiastreidae, *Monoaulastrea*, and three species - *Monoaulastrea rawi*, *Latusastrea rubrolineata*, *Camptodocis corralesi* - are described as new. The preoccupied coral genus *Floria* is replaced by the new name *Floriastrea*. The new fauna shows relationships to faunas from the late Berriasian to late Albian. Most species are shared with the Hauterivian faunas from Georgia in the central Tethys and the Paris Basin in the Boreal, but also with younger faunas such as the Barremian of Central Mexico, the early Aptian of Greece and the early Albian of the Bisbee Basin (Northern Mexico). [original abstract; Löser]

Masse J.-P., Morycowa E. et Fenerci-Masse M. 2008. Valanginian-Hauterivian scleractinian coral communities from the Marseille region (SE France). *Cretaceous Research* **30**, 1: 178-192. doi: 10.1016/j.cretres.2008.07.002
Coral beds associated with Valanginian and Hauterivian platform carbonates from the Marseille region show two faunal assemblages corresponding with a *Stylosmilia-Baryphyllia* community (late Valanginian) and a *Mesomorpha-Dimorpharaea* community (early Hauterivian). The stratigraphic position of this fauna is based on the associated microfossils and correlation with ammonite-bearing beds. The internal architecture of the coral beds is loosely packed, the geometry of the corresponding bodies is tabulate and flat, and their depositional setting being the deeper, muddy part of the infralittoral zone. The biostratigraphic significance of the encountered species which include: *Stylosmilia* cf. *corallina*, *Eocomoseris raueni*, *Mesomorpha ornata*, *Dimorpharaea catalaunica* and *Baryphyllia haimei*, is low and our data tend to broaden the stratigraphic range of some of them. Assuming that the corresponding species were zooxantellate suggests the existence of an oligotrophic rather than a mesotrophic oceanic regime, postulated by some workers for the time span in question. [original abstract; Löser, Kolodziej]

Masse J.-P., Morycowa E. et Fenerci-Masse M. 2008. Corrigendum to: ?Valanginian-Hauterivian scleractinian coral communities from the Marseille region (SE France)? (vol 30, pg 178, 2009). *Cretaceous Research* **30**, 2: 503-503. doi: 10.1016/j.cretres.2008.12.010 [Kolodziej]

Miler M. et Pavsic J. 2008. Triassic and Jurassic beds in Krim Mountains area (Slovenia). *Geologija* **51**, 1: 87-99. [Löser]

Montaggioni L. F. et Braithwaite C. J. R. 2009. Quaternary coral reef systems: history, development processes and controlling factors. *Developments in marine geology* **5**, 17; 532 pp, 157 figs. [Löser]

Morycowa E. 2009. Koralowce Scleractinia z wapieni egzotykowych typu sztramberskiego polskich Karpat zewnetrznych. [Scleractinian corals from Stramberk-type limestones of the Polish Outer Carpathians). *Geologia* **34**, 3/1: 129-137. [in Polish; Kolodziej]

Morycowa E. et Masse J.-P. 2009. Lower Cretaceous Microsolenina (Scleractinia) from Provence (southern Fance). *Annales Societatis Geologorum Poloniae* **79**, 2: 97-140. http://www.asgp.pl/
In the Lower Cretaceous (Urgonian) limestones of the Provence region (South France) shallow-water scleractinian corals are very common. This paper concentrates on corals from the suborder Microsolenina. They represent 34 taxa (including 5 new species) belonging to 14 genera from two families: Microsolenidae and Latomeandridae. This coral assemblage is representative for the late Early Cretaceous Tethyan realm but also shows some endemism. Its characteristic feature is the abundance of hydnophoroid specimens from the genus *Hydnophoromeandraraea* Morycowa. The Barremian-Early Aptian age of the studied corals is based on foraminifera (mainly orbitolinids), dasycladale algae and rudists, and agrees with that of the whole studied coral fauna. [original abstract; Kolodziej]

Neves E. G., Da Silveira F. L., Pichon M. et Johnsonn R. 2010. Cnidaria, Scleractinia, Siderastreidae, *Siderastrea radians* (Ellis & Solander, 1786): Hartt Expedition and the first record of a Caribbean siderastreid in tropical southwestern Atlantic. *Check List* **6**, 4: 305-510. [Lathuiliere]

Pandey D. K., Fursich F. T. et Baron-Szabo R. C. 2009. Jurassic corals from the Jaisalmer Basin, western Rajasthan, India. *Zitteliana A* **48/49**: 13-38.
The first comprehensive taxonomic description of Jurassic corals from the

Jaisalmer Basin, a pericratonic shelf basin on the northwestern slope of the Indian peninsular shield, is based on 75 specimens, which belong to five suborders, seven families, nine genera, and ten species. In Upper Bajocian rocks, all corals belong to the suborder Faviina, in Middle Bathonian rocks 75% of the specimens are members of the Stylinina, whereas corals occurring in the Tithonian all belong to the Caryophylliina. [original abstract; Löser]

Pandolfi J. 2007. A new, extinct Pleistocene reef coral from the *Montastraea* "*annularis*" species complex. *Journal of Paleontology* **81**: 472-482.
A new species of the *Montastraea* "*annularis*" species complex is herein described from Pleistocene coral reefs of the Caribbean Sea. The species, *Montastraea nancyi* n.sp., had a broad geographic distribution at mainly insular sites 125Ka. It has a fossil record extending from 600Ka (thousand years) to 82Ka, both first and last occurrences exclusively on the island of Barbados. It also had a broad environmental tolerance, occurring in fringing, windward back-reef and reef-crest, leeward reef-crest, and lagoonal patch-reef environments. In every habitat in which it lived, there are examples that it either dominated the coral fauna or shared dominance with *Acropora palmata*, a dominant shallow water coral in high-energy Pleistocene and modern reefs. The extinction of *Montastraea nancyi* resulted in evolutionary and ecological change in surviving members of the *M*. "*annularis*" species complex. [original abstract; Löser]

Pichon M., Benzoni F., Chaineau C.H. et Dutrieux E. 2010. Field Guide of the Corals of South Yemen. Collection "Parthenope" Editions Biotope, 256p. ISBN 9782914817462. [Lathuiliere]

Proz P.-A. 2002. Les collections du département de géologie et de paléontologie du Muséum d'histoire naturelle de Geneve. **77**. La collection générale (Coelenterata). *Revue de Paléobiologie* **21**: 881-897. [Löser]

Reolid M., Molina J. M., Löser H., Navarro V. et Ruiz-Ortiz P. A. 2009. Coral biostromes of the Middle Jurassic from the Subbetic (Betic Cordillera, Southern Spain) facies: coral taxonomy, taphonomy and

palaeoecology. *Facies* **55**, 4: 575-593.
Coral biostromes from the Camarena Formation (External Subbetic, Betic Cordillera) are reviewed under palaeoecologic, taphonomic and palaeontologic aspects. The biostromes are dominated by phaceloid forms and are characterised by a typical shallow-marine microencruster assemblage with photophilic microencrusters and scarce microbial crusts. The abundance of stylinid corals and light-dependant microencrusters suggest oligotrophic conditions. Coral colonies were located among oolitic shoals which were unfavourable for coral growth. The corals were developed in phases without oolitic production alternating with phases of oolitic production, forming metric-scale sequences. A relative sea-level fall would have reduced the ooidal production and led to the deposition of thin layers of micritic facies in intertidal areas. The cementation and hardening of the bottom resulted in a hardground that was colonized by corals after a subsequent relative sea-level rise. The progressive increase of the energetic conditions induced an increasing production of ooids and the migration of oolitic shoals, which covered and finished the coral biostromes. Repetition of this process gave rise to sequences reflecting small pulses of oscillations in the relative sea level. [original abstract; Löser]

Roniewicz E. 2008. Kimmeridgian-Valanginian reef corals from the Moesian Platform from Bulgaria. *Annales Societatis Geologorum Poloniae* **78**: 91-134. http://www.asgp.pl/2008/78_2/contents.html
The coral fauna of the Late Kimmeridgian?Valanginian interval from the Slivnitsa Formation, Lyubash monocline, SW Moesian Platform, is presented. Coralliferous interbeds from a continuous, over 350m thick sequence of well-bedded platform limestones, cropping out near the village of Lyalintsi, yielded 72 species (29 determined in open nomenclature) classified into 50 genera and 23 families belonging to the orders Scleractinia and Hexantiniaria. The following genera and/or species are described as new: *Epistreptum communeformae* gen. et sp. n., *Lyubasha gracilis* gen. et sp. n., *Oedalmiopsis cretacaea* gen. et sp. n., *Siderastreites lyalintsensis* gen. et sp. n., and *Latomeandra obliqua* sp. n., *Microphyllia elevata* sp. n., *M. amalla* sp. n.; a new family Solenocoeniidae is erected. The fauna shows a mixed Late Jurassic/Early Cretaceous character, with Jurassic taxa prevailing over Cretaceous taxa. Epithecate phaceloid

(pseudocolonial), lamellar, and ramose (colonial) growth forms dominate over massive (hemispherical) and solitary corals. Rich microencrusting organisms are associated. The predominantly pelmicritic sediment of thrombolite macrofabric, and the character of the fauna show that the palaeoenvironment was situated below wave base. The stratigraphical distribution of the Cretaceous coral taxa is conformable with the micropaleontological (foraminifera, calcareous dinocysts, diploporids) stratigraphical zonation established in the Slivnitsa Formation. [original abstract; Kolodziej]

Roniewicz E., Mandl G. W., Eli O. et Lobitzer H. 2007. Early Norian scleractinian corals and microfacies data of the Dachstein Limestone of Feisterscharte, Southern Dachstein Plateau (Northern Calcareous Alps, Austria). *Jahrbuch d. Geologischen Bundesanstalt* **147**, 3/4: 577-594. http://www.geologie.ac.at/filestore/download/JB1473_577_A.pdf
This is the first report concerning an Early Norian coral fauna from the Northern Calcareous Alps. The coral-bearing limestones outcrop in the vicinity of the Feisterscharte, in the southern Dachsteinplateau. In this Alpine region, aside from the Dachsteinplateau, Early Norian corals have been recorded only from the Gosaukamm range, which is also part of the Dachstein massif. The exposures at Feisterscharte show one of the most taxonomically diversified Early Norian coral assemblages known so far. In the assemblage, Carnian genera are prevailing in number, and Early Norian index species, *Pachysolenia cylindrica* and *Pachydendron microthallos*, are frequent. The Early Norian age is prooved by conodonts. Some remarks on microfacies and foraminifera content of the reef and associated limestones are given. The rocks represent the initial growth stage of the Norian to Rhaetian Dachstein carbonate platform. [original abstract; Kolodziej]

Roniewicz E., Stanley G. D. Jr, Da Costa Monteiro F. et Grant-Mackie J. A. 2005. Late Triassic (Carnian) corals from Timor-Leste (East Timor): their identity, setting, and biogeography. *Alcheringa* **29**: 287-303. doi: 10.1080/03115510508619307
Four scleractinian coral taxa are described from limestones within a sandstone-shale sequence correlated with the Late Triassic Babulu Formation, Manatuto township, on the northern coast of Timor-Leste (East

Timor). The coral fauna consists of three phaceloid taxa, *Paravolzeia timorica* gen. et sp. nov., *Craspedophyllia ramosa* sp. nov., *Margarosmilia confluens* (Muenster), and a generically indeterminate solitary taxon attributed to the family Margarophylliidae. All four corals are related at various taxonomic levels to Carnian faunas from the Dolomites of northern Italy. Previously, only Norian coral faunas were known from the Triassic of Timor. The fauna exhibits both similarities to and differences from Carnian faunas of the Dolomites and helps confirm palaeogeographic affinities with the western Tethys, although during Late Triassic time Timor lay in the distant southeastern portal of the Tethys. Despite isolation from the western Tethys, the presence of two species found also in the Dolomites indicates that larval dispersal occurred between the two areas. [original abstract; Kolodziej]

Roniewicz E. et Stanley G. D. Jr. 2009. *Noriphyllia*, a new Tethyan Late Triassic coral genus (Scleractinia). *Palaeontologische Zeitschrift* **83**, 4: 467-478. http://www.springerlink.com/content/h0nw364h2233771x/ *Noriphyllia* gen. n. is a distinctive coral representing the Coryphylliidae, a group of Late Triassic scleractinian corals. Coral faunas of this age are poorly known. The new coral is distinguished from related corals belonging to the reimaniphylliids by key features of septal microstructure as discerned in thin sections. This microstructure consists of a straight/wavy midseptal zone and lateral septal stereome organized into thin fascicles of fibres, producing a fine and sharp micromorphology of the septal sides. The solitary genus *Noriphyllia* gen. n. contains two Early Norian species: *N. anatoliensis* sp. n. chosen as the type species and *N. dachsteinae* sp. n., and a Carnian species referred to as *N. monotutoensis* sp. n. The new genus is widely distributed in the Late Triassic, Early Norian reef facies of the Tethys region (Northern Calcareous Alps, Austria; Taurus Mountains, Turkey) and it also occurs in the Carnian of Timor. *Noriphyllia* gen. n. is unique and details of its microstructural features add new understanding to the composition of both Late Carnian and Early Norian corals. [original abstract; Kolodziej]

Salomidi M., Zibrowius H., Issaris Y. et Milionis K. 2010. *Dendrophyllia* in Greek waters, Mediterranean Sea, with the first record of *D. ramea* (Cnidaria, Scleractinia) from the area. *Mediterranean Marine Science* **11**, 1: 189-194. [Lathuiliere]

Schlaginweit F. 2009. The incertae sedis *Carpathoporella* Dragastan, 1995, from the Lower Cretaceous of Albania: skeletal elements (sclerites, internodes / branches, holdfasts) of colonial octocorals. *Facies* 55, 4: 553-573.

The incertae sedis *Carpathoporella* Dragastan, 1995, reported from the Lower Cretaceous of the Western Tethyan domain, is usually interpreted as remains of calcareous algae (Dasycladales or Characeae). New thin-section material from the Aptian of Albania sheds light not only on its biogenic nature but also the morphological variability of this taxon. In fact, *Carpathoporella* represents the debris of colonial, bushy, most likely gorgonid octocorals with tuberculated spheroids that maybe fused at least near the basal root-like holdfast. Colony branching originates from longitudinally grooved calcareous branches or internodes. Possible relationships to other Upper Cretaceous to Palaeogene genera are discussed and a revised critical inventory of Cretaceous octocorals is presented. Due to the evidenced morphological features, *Carpathoporella* could either represent an ancestral isidid octocoral of the order Alcyonacea such as *Moltkia* Steenstrup or, due to the likely primary aragonitic skeletal mineralogy, a representative of *Epiphaxum* Lonsdale of the order Helioporacea. Due to morphological analogies, the new combination *Carpathoporella elliotti* is proposed. In any case, the Lower Cretaceous record from Tethyan peri-reefal shallow-water carbonates is highlighted since numerous skeletal findings of fossil gorgonid Octocorallia were so far only known from Upper Cretaceous and younger strata of outer shelf environments of the boreal realm. The origin of deep-water Upper Cretaceous octocorals from Lower Cretaceous shallow-water taxa such as *Carpathoporella* is proposed as a possible further example of onshore/offshore evolutionary pattern. [original abstract; Löser]

Sorauf J. E. 2010. Colonial form, free-living corals, and macroborers from the Pleistocene of South Florida. *Palaeoworld* **19**, 3-4: 426-434. (published on-line 17 September 2010), doi 10.1016/j.palwor.2010.09.007; ISSN 1871-174X

[key words: Free-living; Pleistocene; Scleractinia; *Manicina*; *Siderastrea*; *Solenastraea*]

Study of corallum shape in free-living colonies of *Manicina*, *Siderastrea* and *Solenastraea* collected from the Pleistocene Bermont formation in southern Florida indicates that they were mobile, either self-righting (*Manicina*), or rotatory (*Siderastrea* and *Solenastraea*), with colony forms that are the result of movement during growth. In rotatory corals, growth of a radial and centrifugal nature away from the corallum center indicates that rolling was frequent enough to maintain the health of individual corallites along the skeleton's entire spherical surface, as postulated previously by several authors. Post mortem sponge boring and boring of sipunculid worms and the bivalves *Lithophaga* and *Gastrochaena* during the life of these colonies were common. Colonization by barnacles during the life of some colonies also occurred, but they were generally overgrown. Boring of rotatory coralla decreased the mass of the skeleton and probably increased the ease and frequency of rolling of round colonies. The presence of these rotatory coralla strongly suggests that the lower Bermont sediments accumulated on and around shallow banks populated by numerous free-living corals and some fixed corals such as branching *Porites*, along with a diverse molluscan assemblage indicative of a *Thalassia* (turtle grass) community. The Pleistocene Bermont Formation also contains numerous well-preserved colonies of *Manicina areolata*, indicative of deposition in shallow subtidal environments with abundant sea grass. This species was well-suited to life in this environment, and to overturning by current action, as it has the capacity to right itself after overturning, either biologically or hydrodynamically or both. The Bermont specimens of *Manicina* all (100%) possess a flat or slightly concave base, typical of self-righting forms. Colonies collected in the Bermont Formation show several types of macroborers, sponges, sipunculid worms, but above all, the bivalve genera *Lithophaga* and *Gastrochaena* as well as epibionts, bryozoans and serpulid worms. *Manicina* is associated stratigraphically with rotatory colonies of *Siderastrea radians*, but the two have not been found within the same

lamina. However, the two, taken together, provide strong indications of depositional environments on banks populated by sea grasses and associated fauna. [original abstract; Wrzolek]

Stefani F., Benzoni F., Pichon M., Cancelliere C. et Galli P. 2008. A multidisciplinary approach to the definition of species boundaries in branching species of the coral genus *Psammocora* (Cnidaria, Scleractinia). *Zoologica Scripta* **37**: 71–91.
The Indo-Pacific coral genus *Psammocora* Dana (1846) has never been formally revised, and its phylogeny has only been partially explored. Several synonymies have been proposed for the 11 nominal species which have highly plastic branching growth forms. In the present study, the definition of genetic and morphologic boundaries among three currently recognized branching morpho-species, *Psammocora stellata*, *Psammocora contigua* and *Psammocora obtusangula*, is addressed through a joint morphometric and molecular study using corallite and branch measurements, and a portion of the β-tubulin gene as a marker. The results show a morphological and partial phylogenetic distinction between *P. stellata* specimens and a complex composed of *P. contigua* and *P. obtusangula*, which is interpreted as a synonym species of *P. contigua*. Among the factors that could be responsible for the lack of reciprocal monophyly of the three species, hybridization is considered the most likely, due to the presence of interspecific recombinant sequences. Type material of nominal species of branching *Psammocora* is examined and classified based on genetically defined groups, and compared with synonyms in the literature. Among the morphological characters used, corallite variables were best for discriminating between the two lineages and allow recognition of putative hybrid specimens. *Psammocora stellata* is reported for the first time in the western Indian Ocean (Mayotte), thus greatly extending its known distribution range. Finally, a hybrid swarm is identified in the Arabo-Persian Gulf, while no genetic structure is detected elsewhere in the Indo-Pacific region. [original abstract; Benzoni]

Wallace C. 2008. New species and records from the Eocene of England and France support early diversification of the coral genus *Acropora*. *Journal of Paleontology* **82**, 2: 313–328.

Five new species of the highly successful reef-building coral genus *Acropora* are described from Eocene locations in England and France (*Acropora britannica*, *A. alvarezi*, *A. wilsonae*, *A. bartonensis*, and *A. proteacea*) and additional records are given for six fossil species (*A. deformis*, *A. anglica*, *A. solanderi*, *A. roemeri*, *A. lavandulina*, and *A. ornata*), based on re-examination of material in the collections of the Natural History Museum, London. Specimens came from the Lutetian (49.0 to 41.3 Ma) of France, Bartonian (41.4 to 37.0 Ma) of England and France and Priabonian (36.0–34.2 Ma) of England. Included are the earliest record of a species with tabular or plate-like colonies similar to those in the modern "*hyacinthus*" species group (*A. proteacea* n. sp.) and the earliest records of simple hispidose forms (*A. bartonensis* n. sp. and *A. roemeri*), similar to those in the modern "*florida*" species group. The Priabonian material from southern England (*A. brittanica* n. sp. and *A. anglica*) shows the earliest occurrence of two sturdy species groups, the "*humilis* II" and "*robusta*" groups respectively, which now occur together on reef fronts throughout the modern Indo-Pacific. The new descriptions and records contribute to evidence that the genus diversified rapidly after its appearance in the fossil record. This diversification may have contributed to the rapid speciation and dispersal, observed in this genus during the Neogene, culminating in its extraordinary dominance of modern Indo-Pacific reefs. [original abstract; Löser]

Wallace C. et Rosen B. R. 2006. Diverse staghorn corals (*Acropora*) in high-latitude Eocene assemblages: implications for the evolution of modern diversity patterns of reef corals. *Proceedings of the Royal Society of London* (B) **273**: 975-982.

Acropora is the most diverse genus of reef-building corals in the world today. It occurs in all three major oceans; it is restricted to latitudes 31°N–31°S, where most coral reefs occur, and reaches greatest diversity in the central Indo-Pacific. As an exemplary genus, the long-term history of *Acropora* has implications for the evolution and origins of present day biodiversity patterns of reef corals and for predicting their response to future climate change. Diversification of *Acropora* was thought to have occurred in the central Indo-Pacific within the previous two million years. We examined Eocene fossils from southern England and northern France

and found evidence that precursors of up to nine of 20 currently recognized *Acropora* species groups existed 49–34 Myr, at palaeolatitudes far higher than current limits, to 51°N. We propose that pre-existing diversity contributed to later rapid speciation in this important functional group of corals. [original abstract; Löser]

Zlatarski V. N. 2008. Need for a more integrative approach to scleractinian taxonomy. *Proceedings of the 11th International Coral Reef Symposium*, Ft. Lauderdale, Florida, 7-11 July 2008; session 26.
[key words: Scleractinia, taxonomy, microstructure, biodiversity, reefs]
The history of scleractinian taxonomy is divided into six periods: the original, purely typological, was based on scarce coralla material; the second, starting at the end of nineteenth century, originated with visiting natural habitat and established variability; the third commenced in the 1930s with detailed skeletal study; the fourth began in the 1950s with scuba access to coral habitat; the fifth began in the 1980s following fundamental discoveries in life history and molecular genetics; and the sixth started in 1995, when data from molecular genetics opened a new avenue for scleractinian megataxonomy, contradicting conventional gross-morphology taxonomy but resulting congruent with skeletal histology and ornamentation. Currently, there are four sources of scleractinian taxonomic information: morphology, paleobiology, developmental biology and molecular genetics. Taxonomy is important for understanding scleractinian biodiversity and reef conservation. However, the taxonomy is fragmented and the nomenclature tangled. The e-dimension benefits have not yet been realized and the New Taxonomy not yet arrived for scleractinians. Vision and teamwork are needed for a more integrative taxonomy. The **Atlantic Scleractinia Initiative** seeks to address the following points: massive sampling, study of the mesophotic habitat, collection access, analysis of phenotypic diversity, life history, geological history, molecular genetics, cyberinfrastructure and education of specialists. [original abstract; Wrzolek]

Zlatarski V. 2010. Palaeobiological perspectives on variability and taxonomy of scleractinian corals. *Palaeoworld* **19**, 3-4: 333-339. (published on-line 21 September 2010) doi 10.1016/j.palwor.2010.09.012; ISSN 1871-

174X
[key words: Scleractinia; Variability; Taxonomy; Paleobiology; Actuopalaeontology]
Scleractinians are well known for their exceptional variability and difficult taxonomy. Until the end of the nineteenth century, these corals were studied outside their natural habitat. In situ investigation brought to attention their variability and led to description of formae and attempts to depart from the typological taxonomy. Studies commenced in 1950s of extant scleractinians of Jamaica, the South Pacific, Madagascar, the Red Sea, Cuba, and Australia demonstrated instances of coralla unclassifiable in the described species because they possess intermediate characters, and sometimes one corallum exhibits the characteristics of more than one species. Since 1984, discoveries about scleractinian life history and molecular data further challenged the conventional taxonomy. The coral holobiont is now being studied as a totality of the coral animal, its endosymbiotic zooxanthellae, and its associated community of microorganisms. Molecular genetics and studies of life history combined with morphological variability and variability in geological time are needed for scleractinian taxonomy. The input of palaeontologists with temporal aspect as well as an enormous amount of morphological data is invaluable, as demonstrated by several examples based on detailed morphological observations later supported by molecular and life history information. Efforts to resolve the variability vs. taxonomy dilemma for fossil scleractinians would benefit from further actuopalaeontological work: studies at all levels of biological organization, including ancient DNA and evolutionary genetics, the rich fossil record, fractals and RLQ analysis, palaeopathological research, sclerochronology, the ecology and skeletogenesis of extant deep sea corals. [original abstract; Wrzolek]

Bibliography / Octocorallia

Lozouet P. et Molodtsova T. 2008. Filling a gap: The first occurrences of *Epiphaxum* (Cnidaria: Helioporacea: Lithotelestidae) in the Eocene, Oligocene and Miocene. *Palaeontology* **51**, 1: 241-250.
A new species of the genus *Epiphaxum* (family Lithotelestidae) is described and illustrated in detail, and compared to other species. *Epiphaxum*

arbuscula sp. nov. has been collected from Upper Eocene (Priabonian), Upper Oligocene (Chattian) and Lower Miocene (Upper Burdigalian) deposits of the Aquitaine Basin, south-west France. *Epiphaxum* is a poorly documented genus but its fossil record extends back to the Late Cretaceous; it was previously known only from the Paleocene (Danian). *Epiphaxum arbuscula* differs from all others species of the genus in the form of its colony. In contrast to the creeping colonies of previously known species, it has branched colonies. It is very common at one Upper Oligocene outcrop from which an assemblage with submarine cave remains has been described. A close relationship between the three extant species (two from the Caribbean Sea and one from the Indo-West Pacific region) and the Paleogene species is also noted. These constitute a group that has not undergone any important morphological changes for the last 65 million years. [original abstract; Löser]

Mikuz V. 2008a. [Eocene Gorgonacean coral remian from surroundings of Gracisce near Pazin, Istria.] *Razprave Slovenska akademija znanosti in umetnosti* **49**, 2: 51-63, 1 pl. [Löser]

Mikuz V. 2008b. [The Gorgonacean coral remains (Octocorallia) from the Middle Miocene beds near Sentilj in Slovenske Gorice, NE Slovenia.] *Razprave Slovenska akademija znanosti in umetnosti* **49**, 2: 79-93, 1 pl. [Löser]

Vertino A., Zibrowius H., Rocca M. et Taviani M. 2010. Fossil Coralliidae in the Mediterranean Basin. In: Bussoletti E., Cottingham D., Bruckner A., Roberts G., Sandulli R. (eds): Proceedings of the International Workshop on Red Coral Science, Management, and Trade: Lessons from the Mediterranean. September 23-26, 2009, Naples, Italy. NOAA Technical Memorandum CRCP-13, Silver Spring, MD., pp 94-98 [pdf file available from H. Zibrowius; Lathuiliere]

Bibliography / reefs

Aretz M. et Herbig H.-G. 2008. Microbial-sponge and microbial-metazoan buildups in the Late Viséan basin-fill sequence of the Jerada Massif (Carboniferous, NE Morocco). *Geological Journal* **43** [M. Aretz, H.-G. Herbig et I. Somerville (eds): From Platform to Basin, Proceedings of the Carboniferous Conference, Cologne 2006]: 307-336. [Aretz]

Aretz M., Herbig H.-G., Somerville I. et Cozar P. 2010. Rugose coral biostromes in the late Viséan (Mississippian) of NW Ireland: Bioevents on an extensive carbonate platform. *Palaeogeography, Palaeoclimatology, Palaeoecology* **292**, 3-4: 488–506.
The extensive upper Viséan (Asbian) platform carbonates in NW Ireland (Bricklieve Limestone Fm, Glencar Limestone Fm and Dartry Limestone Fm) contain distinctive rugose coral biostromes, which are dominated by different species of the genus *Siphonodendron*. These are in stratigraphic sequence: *pauciradiale* biostrome (oldest), *martini* biostrome and several *junceum* biostromes (youngest). They represent bioevents caused by special short-lasting ecological conditions and can be used as approximately synchronous horizons to correlate within the region. The *pauciradiale* biostrome is the thickest, laterally most persistent and most variable in facies and biotic composition of all biostromes. It formed on a tectonically influenced platform with a landward–seaward zonation from northwest to southeast, mainly above storm wave-base and below fair-weather wave-base. The northwestern Streedagh facies is characterized by the presence of clusters of large sheet-like colonies of *S. pauciradiale*. The intermediate O'Donnell's Rock facies is unique for the predominance of the fasciculate genus *Solenodendron*. The southeastern Bricklieve facies represents the amalgamation of autochthonous and allochthonous coral debris and bioclastic debris with localized small patches of coral boundstone. Mass occurrences of fasciculate rugose corals re-appear in the *martini* biostrome. This biostrome developed in a shallower water setting, just above fair-weather wave-base on a levelled carbonate platform. The *junceum* biostromes are thinner, decimetre to some metres thick, and less persistent. They formed in deeper water mostly below storm wave-base, except for the composite 2nd *junceum* biostrome of the Bricklieve Mountains, which

records a period of shallowing. According to facies and coral morphologies, which were compared with modern scleractinian growth forms, sea-level variation exerted one of the strong controls on the rise and decline of the biostromes. The *pauciradiale* biostrome formed during an extended shallowing-upward cycle in a depth interval leading to the climax of *Siphonodendron pauciradiale*. The cycle ended with the development of the *martini* biostrome in shallow water. Its demise is probably caused by drowning during the late Asbian sea-level rise. During that time slice the *junceum* biostromes flourished in deeper water on the platform. Coral growth ceased almost completely after formation of the *junceum* biostromes during the falling sea level of the latest Asbian. Siliciclastic input and resulting turbidity, as well as turbulence formed a complex cascade of ecological constraints. In addition to the local tectonic influences, they combined to result in the "depth" factor which controlled the distribution of predominating coral populations and the succession of the different biostromes in the Asbian of NW Ireland. [Lathuiliere]

Carpentier C., Lathuiliere B. et Ferry S. 2010. Sequential and climatic framework of the growth and demise of a carbonate platform: implications for the peritidal cycles (Late Jurassic, North-eastern France). *Sedimentology* (2010) **57**: 985-1020.
The Middle Oxfordian of the eastern Paris Basin constitutes a remarkable example of the growth and demise of a carbonate platform. The paper proposes a sequence stratigraphic interpretation of famous coral bearing sedimentary units that yielded a great part of Jurassic coral taxa created by Michelin (1843). [available at http://www.g2r.uhp-nancy.fr/annuaire/lathuiliere3.html; Lathuiliere]

Copper P. et Edinger E. 2009. Distribution, geometry and palaeogeography of the Frasnian (Late Devonian) reef complexes of Banks Island, NWT, western arctic Canada. *The Geological Society, London, Special Publications* **314** [P. Konigshof (ed.): Devonian Change: Case Studies in Palaeogeography and Palaeoecology]: 107-122. [Young]

Deliya S. V. et Danshina N. V. 2010. A lithofacies model for the Upper Devonian Pamyatno-Sasovskoye reef (oilfield) (Volgagradskoe Povolzhye, Russia). *Palaeoworld* **19**, 3-4: 278-283. (published on-line 17 September 2010), doi 10.1016/j.palwor.2010.09.008; ISSN 1871-174X
[key words: Frasnian reefs; Stromatoporoids; Corals; Crinoids; Algae; Russia]
Based on the exploratory drilling data provided by LLC LUKOIL-Nizhnevolzhskneft, we studied the structure, composition, and conditions of formation of the middle-upper Frasnian sections of the Pamyatno-Sasovskoye oilfield, Central Russia, which are related to a complex organogenic build-up. We also conducted a lithofacies section modeling based on the data derived from classification of secondary dolomitic limestones (as per Dunham's classification), palaeontological components (e.g., algae, stromatoporoids, crinoids, gastropods, protozoans), structural constructions, and logging data. [original abstract; Wrzolek]

Hladil J., Koptíková L., Galle A., Sedlácek V., Pruner P., Schnabl P, Langrová A., Bábek O., Frána J., Hladíková J., Otava J. et Gersl M. 2009. Early middle Frasnian (E-MF) platform reef strata in the Moravian Karst interpreted as recording the atmospheric dust changes: the key to understanding perturbations in the *punctata* conodont zone. *Bulletin of Geosciences* **84**: 75-106.
The early middle Frasnian (Upper Devonian) *punctata* Zone interval of Moravia, Czech Republic, was chosen, because a pure limestone lacking an obvious siliciclastic component is present, and because the authors had access to voluminous surface and subsurface stratigraphic data. Research methodology included [quotations from abstract, p. 75]: "… biostratigraphy and facies analysis, magnetic susceptibility (MS), gamma-ray specteometry (GRS), instrumental neutron activation analysis (INAA), and finally, separation and assessment of rare non-carbonate particles." … "The most significant disturbance was found near the mid-punctata Zone level." They conclude that the exotic nature of the grains may be due to the Alamo Impact Event in Nevada, USA [see Aul 2010 & Aul et al. 2010, in stromatoporoid chapter], but feel that a single event does not explain all their findings. [Stock]

Ivanova D., Kolodziej B., Koleva-Rekalova E. et Roniewicz E. 2008. Oxfordian to Valanginian palaeoenvironmental evolution on the western Moesian carbonate platform: a case study from SW Bulgaria. *Annales Societatis Geologorum Poloniae* **78**: 65-90.
http://www.asgp.pl/2008/78_2/contents.html
Three sections (Rebro, Lyalintsi and Velinovo) of the Upper Jurassic–Lower Cretaceous carbonate sequences from the Lyubash unit (Srednogorie, Balkanides, SW Bulgaria) have been studied for elucidation of biostratigraphy and palaeoenvironmental evolution. Palaeontological studies of foraminifera, supplemented by studies of calcareous dinoflagellate cysts and corals, enabled the determination of the Oxfordian–Valanginian age of the analysed sequences. They were deposited on the Dragoman Block (western part of the Moesian Platform), and during Mid–Late Cretaceous included to the Srednogorie. A possible Middle to Late Callovian age of the lowermost part (overlying the Bajocian–Lower Bathonian Polaten Formation) of the studied sections assumed till now has not been confirmed by the present studies. Eleven facies have been distinguished and attributed to depositional environments. Marine sedimentation on a homoclinal ramp started in the Oxfordian and till the Early Kimmeridgian – in all three sections – was dominated by fine–grained peloidal–bioclastic wackestones to grainstones. Since the Late Kimmeridgian, when a rimmed platform established, facies pattern underwent differentiation into (i) the inner platform (lagoon and tidal flat facies) – only in Velinovo, (ii) reef and peri–reef facies/bioclastic shoals – mainly in Lyalintsi, and (iii) platform slope – mainly in Rebro. Sedimentation generally displays a shallowing–upward trend. Two stages in evolution of the rimmed platform are postulated. The mobile stage lasting till the Tithonian/Berriasian boundary was followed by a more stable stage in the Berriasian to Valanginian time. Reefs are developed mainly as coral–microbial biostromes, lower coral bioherms or coral thickets, in the environment of moderate energy and sedimentation. They contain highly diversified corals (72 species) [see Roniewicz (2009)]. Microbialites contributed to the reef framework, but they never dominated. Locally, microencrusters and cement crusts formed important part of reefal framework. During the mobile stage of the platform evolution a relative sea–level rise interrupted reef development, as evidenced by intercalations

of limestones with *Saccocoma*. During the second stage high carbonate production and/or regressive eustatic events, not balanced by subsidence, decreased accommodation space, limiting reef growth and enhancing carbonate export to distal parts of the platform. [original abstract; Kolodziej]

Kiessling W., Simpson C. & Foote M. 2010. Reefs as Cradles of Evolution and Sources of Biodiversity in the Phanerozoic. *Science* **327**: 196-198.
Large-scale biodiversity gradients among environments and habitats are usually attributed to a complex array of ecological and evolutionary factors. We tested the evolutionary component of such gradients by compiling the environments of the geologically oldest occurrences of marine genera and using sampling standardization to assess if originations tended to be clustered in particular environments. Shallow, tropical environments and carbonate substrates all tend to have harbored high origination rates. Diversity within these environments tended to be preferentially generated in reefs, probably because of their habitat complexity. Reefs were also prolific at exporting diversity to other environments, which might be a consequence of low-diversity habitats being more susceptible to invasions. [abstract of a report; Wrzolek]

Lathuiliere B. et Weis R. 2008. Jurassic coral reefs and coleoids at the Ottange-rumelange quarry. Coleoid cephalopods through time, 3rd international symposium, Luxembourg: 127-133 [available as pdf file at http://www.g2r.uhp-nancy.fr/annuaire/lathuiliere3.html; Lathuiliere]

Machado G., Hladil J., Koptikova L., Fonseca P. E., Rocha F. T. et Galle A. 2009. The Odivelas Limestone: evidence for a Middle Devonian reef system in western Ossa-Morena Zone (Portugal). *Geologica Carpathica* **60**, 2: 121-137. doi: 10.2478/v 10096-009-0008-1
[key words: Eifelian/Givetian, Paleozoic orogens, Ossa Morena Zone, Beja Igneous Complex, biostratigraphy, reef fauna, carbonate petrology, magnetic susceptibility]
The Odivelas Limestone constitutes one of the few records of Middle Devonian sedimentation in the western Ossa-Morena Zone. Although

deformed and metamorphosed the limestones have an abundant fossil content which allows their positioning as late Eifelian/early Givetian in age and to relate the reef fauna with the typical Rhenish facies for the same time period. Magnetic susceptibility analysis was attempted and is in agreement with the biostratigraphy, but the limited extent of sections and the metamorphism precludes firm correlations. The field evidence, petrographic and geochemical analysis point to a close paleogeographical relation and dependence of the reef system on volcanic structures which are included in the Beja Igneous Complex. The age of part of the volcanic and sub-volcanic suite of this complex is thus constrained. [original abstract; Wrzolek; taken from http://versita.metapress.com/content/v218r0t04pr43780/fulltext.pdf]

Martin-Garin B., Lathuiliere B., Geister J. et Ramseyer K. 2010. Oxygen isotopes and climatic control of Oxfordian coral reefs (Jurassic, Tethys). *Palaios* **25**, 11: 721-729.
Stable isotope studies were carried out on shells of reef-dwelling brachiopods and oysters to evaluate the impact of climate changes on coral communities during the Oxfordian (Late Jurassic) in western Europe and northwestern Africa. Low to medium diversities observed in coral associations in the pioneering and terminal reef phases correlate well with average seawater paleotemperatures of <20.3 °C. The reef climax coincides with optimum environmental conditions, reflected by a high coral diversity and an average seawater temperature between 22 and 30 °C. The results of this study show that water temperatures set the physiological limits for the distribution of corals and coral reefs in Oxfordian time. [Lathuiliere]

Montaggioni L. F. et Braithwaite C. R. J. 2009. Quaternary Coral Reef Systems: History, development processes and controlling factors. Elsevier 550 pp. [Kolodziej]

Morycowa E. et Szulc J. 2010. Environmental controls on growth of early scleractinian patch reefs (Middle Triassic; Silesia; Poland). *Palaeoworld* **19**, 3-4: 382-388. (published on-line 21 September 2010), doi 10.1016/j.palwor.2010.08.002; ISSN 1871-174X
[key words: Patch reefs; Scleractinian corals; Middle Triassic; Peri-Tethys;

Upper Silesia; Poland]
Anisian scleractinian corals are known from the Lower and Middle Muschelkalk of the Cracow-Silesian region, but in bioherms they occur only in the western part, i.e., in the Upper Silesian area, in the higher part of the Lower Muschelkalk (Karchowice Beds). Silesian reefs of Anisian (middle Pelsonian-early lllyrian) age are, so far, the oldest in situ coral reefs following the Permian / Triassic extinction. In Anisian time, Silesian corals formed a Tethys marginal reefal rim, separating offshore Tethyan open marine waters from the backreef area (Germanic Basin). The shallow-water coral-bearing facies capped sponge buildups, following a general shallowing trend in the basin. Final emersion in the early Illyrian halted coral reef growth. Anisian scleractinian corals appear to have been zooxanthellate, as suggested in Morycowa, 1988. [original abstract; Wrzolek]

Nestor H., Copper P. et Stock C. W. 2010. Late Ordovician and Early Silurian stromatoporoid sponges from Anticosti Island, eastern Canada: crossing the O/S mass extinction boundary. NRC Research Press, Ottawa, 163 pp., 28 text-figs., 28 pls. (June 2010). [Young]
During Late Ordovician and Early Silurian time, from 450 to 428 million years ago, stromatoporoid sponges were some of the most common and abundant fossils in shallow water tropical settings of the Anticosti Basin (Gulf of St Lawrence). They formed dense, massive coralline skeletons of calcium carbonate, some up to a meter or more across, especially in reef environments, but also in deeper waters of the Anticosti shelf, down to the margins of the photic zone, where light faded. The Anticosti Basin reveals one of the most fossiliferous carbonate sequences worldwide for rocks of this age, straddling a global mass extinction boundary, and thus revealing not only those taxa that became extinct, but also how the seas were repopulated in an equatorial setting after the mass extinction. The mass extinction has been correlated to globally cooling climates of the time, and southern hemisphere glaciation in North Africa. This monograph describes, for the first time, the skeletal architecture of these abundant and exquisitely preserved sponges from Anticosti, and includes more than 300 skeletons selected from ca. 2000 field localities [3000 skeletons from 200 localities?!], assigned to 14 genera, of which 4 are new, and 35

stromatoporoid species, of which 18 are new. These are illustrated by 56 figures and plates and fill a major gap in our global knowledge of the reef building stromatoporoids, especially during the Early Silurian and latest Ordovician. All materials are precisely geographically and stratigraphically defined from the Vaureal through Chicotte formations over a nearly a kilometer thick section, and their ecologic distribution plotted across shallow to deeper water facies. Oil and gas exploratory drilling in the Gulf of St Lawrence will ultimately reveal what happened in the deeper water offshore facies, not exposed on Anticosti Island itself. [original abstract; Wrzolek]

Onoue T. et Stanley G.D.Jr. 2008. Sedimentary facies from Upper Triassic reefal limestone of the Sambosan accretionary complex in Japan: mid-ocean patch reef development in the Panthalassa Ocean. *Facies* **54**: 529-547.
Microfacies of the Early to Middle Norian reefal limestone of the Sambosan Accretionary Complex (SAC) at Kamase locality, southwest Japan, are classified into seven major facies types in stratigraphic order: peloidal grainstone-packstone, unfossiliferous lime-mudstone, tubular problematica-rich wackestone, sponge-coral floatstone, sponge bafflestone, coral rudstone, and peloidal-bioclastic packstone-grainstone. The SAC records patch reef development on a mid-oceanic seamount in the Panthalassa Ocean. Because most examples of Triassic reefs come from the former Tethys, counterparts such as those from the SAC are pivotal in resolving paleogeographic issues as well as clarifying the depositional patterns between the eastern Tethys and adjacent western Pacific (Panthalassa). We also reveal that the primary stratigraphy of the reefal limestone was disrupted by submarine landslides of the seamount in an open-ocean realm during the late Middle to Late Jurassic time. [original abstract; Löser]

Radwanski A., Gorka M. et Wysocka A. 2006. Middle Miocene coralgal facies at Maksymivka near Ternopil (Ukraine): A preliminary account. *Acta Geologica Polonica* **56**, 1: 89-103.
A peculiar coralgal facies is recognized in the Lviv-Ternopil region, Ukraine, from the northern shores of the Middle Miocene (Badenian) Fore-

Carpathian Basin. Its complex structure is dominated by algal buildups composed of interfingering red-algal (lithothamnian) colonies and blue-green-algal crusts, associated locally with numerous hermatypic corals (*Tarbellastraea reussiana*, *Porites vindobonarum prima*), either isolated, or overlapping each other. The holes amidst, and the crevices in, the buildups are filled with coarse bioclastic sediment (shell-grit), burrowed commonly by crustacean decapods (alpheid shrimps). The alpheid burrows, filled with coarser or finer shell-grit, served frequently as taphonomic traps for crustacean decapods (squat lobsters and crabs) and echinoids. Special attention is paid to the activity of rock-boring bivalves (*Jouannetia semicaudata, Lithophaga lithophaga*) in coralgal buildups and/or in particular coral colonies, some of which are redeposited, and riddled densely by bivalve borings. Emphasis is given to the environmental significance of alpheid shrimps, the tiered burrows of which are recorded in the Fore-Carpathian Basin for the first time. Crustacean decapods and echinoids are systematically studied. A comparison of the studied coralgal facies with others of the Lviv-Ternopil region, and those from the territory of Poland, indicates their faunistic and biogeographic identity. [original abstract; Löser]

Ressetar R. et Herring D. M. 2009. Distribution of Devonian stromatoporoid buildups in the eastern Basin and Range. *In* B. Tripp, K. Krahulec, and L. Jordan (eds.): Geology and Geologic Resources and Issues in Western Utah. *Utah Geological Association Publication* **38**: 43-53, 2 appendices, 8 plates.
Devonian carbonates in the Basin and Range Province of western Utah and eastern Nevada form part of a large, carbonate-dominated depositional complex that occupied the western margin of the mid-Paleozoic North American craton. These Devonian carbonates are generally continuous with and coeval with hydrocarbon reservoirs in the Alberta foreland basin of Canada. This stratigraphic association and the production of modest amounts of oil from the Devonian in Nevada raise the possibility that the carbonate-reef play concepts that have been successful in Canada could be applied to the Devonian of the Basin and Range. For this review paper, we collected descriptions of more than 100 measured outcrop sections in the literature and oil-industry data from about 45 wells, and integrated the

descriptions with published sequence stratigraphic frameworks for the Middle and Upper Devonian. We assigned the carbonates to eight depositional environments, ranging from supratidal to deep subtidal, and correlated the measured sections across four cross sections. Paleogeographic maps based on limited age control suggest that two populations of stromatoporoid buildups occur: a shelf-edge group that is probably not prospective for hydrocarbons, and a middle-shelf group that may be prospective. However, the Basin and Range buildups are smaller and less numerous than those in Canada, lack structural control and internal biofacies zonation, and are mud supported. From the hydrocarbon exploration perspective, carbonate buildup distribution is probably less important than timing and development of fracture porosity. [original abstract; Stock]

Rodriguez S., Fernandez-Martinez E., Cozar P., Valenzuela-Rios J. I., Pardo Alonso M. V., Liao J.-C. et May A. 2010. Stratigraphic succession, facies and depositional environment of Emsian reefal carbonates in the Ossa-Morena Zone (SW Spain). *Neues Jahrbuch fur Geologie und Palaontologie Abhandlungen* **257**: 69-83.
[key words: Lower Devonian, Emsian, Spain, microfacies, facies, reefs, carbonates, paleoenvironments]
The Devonian succession between the Guadiana and Guadalquivir valleys in the Obejo-Valsequillo Domain comprises more than 600m of shale and sandstone with some interbedded limestone and marl. The most complete reefal sequences of the region are exposed in the Guadamez-2 section, which is located on the western bank of the Guadamez River, near Zalamea de la Serena. It consists mainly of shale and calcareous shale in its lower part and shaly, skeletal and reefal limestone in its upper part. Conodont and brachiopod data indicate that this section spans the interval from the Lochkovian to at least the upper Emsian. Eight microfacies types have been identified in the calcareous facies: (A) brachiopod-echinoderm wackestone/packstone; (Bl) echinoderm grainstone; (B2) echinoderm-bryozoan grainstone/packstone; (C) echinoderm packstone; (D) tabulate coral rudstone; (E) brachiopod wackestone/packstone; (F) brachiopod grainstone/packstone; and (G) stromatoporoid and tabulate coral boundstone/rudstone. Microfacies A, Bl, C, E and F represent a sequence of

environments from middle platform (A) to tidal flat (F), including shoals (Bl) and shallow platform facies. Microfacies B2, D and G represent the development of patch-reefs superimposed on the shoals. [original abstract; Wrzolek]

Sheppard C. R. C., Davy S. K et Pilling G. M. 2009. The Biology of Coral Reefs. Oxford University Press, 352 pp. [Kolodziej]

Somerville I. D., Cozar P., Aretz M., Herbig H.-G., Mitchell I. et Medina-Varea P. 2009. Carbonate facies and biostromal distribution in a tectonically controlled platform in northwest Ireland during the late Visean (Mississippian). *Proceedings of the Yorkshire Geological Society* **57**: 165-192.

Veron J. E. N. 2008. A reef in time: The Great Barrier Reef from Beginning to End. The Belknap Press of Harvard University Press, 304 pp. [Kolodziej]

Wood R. 2010. Taphonomy of reefs through time. *Topics in Geobiology* **32** [P.A. Allison et D.J. Bottjer (eds): Taphonomy: bias and process through time; 2nd Edition; Springer]: 375-409.
http://www.springer.com/series/6623 [Kolodziej]

Bibliography / various topics

Bromley R. G., Kedzierski M., Kolodziej B. et Uchman A. 2009. Large chambered sponge borings on a Late Cretaceous abrasion platform at Cracow, Poland. *Cretaceous Research* **30**: 149–160.
doi:10.1016/j.cretres.2008.07.001
A new ichnospecies of the bioeroding sponge ichnogenus *Entobia*, i.e., *E. cracoviensis* isp. n., is distinguished by having a single, large, isolated chamber and radiating canals. It occurs in a rockground surface on a Turonian or Santonian abrasion platform that is cut into Oxfordian limestones as exposed at Bonarka, Cracow. The morphology of the new ichnospecies is compared with fossil and modern sponge boring morphologies. [abbreviated abstract; Kolodziej]

Brahmi C., Meibom A., Smith D. C., Stolarski J., Auzoux-Bordenave S., Nouet J., Doumenc D., Djediat C. et Domart-Coulon I. 2009 (online first). Skeletal growth, ultrastructure and composition of the azooxanthellate scleractinian coral *Balanophyllia regia*. *Coral Reefs*. doi:10.1007/s00338-009-0557-x
The biomineralization process and skeletal growth dynamics of azooxanthellate corals are poorly known. Here, the growth rate of the shallow-water dendrophyllid scleractinian coral *Balanophyllia regia* was evaluated with calcein-labeling experiments that showed higher lateral than vertical extension. The structure, mineralogy and trace element composition of the skeleton were characterized at high spatial resolution. The epitheca and basal floor had the same ultrastructural organization as septa, indicating a common biological control over their formation. In all of these aragonitic skeletal structures, two main ultrastructural components were present: ”centers of calcification” (COC) also called rapid accretion deposits (RAD) and ”fibers” (thickening deposits, TD). Heterogeneity in the trace element composition, i.e., the Sr/Ca and Mg/Ca ratios, was correlated with the ultrastructural organization: magnesium was enriched by a factor three in the rapid accretion deposits compared with the thickening deposits. At the interface with the skeleton, the skeletogenic tissue (calicoblastic epithelium) was characterized by heterogeneity of cell types, with chromophile cells distributed in clusters regularly spaced between calicoblasts. Cytoplasmic extensions at the apical surface of the calicoblastic epithelium created a threedimensional organization that could be related to the skeletal surface microarchitecture. Combined measurements of growth rate and skeletal ultrastructural increments suggest that azooxanthellate shallow-water corals produce well defined daily growth steps. [original abstract; Kolodziej]

Charlton T. R., Barber A. J., McGowan A. J., Nicoll R. S., Roniewicz E., Cook S. E., Barkham S. T. et Bird P. R. 2009. The Triassic of Timor: Lithostratigraphy, chronostratigraphy and palaeogeography. *Journal of Asian Earth Sciences* **36**: 341-363. doi:10.1016/j.jseaes.2009.06.004
The palaeontologically rich and lithologically diverse Triassic successions of Timor provide a key stratigraphic and palaeontological link between northwestern Australia and other terranes of former eastern Gondwana

(present-day Southeast Asia). Timor is now located in the zone of collision between the northern margin of the Australian continent and island arc terranes bordering the Eurasian plate, with the Triassic successions exposed in a fold-and-thrust belt and an extensive mélange complex. In the paper embracing results of multidisciplinary geological investigations managed recently in Timor, paleogeographical and palaeoecological conclusions from examination of Carnian corals (found by F. Da Costa Monteiro.) in the Babulu Formation, East Timor, have been included. [abbreviated abstract; the above mentioned coral fauna from Timor was described in two taxonomical publications: Roniewicz et al. (2005) and Roniewicz et Stanley (2009) – see Scleractinia; Roniewicz, Kolodziej]

Cozar P., Somerville I. D., Rodriguez S. et Medina-Varea P. 2007. New genera of late Viséan metaspondil dasycladales from the Fuenteobejuna section (Mississppian of the Guadiato Valley, southwestern Spain). *Neues Jahrbuch für Geologie und Paläontologie* **246**: 97-109. [Rodriguez]

Cozar P., Vachard D., Somerville I. D., Berkhli M., Medina-Varea P., Rodriguez S. et Said I. 2008. Late Viséan-Serpukhovian foraminiferans and calcareous algae from the Adarouch region (central Morocco), North Africa. *Geological Journal* **43**: 463–485. [Rodriguez]

Denniston R.F., Asmerom Y., Polyak V.Y., McNeill D.F., Klaus J.S., Cole P., Budd A.F. 2008. Caribbean chronostratigraphy refined with U-Pb dating of a Miocene coral. *Geology* **36**, 2: 151-154.
An exceptionally well-preserved aragonitic coral of the extinct species *Goniopora hilli* was collected from late Cenozoic sedimentary deposits in the Dominican Republic and dated using U-Pb techniques. Nine coralline subsamples yielded a 238U/206Pb- 207Pb/206Pb three-dimensional (3-D) inverse linear concordia age of 5.52 ą 0.15 (2s) Ma, which, when coupled with 87Sr/86Sr ratios obtained from the same coral, allows for tighter constraints on temporal variability of marine species diversity prior to closure of the Central American Seaway. The recognition that pre-Quaternary aragonitic corals can be suitable for U-Pb dating creates new possibilities for refining the chronologies of late Cenozoic marine sedimentary sequences. [original abstract; Löser]

Fagerstrom J. A. et West R. R. 2010. Roles of clone-clone interactions in building reef frameworks: principles and examples. *Facies*, available prior to paper publication online at **www.springerlink.com**.
In living and fossil reefs, rapid upward clone growth provides positive topographic relief; the skeletal framework provides rigidity. Clonal organisms have been the chief frame-builders during most of the Phanerozoic; large clone size, growth habit, growth form, and arrangement of these clones in the framework result from rapid growth rates. Dense skeletal packing enhances rigidity and results in live-live interactions between juxtaposed clones. These interactions are both heterospecific and conspecific; the former mostly involve spatial competition whereas the latter involve clone fusion, self-overgrowth and fission. We describe three types of fusion: a) inter-clone fusion of two or more clones, each from a separate propagule; b) intra-clone fusion of parts of the same clone having its origin from a single propagule; it includes recovery from partial clone degradation and self-overgrowth; c) quasi-fusion between a live bud/polyp/zooid and a dead part (stem; branch) of the same or a different clone, i.e. a live-dead association. [original abstract; Stock]

Feng Q., Gong Y.-M. et Riding R. 2010. Mid-Late Devonian calcified marine algae and cyanobacteria, South China. *Journal of Paleontology* **84**: 569-587.
Sampled strata range from upper Middle Devonian (Givetian) to Upper Devonian (Frasnian & Famennian). At the Shenwan locality "The Guilin Formation, mainly grainstone interbedded with dolostone, contains abundant Amphipora and local deposits of bulbous stromatoporoids." (p. 571). Apparently, the Guilin Formation at Shenwan is Frasnian in age. [Stock]

Franke C. 2010. Marine Fauna der Wiltz-Schichten (Ober-Emsium, Unter-Devon) der Mulde von Wiltz und der Daleider Mulden-Gruppe (Luxemburg, Deutschland): Teil 1. *Ferrantia* **58**: 5-62. [Coen-Aubert]
[key words: Luxembourg, Oesling, Germany, western Eifel, Upper Devonian, Wiltz-beds, benthic fauna, sponges, conularies, rugose corals, worms, trilobites, phyllocarids]
A multitude of new finds permit a fundamental revision of the fossil contents of the Wiltz layers. For this purpose, approx. 5,700 proofs of finds

were evaluated. Due to the numerous finds, the study will be published in several parts. It turns out that the species-diversity is very much greater than assumed to date. The presence of many of genera and species known from other sedimentation areas have now been proved for the Wiltz-layers in the Wiltz-basin and Daleiden Synclinal Group. This publication includes plant fossils, *Rhaphidopora* sp. cf. *Rhaphidopora lonsdalei*, *Cornulites* sp. and Pterygotoidea fam., gen. et sp. indet. The trilobite *Leonaspis grafi* n. sp. is described.
Finally, the area examined can be defined as an extensive long-lived deposit region of a shallow water situation extending from close to and far from the coast of the Ardennes-Rhenish continental shelf with multifold faunistic correspondences to other regions in the Variscan sea during the upper Emsian. [original abstract; Wrzolek]

Gischler E., Hudson J. H. et Pisera A. 2009. Late Quaternary reef growth and sea level in the Maldives (Indian Ocean). *Marine Geology* **250**, 1-2: 104-113. doi:10.1016/j.margeo.2008.01.004
Based on rotary drilling and radiometric and U-series dating, we present the first comprehensive data on Holocene reef anatomy and sea-level rise as well as nature and age of underlying Pleistocene limestone in the Maldives. Holocene reefs in Rasdhoo Atoll, central Maldives, are composed of four facies including (1) robust-branching coral facies, (2) coralline algal facies, (3) domal coral facies, and (4) detrital sand and rubble facies. Branching coral and coralline algal facies predominate the marginal reefs and domal corals and detrital facies preferentially occur in a lagoon reef. In addition, microbialite crusts are found in lower core sections of marginal reefs. Microbialites formed during the early Holocene in reef cavities. Holocene reef thickness ranges from 14.5 m to > 22 m. Reef growth started as early as 8.5 kyr BP. Marginal reefs accreted in the keep-up mode with rates of > 15 m/kyr. Rate of sea-level rise significantly slowed down from 7-6 kyr BP and subsequently gradually rose with rates < 1 m/kyr. The lagoon reef accreted in the catch-up mode with rates of around 4 m/kyr. Even though no indications of a higher than present sea level were found during this study, it is not entirely clear from the data whether the sea gradually rose to or exceeded present level in the late Holocene. Submarine cementation in Holocene reefs studied is rather weak, presumably as a consequence of high

accretion-rates, i.e., short time available for consolidation. Pleistocene coral grainstone was encountered in one core at 14.5 m below present level and three U-series dates indicate deposition during marine isotope stage 5e ca. 135 kyr BP. [original abstract; Kolodziej]

Gomez-Herguedas A. et Rodriguez S. 2008. Paleoenvironmental analysis based on rugose corals and microfacies: a case study at La Cornuda section (early Serpukhovian, Guadiato Area, SW Spain). *Lethaia* **42**: 39-54. [Rodriguez]

Hladil J., Koptíková L., Schnabl P., Slechta S., Galle A., Strnad L. et Drabkova V. 2010. Complex pathways of iron uptake in stromatoporoid skeletons: variability mapped by magnetic susceptibility. In D. Chen, A. C. da Silva (eds.), IGCP 580 Meeting Applications of Magnetic Susceptibility on Paleozoic Rocks, 28th November-4th December 2010, Guilin, China. Meeting Programme and Abstracts, Beijing, p. 4-5.
The authors of this extended abstract are studying middle Givetian *Actinostroma* and upper Frasnian *Stromatopora* from the Moravian Karst. In *Actinostroma* they have detected differences in the deposition of iron within the CaCO3 of three types of seasonal banding, "each prevailing in short periods of decadal scale." [Stock]

Houlbreque F., Meibom A., Cuif J.-P., Stolarski J., Marrocchi Y., Ferrier-Pagés C., Domart-Coulon I. et Dunbar R. B. 2009. Strontium-86 labeling experiments show spatially heterogeneous skeletal formation in the scleractinian coral *Porites porites*. *Geophysical Research Letters* **36**, L04604, doi:10.1029/2008GL036782.
This paper presents the results of an effort to label calcium carbonates formed by marine organisms with stable isotopes to obtain information about the biomineralization processes. The growing skeleton of the scleractinian coral *Porites porites* was labeled three times with enhanced abundances of 86Sr. The distribution of 86Sr in the skeleton was imaged with the NanoSIMS ion microprobe with a spatial resolution of 200 nm and combined with images of the skeletal ultra-structure. Importantly, the distribution of the 86Sr label in the *P. porites* skeleton was found to be strongly heterogeneous. This constrains the physical dimensions of the

hypothetical Extracellular Calcifying Fluid (ECF) reservoir at the surface of the growing skeleton, which is implicit in most geochemical models for coral biomineralization. These new experimental capabilities allow for a much more detailed view of the growth dynamics for a wide range of marine organisms that biomineralize carbonate structures. [original abstract; Kolodziej]

Kossovaya O. L. et Somerville I. D. 2010. "Fossil corals, archaeocyaths and sponges" - Proceedings of the 10th International Symposium on Fossil Cnidaria and Porifera, August 12-16, 2007, Saint-Petersburg, Russia. *Palaeoworld* **19**, 3-4: 209-211. (published on-line 17 September 2010), doi 10.1016/j.palwor.2010.09.009; ISSN 1871-174X
The 10th meeting of the "International Association for the Study of Fossil Cnidaria and Porifera" was held in Saint-Petersburg, Russia from August 12 to 16, 2007. Saint-Petersburg was elected to host the 10th International Symposium on Fossil Cnidaria and Porifera during the general assembly of the International Association in Graz, Austria in 2003. This 10th jubilee Symposium of the Fossil Cnidaria and Porifera Association was dedicated to the Academician of the Russian Academy of Science, Boris Sokolov, one of the 'founding fathers' of the Association and the President of the First Symposium in Novosibirsk in 1971. A number of colleagues with the support of the Administration of The Karpinsky Research Geological Institute organized the scientific and social programme. About 120 participants from 24 countries attended the meeting. [taken from preface; Wrzolek]

Legrand-Blain M., Aretz M. et Atif K. 2010. Discussion of Carboniferous stratigraphy and depositional environments in the Ahnet Mouydir area (Algerian Sahara) by Wendt et al. (Facies 55, 3:443-472, DOI 10.1007/s10347-008-0176-y). *Facies* **56**, 3: 471-476. (DOI 10.1007/s10347-010-0214-4).
The attribution of a Bashkirian age to the Berga Limestone and the proposed Late Visean-Serpukhovian hiatus is not supported by the data and discussion presented herein. This also sheds some doubts on the existence of a lower Bashkirian transgression in entire North Africa. Wendt et al. (2009) have questioned the stratigraphic extension of some commonly used

groups and organisms, but all data except the three samples containing *D. noduliferus* of Wendt et al. (2009) point to a Visean-Serpukhovian age. However, the Reggane-Ahnet data in combination to the Spanish data indicate that the first entry of *D. noduliferus* was possibly during the uppermost (?) Serpukhovian. and thus it is of limited use for defining the base of the Pennsylvanian. This may help to elucidate the confusion at this stratigraphic level, north of the Hoggar as well as on a global perspective. [original conclusions; Wrzolek]

Liao Weihua et Deng Zhanqiu 2009. Age re-assessment of the Longdongshui Member (Middle Devonian) in Southern Guizhou on the basis benthic fossils. [in Chinese, with English summary] *Acta Palaeontologica Sinica* **48**, 4: 637-645. [Coen-Aubert]
[key words: Fossil Corals, Longdongshui Member, Eifelian, Middle Devonian, Houershan, Guizhou]

Lukeneder A., 2008. The ecological significance of solitary coral and bivalve epibionts on Lower Cretaceous (Valangianian–Aptian) ammonoids from the Italian Dolomites. *Acta Palaeontologica Polonica* **58**, 4: 425-436. Lower Cretaceous deposits of the Puez section in the Dolomites (northern Italy) yielded a rich ammonoid fauna (28 genera, n=424) showing unique epifaunal encrustations by the ahermatypic solitary scleractinian ?*Cycloseris* Lamarck, 1801. The coral encrusted only the outer shell surfaces of the ammonoids; the inner surface remained unaffected. such a Cretaceous community and the relationship between the two fossil groups are described for the first time. The shells of dead ammonoids sank to the sea bottom and became colonized by the coral larvae, as documented by the location of the epibionts on only one side of the shells. The coral was fixed to the ammonoid shell for its entire life. Only the "sediment free" upper side of the ammonoid shells could be inhabited by epibionts such as corals and serpulids. The encrustation of ammonoid shells by the bivalve *Placunopsis* represents a different situation in that both sides of the ammonoid shells were affected, pointing to encrustation of floating ammonoids. This long-term infestation in the water column contrasts with coral settlement on the sea-floor. Ammonoid specimens encrusted by *Placunopsis* never exhibit encrustation by corals. The ammonoid-coral

relationship from the Dolomites is documented from the Valanginian to Aptian interval. examples of coral epibionts on ammonoids and other fossil groups throughout the geological column are briefly reviewed. [original abstract; Löser]

Martinell J. et Domenech R. 2009. Commensalism in the fossil record: Eunicid polychaete bioerosion on Pliocene solitary corals. *Acta Palaeontologica Polonica* **54**, 1: 143-154.
[key words: Scleractinia, Polychaeta, Eunicida, palaeoecology, bioerosion, commensalism, Pliocene, Mediterranean]
Some solitary caryophylliid (*Caryophyllia*, *Trochocyathus*, and *Ceratotrochus*) and flabellid (*Flabellum*) scleractinian corals from Pliocene of Western Mediterranean exhibit long groove-shaped bioersional structures running along the surface of the thecae. They are epigenic structures produced by an episkeletozoan and therefore, they are described as Fixichnia. Here we propose *Sulcichnus* as a new ichnogenus, with three new ichnospecies (*Sulcichnus maeandriformis*, *S. helicoidalis*, and *S. sigillum*) to name these traces. *Sulcichnus* is attributed to the activity of polychaetes. Similar structures are recently produced by *Lumbrineris flabellicola*, a symbiotic eunicid which maintains a commensalistic relationship with solitary corals. In the fossil record, *Sulcichnus* occurs associated to shallow marine environments whereas their Recent counterparts are described on deep-marine corals. We interpret this as a consequence of a change in the environmental requirements of the coral/worm pair. [original abstract; Löser]

Philippe H., Derelle R., Lopez P., Borchiellini C., Boury-Esnault N., Vacelet J., Renard E., Houliston E., Quinnec E., De Silva C., Wincker P., Le Guyader H., Leys S., Jackson D.J., Schreiberg F., Erpenbeck D., Morgenstern B., Wörheide G. et Manuel M. 2009. Phylogenomics Revives Traditional Views on Deep Animal Relationships. *Current Biology* **19**, 8: 706-712; doi:10.1016/j.cub.2009.02.052.
The origin of many of the defining features of animal body plans, such as symmetry, nervous system, and the mesoderm, remains shrouded in mystery because of major uncertainty regarding the emergence order of the early branching taxa: the sponge groups, ctenophores, placozoans,

cnidarians, and bilaterians. The "phylogenomic" approach [1] has recently provided a robust picture for intrabilaterian relationships [2, 3] but not yet for more early branching metazoan clades. We have assembled a comprehensive 128 gene data set including newly generated sequence data from ctenophores, cnidarians, and all four main sponge groups. The resulting phylogeny yields two significant conclusions reviving old views that have been challenged in the molecular era: (1) that the sponges (Porifera) are monophyletic and not paraphyletic as repeatedly proposed [4-9], thus undermining the idea that ancestral metazoans had a sponge-like body plan; (2) that the most likely position for the ctenophores is together with the cnidarians in a "coelenterate" clade. The Porifera and the Placozoa branch basally with respect to a moderately supported "eumetazoan" clade containing the three taxa with nervous system and muscle cells (Cnidaria, Ctenophora, and Bilateria). This new phylogeny provides a stimulating framework for exploring the important changes that shaped the body plans. [Lathuiliere]

Pille L., Vachard D., Argyriadis I. Et Aretz M. 2010. Revision of the late Visean - Serpukhovian (Mississippian) calcareous algae, foraminifers and microproblematica from Balia-Maden (NW Turkey). *Geobios* **43**, 5: 531-546. doi: 10.1016/j.geobios.2010.03.005 [Aretz]
[key words: Foraminifers; Algae; Microproblematica; Mississippian; Late Visean; Serpukhovian; Turkey]
The taxonomic revision of the carbonate microbiota of the limestone lenses intercalated into the Carboniferous siliciclastic series of Balia-Maden (Turkey) shows that most lenses are early or middle Brigantian in age (latest Visean), only a single lens being of younger age (late Serpukhovian). Calcareous microbiota are abundant in the Balia-Maden lenses carbonates. Microfacies analysis shows the dominance of shallow water environments. The Brigantian assemblage is accurately illustrated. The new foraminiferal taxon *Cribrospira baliamadeni* nov. sp. is morphologically similar to type-material of *Cribrospira panderi* von Moller, but has a porous wall with wider pores, almost keriothecal. *C. baliamadeni* nov. sp. corresponds to the misinterpreted *Bradyina* and *Janischewskina* of the previous literature on Balia-Maden lenses. These limestones show a great diversity of algosponges (carbonate microproblematica). Among them, (1) small,

atypical *Fasciella* previously confused with *Eosigmoilina*; (2) an abundant form described for the first time, *Frustulata reticulata* nov. sp.; and (3) typical *Falsocalcifolium punctatum* (Maslov), important for the biostratigraphic implications, are also mentioned. The single Serpukhovian lens consists of a grainstone and contains the age-sensitive alga *Archaeolithophyllum johnsoni* Racz, and the foraminifers *Monotaxinoides gracilis* and *Janischewskina* sp. [original abstract; Wrzolek]

Rakocinski M. 2010 (online first). Sclerobionts on upper Famennian cephalopods from the Holy Cross Mountains, Poland. *Palaeobiodiversity and palaeoenvironments*. DOI: 1007/s12549-010-0045-x.
[recorded are crinoid holdfasts, problematic worms, bryozoans, microconchids, possible cornulitids and "organisms of uncertain affinities"; although corals, both Rugosa and Tabulata, are recorded from the investigated horizon at Kowala quarry, neither group is mentioned by the author as settling on cephalopods; Wrzolek]

Rodriguez S., Arribas M. E., Bermudez-Rochas D. D., Calvo A., Cozar P., Falces S., Hernando J. M., Mas J. R., Moreno-Eiris E., De la Pena J. A., Perejon A., Sanchez-Chico F. et Somerville I. D. 2007. Stratigraphical and palaeontological synthesis of the Sierra del Castillo succession (late Viséan, Córdoba, SW Spain). *Proceedings of the XVth International Congress on Carboniferous and Permian Stratigraphy*, Royal Academy of Sciences, Amsterdam: 205-216. [Rodriguez]

Roniewicz E. 2010. Uniform habit spectrum vs. taxonomic discrepancy between two succeeding Triassic coral faunas: A proof of the intra-Norian faunal turnover. *Palaeoworld* **19**, 3-4: 410-413. (published on-line 21 September 2010), doi 10.1016/j.palwor.2010.08.004; ISSN 1871-174X
[key words: Scleractinian corals; Late Triassic; Intra-Norian faunal turnover]
Triassic coral fauna from the Tethys Ocean contains, besides colonial cerioid, meandroid and thamnasterioid corals, a high percentage of solitary and pseudocolonial, phaceloid corals with exclusively epithecal walls, about one-fifth of the genera with micromorphology of septa having pennules or menianes. These features are significant indications of

moderate depth environments of low energy level and reduced illumination. Despite a uniform spectrum of growth forms, microstructural criteria allow discriminating a middle Anisian-early Norian (A2-N1)fauna from the middle/late Norian-Rhaetian (N2/3-R) one. Taxonomy of the two faunas shows meaningful differences: of four families that dominated in A2-N1 fauna, Volzeiidae, Conophylliidae, and Tropiastraeidae are absent from the N2/3-R fauna and Margarophylliidae are present in a considerably reduced volume. As a consequence of reduction of the earlier corals, particular morphologies were eliminated. In the N2/3-R fauna, five families are abundant: the solitary and phaceloid Reimaniphyllidae and Stylophyllidae, along with colonial Cuifastraeidae, Pamirosehidae and Astraeomorphidae, all known as rare and rudimentary elements in the earlier fauna.
This change in faunal content in the Tethys during the Norian was controlled by environmental factor(s) hardly identifiable by simple observation, as this is not connected with any obvious facies or change in coral growth form. [original abstract; Wrzolek]

Stanley G. D. Jr. 2009. Corals and ocean acidification. *McGraw-Hill Yearbook of Science and Technology* **2009**: 66-69; McGraw-Hill Companies, Inc., New York.

Stanley G. D. Jr. 2010. Recovery of corals and reefs after the end-Permian and the "Naked Coral" Lazarus effect. *Journal of Earth Science* (China) **21**: 161-164. [Stanley]

Stanley G. D. Jr. et Helmle K. B. 2010. Middle Triassic coral growth bands and their implication for photosymbiosis. *Palaios* **25**, 12: 754-763. [Stanley]

Stanley G. D. Jr. et van de Schootbrugge B. 2009. The evolution of the coral-algal symbiosis. *Ecological Studies Series* **205** [Coral Bleaching: Patterns, Processes, Causes and Consequences; M.J.H. van Oppen & J.M. Lough (eds)]: 7-19 [chapter 2].

Stewart L., Elias R. J. et Young G. A. 2010. Stromatoporoids and colonial corals hosting borers and linguloid brachiopods, Ordovician of

Manitoba, Canada. *Palaeoworld* **19**, 3-4: 249-255. (published on-line 21 September 2010), doi 10.1016/j.palwor.2010.09.013; ISSN 1871-174X [key words: Stromatoporoids; Corals; Linguloid brachiopods; Nestlers; *Trypanites* borings]
There have been very few published reports of stromatoporoids and colonial corals with borings that contain linguloid brachiopods; all are from the Ordovician and/or Silurian in just four areas of eastern Canada and northwestern Europe. Here, we report the discovery of an earlier Ordovician occurrence, in both stromatoporoids and corals, and expand the geographic range of such associations to central Canada. In the Upper Ordovician Selkirk Member of the Red River Formation, southern Manitoba, the stromatoporoid *Stratodictyon* and tabulate coral *Protrochiscolithus* commonly contain cylindrical macroborings representing the ichnogenus *Trypanites*, almost certainly produced by worms. In a few specimens, a small proportion of borings contain single linguloids. The linguloids occur predominantly in borings with relatively large diameters, but their occurrence with respect to boring length and their vertical location within borings are random. They are interpreted as nestlers that occupied vacant borings throughout life. Although some of the borings were covered over by subsequent growth of the host or recolonization of its surface, there is no evidence of embedment structures in stromatoporoids or corals that would indicate interaction of the host with either the borers or linguloids. This is comparable to occurrences in the Ordovician of Manitoulin and Anticosti islands in eastern Canada, in that the linguloids are found within *Trypanites* borings without associated embedment structures. In the Silurian of Anticosti, Gotland, and the Welsh Borderlands, however, some borings were further developed into embedment structures during upward growth of the hosts, indicating that these relationships involved some type of symbiosis. [original abstract; Wrzolek]

West R. R., McKinney F. K., Fagerstrom J. A. et Vacelet J. 2010. Biological interactions among extant and fossil clonal organisms. *Facies*, available prior to paper publication online at **www.springerlink.com**.
Biological interactions among clonal marine organisms are an important aspect of their behavior and are important in the construction of biological reefs. The interactions addressed here are among crustose and erect

coralline algae, sponges, corals, and bryozoans and may involve clones of the same species (conspecific), or different species (heterospecific). Conspecific interactions may be either between modules or clones that are produced asexually from one propagule, genetically identical, or between clones that are sexually produced from two or more propagules that may or may not be genetically identical. Juxtaposed genetically identical clones generally fuse whereas non-identical clones may or may not fuse, depending on their relatedness and histocompatibility. Most heterospecific clonal interactions are spatially competitive and result in overgrowths or stand-offs. Clone fission/fragmentation may occur as a result of biotic or abiotic processes that initially degrade but may eventually restore or even enhance ability to gain space and/or nutrients. Self-overgrowths also occur, usually over dead, diseased, or senescent parts of the same clone. [original abstract; Stock]

Wisshak M., López Correa M., Zibrowius H., Jakobsen J. et Freiwald A. 2009. Skeletal reorganisation affects geochemical signals, exemplified in the stylasterid hydrocoral Errina dabneyi (Azores Archipelago). *Marine Ecology Progress Series* **397**: 197-208. doi: 10.3354/meps08165.
[key words: Hydrozoa; Stylasteridae; Microstructure; Biomineralisation; Coenosarc canals; Geochemical signals; Stable isotopes; Epoxy-casting technique]
The pure white fans of the stylasterid *Errina dabneyi* are a conspicuous feature on the upper bathyal slopes in Azorean waters and were documented and recovered alive with the aid of a submersible in the southern Faial Channel. Etched vacuum-epoxy-casts of the aragonite skeleton, studied by scanning electron microscopy, reveal the 3-dimensional internal architecture comprising coenosarc canal meshwork, dactylopores, gastropores and ampullae. Near the surface, the canals are narrow and interconnected in a regular 3-dimensional meshwork. Deeper inside, the canals are less abundant, more irregular and wider. This pattern implies that the skeletal architecture is modified during growth, with more central canals being enlarged by dissolution, and other canals, gastropores and dactylopores in turn being filled with aragonite reprecipitates. The skeleton is primarily composed of irregular spherulitic aggregates and overprinting during growth is evident from ghost structures in the form of

successive semi-spherulitic infill of former canals. Due to differential dissolution and reprecipitation, this internal rebuild process inevitably involves an alteration of initial geochemical signatures such as stable isotope ratios (δ18O and δ13C), trace element signals and the distribution of radiogenic isotopes of carbon and uranium. This has to be taken into account when applying radiometric dating techniques and when using stylasterids as a geochemical archive. [original abstract; Wrzolek]

Wolniewicz P. 2010. Stromatoporoid biometrics using image analysis software: A first order approach. *Computers & Geosciences* **36**: 550-558. doi:10.1016/j.cageo.2009.09.010
Strommetric is a new image analysis computer program that performs morphometric measurements of stromatoporoid sponges. The program measures 15 features of skeletal elements (pillars and laminae) visible in both longitudinal and transverse thin sections. The software is implemented in C++, using the Open Computer Vision (OpenCV) library. The image analysis system distinguishes skeletal elements from sparry calcite using Otsu's method for image thresholding. More than 150 photos of thin sections were used as a test set, from which 36,159 measurements were obtained. The software provided about one hundred times more data than the current method applied until now. The data obtained are reproducible, even if the work is repeated by different workers. Thus the method makes the biometric studies of stromatoporoids objective. [abstract; Kolodziej]

Young G. A. et Hagadorn J. W. 2010. The fossil record of cnidarian medusae. *Palaeoworld* **19**, 3-4: 212-221. (published on-line 21 September 2010), doi 10.1016/j.palwor.2010.09.014; ISSN 1871-174X
[key words: Medusae; Jellyfish; Scyphozoa; Hydrozoa; Cubozoa; konservat-Lagerstatten]
Fossils of cnidarian medusae are extremely rare, although reports of fossil medusoids, most of which do not represent medusae, are rather common. Our previous inability to distinguish these fossils has hampered attempts to investigate patterns and processes within the medusozoan fossil record. Here we describe criteria for the recognition of *bona fide* fossil medusae and use them to assess the evolutionary, paleoenvironmental, and taphonomic history of the Medusozoa. Criteria include distinctive

sedimentologic and taphonomic features that result from transport, stranding, and burial of hydrous clasts, as well as unequivocal body structures comparable to those of extant animals. Because the latter are uncommon, most fossil medusae remain in open nomenclature; many are assigned to stem-group scyphozoans. The majority of described medusae are associated with coastal depositional environments (such as tidal flats or lagoons). They rarely occur in oxygen-poor deeper-water facies. All medusan groups have long geologic histories. Scyphozoa are known from the Cambrian, but more derived scyphomedusae were not demonstrably present until the Carboniferous; Mesozoic scyphozoans are rather diverse. Hydromedusae are known from the Ordovician but may extend back to the Cambrian. The record of cubozoans is shorter and sparser; the oldest definite cubozoan is Carboniferous in age. [original abstract; Wrzolek]

Bibliography / biographies

Sorauf J. E. et Fedorowski J. 2010. William A. Oliver, Jr. (1926-2005). *Palaeoworld* **19**, 3-4: 340-347. (published on-line 15 October 2010), doi:10.1016/j.palwor.2010.09.011; ISSN 1871-174X
[an extensive and detailed memory of W.A. Oliver (1926-2005), student of fossil corals, with sections on his personal life, research and publications]

Systematics and evolution of scleractinian corals / conference report by G. D. Stanley Jr.

Scleractinian coral systematics is in the midst of a revolution resulting from advances in molecular systematics and in the microscopic technology used for extracting morphologic information. New research (e.g., Fukami et al. 2008 - see below) has shown that the majority of taxa at the suborder and family level are polyphyletic. From June 15-19, 2009, the **Scleractinia Working Group (SWG)** convened a 5-day workshop entitled "Systematics and evolution of scleractinian corals" at the National Museum of Natural History Museum of the Smithsonian Institution in Washington DC. The main goal of the workshop was to develop a strategy for revising the traditional phylogeny and classification system for Scleractinia and creating a new taxonomic synthesis, which integrates morphologic and molecular data. The synthesis will replace out-dated systems currently used in marine

ecology, conservation biology, and paleontology. The workshop was sponsored by the **Encyclopedia of Life (EOL)**, with additional support from the **Treatise on Invertebrate Paleontology (TIP)**, and led by **Ann Budd**, **Stephen Cairns**, and **Nancy Knowlton**. The twenty-six participants (18 professionals, 3 postdocs, 5 graduate students) consisted of marine biologists and paleontologists based in ten countries (Australia, France, Italy, Jamaica, Japan, Netherlands, Poland, Taiwan, U.K., U.S.A.), and included both taxonomic experts and those skilled in modern systematics techniques. **SWG** is currently engaged in three community database projects:

(1) **Corallosphere** (**www.corallosphere.org**), led by **Ken Johnson**. Corallosphere is a publically-accessible taxonomic database containing >1600 fossil and modern genera. It provides a dynamic central system for collecting, editing, and disseminating data and images. All data and images are first entered into Corallosphere before they are shared with other databases.

(2) Scleractinian volumes of the **Treatise on Invertebrate Paleontology** (paleo.ku.edu/treatise), led by **Jarek Stolarski**. These volumes will be part of a printed series of volumes published by the Paleontological Institute, University of Kansas; recent volumes are available online as downloadable chapters and a searchable database. The series synthesizes taxonomic information about all known invertebrate fossil genera.

(3) **Encyclopedia of Life** (**www.eol.org**). **EOL** is a web-based species-level database covering all living organisms (~1.8 million known species) on Earth. The classification system adopted in Corallosphere is being shared with **EOL**.

After giving individual talks, participants divided into more focused taxonomic break-out groups, which each addressed different clades in the molecular phylogeny. A number of different morphologic characters that are potentially diagnostic of these clades were evaluated, but several seemed to provide more noise than phylogenetic signal. Problems identified with morphologic characters include: (a) the plethora of existing terms, (b) the lack of homology in character definition, (c) the relative newness of micromorphologic and microstructural characters and lack of usage and rigorous definition, and (d) the need for character weighting. In addition, several unresolved issues in the molecular analyses were discussed.

SWG agreed that existing classification systems for scleractinians are inadequate, and a revised system that better reflects new molecular results needs to be adopted as soon as possible. A detailed report is available for downloading from the Corallosphere website.

Reference

Fukami H., C. A. Chen, A. F. Budd, A. Collins, C. Wallace, Y.-Y. Chuang, C. Chen, C.-F. Dai, K. Iwao, C. Sheppard et N. Knowlton 2008. Mitochondrial and nuclear genes suggest that stony corals are monophyletic but most families of stony corals are not (Order Scleractinia, Class Anthozoa, Phylum Cnidaria). *PLoS One* **3**, 9: e3222(1-9).

Scleractinian Treatise report / George Stanley Jr.

Steve Cairns (Smithsonian) and **George Stanley** (University of Montana) report that for several years a team of coral taxonomists has been laboring to update the Scleractinia section of the Treatise on Invertebrate Paleontology. The main coordinator of this effort is **Jarek Stolarski** (Institute of Paleobiology, Poland), and co-coordinators include: **Stephen Cairns**, **Ann Budd** (University of Iowa), and **George Stanley**. The product will entail two volumes: the first an introduction and the second the taxonomy of the genera and families. In the introductory volume, managing editor **Jarek Stolarski** will include discussions of biology, biomineralization, morphology, ecology, reefs and phylogeny and will also include a glossary. The taxonomic volume, edited by **Stephen Cairns**, is being built by five teams of taxonomists, each led by a team leader. The genera assigned to each of the five teams are divided roughly stratigraphically as follows: Triassic (**Ewa Roniewicz**), Jurassic (**Benard Lathuiliere**), Cretaceous (**Rosemarie Baron-Szabo**), Cenozoic zooxanthellates (**Ann Budd**), and Cenozoic azooxanthellates (**Stephen Cairns**).

The original 1956 Treatise included 33 families and 1022 generic and subgeneric names: 478 valid names, 491 junior synonyms, 21 of uncertain position, 14 unrecognizable, and 18 invalid. The new edition will include about 100 families and 1666 generic names. To date accounts have been written for 710, or 43%, of the generic names. Information is being added continuously to a data base called **Corallosphere**, managed by **Ken**

Johnson (The Natural History Museum, London), prior to being formatted for the Treatise.

Chaetetid Treatise report / Ronald R. West

Treatise on Invertebrate Paleontology - chaetetid chapters: the first proofs of the six introductory chapters of the volume noted above have been reviewed and revised. Second proofs with illustrations are now being prepared by the Treatise office at the Paleontological Institute at the University of Kansas in Lawrence, Kansas. These chapters address the general features, functional morphology, classification, evolution, paleoecology, and paleogeography and biostratigraphy of chaetetids.

Hypercalcified Sponges Treatise / Colin Stearn & Carl Stock

Portions of the Treatise on Invertebrate Paleontology volume on hypercalcified sponges (stromatoporoids, chaetetids, archaeocyaths, etc…) are beginning to appear online as part of *Treatise Online* at **paleo.ku.edu/treatiseonline**. At this point there are 12 chapters available online, with more to come. After all chapters are complete, the traditional book version of this Treatise volume (Part E, Revised, Volume 4) will be produced. Content may be modified between electronic and paper publication.

List of chapters available in December 2010:

5 - Upper Paleozoic and Mesozoic Stromatoporoid-like Genera;
6 - Disjectoporids;
8 - Glossary;
9A - Stromatoporoids, General Introduction;
9D - Microstructure and Mineralogy of Paleozoic stromatoporoids;
9E - Morphologic Affinities of Stromatoporoidea;
9F - Functional Morphology;
11A - Diversity Trends;
11B - Extinction patterns;
15A - Techniques of study;
15B - Classification.

The complete lists and methods of ordering are available at **paleo.ku.edu/treatiseonline**.

Virtual Paleontological Museum / Tomasz Wrzolek

http://www.rugosa.wnoz.us.edu.pl/: in June 2009 the Museum has been invaded by a trojan and after a nervous week the contamination has been repelled. I can only hope there was no damage either to visitors or to contents of the VMP.
Jaroslaw Krupa cleans and updates the Virtual Paleontological Museum [autumn 2010]. We have got lately some extra space at our server so we expect there will be no more difficulties in getting access to scans in the Museum.

Websites with living and fossil Cnidaria and Porifera

1) Corallosphere **www.corallosphere.org**.
2) University of Liege / info on 11th IASFCP Symposium is at **www2.ulg.ac.be/paleont**.
3) Genomic databases of the Cnidaria of the Boston University at **cnidbase.bu.edu** – last updated in January 2009.
4) News on research on Fossil Cnidaria & Porifera are provided at **http://kse.wnoz.us.edu.pl/iascp.htm** – this page.
5) Oxford University Museum – among other groups also fossil corals can be found at **http://www.oum.ox.ac.uk/**.
6) Virtual paleontological museum, Sosnowiec, Poland: **http://www.rugosa.wnoz.us.edu.pl/** – last updated in October 2010.
7) Bibliography on extant corals (1758–2002), with about 9000 annotated entries, is presented by Hannes Löser at **http://www.scleractinia.de/** - last updated in August 2008.
8) Catalogue of Cretaceous Corals - 3 Volumes appeared so far, 4th one is in preparation; introduced by Hannes Löser at **http://www.cp-v.de/ccc/**- last updated in April 2010.

WHERE IS THE TREASURER?

Editors of *FC&P* will welcome the Person who will care for collecting membership fees of the IASFCP, 10,- euro per year, to cover, at least partly, costs of printing and distribution of our Newsletter. Please remember that our editorial work is made at cost of most precious and

limited resource of your editors, which is TIME. Please do not allow us, dear Colleagues, to bear also financial burden of our activity.

ANNOUNCEMENTS

Geological heritage conference / Ukraine / May 2011

16-20 May 2011 Geological museum of National Natural History Museum NASU, "Association of Ukrainian Geologists" and State Geological Service [invite you] to take part in organization of International theoretical and practical conference "Geological Heritage - Bright evidence of Earth evolution", which will be held in Kamenets-Podilsky, Ukraine.
Irina Nazarova / nazarova@museumkiev.org
more details and registration form are available at the IASFCP page.

New book on Jurassic and Cretaceous corals / Löser

Löser H. 2009. Fossile Korallen aus Jura und Kreide. Aufbau, Klassifikation, Bestimmung und Fundmöglichkeiten. CPress Verlag, Dresden, VI, 206 pp., 279 (15 colour) figures (440 single figures). ISBN 978-3-931689-12-4.
This book (Jurassic and Cretaceous Corals – Morphology, classification, determination, and localities) has been already printed. It is aimed at students, interested biologists and geologists, as well as fossil collectors. The book has 216 pages and 279 figures (15 in colour; 440 single figures at all) and is published in German. The size is 270x190mm. Hard cover. ISBN 978-3-931689-12-4. More information and text examples are at: http://www.cp-v.de/books/kfke.htm; see also chapter on Scleractinia bibliography at the present site.

Paleozoic corals' research in Manitoba (Canada) / Young

Bob Elias (University of Manitoba) and **Graham Young** (Manitoba Museum, adjunct professor at U of M) welcome inquiries and applications from students interested in graduate studies (see www.umanitoba.ca/geoscience/program/gradstudies/gradbrochurejune08.pdf). M.Sc. and Ph.D. projects are available on all aspects and applications of Paleozoic corals. There are also interesting projects related to Lower Paleozoic paleoecology and stratigraphy.

Addresses changed and new/ as of November 2010

new address
Dr Mohammad Ali ABBASI
mo_ab836@stu-mail.um.ac.ir
University of Ferdowsi,
Geology Department, sciences Faculty,
Park square, Mashhad, Iran.

new address and e-address
Dr Markus ARETZ
aretz@lmtg.obs-mip.fr
Observatoire Midi-Pyrénées, LMTG
14 avenue Edouard Belin
31400 Toulouse, France

new IASFCP member
Dr Christian BAARS
Christian.Baars@museumwales.ac.uk
Department of Geology,
National Museum Wales,
Cathays Park,
Cardiff CF10 3NP UK
phone 0044 (0) 29 2057 3352

new (?) contact
Dr Mahdi BADPA
ma_ba574@stu-mail.um.ac.ir

new mailing address
Dr Paul COPPER
Loupicoubas
46220 Prayssac, France

new e-address
Dr Jean-Pierre CUIF
jean-pierre.cuif@u-psud.fr

new e-address
Dr Owen A. DIXON
o.r.dixon@hughes.net

new address
Dr Esperanza FERNANDEZ MARTINEZ
e.fernandez@unileon.es
Facultad de Ciencias Biológicas y Ambientales
Campus de Vegazana s/n
24171 León, Spain

new IASFCP member
Katarzyna JANISZEWSKA, M.Sc.
k.janiszewska@twarda.pan.pl
Institute of Paleobiology,
Polish Academy of Sciences,
ul. Twarda 51/55,
00-818 Warszawa, Poland.

new IASFCP Member
Dr Ken JOHNSON
k.johnson@nhm.ac.uk
Department of Palaeontology
Natural History Museum
Cromwell Road,
London SW7 5BD, UK

new e-address
Dr Andreas MAY
may_devonian@yahoo.es

changed e-address and phone
Dr J. Keith RIGBY
rigbyjkeith@gmail.com
Department of Geological Sciences,
Room S389 Eyring Science Center,
Brigham Young University,
Provo, Utah 84602-4606, USA.

new e-address
Colin W. STEARN
cwstearn@rogers.com

new phone numbers
Daniel UNGUREANU M.Sc.
mobile: +40 723 534 383
home phone: +40 21 745 72 63
fax: +40 21 745 55 99

changed e-address
Dr Alberto Correa de VASCONCELLOS
acvascon@yahoo.com.br

new address & e-address
Dr Helmut ZIBROWIUS
helmut.zibrowius@orange.fr
Le Corbusier 644,
280 Boulevard Michelet,
13008 Marseille, France.

EDITORIAL NOTE

December 31st 2010.

Edited by: International Association for the study of Fossil Cnidaria and Porifera.

Editors: Tomasz Wrzolek / Poland and Ian Somerville / Ireland.

Printed in: not printed as yet, version on-line of December 31st 2010 will be saved and distributed as **archival** file and corresponds exactly to any previously printed volume of *Fossil Cnidaria & Porifera*.

Size: formatted as 144 pages of A5 format (printing area of ca 13x18,3 cm per page; the file is FC&P36_i.pdf of ca. 910KB size.

Distribution: available at request for IASFCP Members and Sympathizers and for any Public Library interested; either from our page or contact **tomasz.wrzolek@us.edu.pl**; please take into consideration limits of file size set by your servers!