Pander Society Newsletter

Compiled and edited by P.H. von Bitter and J. Burke

PALAEOBIOLOGY DIVISION, DEPARTMENT OF NATURAL HISTORY,
ROYAL ONTARIO MUSEUM, TORONTO, ON, CANADA M5S 2C6

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Webmaster Mark Purnell, University of Leicester

Chief Panderer's Remarks **May 1, 2009**

Dear Colleagues:

It is again spring in southern Canada, that very positive time of year that allows us to forget our winter hibernation & the climatic hardships endured. It is also the time when Joan Burke and I get to harvest and see the results of our winter labours, as we integrate all the information & contributions sent in by you (Thank You) into a new and hopefully ever better Newsletter.

Through the hard work of editor Jeffrey Over, Paleontographica Americana, vol. no. 62, has just been published to celebrate the 40th Anniversary of the Pander Society and the 150th Anniversary of the first conodont paper by Christian Pander in 1856; the titles and abstracts are here reproduced courtesy of the Paleontological Research Institution in Ithica, N.Y.

Glen Merrill and others represented the Pander Society at a conference entitled "Geologic Problem Solving with Microfossils", sponsored by NAMS, the North American Micropaleontology Section of SEPM, in Houston, Texas, March 15-18, 2009; the titles of papers that dealt with or mentioned conodonts, are included in this Newsletter.

Although there have been no official Pander Society meetings since newsletter # 40, a year ago, there were undoubtedly many unofficial ones; many of these would have been helped by suitable refreshments, the latter likely being the reason I didn't get to hear about the meetings. It apparently doesn't require an official Pander Society meeting for our members to get up & speak about their favourite group; an electronic search of Geological Society of America meetings of the last year using the word conodont, yielded 24 abstracts that I have reproduced in this Newsletter.

The big upcoming meeting ICOS 2009, this July 12-17, promises to be an outstanding one, and on behalf of Charles Henderson and his organizing group, I invite you to come to Calgary, in the Canadian West, not only to learn about the state of conodont studies, but also to renew old friendships and establish new ones.

Because my five year term as Chief Panderer is up, I will be stepping down this summer, at ICOS 2009; thus, this Newsletter will be the last one that Joan Burke and I assemble, and produce. I thank all of you for sending in your contributions, and for responding to Joan and my proddings in a kind and gentle, and sometimes humorous, way. You are a great group of colleagues and friends, and it has been an honour to be your Chief Panderer and a pleasure to interact with you in this role.

I especially thank Joan Burke for having helped me pull this Newsletter together these last five springs; Joan and I worked together for 34 years, before she retired as the (then) Palaeobiology assistant, five years ago. Her willingness to come back to work with me on the Newsletter was key to my accepting the job of Chief Panderer in 2004, and I literally couldn't have done this job without her. I am also very grateful to Mark Purnell, for having been the very capable webmaster at the Leicester end of this operation during my tenure, and for his willingness to continue in this role. Finally, I wish the new Chief Panderer, the Pander Society, and you the members, all the very best for a bright conodont future.

Peter

Peter von Bitter
Chief Panderer

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Contents

The Richard Aldridge Prize

While indexing the new conodont volume he edited (below), Jeff Over found several conodont names and places that contain "ICOS." With all due respect to Dick Aldridge, and to further encourage excitement for ICOS 2009 in Calgary, Jeff challenges the members of the Pander Society to find a**s** many conodont taxa, and places where conodonts have been found, that contain "icos" in the name. The Richard Aldridge Prize, naturally consists of a pint glass filled with a conodont-coloured liquid, and will be awarded to whoever comes up with the most. All participants and non-participants will also be asked to toast the winner. Any/all controversies to be resolved by the Chief Panderer, with liquid help, if necessary.

After Jeff challenged our membership, John Repetski offered the following wisdom, based on his many years of experience with amber coloured liquids:

"Good challenge. As long as the 'prize liquid' matches CAI 1 through 4 (Guinness?). Can't think of anything good that would match 5; and anything matching 6-8 probably would have to involve hard stuff, which might get pricey for a pint." John also offered the first entry: Anticosti

Steven Leslie subsequently took up the challenge, because doing so allowed him to further perfect the fine art of procrastination, i.e. he said he "would rather do this than put together the fall teaching schedule!" Steven's entries include the "icostates": unicostate (unicostatiform), bicostate (bicostiform), tricostate (tricostiform), quadricostate (quadricostoform), and the "icostid" species (of which he is sure there are more!) *Dapsilodus obliquicostatus*, *Paltodus unicostatus*, *Icriodus multicostatus*, *Bispathodus spinulicosatus*, *Semiacontiodus longicostatus*, *Protopanderodus varicostatus*, *Polygnathus semicostatus*, and *Polygnathus robusticosatus*

(You are hereby invited and encouraged to develop a great thirst for ICOS 2009 & to sharpen your icostates, icostid species, or whatever. P/)

40th Anniversary Volume of the Pander Society

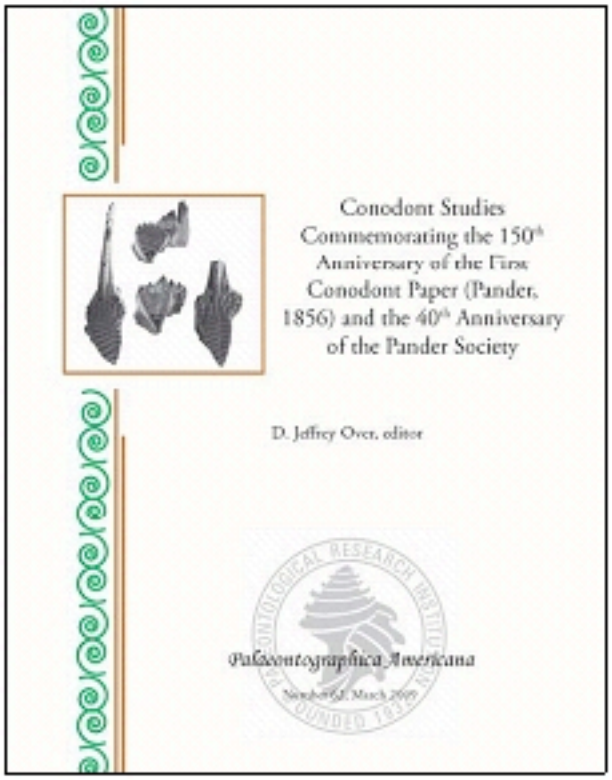
To commemorate the 40th anniversary of the founding of the Pander Society in Calgary in 1967, celebrate the first full meeting of the society in Iowa City in 1968, and provide a publication forum for papers presented at North American Pander Society meetings in 2006 (Conodonts in Sequence Stratigraphy, Conodonts in the 21st Century) and 2007 (Mixed Conodont Faunas), as well as for those presented at ICOS 2006 at Leicester, a theme volume on these and other conodont topics was published in March 2009 as *Paleontographica Americana* no. 62.

Conodont Studies Commemorating the 150th Anniversary of the First Conodont Paper (Pander, 1856) and the 40th Anniversary of the Pander Society, edited by D. Jeffrey Over, *Palaeontographica Americana* no. 62 (152 pp., ISBN 978-0-87710-483-4, softcover), US $60.00.

The studies herein were, for the most part, first presented in conference proceedings dedicated to conodont studies at the North American Pander Society meeting in 2006 (Conodonts in Sequence Stratigraphy), International Conodont Symposium (ICOS) 2006, a theme session at Geological Society of America in 2006 (Conodonts in the 21st Century), and the North American Pander Society 2007 (Mixed Conodont Faunas) that correspond to and celebrated two milestones in conodont studies, the 150th anniversary of Christian H. Pander's paper in 1856 that first described and illustrated conodonts, and the organization of the society of conodont enthusists that now bears his name, in 1967. These papers cover a wide range of topics, times, and regions, illustrating the broad utility of conodonts, primarily as biostratigraphic tools, but also in studies of, although not limited to, geochemistry, paleobiology, paleogeography, and sequence stratigraphy. The volume is dedicated to William M. Furnish (1912-2007) one of the pioneer practitioners of conodont studies, a gentleman, scientist, and fine teacher who in passing, has left us all poorer.

D. Jeffrey Over, Editor

New from Paleontological Research Institution …



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Conodont Studies Commemorating the 150th Anniversary of the First Conodont Paper (Pander, 1856) and the 40th Anniversary of the Pander Society, edited by D. Jeffrey Over, Palaeontographica Americana, no. 62, 2009.

Conodonts are extinct chordates resembling eels, known mainly from tooth-like microfossils called elements, found in Late Cambrian to Late Triassic fossil deposits (495 to 200 MYA). The nine manuscripts in this volume were, for the most part, first presented at conferences dedicated to conodont studies in 2006-2007 that each celebrated two milestones in conodont studies, the 150th anniversary of Christian H. Pander's 1856 paper that first described and illustrated conodonts, and the organization of the society for conodont enthusiasts that now bears his name in 1967. These papers cover a wide range of topics, times, and regions, illustrating the broad utility of conodonts, primarily as biostratigraphic tools, but also in studies of, although not limited to, geochemistry, paleobiology, paleogeography, and sequence stratigraphy.

This volume is dedicated to William M. Furnish (1912-2007) one of the pioneer practitioners of conodont studies, a gentleman, scientist, and fine teacher who in passing has left us all poorer.

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Contents of the 40th Anniversary Volume of the Pander Society

Abstracts of the Papers in the the Pander Society 40th Anniversary Volume

Klapper, Gilbert: William M. Furnish (1912-2007).

[**no abstract;** first three paragraphs provided]: William Madison Furnish ("Bill" or "Uncle Bill" as he was fondly known to almost everyone) was an outstanding teacher, a world-renowned paleontologist, and Professor Emeritus at the University of Iowa.

Bill Furnish was born in 1912 near Tipton, Iowa, and celebrated his ninety-fifth birthday on August 17, 2007. He received a B.A. in 1934, M.S. in 1935, and a Ph.D. in 1938, all from the University of Iowa. Bill studied under Professor A. K. Miller, an internationally recognized specialist on fossil cephalopods and served as his postdoctoral research associate from 1938 to 1940. During the postdoctoral, Miller and Furnish published several important monographs on ammonoid cephalopods.

Bill's doctoral dissertation, numbering 38 pages, was on Ordovician conodonts from Iowa, Minnesota, and Wisconsin and was published in the *Journal of Paleontology* in 1938. At that time, the paper represented one of the two major advances in the study of Ordovician conodonts since Pander's monograph in 1856, the other being the influential papers of Branson and Mehl in 1933. Bill's master's thesis also dealt with Ordovician conodonts.

Aldridge, Richard J., & Peter von Bitter: The Pander Society: a Brief History at Forty (1967-2007).

[**no abstract;** first paragraph provided]: The Pander Society is one of a number of informal scientific societies that sprang up in the middle of the twentieth century to encourage interaction between researchers within the same discipline, using newsletters and other forms of communication, particularly contact and debate at national and international meetings. The role of societies like the Pander Society, the Ludlow Research Group, and the International Research Group on Ostracoda in furthering science tends to be overlooked in historical treatments, which concentrate on the importance of the larger, more formal societies, such as the Geological Society of America (GSA), the Royal Society, and the Geological Society of London. It is, however, precisely the informal nature and smaller size of these speciality societies that allows their members to communicate effectively, quickly, and pleasantly, with as little politics as is possible in human affairs. Such has been the happy history of the Pander Society.

Leslie, Stephen A: Relationships between Upper Ordovician (Sandbian, Mohawkian) lithofacies and conodont biofacies distribution patterns using K- Bentonite Beds as time planes.

ABSTRACT: Distribution patterns of conodont biofacies are discernable through cluster analysis of conodont data from Upper Ordovician (Sandbian, Mohawkian) strata in the interval containing the Deicke and Millbrig-Kinnekulle K-bentonite beds in eastern North America and northwestern Europe. Immediately below the time plane of the Deicke K-bentonite Bed, four distinct conodont biofacies that cluster as discrete groups in R-mode cluster analysis using either Jaccard similarity coefficients or Spearman rank correlation coefficients are recognized. Immediately above the time plane of the Millbrig K-bentonite Bed, four distinct biofacies are recognized, three that cluster as discrete groups in R-mode cluster analysis using Jaccard similarity coefficients, and all four cluster using Spearman rank correlation coefficients. In eastern North America, four distinct lithofacies are present in the beds immediately below the Deicke K-bentonite Bed, and five distinct lithofacies are present in beds immediately above the Millbrig K-bentonite Bed. Cluster analysis illustrates the correlation between the distribution patterns of lithofacies and conodont biofacies both above the Deicke and below Millbrig-Kinnekulle K-bentonite beds. The relationships are most likely related to paleoenvironmental differences between the different lithofacies. By examining the relationships between biofacies and lithofacies distribution patterns, insight into mode of life of conodonts is gained. Based on the distribution of depositional environments inferred from lithofacies distribution patterns, as well as both statistical and qualitative analysis of the relationships between distribution patterns of conodont biofacies and lithofacies, it is concluded that different species of conodonts were controlled by different physical environmental conditions. In this study, Late Ordovician conodonts are interpreted as having had different modes of life ranging from nektobenthic, with a possible infaunal capability, to strictly pelagic.

Barrick, James E., Mark A. Kleffner, and Haraldur R. Karlsson: Conodont faunas and stable isotopes across the mulde event (late Wenlock; Silurian) in southwestern Laurentia (south-central Oklahoma and subsurface west Texas).

ABSTRACT: The mid-Homerian Mulde Event coincides with a sequence boundary in distal carbonate ramp settings in southwestern Laurentia (west Texas and Oklahoma). The position of the Mulde Event interval and the associated unconformity could only be located by detailed collections of conodonts, which display clearly the Mulde extinction level. *Dapsilodus praecipuus* Barrick, 1977, *D. sparsus* Barrick, 1977, *Pseudooneotodus linguicornis* Jeppsson, 2003, and *Panderodus unicostatus* (Branson & Mehl ,1933), species characteristic of the *Ozarkodina sagitta sagitta* Walliser 1964, Zone, disappear abruptly and are replaced by *Panderodus equicostatus* (Rhodes, 1953) and *Belodella silurica* Barrick, 1977, species characteristic of the *O. bohemica longa* Jeppsson, 2003, and *Kockelella ortus absidata* Barrick & Klapper, 1976, zones. Much of the time represented by the Mulde Event appears to be absent because the positive $\delta^{13}C$ excursion associated with the event is incompletely preserved. Strata equivalent to much of the time of the Mulde Event were either removed or not deposited in southwestern Laurentia during the brief eustatic sea level fall that accompanied the Mulde Event. Based on these results, more consideration of the effect of eustatic events in interpreting Silurian oceanic events is merited.

Kleffner, Mark A., James E. Barrick, James R. Ebert, Damon K. Matteson, and Haraldur R. Karlsson: Conodont biostratigraphy, $\delta^{13}C$ chemostratigraphy, and recognition of Silurian/Devonian boundary in the Cherry Valley, New York region of the Appalachian Basin.

ABSTRACT: The Silurian/Devonian (S/D) boundary in New York has been recognized within the lower Helderberg Group since the late 1800s, although the level at which the S/D boundary has been recognized within the lower Helderberg Group has varied considerably. Even today, there is still no uniform agreement on the position of the S/D boundary within these strata. Most of the lower Helderberg Group is exposed at two locations on Sprout Brook Road (Otsego County Rte. 32) in the Cherry Valley (central New York) region of the Appalachian Basin: uppermost part of Rondout Formation, Manlius, Coeymans, and Kalkberg formations. A conodont biostratigraphy and $\delta^{13}C$ chemostratigraphy are developed for dolostone section at Cherry Valley to determine the position of the S/D boundary in that region. Despite the presence of potentially diagnostic species in the lower Helderberg Group in the Cherry Valley region, facies-controlled

distribution of those species, poor average yields, and poor preservation prohibit recognition of any specific conodont biozones, and thereby a precise level for the S/D boundary. Specimens referred to *Icriodus postwoschmidti* Mashkova, 1968, group do permit recognition of Devonian age for the Kalkberg Formation in the Cherry Valley region. The overall variation throughout the lower Helderberg Group is 2.95‰ in $\delta^{13}C$ and 3.91‰ in $\delta^{18}O$. A positive $\delta^{13}C$ excursion (1.30‰ increase to peak, 1.50‰ decrease following peak) is represented by a 5.0-m thick interval, which begins in the Thacher Member of the Manlius Formation, peaks in the Green Vedder Member (informal) of the Manlius Formation (GVM), and ends in the Dayville Member of the Coeymans Formation. Lack of high-resolution biostratigraphic control prevents definitive recognition of this $\delta^{13}C$ excursion as the globally recognized S/D boundary excursion. The conodont biostratigraphy and $\delta^{13}C$ chemostratigraphy in this study are used independently to recognize seven potential levels for the S/D boundary between the uppermost Chrysler Member of the Rondout Formation to the base of the Kalkberg Formation. Two levels are most likely for the S/D boundary: either within the GVM, or at the Punch Kill Unconformity between the Ravena Member of the Coeymans Formation and the Kalkberg Formation.

Suttner, Thomas J: **Lower Devonian conodonts of the "Baron von Kottwitz" quarry (southern Burgenland, Austria).**

ABSTRACT: A recently discovered conodont fauna from a quarry close to Kirchfidisch in southern Burgenland (Austria) could show that the age of the limestone deposits, which were roughly confined to the Mid-Paleozoic based on sparse remains of corals, can now be constrained to the lowermost Devonian. *Ozarkodina excavata excavata* (Branson & Mehl, 1933), *O. remscheidensis eosteinhornensis* (Walliser, 1964) beta morph, *O. r. remscheidensis* (Ziegler, 1960), *O.* sp., *Icriodus woschmidti woschmidti* Ziegler, 1960, *I.* sp., and a few simple cone elements (*Dvorakia* sp.? and *Belodella* sp.?) were obtained.

Over, D. Jeffrey, Sarah de la Rue, Peter Isaacson, and Brooks Ellwood: Upper Devonian conodonts from black shales of the high latitude Tomachi Formation, Madre de Dios Basin, northern Bolivia.

ABSTRACT: Upper Devonian conodonts of the genera *Polygnathus, Ozarkodina, Branmehla*, and *Cryptotaxis*, in association with marine fish, marine acritarch cysts, and *Tasmanites*, were recovered from black shale bedding surfaces in a drill core from the Madre de Dios Basin. Two distinct faunas were recovered, an older Frasnian and younger Famennian. These are the first Devonian conodonts reported from Bolivia and represent a high latitude fauna that suggests the influence of warm equatorial currents prior to the onset of Late Devonian glaciation in South America. Three new taxa: *Polygnathus pandoensis* n. sp., *Polygnathus manuripiensis* n. sp., and *Cryptotaxis madrededios* n. sp., are described. A positive shift in magnetic susceptibility occurs just above the highest Frasnian conodont fauna.

May, Michael T., Carl B. Rexroad, and Lewis M. Brown: Carboniferous conodont biostratigraphy along the southeastern periphery of the Eastern Interior Basin, Kentucky, U. S. A.

ABSTRACT: A wide variety of terrestrial, transitional, and shallow marine facies are found in the Mississippian and Pennsylvanian rocks across the systemic boundary north and somewhat west of Bowling Green, Kentucky. Similar lithologies across the boundary can make it difficult to distinguish Upper Mississippian from Lower Pennsylvanian strata. Likewise, where thick Caseyville sandstones are absent or covered, it can be difficult to distinguish the Caseyville from the overlying Tradewater Formation. Conodonts and macrofossils from four sections along the Natcher Parkway were sampled to clarify local age relationships. Conodonts indicate an Atokan age for Locality 1, which would indicate that the unit is the Tradewater Formation; conodonts from Locality 2, however, cannot date it more precisely than Pennsylvanian. Steven F. Greb and Allan W. Archer in 1998, however, ascribed a probable age equivalent to the Tradewater at Locality 2. Both localities were originally mapped by the U. S. Geological Survey as Caseyville Formation-Tradewater Formation undifferentiated. Localities 3 and 4 are Chesterian in age. Locality 3 likely belongs within the interval of the Vienna Limestone through the Clore Limestone, as shown by conodonts, and on the basis of conodonts and crinoids, Locality 4 perhaps belongs within the interval of the Vienna through the Menard Limestone. This is consistent with previous mapping of the interval as the Leitchfield Formation, which is equivalent to the Vienna and younger Mississippian strata basinward, but the additional information aids in subdividing unmapped units within the Leitchfield. The

Mississippian-Pennsylvanian unconformity here extends from the middle to late Chesterian, no younger than the Clore-equivalent basinward, to possibly the Atokan Tradewater, although more study is needed of covered intervals, and palynology would be required to delineate the dominantly nonmarine Caseyville Formation.

Rosscoe, Steven J., and James E. Barrick: Revision of *Idiognathodus* species from the Desmoinesian-Missourian (~Moscovian-Kasimovian) boundary interval in the Midcontinent Basin, North America.

ABSTRACT: Taxonomic revision of latest Desmoinesian (~latest Moscovian) and early Missourian (~Kasimovian) species of *Idiognathodus* from the Midcontinent Basin is based on functional characters of the rostral lobe and surface roughness on the P_1 element. *Idiognathodus swadei* n. sp., the sole survivor of the late Desmoinesian extinction event, is the stem species for all early Missourian species of *Idiognathodus* in the Midcontinent. Restriction of the rostral lobe led to three subspecies of *I. sulciferus* Gunnell, 1933, and its descendent species, *I. eccentricus* (Ellison, 1941), in the basal Missourian Exline cyclothem and *I.* sp. 1 in the Hertha cyclothem. *Idiognathodus swadei*, with its expanded rostral lobe, persisted through the early Missourian and gave rise to *I. turbatus* n. sp. in the Exline, and *I. vorax* n. sp. in the Hertha cyclothem. The proposed index for the base of the Kasimovian, *I. sagittalis* Kozitskaya, 1978, is not present, but *I. eccentricus* or *I. turbatus* could serve as an indicator of the base of the Kasimovian if either occurs widely in Eurasia.

The Pander Society Medal & the Hinde Medal for Young Conodont Researchers

Please forward your nominations for the Pander Society Medal & the Hinde Medal for young conodont researchers to any of the three members the Pander Society medals committee consisting of (chair) John Repetski jrepetski@usgs.gov, Cristina Perri Mariacristina.perri@unibo.it, and Cheng-yuan Wang cywang@nigpas.ac.cn. The committee urges Society members to consider possible worthy candidates, and to formulate and submit nominations for deserving colleagues. Nominations can be submitted at any time.

Since an actual Hinde Medal could not be presented to Mark Purnell, the first recipient of that award at ICOS 2006 in Leicester, the Chief Panderer is doing his absolute best to bring about the design and manufacture of such a medal in time for ICOS 2009. Lennart Jeppsson and Ronald Austin have very generously offered to assist with the financing of this award.

Chief Panderer to Step Down

The Chief Pander's five year term is up, and a nominating committee consisting of Philip Donoghue phil.donoghue@bristol.ac.uk , Catherine Girard Catherine.Girard@univ-lyon1.fr and Jeffrey Over over@geneseo.edu has been busy soliciting nominations, conducting negotiations, and making the final decision, hopefully in time for the new Chief Panderer (?Panderix) to be installed at ICOS 2009 this summer.

Thank you

The Pander Society thanks the Palaeobiology Division, Department of Natural History, Royal Ontario Museum, for providing the facilities that has made the assembly and production of this Newsletter possible; the Society also thanks the University of Leicester for permitting the Newsletter to be distributed from their webserver.

Business Meetings

There have been no business meetings of the Pander Society, since the one held at Evansville, Illinois, in April 2008, reported in Pander Society Newsletter # 40.

Online Catalogue of Conodonts: An Update

Jim Barrick reports that there not been any interest or support for a subscription-based catalogue like the Catalogue of Foraminifera. However, Jim uses the yearly summary of conodont articles in the Pander Society Newsletter heavily, is considering (with help from his colleagues) providing a listing of new taxa named each year to the Pander Society Newsletter, and feels that this would be useful. Each colleague would just need to send a list of the new taxa they, or colleagues, have named during the year, and this list could be placed on-line annually (please contact Jim at jim.barrick@ttu.edu if interested).

Becoming a Part of Con-nexus

Con-nexus is a free e-mail forum for the rapid exchange of ideas and information concerning conodonts and conodont research. **To subscribe**, go to http://lists.le.ac.uk/mailman/listinfo/con-nexus and enter your details. **To post a message** to all other members of con-nexus (only subscribers can post), address it to: con-nexus@lists.le.ac.uk. **To unsubscribe** go to the following webpage and enter your details: http://lists.le.ac.uk/mailman/listinfo/con-nexus. This page also contains other useful information, such as how to access archives, and change your subscription information and settings.
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Miscellanea

How many of you remember (or still consult?) the first Treatise of Invertebrate Paleontology (Part W) that included conodonts? In this 1962 publication, our noble conodonts were ignomiously included in the Miscellanea, along with conoidal shells of uncertain affinities, worms, trace fossils and problematica. Conodonts have come a very long way, or to paraphrase King David (2 Samuel 1:19-27) "Oh, how the mighty have risen "!!!

Attention Permian Researchers

The New SPS website is at http://www.nigpas.ac.cn/permian/web/index.asp

Attention Mississippian Researchers

Michael Huggins (mhuggins@wpinc.com) recently wrote that he has allowed Virginia Tech to make available free electronic download (PDF) copies of his MS Thesis, *Meramecian conodonts and biostratigraphy of the (upper Mississippian) Greenbrier Limestone (Hurricane Ridge and Greendale Synclines), southwestern Virginia and southern West Virginia* http://scholar.lib.vt.edu/theses/available/etd-09242008-113851/ . Michael wrote that he's been away from conodont research since he finished his MS at Virginia Tech in 1983, and that since he is unlikely to take this up again, he hoped it might be useful to anyone interested in this area of investigation, without having to jump through hoops to get a copy from Virginia Tech. (Thank you, Michael, for making this available. P/)

Abstracts of Papers involving Conodonts, Presented at Regional and Annual Meetings of the The Geological Society America in 2008 & 2009

The Geological Society America makes abstracts from past GSA meetings available at www.geosociety.org under Past Meetings. Abstracts copied in this Newsletter were located by searching the meeting abstracts for the word conodont, and are reproduced courtesy of Geological Society of America, P.O. Box 9140, Boulder, CO 80301-9140 USA (http://www.geosociety.org).

PRELIMINARY MISSISSIPPIAN RADIOLARIA STUDIES FROM THE FORT PAYNE CHERT OF ALABAMA'S MISSISSIPIAN AND COMPARISON WITH THE ARBUCKLE MOUNTAINS OF OKLAHOMA VIA RADIOLARIA AND CONODONTS

KARIMINIA, Seyed Mohsen, DIXON, Burton, and SABETY SORAIADOOST, Narjes, 11685 Red Maple Forest Drive, Alpharetta, GA 30005, smkariminia@hotmail.com

The Forth Payne Chert of Alabama represents a depth close to the calcium compensation depth (CCD), and a generally lack of terrigenous sediment influx for the Mississippian ocean. Deposition of the overlying clean Tuscambia Limestone supports the idea of existing a relatively deep depositional environment far from any tectonic activity at early to middle Mississippian for most part of northern Alabama. Paleo-ecologicly, one can expect radiolaria in the sediments from the above mentioned depositional environment.

A preliminary investigation of the Forth Payne Chert strata along highway 59 , northeast of Gadsden, Etowah County, Alabama confirms that radiolaria of the Albaillellaria Group are present in Mississippian rocks of Alabama. Since the Mississippian Conodont biostratigraphy of Alabama has been documented (Ruppel 1971, Hassler 1993), it can be utilized to the study and calibrate radiolarian biostratigraphy of Alabama with other Mississippian radiolarian-/conodont- bearing strata of southern United States, i.e. Arbuckle Mountains and Criner Hills of Oklahoma (Scwartzapfel, and Holdswort, 1996).

Southeastern Section - 57th Annual Meeting (10–11 April 2008)

MICROSTRUCTURAL ANALYSIS OF CALCITE WITHIN THE WEAUBLEAU STRUCTURE, WEST-CENTRAL MISSOURI

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There are currently 114 confirmed impact structures on Earth, and many unconfirmed but suspected impact structures. One such suspected structure is the Weaubleau-Osceola structure located in St. Clair County, western Missouri. Although poorly exposed, the structure may be circular in shape with highly deformed Ordovician and Mississippian strata within center. Undeformed Pennsylvanian strata overlie much of the structure. Macroscopic deformation features recognized within the structure include faults, folds, and various types of breccia. Features indicative of an impact structure include quartz grains with planar deformation features (found within light fractions of resurge breccia samples processed for conodonts) and mixed conodonts that have been reworked stratigraphically up section.

This project examined microstructures within calcite of the affected Mississippian limestone to evaluate the operative calcite deformation mechanisms within a likely impact structure. Five limestone samples were collected from within the structure and one sample was collected several kilometers outside of the structure. Microstructures were observed under petrographic and universal stage microscopes. Mechanical twins and microfractures were found to be the dominant microstructures. Point counting provided twin and fracture densities per sample site. Twin density was found to be highest within a sample collected near the center of the structure, with most other samples displaying low twin density comparable to that found regionally outside of the structure. Similarly, microfracture density was highest within a sample collected near the center of the structure. The increase in fracture and twin densities towards the center of the structure indicates that mechanical twinning, as well as fracturing, is operative at the high strain rates resulting from an impact event.

South-Central Section - 42nd Annual Meeting (30 March - 1 April, 2008)

LATE DEVONIAN-EARLY PERMIAN ORGANIC-RICH GAS SHALES OF THE NORTH AMERICAN MIDCONTINENT

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Dark gray-black organic-rich gas producing shales are abundant in outcrop and subsurface in the North American Mid-Continent. Late Devonian-earliest Mississippian Woodford and Chattanooga black shales consist of fissile black shales in shelfal settings, abundant chert and black shale interbeds in distal shelf and slope settings, and novaculite with black shale interbeds in basinal settings. No benthic fauna is present. Faunal elements consist only of pelagic forms including radiolarians, conodonts, ammonoids, and fish debris.

Midcontinent Late Mississippian black shales include the Barnett Shale of Texas, Caney Shale of central and southern Oklahoma, and Fayetteville Shale of Arkansas and northeast Oklahoma. These shales differ from those of the Woodford and Chattanooga in lacking significant chert beds or novaculite but are similar in containing black fissile organic-rich shale and localized phosphate. Ammonoid-bearing diagenetic carbonate concretions (bullion) typify these black shales. Faunal elements include both pelagic and benthic components. The pelagic components include radiolarians, conodonts, ammonoids, and fish. Bethic faunas are localized and consist of low diversity including acrotretids and Leiorhynchoidea brachiopods, bivalves (Caneyella), and gastropods (archaeogastropods). The presence of localized benthic faunal elements suggest dysoxic conditions alternated with anoxia.

Late Carboniferous (Moscovian-Gzhelian) and Lower Permian (Asselian) black fissile organic-rich phosphatic shales are numerous (>30) in the Midcontinent, and are thin (1-2 meters) and are typically underlain and overlain by gray dysoxic shales. Abundant benthic faunal elements are present in the gray shales.

South-Central Section - 42nd Annual Meeting (30 March - 1 April, 2008)

LOWER TO MIDDLE ORDOVICIAN BIOSTRATIGRAPHY OF THE APPALACHIANS: IS THERE ANY NEED FOR IMPROVEMENTS?

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Fossils can be used to infer ages of lithological units, understand facies differentiations, structural complexities and paleogeographic relationships in the Early Paleozoic of eastern North America. In this respect, graptolites are more commonly used than any other fossil groups, even though diverse macro- and microfossil assemblages are also available for study. Unfortunately, graptolites are lacking in certain lithologies due to their organic composition, and are replaced as biostratigraphically important elements by conodonts and other microfossils, which are often less precise and more long-ranging. Exact dating of lithostratigraphical units, therefore, is often impossible, leaving wide spaces for improvement.

Graptolites are the most commonly used macrofossils to identify ages of Lower and Middle Ordovician rocks in the New York, Quebec and Newfoundland Appalachians and provide the data for a precise correlation of lithostratigraphical units along the length of the orogen. Especially the succession of the continental slope and rise, preserved in the allochthonous slices of the Humber tectono-stratigraphic zone in western Newfoundland and Quebec, and the overlying foreland basin of the Table Head Group of the Port-au-Port Peninsula are an excellent study region to understand Ordovician biostratigraphy and application of paleontological data. The intercalation of various lithologies and their individual preservational potential for macro- and microfossils provide the opportunity to study, correlate and integrate biostratigraphies of various fossil groups, including graptolites, trilobites, phosphatic and calcareous brachiopods, conodonts, chitinozoans and radiolarians, and, thus, improve their usefulness for dating and other purposes considerably. As the various groups of fossil organisms occur in different lithologies and facies relationships, the biostratigraphic correlation of their occurrences is often hampered with difficulties. Miscorrelations are common and may be of immense impact for the timing of events and the understanding of tectonic structures.

Northeastern Section - 43rd Annual Meeting (27-29 March 2008)

STATUS OF THE COCALICO FORMATION, SOUTHEASTERN PENNSYLVANIA

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The greenschist grade Cocalico Formation is a generally equivalent hinterland version of the allochthon-rich anchizone grade Martinsburg Formation in SE Pennsylvania. Stose (1946) included the Cocalico with the “Taconic Sequence in Pennsylvania”, drawing comparisons to the allochthonous rocks in the Great Valley (GV) (foreland) of Pennsylvania where he proposed the “Hamburg klippe”. The Cocalico is now recognized as complexly infolded with the Taconian nappes of the Lebanon Valley. It is

composed of shale to coarser clastic rocks, including green and reddish-purple units that Stose called “tuffaceous” (unconfirmed).

The alternative to Stose's Hamburg klippe is allochthons thrust into the Martinsburg foreland basin. There, graptolites and conodonts have been used to separate autochtonous Martinsburg from Taconic allochthons of the Dauphin Formation in the GV. Using this model, the Cocalico would be a segment of the Martinsburg foreland and also a composite terrane containing autochthonous and allochthonous rocks. We consider the clastic rocks transported on the Alleghenian Yellow Breeches thrust as part of the Cocalico sequence (Cocalico North) and separated from the main body of the Cocalico sequence (Cocalico South) by the truncating Mesozoic basin.

Few fossils have been recovered from the Cocalico South. Some dubious graptolites were reported and a single conodont occurrence is identifiable only as Ordovician. Based on appearance alone some of the siliceous “red” units resemble radiolarian cherts in the Taconic allochthons of the GV. Other greywacke/shale units compare to Martinsburg lithologies. The Cocalico north has deformed graptolite-bearing phyllite with an exclusively “biserial” fauna indicating a probable early Late Ordovician age permissive for Martinsburg time. Some rocks in the Cocalico North also resemble Dauphin allochthons north of the Yellow Breeches thrust. Thus, the evidence supports the Cocalico being a metamorphosed segment of the Martinsburg foreland comparable to the allochthon-influenced area in the GV. The degree of allochthony for the Cocalico is however, unknown, and its specific relationship to the rocks in the Great Valley awaits more study.

Northeastern Section - 43rd Annual Meeting (27-29 March 2008)

THE EMSIAN STAGE (UPPER LOWER DEVONIAN), APPALACHIAN BASIN: STRATIGRAPHY, SEQUENCES & T-R CYCLE IB, VOLCANICS & GEOCHRONOLOGY, & NEW DIRECTIONS

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Emsian strata in the Appalachian Basin have been largely overlooked by geologists and paleontologists over the years. Recent basinwide analyses of Emsian and Eifelian strata (>350 outcrops) have vastly improved knowledge of this interval, making the Appalachian Basin one of the better known Emsian successions globally. These Emsian strata are now shown to comprise the Esopus and Schoharie fms. (NY, e PA); the Beaverdam and calcareous shale mbrs. of the Needmore Fm. (cent. PA, MD, VA, WV); and the Huntersville Fm. (except a thin capping sandstone; sw VA, WV). The latter was long mistakenly correlated with the overlying Eifelian Onondaga Fm.

Five Emsian “third order” depositional sequences are correlatable throughout the basin. Three of these occur in “lower Emsian” strata of the Esopus Fm. and equivalents (Beaverdam, lower Huntersville). The remaining two sequences occur in “upper Emsian” strata of the Schoharie Fm. and equivalents (calcareous shale, upper Huntersville). These two subdivisions appear equivalent to the international Subcommission on Devonian Stratigraphy's proposed Zlichovian and Dalejan substages of the Emsian Stage.

The Devonian T-R cycle model of Johnson et al. (1985) assigned one major T-R cycle to Emsian and lowest Eifelian strata, based on what now is seen as too little available data. Based on a greater knowledge, Emsian T-R Cycle Ib is now proposed to comprise five major T-R cycles. This reinterpretation is supported by geochronologic data from Appalachian Basin K-bentonites (lower Emsian Sprout Brook K-bentonites, 408.3 +/- 1.9 Ma; and lower Eifelian Tioga Middle Coarse Zone K-bentonites, 391.4 +/- 1.8 Ma; dates from Tucker et al., 1997), indicating a ca. 17.2 million year duration for the Emsian – making T-R Cycle 1b unjustifiably an order of magnitude greater than other Devonian T-R cycles.

One of the problems in utilizing the Appalachian Basin Emsian as a global standard is poor biostratigraphic resolution. New collaborative studies with global experts are presently underway, in a search for globally correlatable taxa (goniatites, conodonts, spores, dacryoconarids, brachiopods, ostracodes), along with an attempt to correlate the major Emsian cycles worldwide using magnetic susceptibility. Hopefully, results will allow correlation of the eastern U.S. record to the global Emsian.

Northeastern Section - 43rd Annual Meeting (27-29 March 2008)

LATE PALEOZOIC CONODONT SEQUENCE BIOSTRATIGRAPHY OF WESTERN PANGEA: SUCCESSES AND SETBACKS

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Several Late Paleozoic cyclothems of Midcontinent North America are characterized by unique and often abundant core shale conodont faunas permit recognition of individual cycles. Application of the Midcontinent conodont sequence biostratigraphic timescale to basins of western North America, however, has yielded only mixed results. In the thicker, carbonate-dominated western sections, a Midcontinent-type core shale is poorly developed or absent and a corresponding conodont fauna more difficult to obtain. Conodont faunas that are recovered from the strongly cyclical carbonates generally come from shallower-water facies than the core shale and faunal differences owing to ecology make identification of the faunas of individual Midcontinent cycles problematic.

At least nine Midcontinent cycles can be recognized in Moscovian and Kasimovian strata of the Paradox basin (eastern Utah) on the basis of their constituent conodonts, thereby enabling correlation of several other cycles by extrapolation. The late Moscovian-Asselian sea level history of the eastern Ely basin (eastern Nevada) has been greatly improved through comparison with the Midcontinent. Rapid sedimentation and low conodont yields complicate correlations in the Oquirrh basin (northern Utah). The exquisitely exposed Moscovian-Kasimovian section at Arrow Canyon (Bird Spring trough, southern Nevada) contains only a few conodont-bearing horizons and these are dominated by generalized idiognathodids. Conodont faunas in Moscovian-Asselian strata in the Pedregosa basin in southwest New Mexico (Horquilla Limestone) are comparable to selected Midcontinent faunas and permit recognition of the Carboniferous-Permian boundary. Deep-water carbonate turbidites of the Keeler Canyon basin of southeastern California yield poorly preserved conodont elements that permit only tentative correlation to the Midcontinent.

This preliminary research suggests that a modified scheme of conodont sequence biostratigraphic units may need to be developed for the western United States, which can then be tied to Midcontinent sequence biostratigraphic timescale as the conodont faunas permit.

Cordilleran Section (104th Annual) and Rocky Mountain Section (60th Annual) Joint Meeting (19–21 March 2008)

The following six abstracts involving conodonts were presented March 16-17, 2009 at the 43rd Annual Meeting of the South-Central Section of the Geological Society of America, in Dallas, Texas, U.S.A.

DECATURVILLE STRUCTURE, CENTRAL MISSOURI: EVIDENCE FOR A PRE-DEVONIAN MARINE IMPACT?

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Decaturville (6.6 km dia) is an eroded impact structure, but the depth of erosion is poorly constrained because no capping strata are found above deformed target rocks. As a consequence, the stratigraphic age also is contentious. Previous investigators have shown that the youngest widely exposed strata are folded and faulted beds of Lower Ordovician Jefferson City Dolomite in the moat region surrounding the central uplift. Exotic blocks of Middle Silurian, Upper Ordovician, and Cambrian rock also have been mapped in isolated exposures around the moat. No rocks younger than Middle Silurian have been found in the structure, nor are rocks of Upper Ordovician or Middle Silurian preserved 30 km to the west or 60 km to the south, where Mississippian strata rest unconformably on Lower Ordovician strata, nor are they preserved 55 km to the north, where Lower Devonian carbonates fill paleokarst below the sub-Mississippian unconformity.

In the 1970's, investigators argued that the age of impact was likely post-Pennsylvanian and perhaps as young as Cretaceous. More recently, paleomagnetic studies suggest a Pennsylvanian or Early Permian age; both age ranges are based on the occurrence of a sulfide breccia in the central uplift that is assumed to be a brecciated MVT deposit that was emplaced prior to the impact. The sulfide emplacement clearly pre-dated brecciation, but the age of this mineralization has not been dated. Drill logs show that the sulfides are confined to an isolated area known as the sulfide pit rather than being widely distributed across the structure.

Bulk samples collected for conodonts from a polymict breccia in the roadcut and samples collected from individual clasts have yielded Upper Ordovician (Mohawkian and Cincinnatian) faunas, which is consistent with their having been derived from the Kimmswick Limestone and Leemon Formation. New field studies have also uncovered several blocks of silicified oöid grainstone breccia that also contains loose unbroken oöids in the matrix. The occurrence of exotic Upper Ordovician and Middle Silurian blocks together with presence of marine components in this breccia suggests a pre-Devonian marine impact.

LATEST GUADALUPIAN CARBON ISOTOPE RECORD FROM THE REEF TRAIL MEMBER OF THE BELL CANYON FORMATION, WEST TEXAS, USA

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A large negative isotope shift in $\partial^{13}C$ from whole rock inorganic carbon is observed near the top of the Reef Trail Member of the Bell Canyon Formation in the Patterson Hills, west Texas. Biostratigraphically the shift begins in the upper part of the *Jinogondolella altudaensis* Zone, above the first appearance of the radiolarian *Albaillella yamakitai*, and appears to correlate with the start of a globally recognized negative excursion associated with the end-Guadalupian mass extinction. The carbonate-dominated Reef Trail Member. is the youngest unit in the basinal Bell Canyon Formation and is overlain by evaporitic strata of the Castile Formation. Samples were taken from micritic beds at intervals of 0.5 m or less from the uppermost 10 meters at the SC1 section, and also from the uppermost 14 meters at the SBR section roughly 1 km away. In addition, coarser calcarenite beds were sampled from the entire SC1 section. A baseline shift of ~-4.5‰ vPDB (from ~ 6‰ to 1.5‰) occurs in the SC1 section and -5‰ (from ~6‰ to 1‰) in the SBR section. Both fine and coarse grained lithologies show comparable shifts. The excursion coincides with a generally upward coarsening shift to more bioclastic beds. Radiolarians occur below and above the shift, and show a change in the relative abundance of taxa, further indicating that this shift records ecologic/environmental variation, and is not a diagenetic artifact. The fusulinaceans *Paraboultonia splendens* and *Codonofusiella (Lantschichites) altudaensis* (sensu Wilde and Rudine) are present at several levels in the SC1 section and persist to within 0.3 meter of the Castile/Reef Trail contact. The isotopic shift continues through unit 14 in both sections and into the Castile Formation. The introduction of the conodonts *Jinogondolella granti, J. crofti,* and *Clarkinia postbitteri hongshuiensis* in unit 14 tie the Patterson Hill sections with those throughout West Texas and to Penglaitan, China, and equate to Bed 6i in that section, just below the Guadalupian-Lopingian (Middle-Upper Permian) boundary definition.

PALEONTOLOGY, PETROLOGY AND PETROGRAPHY OF EARLY DIAGENETIC CALCAREOUS CONCRETIONS IN THE OAKLEY SHALE MEMBER OF THE VERDIGRIS FORMATION AT SAYLORVILLE DAM EMERGENCY SPILLWAY, POLK COUNTY, IOWA

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Several major overflow events, since 1983, at the Saylorville Dam Emergency Spillway have exposed the middle part (including the Verdigris cyclothem) of the Middle Pennsylvanian (Desmoinesian Stage) Cherokee Group. The Verdigris cyclothem, from bottom to top, consists of strata from the top of the paleosol below the underlying Whitebreast Coal at the top of the Floris Formation, an unnamed lenticular limestone, the Oakley Shale, the Ardmore Limestone, and shales and mudstones to the top of the paleosol below the overlying Wheeler Coal in the Swede Hollow Formation. A rarely seen concretionary limestone (lime-wackestone to packstone) between the Whitebreast Coal and Oakley Shale contains abundant carbonized-wood, dolomite and pyrite replaced gastropods, clams and pyrite. This unnamed lenticular limestone represents early transgressive deposits of the Verdigris cyclothem. On outcrop, the nodules in this limestone can easily be confused with nodules occurring within the Oakley Shale. The overlying Oakley Shale is a black, fissile, non-sandy, phosphatic shale about 60 cm thick, which represents deposition during sea level high-stand, during maximum transgression. Early diagenetic, organic-rich (lime-mudstone to lime-wackestone) concretions, up to 45 cm across, occur at several randomly scattered horizons within the Oakley Shale, and contain abundant phosphorite lenses and laminae, and pyrite. These concretions also contain conodonts (*Gondolella pohli*, *Neognathodus* spp., *Idiognathodus* spp., and *Diplognathodus* sp. cf. *D. coloradoensis*), fish teeth and scales, abundant spumellarian and pseudolalbaillellid radiolarians and sponge spicules. Most of the originally silica (opal-A) radiolarians and sponges in the calcareous concretions are poorly preserved as casts of dolomite with some being excellently preserved as pyrite casts. Radiolarians and sponges in phosphorite nodules are preserved as pyrite and phosphate casts. No radiolarians or sponges were recognized in the black shale.

PETROLOGY, PETROGRAPHY AND CONODONT BIOSTRATIGRAPHY OF THE BURLINGAME LIMESTONE AND SOLDIER CREEK SHALE MEMBERS OF THE BERN FORMATION, RULO, NEBRASKA

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The upper 30 cm of the Silver Lake Shale of the Scranton Formation and the Burlingame Limestone Member and lower part of the overlying Soldier Creek Shale Member of the Bern Formation (Wabaunsee Group, Virgilian Stage, Upper Pennsylvanian) are exposed in a roadcut 3.2 km south of Rulo, Richardson County, Nebraska. The intermediate Burlingame cyclothem comprises the upper part of the Silver Lake Shale, the Burlingame Limestone and the lower part of the Soldier Creek Shale. Early transgressive deposits grade upward from sandy shales and micaceous, fossiliferous (mainly ostracodes, gastropods and clams), calcite-cemented quartz arenites in the upper part of the underlying Silver Lake Shale Member of the Scranton Formation to an arenaceous fossiliferous grainstone in the lower Burlingame Limestone. Maximum transgression and still-stand occurs about 50 cm above the base of the Burlingame Limestone in a slightly arenaceous and argillaceous lime wackestone with an abundant open marine fauna and a moderate abundance of *Streptognathodus* spp. conodonts (65 elements per kilogram). Regressive deposits include the upper Burlingame Limestone, a lime wackestone that grades upward to an intraclastic packstone with an intraclastic grainstone at the top. Intraclasts are rounded, up to 3 cm across and consist of arenaceous, ostracodes-rich lime wackestone. Above the main ledge of the

Burlingame Limestone is about 13 cm of slightly sandy shale containing carbonized wood fragments, and an overlying 5 cm thick grainstone with abundant carbonate intraclasts and gastropod fragments. Above this lime packstone, in the base of the Soldier Creek Shale, is about 55 cm of very fossiliferous gray shale with no sand, but an open marine fauna with abundant gastropods, brachiopods and small foraminifers. This shale may represent a minor sea level rise in late stages of the Burlingame cyclothem. The top (maximum regressive deposits) of the Burlingame cycle is represented by 25 cm of light to medium gray mudstone. The upper part of the mudstone has abundant plant fossils preserved as limonite casts and may represent a poorly developed coal horizon related to the overlying Wakarusa cyclothem. Above the coaly zone, the next 1.5 m of the Soldier Creek Shale has an abundant open marine fauna with cephalopods, crinoids, bryozoan, brachiopods and conodonts

STRATIGRAPHY OF THE BELL CANYON FORMATION IN THE NORTHWESTERN PART OF THE APACHE MOUNTAINS, SOUTHEASTERN CULBERSON COUNTY, WEST TEXAS

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Middle Permian marine (Bell Canyon Formation) strata along the southwestern margin of the Delaware Basin in southeastern Culberson County, West Texas provide excellent exposures of slope and basinal strata, useful fossils for age dating, and a variety of interpretations of possible depositional environments. A surficial geologic map of about a seven square kilometer area of the northwestern Apache Mountains, located to the west of and bounded on the southeast by Texas FM 2185 about 60 kilometers northeast of Van Horn, West Texas demonstrates the presence of several significant and extensive debris flows and a complex structural setting for Late Guadalupian/Lopingian age strata in the area. The stratigraphic succession ranges from the Bell Canyon Formation (about 200 meters) into the Rustler Formation. The mapped limestone units of the Bell Canyon Formation can be tentatively correlated to parts of its well known limestone members (Hegler, Pinery, Rader, McCombs, Lamar, and Reef Trail) as originally described in the Guadalupe Mountains by using microfossil data from radiolarians, conodonts, fusulinaceans and other foraminifers. The upper boundary of the Guadalupian Series can be traced across the area in a transitional interval of a few meters just below typical strata of the Castile Formation. This interval is identified by the presence of the conodont subspecies *Clarkina postbitteri hongshuiensis*, the biostratigraphic marker for the uppermost conodont zone of the Guadalupian Series in China. Several major subaqueous gravity flows present in the map area aided in the mapping of the various units of the Bell Canyon Formation. Microfossils present, especially the conodonts, aided in providing a framework for a proposed correlation of the Bell Canyon with its various members in the Guadalupe Mountains. Analysis of one of the major, thick subaqueous gravity flows within the Bell Canyon Formation in the mapped area provides information about its clast lithofacies, biofacies, lateral extent, timing of emplacement and allochthonous debris origin.

THE BELL CANYON/CASTILE FORMATIONAL CONTACT: IMPLICATIONS FOR THE GUADALUPIAN/LOPINGIAN SERIES BOUNDARY (MIDDLE/UPPER PERMIAN) IN THE APACHE MOUNTAINS, WEST TEXAS

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The Bell Canyon Formation (Middle Permian, Guadalupian) is comprised of six members named for strata in the Guadalupe Mountains of West Texas and can be recognized biostratigraphically in the Apache Mountains on the southwestern side of the Delaware Basin. Some member names, such as Lamar and Rader, have been carried to this area even though the lithofacies display different characteristics and their use is questionable. Bed by bed sampling of several sections in the uppermost Bell Canyon equivalent has recently documented these strata as coeval with the upper part of the Reef Trail Member (uppermost Bell Canyon in the Guadalupe Mountains), and both contain the conodonts *Jinogondolella altudaensis*, *Clarkina crofti*, *C. postbitteri hongshuiensis*, and the fusulinaceans *Paraboultonia,* and *Conodonofusiella (Lantschichites)*.

The precise placement of the lithostratigraphic boundary between the Bell Canyon Formation and the overlying Castile Formation presents a most interesting problem because of a one to two meter transitional interval. This interval conformably overlies two thin superposed limestone beds containing foraminifers, conodonts, and radiolarians. The transitional zone begins with a laminated barren gypsiferous limestone overlain by a pinkish limestone with silica filled vugs from the dissolution of gypsum and the unit contains sparse specimens of the conodont *Clarkina postbitteri hongshuiensis* and the fusulinaceans *Paraboultonia* and *Codonofusiella (Lantschichites)*. A second barren limestone at the top of the transitional interval is also laminated, and is overlain by typical varved and brecciated strata of the Castile Formation. At some sections, there are a few thin beds of radiolarian limestone interbedded with siltstone before the typical Castile deposits. The placement of part or the entire transitional interval in the uppermost Bell Canyon has been suggested by various authors. The Bell Canyon/Castile contact could also be placed at the base of the first laminated limestone, as suggested by King in 1942, which would imply that the lowermost few meters of the Castile Formation would fall into the uppermost Guadalupian. The presence of the conodont *Clarkina postbitteri postbitteri*, which defines the base of the Lopingian Series, has yet to be documented in the Permian of West Texas.

SOMETHING IS MISCORRELATED IN THE STATE OF DENMARK: THE LATE ORDOVICIAN MILLBRIG AND KINNEKULLE K-BENTONITES

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The Kinnekulle "Big Bed" and Millbrig K-bentonites have been considered correlative and thus comprising one of the largest eruptions of the Phanerozoic. However, geochemical data from previous work on biotite phenocrysts suggest that both beds may be different. Whether these two K-bentonites correlate is important for understanding the paleogeographic reconstructions of Laurentia and Baltica, trans-oceanic biostratigraphic correlations of graptolites and conodonts, and the potentially global occurrence of the Guttenburg carbon istotope excursion. We have previously shown that correlated K-bentonites in North America have persistent apatite trace element concentrations despite environment of deposition and post-depositional tectonism. These findings are also consistent with apatite chemistry from modern eruptions. Trace element analyses of apatite phenocrysts were thus measured to provide possible discrimination for the Kinnekulle and Millbrig K-bentonites. On the basis of F, Mg, Cl, Mn, Fe, Ce, and Y concentrations in apatite, the Kinnekulle and Millbrig K-bentonites must be viewed as representing two different eruptions. Vertical sub-sampling of several layers from each bed indicate that both beds are composed of multiple eruptions that do not coincide with one another. These results suggest that the Millbrig and Kinnekulle cannot both be derived from a single ultra-plinian eruption as proposed in recent literature.

Northeastern Section - 44th Annual Meeting (22–24 March 2009)

AGE AND CORRELATION OF THE WOODFORD SHALE, UPPER DEVONIAN-LOWER CARBONIFEROUS, IN THE SUBSURFACE OF EASTERN NEW MEXICO AND WESTERN TEXAS

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The Woodford Shale in the type area of southern Oklahoma consists of approximately 75 m of predominately dark organic-rich shales, as well as light shales, bedded chert, and interbedded phosphate-rich strata that lie unconformably on Middle Devonian or older units. The Woodford includes strata of Upper Frasnian, Famennian, and lower Carboniferous. In the subsurface of west Texas and eastern New Mexico the Devonian light and black shales assigned to the Woodford rest unconformably on Silurian or Lower Devonian carbonates. Although Middle Devonian and lowest Frasnian deposition is indicated by conodonts recovered from cavity fills in the underlying carbonates and a thin basal green-gray shale, typical Woodford rocks in seven cores in the study area, from Chaves County NM to Howard County TX, consist of 4 to 20 m of Famennian strata that starts in the Upper *crepida* Zone, coincident with a global rise in sea level and deposition of other black shale units in the central and eastern United States, and ranges into the Upper *marginifera* Zone. The Lower *marginifera* Zone strata interval correlates across 350 km of the Upper Devonian basins. A well in Glasscock County TX did not have lower Famennian Woodford, but preserves high Famennian strata of the Middle *expansa* Zone or higher, as well as lower Carboniferous strata of the Upper *duplicata* Zone or higher. The Middle *expansa* Zone is characterized by deposition of another wide spread black shale interval in the eastern United States.

Northeastern Section - 44th Annual Meeting (22–24 March 2009)

EARLY TRIASSIC CONODONTS IN THE PAHVANT RANGE OF CENTRAL UTAH

STEPHEN, Daniel A.[1], MENLOVE, Lara[1], GOUDEMAND, Nicolas[2], BYLUND, Kevin G.[3], BRAYARD, Arnaud[4], MCSHINSKY, Ranae Dawn[1], BUCHER, Hugo[2], and JENKS, Jim[5], (1) Earth Science Department, Utah Valley University, 800 West University Parkway, Orem, UT 84058, laramenlove@hotmail.com, (2) Paleontological Institute and Museum, University of Zurich, Karl Schmid-Strasse 4, Zurich, 8006, Switzerland, (3) 140 South 700 East, Spanish Fork, UT 84660, (4) Université de Bourgogne, Dijon, 21000, France, (5) 1134 Johnson Ridge Lane, West Jordan, UT 84084

The Pahvant Range lies near the junction of three major geological provinces in the western USA: the Basin and Range, the Rocky Mountains, and the Colorado Plateau. The complex geological milieu of central Utah provides both challenges and opportunities. Among these is the elucidation of the precise age relationships of the strata found in the Pahvant Range. The Thaynes Group (formerly called Thaynes Formation in Utah) is a marine unit deposited in the Sonoma Foreland Basin during the Early Triassic. Rocks of this group are now exposed in various locations in Utah and adjacent states. In the Pahvant Range, the Thaynes Group is represented by numerous, thin limestone beds separated by fissile shale intervals. The group rests disconformably upon the Permian Kaibab Formation and is overlain by the Upper Triassic Chinle Group.

In an effort to more precisely constrain the age of the Thaynes Group in the Pahvant Range, we conducted a detailed sampling at two measured sections. Macrofossils were collected as well as bulk rock samples for microfossil analysis. Ammonoids were abundant, especially in the upper limestone beds, whereas palynomorphs seem to be lacking in the shale intervals. The Early

Triassic age of the Thaynes Group has been independently confirmed by analyses of the ammonoid fauna (reported in another presentation at this meeting). A meager collection of poorly preserved conodonts was recovered from the limestone beds. From this sparse conodont assemblage, we have tentatively identified Neospathodus waageni, which indicates a Smithian age for at least some of the Thaynes Group in the Pahvant Range. This age determination is corroborated by studies of the ammonoid assemblages.

Lower Triassic conodont biostratigraphy in North America has apparently been in a state of flux for decades, and it remains problematic for several reasons, perhaps most importantly because of trouble in defining and reliably identifying zonal boundaries. We hope our ongoing research in the Pahvant Range of central Utah may ultimately help resolve some of these issues.

Rocky Mountain Section - 61st Annual Meeting (11-13 May 2009)

RECOGNITION OF FOX MOUNTAIN FORMATION SOLVES ENIGMATIC DEVONIAN STRATIGRAPHY IN CENTRAL AND NORTHERN UTAH

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Heretofore, the upper Middle Devonian (Givetian) Fox Mountain Formation, which is widespread in Nevada east of the Roberts Mountains thrust, has been identified only as far eastward as the Confusion Range and Burbank Hills in westernmost Utah. The formation comprises a thick lower member composed of restricted-marine evaporite-solution breccia and pelmicrite and a thin upper member composed of fossiliferous open-marine limestone that represents the continent-wide Taghanic onlap. In the Black Rock Hills, west of the Thomas Range, west-central Utah, the Fox Mountain and overlying yellow slope-forming (YSF) unit of the basal Guilmette Formation are now identified and dated by conodonts at the base of a previously unidentified Devonian sequence. In the Star Range, central Utah, the Fox Mountain and YSF are now recognized <50 m below the basal Famennian unconformity. Thus, the overlying Guilmette is largely truncated there and is not 137 m thick as previously reported. In northern Utah, the Lower Devonian Water Canyon Formation was previously interpreted to be directly overlain by the Guilmette-equivalent, mainly lower Upper Devonian (Frasnian) Hyrum Formation. However, an intervening breccia was included either in the Water Canyon or Hyrum. This breccia is now identified as the lower Fox Mountain. Thus, at Portage Canyon, Samaria Mountain, the sequence above the Water Canyon is identified as Oxyoke Canyon(?) Sandstone, Simonson Dolostone, lower and upper Fox Mountain Formation, and YSF. At Logan Canyon, Bear River Range, the identical sequence, except for the YSF, is also present. However, the Water Canyon-Hyrum contact was previously placed between the lower and upper members of the Fox Mountain. Our study thus demonstrates that the bases of the Devils Gate Limestone of Nevada and the Guilmette and Hyrum Formations represent a virtual time line marking the onset of a late Middle to early Late Devonian carbonate platform that fringed western North America.

Rocky Mountain Section - 61st Annual Meeting (11-13 May 2009)

SPATIAL TRENDS IN CONODONT DISTRIBUTION PATTERNS AND TAPHONOMY IN KEY STRATIGRAPHIC SURFACES AND HORIZONS THAT DELINEATE GENETIC UNITS WITHIN THE IOLA LIMESTONE: UPPER PENNSYLVANIAN OF KANSAS AND IOWA

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Temporal trends in the distribution of conodonts and facies stacking patterns have long been used to illustrate the transgressive and regressive nature of Upper Pennsylvanian strata that comprise a Kansas Cyclothem. Sequence stratigraphic studies of these rocks have demonstrated complexities not recognized in the cyclothem model, especially by examining spatial trends revealed by correlation of key stratigraphic surfaces. This investigation examines the temporal and spatial trends in the taphonomy and distribution of conodonts within a sequence stratigraphic framework interpreted for sections of the Iola Limestone (Upper Pennsylvanian) of eastern Kansas and central Iowa. Three additional sections have been sampled in eastern Kansas, and results will be compared with three previously sampled sections.

Temporal trends in conodont distribution were examined in samples from correlative sections of the Iola sequence in Kansas and Iowa. An increase in conodont elements/kg characterize the interval directly above all bounding surface types within the Iola. Conodont elements/kg values are much higher, however, in the intervals above the maximum flooding surface or horizon and directly above the sequence boundary, than parasequence boundaries. Generic diversity tends to increase above flooding surfaces, but drop abruptly above sequence boundaries. A change in taxonomic composition of samples above bounding surfaces also distinguishes sequence boundaries and maximum flooding surfaces or horizons from parasequence boundaries.

Spatial trends in conodont distribution and taphonomy were examined in samples above flooding surfaces and unconformities in the Iola. Multivariate statistical analyses of conodont distribution suggest a correlation between sample composition and the relative location of the surface within the basin (updip versus downdip). Spatial trends in taphonomy, particularly fragmentation and bias towards robust elements, help to characterize compound stratigraphic surfaces in updip areas within the basin. Trends in the

distribution and taphonomy of conodonts can be used as a tool to assist bounding surface identification (distinguishing between flooding surfaces and sequence boundaries) and to aid in characterization of basinal trends of key surfaces and horizons within marine Paleozoic sequences.

North-Central Section - 43rd Annual Meeting (2-3 April 2009)

CONODONT BIOSTRATIGRAPHY OF THE PORVENIR FORMATION (DESMOINESIAN, PENNSYLVANIAN), SOUTHEASTERN SANGRE DE CRISTO MOUNTAINS, NEW MEXICO, USA

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The Porvenir Formation consists of marine limestones, gray shales, and sandstones that conformably overlie the Sandia Formation and are overlain with local angular unconformity by the Alamitos Formation in the southeastern part of the Sangre de Cristo Mountains. We collected conodonts from two sections representing two of the three described facies, the type locality representing the southern, dominantly carbonate facies, and a reference section representing the northern sandstone-shale-limestone facies. Our goals include describing the conodonts, clarifying local age relationships, and utilizing biofacies and magnetic susceptibility to interpret depositional environments.

Conodont faunas from these sections are dominated by Idiognathodus. Hindeodus and Neognathodus are locally common; Adetognathus is uncommon; and Diplognathodus, Idioprioniodus, and Ubinates are rare. Conodont biofacies indicate that the paleoenvironment varied from open marine conditions to nearshore, shallow-water euryhaline environments of varying energy levels.

At the Porvenir type locality the Neognathodus Index (NI), a primary biostratigraphic indicator for the Desmoinesian Series, shows a general increase from the bottom where it is 2.65 to the upper part where it is 4.29. The similarity in NI between the upper part of the Sandia, 2.30, and the lower 50 feet of the Porvenir, 2.33, supports their conformable relationship. At the northern reference locality the Porvenir NI is 4.57. Thus, the Porvenir there is younger than the top of the Porvenir at the type locality necessitating a revised correlation between these sections.

Magnetic susceptibility was measured on samples collected at one foot intervals in the carbonate lithologies of the lower 36 feet of the Porvenir type section. The SI mass normalized magnetic susceptibility of the majority of the samples is ±0.002 m3/kg. Variations in magnetic susceptibility results in several horizons between 0 and 7 feet where susceptibility increases up to 0.007 m3/kg and a single larger increase to 0.026 m3/kg at 34 feet. The increases in susceptibility are likely due to changes in the primary minerals for which there are a variety of potential causes such as climate change.

North-Central Section - 43rd Annual Meeting (2-3 April 2009)

PALEOZOIC FISH REMAINS AND ICHTYOLITHS FOUND IN A LATE TO MIDDLE DEVONIAN BONE BED AT THE BOUNDARY BETWEEN THE COLUMBUS LIMESTONE AND THE OHIO SHALE IN EAST LIBERTY, OHIO

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A paleontologically important, well preserved macro- and micro-vertebrate fauna was obtained from a bone bed at the boundary between the Columbus Limestone and the Ohio Shale in East Liberty, Ohio. The exposure occurs at the uppermost portions of the East Liberty Quarry, located adjacent to U. S. Highway 33. The quarry exposes approximately 11 meters of the Columbus Limestone and overlain by 5 meters of the Late Devonian Ohio Shale, in spots covered by the Olentangy Shale.

This bone rich bed occurs within a distinct, 10 cm layer that spans portions of the exposure. The lithology of the layer consists of a maroon-gray to brownish-gray, fine to medium-crystalline dolomitic limestone. Copious well preserved macro- and micro-vertebrate remains and phosphatic nodules are scattered primarily on the upper surface and within the upper two –to- three centimeters of the layer.

Macro-vertebrate remains include disarticulated arthrodire plates and isolated skeletal elements. Micro-vertebrate material consists of abundant conodont elements, acanthodian scales, chondricthyan dermal denticles and teeth. Chondrichthyans are represented by the cladoselachids *Stethacanthus*, *Symmorium*, *Ohiolepis*, cladodonts, by the phoebodontids *Phoebodus*, by members of the genus

Protacrodus, as well as several undescribed species.

Faunal comparison, based on icthyoliths and conodonts, of the bone beds found in the Columbus Limestone (Wells 1944) and those found within the East Liberty Quarry do not correlate. Given this dissimilarity, future work will focus on faunal correlation between the East Liberty bone bed and the bone beds found within the Delaware Limestone and the Ohio Shale. Additionally, the vertebrate fauna appears to be similar to the bone bed that can be found at the Little Hardwick Creek in Clay City, Kentucky (Brett, et. al. 2003). Given this similarity, future work will focus on careful lithostratigraphic, sequence stratigraphic, and biostratigraphic analysis, as well as faunal correlation with the Little Hardwick Creek.

North-Central Section - 43rd Annual Meeting (2-3 April 2009)

A $\delta^{13}C$ STRATIGRAPHIC PROFILE FROM THE ROUBIDOUX AND JEFFERSON CITY FORMATIONS, CENTRAL MISSOURI

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High-resolution chronostratigraphic correlation of the classic Ibexian Series in western North America to age-equivalent successions in the Midcontinent region is limited by the relative paucity of diagnostic fossils in many sections. Correlation of the Stairsian Stage (the second stage of the Ibexian) away from the type region is further complicated by a lack of detailed faunal zonation; there are only two (or three) generally recognized Stairsian conodont assemblage zones, as opposed to as many as nine conodont assemblage zones in the underlying Skullrockian Stage.

Previous carbon isotopic ratio ($\delta^{13}C$) results from Stairsian-aged sections in New Mexico and western Utah indicate a major shift in the behavior of the marine carbon cycle that spans virtually all of the Stairsian, ending in a sharp drop to $\delta^{13}C$ values near -4‰ (V-PDB). In both regions, minimum δ^{13}values were found in C conjunction with significant lithologic change that may represent a rapid deepening, followed by a return to shallower conditions. This conjunction of a Stairsian-aged δ^{13}minimum and sea-level C change has also been recognized in the Argentina Precordillera region.

Although general Lower Paleozoic chronostratigraphic relationships are well-known in Missouri, detailed correlations to deeper water sections have proven to be elusive. Based on conodonts, the Stairsian Stage is known to span from the upper Gasconade Formation, through the heterolithic Roubidoux Formation, and end within the lower Jefferson City Formation. High resolution $\delta^{13}C$ profiles from two sections of the Roubidoux and Jefferson City formations in Missouri were developed, and correlated to previous δ^{13}results from New C Mexico and Utah. Major features of the δ^{13}profile can be correlated with confidence, C but there are important differences that remain the focus of ongoing study.

North-Central Section - 43rd Annual Meeting (2-3 April 2009)

AN IOWA-BALTOSCANDIA-CHINA CONNECTION: PRECISE LONG-RANGE CHEMOSTRATIGRAPHIC CORRELATION OF UPPER ORDOVICIAN STRATA USING THE GUTTENBERG $\delta^{13}C$ EXCURSION (GICE)

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Among the seven Ordovician positive $\delta^{13}C$ excursions currently recognized and named, two have proved to be particularly useful for international correlations, namely the latest Ordovician Hirnantian excursion (HICE), which is the most prominent among the Ordovician excursions, and the early Late Ordovician (early Katian) Guttenberg excursion (GICE), which was first recognized in the Decorah Shale of Iowa. Although being of smaller magnitude than the HICE, the GICE has now been documented from more than 20 localities across North America, ranging from Oklahoma to Ontario, and from New York State to Nevada. Stratigraphically, this excursion occurs slightly above the Deicke and Millbrig K-bentonites and somewhat above the base of the North American Chatfieldian Stage. Documented GICE occurrences include, for instance, the Viola Springs Formation in Oklahoma, the Lexington Limestone of Kentucky, the Hermitage Formation of Tennessee, the lower Decorah Shale of the Upper Mississippi Valley, the Napanee and Kings Falls formations of New York State, and the uppermost Copenhagen Formation of Nevada. In Europe, the GICE is now recorded from more than a dozen localities in Estonia and Sweden where it occurs above the widespread Kinnekulle K-bentonite in the upper Keila and Oandu stages. Recently, the GICE has been discovered at several localities in southern and northwestern China, where it is present in the Pagoda Formation. Being biostratigraphically dated by means of conodonts and graptolites, the GICE is a globally useful chemostratigraphic tool for clarifying the precise relationships between geographically widely separated sections that previously were difficult, or impossible, to correlate. This is illustrated by the fact that it offers a correlation precision of ± a couple of meters between strata in Iowa and southern China.

North-Central Section - 43rd Annual Meeting (2-3 April 2009)

MIDDLE & UPPER GIVETIAN (MIDDLE-DEVONIAN) RECORD OF SEA LEVEL AND FAUNAL EVENTS IN EASTERN BRITISH COLUMBIA, WESTERN CANADIAN ROCKY MOUNTAINS

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The lower part of the Devonian succession in Kakwa Park area of eastern B.C. provide a record of three (or four) major relative sea level events that record the initial, and progressive onlap of the Peace River and West Alberta arches. Faunal data in the upper Yahatinda and lower Flume Formation suggest the initial marine transgression occurred no earlier than upper Middle *varcus* Zone, coinciding to the initial eustatic deepening of Devonian Transgressive-Regressive (T-R) Cycle IIa of Johnson and others, and T-R cycle IIa-1 of Day and others. The lowest brachiopod fauna of the lower Flume consists of the oldest element of the *Tecnocyrtina* brachiopod lineage (*T.* sp. aff *T. missouriensis*) in North America. Above this initial assemblage, brachiopod-bearing Flume Sequence 1 highstand deposits yield *Desquamatia (Desquamatia)* with *Athyris* and comprise the biotic signature of the initial or first Taghanic bioevent in the region. A second significant marine flooding event established middle shelf conditions with diverse Upper Givetian brachiopod fauna (second Taghanic event) including *Desquamatia* (*D.*), *D.* (*Seratrypa*), *Spinatrypa* aff. *S. bellula*, *T. missouriensis raaschi*, *Cyrtina, Nervostrophia* sp., and "*Hypothyridina*" cf. "*H.*" *cameroni*, capped by prograding stromatoporoid reef carbonates. This initial phase of fringing reef development in the Kakwa Park area coincided with Slave Point reef development in along the northern flank of the Peace River Arch in northern Alberta. The brachiopod assemblage indicates an age no older than the *hermanni* Zone and no younger than the lower part of the *disparilis* Zone indicating that this second marine flooding event began during than *hermanni* Zone and represents an intra-T-R cycle IIa-1 event new recognized in North American basins. A third marine flooding event may be represented by minor reef platform backstepping, and resumed Upper Flume fringing reef progradation, associated with the occurrence of conodonts of the Upper *Icriodus subterminus* Fauna. Platform drowning associated with very late Givetian marine flooding of Devonian T-R cycle IIb-1 (first "Waterways cycle") terminated Flume reef development and introduced deeper shelf faunas with elements of the *Tecnocyrtina billingsi* Zone fauna.

North-Central Section - 43rd Annual Meeting (2-3 April 2009)

SEQUENCE STRATIGRAPHY AND CONODONT PALEOECOLOGY OF THE LOWER DUPEROW FORMATION (UPPER DEVONIAN) IN WESTERN NORTH DAKOTA

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Very little work has been done on the classic Devonian Duperow Cycles from the Williston Basin in last 20 years. This study will examine the Duperow Formation (from the subsurface of western North Dakota) to get more information on the environmental and climatic conditions of this part of North America approximately 350 million years ago. This is an important time for this area of North America because it was tropical and covered periodically by a shallow sea. The area of study in western North Dakota had deeper seas and therefore has the best sediment record of this time period. The transgression and regression of the sea can be read through the rock record, by analyzing well logs and core samples. These cores have been studied by visiting the Wilson M. Laird Core and Sample Library. It is important to understand the transgression and regressions because transgressions in the rock tell us that global climate was warming. This goes the same for regressions showing that sea level fell and climate was cooling.

After examining many cores and well logs from relative close locations, we are correlating this data over a wide spread area so we can plot the major and minor transgressions and regressions of the ocean that resulted in the deposition of the Duperow. All of this research is important because understanding the past is the key to understanding what is happening today and in the future with climate change. Another important factor of this formation is that the oil that is being drilled for in North Dakota comes from this time period. Knowing the stratigraphy is key in the economics of North Dakota as well. The stratigraphic study will provide a temporal and spatial framework for paleontological studies. This further study is also important because it is more concrete data of the climate change of the time. It will be accomplished by studying and analyzing conodonts from core samples.

North-Central Section - 43rd Annual Meeting (2-3 April 2009)

The Chief Panderer apologizes if any conodont-bearing or conodont-related abstracts, were missed in these, or any other, meetings.

Past Meetings

March 15-18, 2009, Houston, Texas, Geologic Problem Solving with Microfossils, sponsored by NAMS, the North American Micropaleontology Section of SEPM

The following papers utilizing or mentioning conodonts, were presented:

Advances in Lower and Middle Pennsylvanian conodont biostratigraphy in southeastern Ohio by Glen K. Merrill, University of Houston-Downtown, Houston, Texas, U.S.A.

Biostratigraphic significance of radiolarians, conodonts, and foraminifers from the Williams Ranch Member of the Cutoff Formation (Roadian, Middle Permian), Guadalupe Mountains, West Texas by Merlynd K. Nestell* and Galina P. Nestell, University of Texas at Arlington, Arlington, Texas, U.S.A.

New conodont findings from the Triassic of Karaburin Peninsula (western Turkey) by Omer Noyan, Celal Bayar University, Manisa, Turkey

Early Triassic conodont biostratigraphy and sedimentary sequences of the Meishan D Section in Changxing, Zhejiang Province, South China by Kexin Zhang*, Jinnan Tong and Xulong Lai, China University of Geosciences, Wuhan, Hubei, China

Stratigraphy and Structure of the Roberts Mountain allochthon, NV, USA, clarified by radiolarian biostratigraphy by Paula J. Noble*, Tim Hall, Brian C. Cellura and Richard C. Capps, all exept the last author are from the University of Nevada at Reno, Reno, Nevada, U.S.A.

(Titles courtesy of Glen K. Merrill; abstracts were not available electronically)

Upcoming Meetings

June 4-11, 2009, Sardinia, Italy; Silurian Field Meeting: Time and Life in the Silurian, A Multidisciplinary Approach

The Subcommission on Silurian Stratigraphy and associated researchers will meet in 2009 in Sardinia, Italy, from June 4th to 7th. The scientific sessions as well as the ISSS Business Meeting will be held in a small town on the southern cost of the island, a few km from Cagliari. A four-day field trip in the southern part of Sardinia will follow the meeting.
All Silurian workers are welcome to join the meeting. Any contribution on Silurian stratigraphy, palaeoecology and palaeogeography is welcome, however the major emphasis will be on integrated multidisciplinary studies on Silurian rocks and fossil biota.

Field Trip - Four days of field trip are scheduled after the meeting, from June 8th to 11th. The field trip will start from the meeting location and finish in Cagliari. Both Silurian limestone and black shale sediments will be accessible at a number of sections and outcrops as well as Hirnantian and Lochkovian sediments. The field trip is limited to 30 participants.

Programme (June 2009)
June 4th arrival of participants and ice-breaker party
June 5-7th technical session and ISSS Meeting
June 8-11th field trip

Contacts
e-mail contacts: silurian2009@unica.it
More information and the second circular are available at: www.unica.it/silurian2009
(submitted by Carlo Corradini and Annalisa Ferretti)

July 12-17, 2009, International Conodont Symposium (ICOS 2009), University of Calgary, Calgary, Alberta, Canada

The second International Conodont Symposium will be held at the University of Calgary during July 2009. General information is provided below, but more detailed information is provided on a website at http://www.ucalgary.ca/conodont or contact Charles Henderson (Chairman of ICOS 2009) via email at charles.henderson@ucalgary.ca or cmhender@ucalgary.ca.

Registration is open online at http://www.ucalgary.ca/conodont/icos/registration.
Early-bird registration was over on May 15, 2009; regular registration continues after May 15th at higher rates. Submit abstract titles and authorship by May 15th ; submit complete abstracts by June 1st, 2009.

Schedule/Itinerary

July 12, 2009; Icebreaker on University Campus: Sunday evening
July 13-14, 2009; Technical Sessions (Please note [below] the symposium at this conference entitled: Functional, Ecological and Evolutionary Significance of Character Change in Conodont Elements, proposed and organised by Mark Purnell and David Jones)
July 15; Workshops or day trip to Royal Tyrrell Museum of Palaeontology;
July 16-17, 2009; Technical Sessions
July 16, 2009, Thursday evening. Western style banquet at Kananaskis Guest Ranch.

Fieldtrips: (in preparation)

July 11 and July 18
Burgess Shale day trips (geological & palaeontological sightseeing). 4 day post-conference Rocky Mountain fieldtrip with overnights in the resorts of Banff and Jasper (July 18-21); mostly latest Devonian to Early Triassic units will be viewed with collecting opportunities including the Permian-Triassic boundary. There will also be a stop to see the glaciers on the Icefields Parkway.

Accommodation:
A block of rooms have been reserved on campus; these are apartment style. A small block of rooms have been reserved at Village Park Inn close to campus. More information will be provided by links in our website. Room reservations and registration will be completed by Conference and Special Events Services on Campus.

Getting to Calgary:

There are two daily flights on Air Canada to Calgary from Frankfurt and London.
There are daily flights from Sydney, Hong Kong, Shanghai, Nanjing connecting through Vancouver.
There are numerous direct or connecting flights from the United States, especially from Chicago, Denver, Los Angeles, Minneapolis, Seattle and San Francisco. Direct flights from most major cities in Canada.

The University and City Attractions:

The University has over 25,000 full-time students and has excellent facilities for our meeting including accommodation. Calgary has a population of nearly 1.1 million and is the gateway to the southern Canadian Rocky Mountains. Calgary is home of The Greatest Outdoor Show on Earth – the Calgary Stampede (July 3-12, 2009). There will be a facility for workshops with microscopes including dual viewing with video monitor.

(Submitted by Charles Henderson).

Functional, Ecological and Evolutionary Significance of Character Change in Conodont Elements; A symposium proposed for ICOS 2009, organised by Mark Purnell and David Jones

Much conodont research deals with identifying taxa and documenting their distribution through time. This symposium will focus on a different level, by examining the underlying causes of these temporal patterns in diversity and distribution through analysis of the morphological characters of elements and apparatuses, how these characters changed through time, and the functional, ecological and evolutionary significance of those changes. Character change, in this context, encompasses both discrete characters and continuously varying aspects of morphology. Changes might include those that occur through lineages, across phylogenies, or within life histories (developmental/ontogenetic and/or consequences of function).

Talks already in the provisional programme include: Quantitative analysis of microevolution in *Pterospathodus*, convergence in tooth complexity and food processing function in conodonts and mammals, the consequences of iterative and convergent morphologies in conodont P elements, wear and damage caused by tooth use in conodonts: within and between species comparisons patterns of character evolution in *Idiognathodus*

Provisional list of speakers include Jim Barrick, Charles Henderson, Jiang Haishui, David Jones, Mark Purnell and Steve Roscoe.

Mark and David invite wider participation from the international conodont community. If you are interested in participating in this symposium, and you have yet to submit your abstract for ICOS, please drop them an email indicating your intention to submit (but send your abstract to Charles Henderson). If you have already submitted an abstract you would like to be considered for inclusion in the symposium, please let them know.

Questions to be considered in talks for this symposium might include: What particular aspects of conodont element morphology were changing and how? Did different characters change in concert or independently? Did changes correlate with environmental perturbations? What was the functional significance of characters and their changes? The answers to these questions are fundamental to understanding conodont evolution, yet they are rarely articulated or addressed explicitly. Mark and David's hope is that this symposium will generate debate and discussion of important issues that lie at the heart of conodont research.

If interested in contributing to this symposium, please contact Mark Purnell mark.purnell@leicester.ac.uk or David Jones, University of Leicester doj2@le.ac.uk

11-19 August 2009, Subcommission of Carboniferous Stratigraphy (SCCS) Field Meeting to visit the historical type sections, as well as proposed and potential GSSPs of the Carboniferous in Russia. Please go to the website http://carbon.paleo.ru/ for more information. If you would like to attend this meeting and have not registered yet, please contact the organisers as soon as possible.

(submitted by Markus Aretz markus.aretz@lmtg.omp-obs.fr)

14-18 September 2009, Paleozoic Seas Symposium, an International Conference, at the Institute of Earth Sciences, Karl-Franzens-University, Graz, Austria

Please follow the link below to the Circular and Registration Form (online registration is possible): Circular and Registration Form under "Veranstaltungen" using the link http://palstrat.uni-graz.at

(submitted by Thomas Suttner thomas.suttner@uni-graz.at)

Future Meetings

April 11-13, 2010, A Pander Society Symposium and Field Trip in honour of Ray Ethington, Tom Thompson and Jim Miller will be held at Branson, Missouri, U.S.A., in conjunction with a combined meeting of the North-Central and South-Central sections of the Geological Society of America. The field trip is scheduled to be to the Weaubleau Impact Structure, and Panderers who were not on that trip several years ago, are encouraged to go. There will also be a "real" Pander trip to see the Kinderhookian and Osagean stratigraphy in the extreme SW Missouri. For more information contact our organizing colleague James F. Miller, Missouri State University at JimMiller@MissouriState.edu

You may also wish to contact Thomas G. Plymate TomPlymate@MissouriState.edu & Marcia Schulmeister mschulme@emporia.edu for information re this GSA joint sectional meeting.

June 28- July 3, 2010, Third International Palaeontological Congress will be held in London in 2010, based in venues in and around Imperial College and the Natural History Museum. The meeting will be hosted by The Palaeontological Association and partner organizations from the 28th June - 3rd July 2010. As in Sydney and Beijing, we plan to showcase contemporary palaeontology through a diversified and exciting scientific programme.

The Pander Society is invited to offer a symposium or, perhaps more appropriately, a workshop for IPC3. As symposium organizers **you** would offer a symposium title and organize chairs and key speakers. The remainder of each symposium will be filled by contributions offered by conference delegates; we aim to have a balance of talks and posters for all formal sessions. All delegates to the conference will have the opportunity to submit abstracts, and the Science Committee will allocate these to appropriate symposia. The symposium organizers will then have the responsibility to accept these submissions as talks or as posters or to recommend to the Science Committee that they be rejected on objective scientific grounds.

For workshops, we anticipate a more informal structure, which can be largely decided by the organizers. The Science Committee reserves the right to suggest modifications to titles/themes and to combine offers that overlap scientifically.

If you wish to offer a symposium or workshop, please submit your ideas to the Chief Panderer. The nature of any Pander Society submisison will be discussed at the ICOS meeting in Calgary.

(Submitted by Richard Aldridge) **Congress website: www.ipc3.org**

Research Interests

Cambrian Bader; Bagnoli; Dong (Xiping); Lehnert; Leslie; Miller (J.F.); Nicoll; Nowlan; Pyle; Qi (Yuping); Repetski; Sansom; Smith; Spencer; Szaniawski; Zhang (Huaqiao);
Ordovician Albanesi; Aldridge; Alekseev; Armstrong; Bagnoli; Bancroft; Barnes; Bergström; Dong (Xiping); Ferretti; Hall; Izokh; Leatham; Lehnert; Leslie; Liu; Löfren; Männik; McCracken; McHargue; Miller (C.G.); Miller (J.F.); Nowlan; Obut; Percival; Pyle; Reimers; Repetski; Sandberg; Sansom; Sarmiento; Savage; Smith; Spencer; Suttner; Sweet; Tarabukin; Viira; Wu (Rongchang); Zhang (Huaqiao); Zhang (Shunxin); Zhen (Yong Yi);
Silurian Aldridge; Bader; Bancroft; Bardashev; Barnes; Barrick; Corradini; Corriga; Garcia-Lopez; Hairapetian; Izokh; Kleffner; Leatham; Lehnert; Leslie; Männik; McCracken; Mawson; Metzger; Miller (C.G.); Molloy; Norby; Nowlan; Over; Pyle; Sansom; Sanz-López; Sarmiento; Sashida; Savage; Simpson; Slavik; Suttner; Talent; Tarabukin; Valenzuela-Ríos; Viira; von Bitter; Wang (Cheng-yuan); Zhang (Shunxin);
S/D boundary Corriga;
Devonian Artyushkova; Bardashev; Barrick; Belka; Bender; Berkyova; Bikbaev; Boncheva; Bultynck; Castello; Corradini; Corriga; Day; Dopieralska; Gholamalian; Girard; Gouwy; Groessens; Herbig; Izokh;

Johnston; Kaiser; Katvala; Kirchgasser; Kirilishina; Klapper; Koenigshof; Kononova; Leatham; Liao; McCracken; Machado; Maslov; Matyja; Mawson; Metzger; Miller (C.G.); Murphy; Narkiewicz; Nazarova; Obut; Over; Perri; Piecha; Pyle; Randon; Repetski; Ruppel; Sandberg; Sanz-Loópez; Savage; Saydam-Demiray; Slavik; Sloan; Snigireva; Spalletta; Suttner; Szaniawski; Tarabukin; Uyeno; Valenzuela-Ríos; Wang (Cheng-yuan); Wankiewicz; Woroncowa-Marcinowska; Zhuravlev;
Frasnian-Famennian boundary Bikbaev; Castello; Kirilishina; Perri; Snigireva; Spalletta;
D/C boundary Corradini; Kaiser; Perri; Spalletta;
Carboniferous Alekseev; Bardasheva; Barrick; Belka; Bender; Boncheva; Corradini; Dopieralska; Dumoulin; Garcia-López; Groessens; Henderson; Herbig; Igo (Hisayoshi); Ishida; Jones (G.Ll); Kaiser; Kononova; Krumhardt; Lambert; Lang (Jiabin); Mawson; Méndez; Nazarova; Nemyrovska; Norby; Orchard; Park; Perri; Piecha; Poole; Purnell; Qi (Yuping); Randon; Reimers; Rexroad; Savage; Spalletta; Sudar; Talent; Tarabukin; von Bitter; Wang (Chen-yuan); Whiteside; Yolkin; Zhuravlev;
Mississippian Blanco-Ferrera; Johnston; Matyja; Medina-Varea; Purnell; Rexroad; Ruppel; Sandberg; Sanz-López; von Bitter;
Pennsylvanian Bader; Blanco-Ferrera; Brown; Heckel; Merrill; Méndez; Pieracacos; Rexroad; Rosscoe; Salinas; Sandberg; Sanz-López; von Bitter;
Permian Alekseev; Dumoulin; Henderson; Ishida; Isozaki; Klets; Lambert; Nakrem; Orchard; Park; Perri; Qi (Yuping); Randon; Reimers; Ruppel; Shen; Wang (Cheng-yuan); Zhuravlev;
Permian-Triassic Interval Aldridge; Kolar-Jurkovšek; Metcalfe;
P/T boundary Goudemand; Henderson; Isozaki; Lai (Xulong); Metcalfe; Paull; Perri; Sweet;
Triassic Dumoulin; Goudemand; Henderson; Hirsch; Igo (Hisayoshi); Ishida; Kaiser; Katvala; Klets; Kolar-Jurkovšek; Kiliç; Kovacs; Liu; Marquez-Aliaga; Mikami; Nakrem; Narkiewicz; Nicoll; Orchard; Perri; Plasencia-Camps; Randon; Reimers; Rigo; Sashida; Savage; Sudar; Wang (Cheng-yuan);
Basal Cambrian to basal Jurassic Kozur;

Biostratigraphy Agematsu; Albanesi; Alekseev; Artyushkova; Bagnoli; Bardashev; Bardasheva; Bauer; Bergström; Berkyova; Bikbaev; Blanco-Ferrera; Boncheva; Bultynck; Corradini; Corriga; Day; Dong (Xiping); Garcia-López; Gholamalian; Goudemand; Gouwy; Hall; Heckel; Henderson; Herbig; Ishida; Izokh; Jeppsson; Johnston; Kaiser; Katvala; Kirchgasser; Kirilishina; Klapper; Kleffner; Klets; Kolar-Jurkovšek; Kononova; Leatham; Lehnert; Leslie; Liao; Liu; Löfgren; Luppold; McCracken; McHargue; MacKenzie; Maslov; Metcalfe; Miller (J.F.); Murphy; Nakrem; Narkiewicz; Navas-Parejo; Nemyrovska; Norby; Nowlan; Obut; Orchard; Over; Park; Percival; Perri; Piecha; Rexroad; Rigo; Rosscoe; Ruppel; Sanz-López; Sarmiento; Sashida; Savage; Shen; Simpson; Smith; Snigireva; Spalletta; Sudar; Sweet; Tarabukin; Uyeno; Valenzuela-Ríos; Viira; Whiteside; Witzke; Woroncowa-Marcinowska; Wu (Rongchang); Yolkin; Zhen (Yong Yi);
Palaeogeology Marquez-Aliaga;
Biochronology Orchard;
Conodont-radiolarian age comparisons Yoshida;

Boundaries Izokh; Kaiser; Obut; Yolkin;
GSSP Rigo;
Zonation Bardashev; Bardasheva; Kaiser; Poole;
Correlation Kaiser;
Graphic correlation Gouwy; Sloan;

Stratigraphy Bardashev; Bardasheva; Bender; Dusar; Groessens; Männik; Matyja; Poole; Pyle; Sandberg; Slavik; Suttner; Tarabukin; Yao (Jianxin);
Sequence stratigraphy Johnston; Kaiser; Lambert; Rosscoe;
Chronostratigraphy Kleffner; Lambert; Valenzuela-Ríos; Whiteside

Event stratigraphy Matyja;
Events Jeppsson; Kleffner; Männik; Sandberg; Savage
Mass Extinction Isozaki; Kaiser; Sandberg; Savage
Crises Girard;
Oceanic episodes Kleffner

Isotope geochemistry Barnes; Lehnert;
Stable isotopes Berkyova; Day; Kaiser; Purnell; Ruppel;
Strontium isotopes Ruppel;
Chemostratigraphy Bergström;
Laser ablation Nascimento;

CAI Barnes; Belka; Blanco-Ferrera; Boncheva; Garcia-López; Ishida; Koenigshof; Kolar-Jurkovšek; Kovacs; Lang (Jiabin); Lehnert; Mawson; Metcalfe; Narkiewicz; Navas-Parejo; Norby; Nowlan; Paull; Piecha; Repetski; Sanz-López; Sarmiento; Sudar; Talent; Tarabukin; Wang (Cheng-yuan); Zhang (Shunxin);
Relationship between CAI and quartz recrystallization Mikami;
Surface texture alteration Repetski;

Conodont Lagerstätten Aldridge; Purnell; von Bitter;
Bedding plane occurrences Leslie; Purnell; von Bitter;

Taphonomy Over;

Lithology Bikbaev; Snigireva
Lithofacies Dumoulin;
Carbonates Berkyova; Ruppel; Wankiewicz
Black shales Over; Ruppel
Biosedimentation Liao;

Faunas Ishida
Databases Charpentier

RESEARCH ACTIVITIES

Agematsu, Sachiko. Ordovician to Devonian conodonts from Thailand and Malaysia; Triassic conodonts from Japan.
Albanesi, Guillermo. Lr. Palaeozoic conodont faunas from the W and NW of the Argentine basins, as well as other specific South American localities; extensive project on high-resolution conodont-graptolite biostratigraphy of the Argentine basins (with G. Ortega et al.); conodont paleothermometry of the Precordillera, and biostratigraphy and paleoenvironments from the Eastern Cordillera (with Ph.D. students G. Voldman & F. Zeballo).
Aldridge, Dick. Ordovician conodont apparatuses from the Soom Shale, South Africa (in prep.); Silurian conodonts from S. China (with Wang Cheng-yuan, to be submitted 2009); P/T boundary conodonts of the Meishan section, China (ongoing with Jiang et al.); polygonal patterning on gondolellid platform elements (with Jiang et al., 2008); inter-relationships of complex conodonts (with Donoghue et al., 2008); cladistic investigation of Silurian *Ozarkodina* (ongoing); the discovery of conodont soft tissues (with Briggs, in press); history of the Pander Society at 40 (with von Bitter, 2009).
Alekseev, Alexander. Ordovician conodonts from xenoliths in Devonian kimberlite pipes of the Arkhangelsk Region, N. European Russia (with T. Tolmacheva); Carboniferous-Permian conodonts of the Russian Platform and S. Urals; Moscovian-Asselian conodonts from condensed sections of the Arkhangelsk Region (with A. Reimers, in progress); improved conodont biostratigraphy for the type Kasimovian and Gzhelian stages, Moscow Basin; revision of conodont assemblages from U. Visean and Serpukhovian sections S. of Moscow (new project, with N. Goreva).
Armstrong, Howard. Industry sponsored projects on peri-glacial black shale deposition and high latitude responses to the Hirnantian glaciation; palaeobiogeographical study of graptolites and chitinoza (with T. Vandenbrucke and M. Williams) (has commenced). The latter project is providing an amazing insight into shifting climate belts during the U. Ordovician, and supplements work on Ordovician Intertropical Convergence Zone behaviour during cooling (Climate belts papers in ?2009).
Artyushkova, Olga. Devonian conodont biostratigraphy of the S. Urals.

Bagnoli, Gabriella. Cambrian (Furongian) conodonts of N. & S. China; potential GSSP for base of Cambrian stages 9 and 10; U. Ordovician conodonts from S. China.
Bancroft, Alyssa. Silurian conodonts of SW Ontario, plus Ordovician conodonts in Pennsylvania (including) Nd isotope analysis.
Bardashev, Igor. Silurian and Devonian stratigraphy and conodonts from central Asia.
Bardasheva, Nina. Carboniferous stratigraphy and conodonts from central Asia.
Barnes, Chris. Relating conodont biostratigraphy, biofacies and biogeography to patterns of eustasy and tectonism affecting N. Laurentia in the early Palaeozoic (with S. Zhang, GSC); conodont geochemistry (with J.Trotter, ANU and CSIRO) (see Science, 2008); L. Ordovician conodonts from S. Ontario (with S. Zhang and G. Tarrant) and Ashgill-Wenlock Canadian Arctic conodonts (with D. Jowett) (nearing completion).
Barrick, James. Silurian and Carboniferous conodont faunas and integration of chemostratigraphy with conodont biostratigraphy. Jim and Mark Kleffner have made considerable progress in their investigations of Silurian oceanic events in Laurentia. A significant aspect is the recognition of the Lau Event in the m. Brownsport Fm. in Tennessee, where they continue to collect data to document the effects of this major event. Taxonomic and biostratigraphic work on Late Carboniferous conodonts has focused on boundary issues; the collective efforts of a large number of conodont workers is making good progress toward faunal characterization of the Moscovian-Kasimovian and Kasimovian-Gzhelian boundaries.
Barskov, Igor. Conodonts of the Serpuchovian type section, Russian Platform.
Bauer, Jeff. Conodonts and biostratigraphy of south-central Oklahoma (ongoing).
Belka, Zdzislaw. L. Devonian conodont stratigraphy, S. Anti-Atlas, Morocco. REE isotope chemistry of conodont elements in the Variscan of Europe, and Devonian CAI studies in N. Africa and Iran. Conodont element composition variations (new project).
Bender, Peter. Devonian and Carboniferous conodonts of the Rheinische Schiefergebirge (Lahn-Dill area) (ongoing).
Bergström, Stig. $\partial^{13}C$ chemostratigraphy (mostly involving conodonts although with little taxonomy) with projects underway in Baltoscandia, China, Malaysia and North America; large biostratigraphic project involving conodonts and graptolites of the Miaopo and Pagoda fms. (with C. Xu, D. Goldman, et al.); Ordovician biodiversity dynamics in Baltoscandia involving more than 400 species (with D. Goldman, D. Sheets & J. Nolvak); chemostratigraphy and conodont biostratigraphy of the Mjosa Formation in Norway with conodonts of Laurentian, rather than Baltic, type (with B. Schmitz, S. Yong & D. Bruton).
Berkyova, Stana. The Basal Choteč event and contemporaneous environmental and biotic changes (ongoing); late Emsian-early Eifelian conodont taxonomy in Nevada and the Prague Basin (with G. Klapper & M. Murphy).
Bikbaev, Alexander. U. Devonian of the Urals, especially F/F boundary (continuing).
Blanco Ferrera, Silvia. CAI and textural alteration in conodonts related to hydrothermal activity; conodonts from diagenesis to metamorphism in the N. Iberian Peninsula, focused in NW Cantabrian Mtns; Mississippian *Gnathodus* species systematics; the Visean-Serpukhovian boundary; conodont faunas near the Mid-Carboniferous boundary; Myachkovian to Kasimovian conodonts from the Cantabrian Mtns.
Boncheva, Iliana. Devonian and Carboniferous conodonts in N. Bulgaria, Turkey and Iran; conodonts in hydrocarbon exploration to estimate paleotemperatures & biogeographic affinities; conodont textures as a result of hydrothermal activity, low-grade metamorphism & low-temperature hydrothermal mineralization. Moesian paleogeographical position during the Palaeozoic, and timing its collision with Laurussia. Paleogeographical interpretation and reconstruction of the Moesian Terrane, based on combined biogeographic, paleoclimatic and paleomagnetic analyses.
Brown, Lewis. West Franklin Ls. (Desmoinesian-Missourian, Pennsylvanian) (MS in final review). Porvenir Ls. (Desmoinesian, Pennsylvanian) s. Sangre de Cristo Mtns., New Mexico, USA (abstract April 2009 NC GSA); Other Illinois Basin projects (with C. Rexroad) (ongoing).
Bultynck, Pierre. Late Givetian- e. Frasnian conodont communities with *Icriodus subterminus* from North America, Europe and NW Africa (MS with K. Narkiewicz); Lochkovian-Pragian conodonts of the Brest area (NW France) (MS in prep. with Plusquellec, Racheboeuf and Weyant). Variability of conodont taxa mainly based on material from the GSSP for the base of the Givetian (Tafilalt, S. Morocco) (with Walliser & Weddige); updating identification of conodonts from other relevant sections.
Buryi, Galina. Main or key morphological structures of euconodont animals.
Castello, Veronica. Devonian conodonts especially tied to the Frasnian-Fammenian boundary and stages (ongoing).

Corradini, Carlo. Devonian/Carboniferous boundary; evolution of early siphonodellids; Silurian, Devonian and Lr. Carboniferous conodonts from Sardinia; Silurian to Lr. Devonian conodonts of the *Orthoceras* limestones of the Carnic Alps; lithostratigraphy of the pre-Variscan sequence of the Carnic Alps.
Corriga, Maria Giovanna. Conodont taxonomy and biostratigraphy of the Silurian-Devonian boundary in Sardinia, the Carnic Alps and other N. Gondwana regions.
Day, Jed. M. & L. Devonian conodont and brachiopod biostratigraphy of continental margin, reef platform and basinal facies in w. Canada (see Whalen & Day, 2008); Givetian and Frasnian conodont biostratigraphy of the epeiric carbonate ramp system in the Iowa Basin (Witzke *et al.*); conodont apatite-based sea surface records for the Frasnian-E. Famennian of the equatorial ocean from Alberta-B.C., compared with the coeval record from the Iowa Basin & to study the role of climate change and third order sea level changes and climate, as a driver for Kellwasser extinction bioevents; the Famennian in subsurface of the Iowa and Illinois basins (with J. Over, underway); C isotope chemostratigraphy of the upper and uppermost Famennian D-C boundary interval in the E. Missouri (with Rowe & Rimmer) with new more complete records of late Famennian carbon isotope events-excursions (Cramer et al., in press). High-resolution integrated C isotope and magnetic susceptibility on the uppermost Famennian Substage in core H-32 (near completion); short term Malankovitch precession and obliquity signals are resolvable, and will permit astronomical calibration (4.1 million year duration) of the M. *expansa* to U. *praesulcata* zone interval, and constraining the onset of the L. Devonian greenhouse-icehouse climate transition.
Donoghue, Philip. The origin of conodonts (ongoing, with Dong Xiping).
Dong, Xiping. Cambrian to Lr. Ordovician conodonts from S. China, and Liaoning, Shandong, N. China; histology of protoconodonts, paraconodonts and earliest euconodonts from China.
Dopieralska, Jolanta. REE isotope chemistry of Devonian and Carboniferous conodonts from the Variscan realm.
Dumoulin, Julie. Carboniferous-Permian Lisburne Group throughout northern Alaska and on Palaeozoic metacarbonate rocks in the Brooks Range and on Sewart Peninsula.
Dusar, Michiel. N. Belgium subsurface geology; Frasnian/Famennian boundary in Vietnam.
Dzik, Jerzy. Evolution of Ordovician and Devonian conodont apparatuses.
Ferretti, Annalisa. Ordovician conodonts of S. Europe. Taxonomic revision of *Teridontus* (Tremadocian, S. Montagne Noire, France)(with Serpagli, Nicoll & Serventi).
García-López, Susana. Silurian to Lr. Carboniferous conodonts, focusing mainly on biostratigraphy and biofacies. Also, conodont CAI in the Cantabrian Zone and Pyrenees of NW and NE Spain.
Gholamalian, Hossein. Biostratigraphy and taxonomic description of Famennian conodonts from east-central Iran.
Girard, Catherine. Frasnian/Famennian conodonts from the Montagne Noire; size and shape analysis of conodonts (especially *Palmatolepis*) (with Renaud, Lyon, France); oxygen isotopes from conodont apatite (with M. Joachimski, Germany) and Sr/Ca ratios of conodonts (with V. Balter, Lyon, France).
Goudemand, Nicolas. E. Triassic condonts, with new material from Pakistan, Spiti, Tibet and Utah.
Gouwy, Sofie. Lr. and M. Devonian of Sardinia, M. Devonian of the Spanish Central Pyrenees (with J.I. Valenzuela Rios & J.C. Liao).
Hairapetian, Vachik. Silurian Niur Fm. in Derenjal Mtns., east-central Iran (with G. Miller). Numerous conodonts and ostracods have been collected. A paper on fish (thelodonts and a few acanthodians) was recently published.
Hall, Jack. S.Appalachian U. Ordovician/Lr. Silurian conodonts (MS in ?2010).
Heckel, Phil. Pennsylvanian biostratigraphy of conodonts, especially providing stratigraphic information for conodont occurrences (ongoing, with colleagues).
Henderson, Charles. Sequence biostratigraphic research on U. Paleozoic to Triassic strata around the world including western and Arctic Canada, Bolivia, China, Russia and the United States (ongoing). Development of refined biozonations by investigating evolutionary models for conodont speciation, the extent of conodont provincialism, and the recognition of geographic clines.
Herbig, Hans-Georg. Carboniferous stratigraphy of the Betic Cordillera (S. Spain) (studies await completion); Tournaisain-Visean boundary in W. Germany (smaller foraminifera, conodonts) (ongoing, with J. Kalvoda, Brno).
Hirsch, Francis. Gondolellacean multi-elements and paleobiogeography (with K. Ishida, Tokushima and A. Murat Kilic, Balikesir).
Igo, Hisayoshi. Lr. Triassic conodonts from Primorye, Russia (2009).

Ishida, Keisuke. Triassic, Permian and Carboniferous of SW Japan; conodont biostratigraphy across the Carnian-Norian boundary in the Jifukudani bedded-chert, Tamba Terrane, Inner Zone of Japan (see Mikami, et al., 2008); multielement analysis of the M.-L. Triassic Nogami collection from SE Asia (with F. Hirsch); Late Carboniferous faunas from the Outer Zone of SW Japan.
Isozaki, Yukio. Field work in S. China. Mass extinction issues, particularly the double-phased extinction at the Guadalupian-Lopingian (M.-L. Permian) boundary and the P-T boundary *per se*.
Izokh, Nadezhda. Ordovician, Silurian and Devonian conodonts of the Altai-Sayan folded area, W. Siberia, Russia and S. Tien Shan (with E.A. Yolkin).
Jeppsson, Lennart. Conodonts & biostratigraphy of the Wenlock and Ludlow events; the Sheinwoodian and late Ludfordian, occasionally other intervals.
Jones, David. Using microwear to elucidate conodont ecology; constraining palaeothermometry based on conodont oxygen isotopes.
Kaiser, Sandra. High-resolution conodont and ammonoid stratigraphy; conodont biofacies in the Carnic Alps, Montage Noire, Pyrenees, Graz Palaeozoic, Rhenish Massif, sw China and Morocco; taxonomic siphonodellid studies at the D/C boundary; conodont studies at the GSSP D/C boundary (La Serre, Montagne Noire); sequence stratigraphy of siliciclastic Devonian and Carboniferous successions in Morocco, for the reconstruction of major sea-level changes during the Hangenberg mass extinction event; C isotope analyses of limestones and organic matter; O isotopes of conodont apatite for the reconstruction of palaeoenvironmental changes at the D/C boundary; new U. Famennian and Lr. Tournaisian conodont zonations. Conodonts, fish and shark teeth from the M. Triassic of SW Germany (Muschelkalk of the Germanic Basin).
Katvala, Eric Cowing. Using biostratigraphic, paleoecologic, and paleogeographic data from Mississippian-Triassic conodonts to constrain paleontologic, stratigraphic, and tectonic interpretations in the accreted terranes of western North America; element distributions in conodont elements utilizing the electron microprobe.
Kiliç, Ali Murat. Multielement taxonomy of Triassic conodonts (with F. Hirsch).
Kirchgasser, William. Microvertebrate sequences, especially conodonts, of the L. Devonian (u. Givetian-Frasnian) of New York (with G. Klapper, G. Baird, J. Over, C. Brett & J. Zambito); goal is to refine alignment of conodont and ammonoid (goniatite) cephalopod zonations (see House & Kirchgasser, 2008, Bull. of Am. Paleo. no. 374).
Kirilishina, Elena. Frasnian & Famennian conodonts of the central Russian Platform.
Klapper, Gilbert. Frasnian and Famennian conodont taxonomy and biostratigraphy (ongoing); Frasnian of New York (with W. Kirchgasser) and late Emsian-early Eifelian taxonomy in Nevada & the Prague Basin (with S. Berkyova) (papers in progress).
Kleffner, Mark. Revised conodont-, graptolite-, and chitinoza-based Silurian chronostratigraphy (with J. Barrick); δ13C chemostratigraphy of Ordovician/Silurian boundary strata of the North American Midcontinent (with S. Bergström); conodont biostratigraphy, oceanic episodes, and δ13C chemostratigraphy of Silurian/Devonian boundary strata in New York; Ireviken Event and Ireviken δ13C excursion (with Cramer et al.); oceanic episodes, 13C chemostratigraphy, and updated Homerian, Gorstian, and Ludfordian (Silurian) conodont biostratigraphy of S. Laurentia; Silurian high-resolution stratigraphy on the Cincinnati Arch (with B. Cramer, P. McLaughlin and C. Brett).
Kletz, Tatyana. Triassic palaeobiology and biostratigraphy.
Königshof, Peter. Correlation of CAI and other methods on low to medium grade metamorphism (ongoing).
Kolar-Jurkovšek, Tea. Permian-Triassic and Triassic biostratigraphic studies in the Dinarides.
Kononova, Ludmila. M. to L. Devonian and E. Carboniferous conodonts.
Kozur, Heinz. Carboniferous, Permian and Triassic conodonts of Turkey; Triassic conodonts of Germanic Basin and the Tethys; Triassic conodont apparatuses.
Lai, Xulong. Conodonts of the P/T and Guadalupian-Lopingian boundaries in S. China.
Lambert, Lance. Carboniferous and Permian (including Moscovian) chronostratigraphic boundaries (with task groups), and M. Permian (with colleagues).
Lang, Jiabin. Carboniferous conodont faunas (ongoing).
Lehnert, Oliver. O isotopes from conodont phosphate for Cambrian-Silurian palaeoclimate reconstructions from different paleocontinents and paleolatitudes; facies development, sea-level changes and stable isotope stratigraphy of the Baltic area, Prague Basin and other areas.
Leatham, Britt. Ongoing conodont studies.

Leslie, Stephen. Integrating Ordovician conodont biostratigraphy with graptolite biostratigraphy (with D. Goldman); high-resolution L. Ordovician biostratigraphy integrated with tephra-chronology and isotope stratigraphy (with C. Miller, S. Samson, and P. Sadler); Ordovician greenhouse-icehouse transition (with M. Saltzman); conodont isotope stratigraphy and paleoclimate in the late Sandbian (with A. Herrmann).
Liao, Jau-Chyn (Teresa). Conodont biostratigraphy and biosedimentation of neritic and pelagic facies in the Spanish Central Pyrenees; correlation with other sequences, mainly in the Iberian Chains and Rhenish Slate Mtns.
Liu, Jianbo. Lr. Triassic conodonts (with S. Yang) and Ordovician conodonts (with Y.-y. Zhen).
Löfgren, Anita. Ordovician conodonts, mostly Swedish (ongoing, with colleagues).
Luppold, Friedrich. Silurian/Devonian conodonts from SE Turkey (paper in prep.); sampling and processing a Visean/Serpukhovian boundary section (with D. Korn); sampling and processing of a temporary section in the German Muschelkalk (Triassic) & study of the recovered palynomorphs, ostracods and conodonts.
Männik, Peep. U. Ordovician-Lr. Silurian conodont biostratigraphy in stratigraphic sequences (4-year project, started 2007); Ordovician-Silurian boundary in the Baltic area (4-year project, started 2008); Ordovician and Silurian biodiversity in Baltica; evolution and impact of the changing environment' (6-year project, started 2008). Also, joint studies with colleagues from Estonia, Germany, Russia, Sweden, UK and USA, on evolution and high-resolution stratigraphy of the E. Palaeozoic sedimentary basins on Baltica and Siberia palaeocontinents; 2008 Siberian field work studying and sampling U. Ordovician and lowermost Silurian sections on Podkamennaya Tunguska River.
Marquez Aliaga, Ana. Iberian (W. Tethys) Triassic paleobiology and biostratigraphy.
Martinez-Perez, Carlos. Emsian conodonts from Spain.
Maslov, Viktor. Devonian conodont biostratigraphy, especially from the S. Urals.
Mason, Charles. Conodonts from the Haughton impact crater, Canadian High Arctic; 2007 and 2008 field samples finally arrived (ongoing, with J. Repetski).
Matyja, Hanna. Devonian to Mississippian stratigraphy and sedimentology including M.-U. Devonian and Mississippian conodont biostratigraphy, and collaborative biostratigraphic work with E. Turnau (miospores) and A. Tomas (foraminifers); M.-U. Devonian and Mississippian sedimentology; Devonian and Mississippian sea-level history; conodont biostratigraphy and biofacies, and extinction events around the Devonian-Carboniferous boundary.
Mawson, Ruth. Taxonomy and age-implications of L. Silurian, Devonian and E. Carboniferous conodonts from E. Australia, northernmost Pakistan, NW Xinjiang (China), and New Zealand.
McCracken, Sandy. M.-U. Ordovician, Silurian and Devonian conodonts from Canada.
Medina-Varea, Paula. Mississippian conodonts of Sierra Morena (SW Spain) and Morocco; gnathodid taxonomy and biostratigraphy, Mississippian, Atlantic Canada (ongoing, with P. von Bitter)
Méndez, Carlos. Carboniferous (Pennsylvanian) conodonts from the Cantabrian Mtns. (N. Spain).
Merrill, Glen. *Gondolella* (with P. von Bitter) and Lr.-M. Pennsylvanian rocks in SE Ohio (ongoing).
Metcalfe, Ian. Conodont CAIs in N. England; Permian-Triassic and P-T boundary conodont biostratigraphy in China, SE Asia and W. Australia.
Metzger, Ronald. Multielement taxonomy of conodonts from the Devonian State Quarry Limestone nr. Iowa City, Iowa (ongoing).
Mikami, Teiji. Structural geology and low grade metamorphism in SW Japan, especially SE of Kyoto; Radiolarians poorly preserved, therefore using U. Triassic conodonts for age determinations; the relationship between CAI and quartz recrystallization (quartz crystallinity index) in Permian and Triassic bedded cherts of the Jurassic accretionary complex; slaty cleavage and folding in the politic rock with low grade metamorphism.
Miller, Giles. Conodonts from the Silurian of Iran and the Ordovician of Oman.
Miller, James. Cambrian-Ordovician and lower Upper Ordovician conodonts from Utah; Ordovician, Devonian and Mississippian conodonts associated with breccias related to a Mississippian asteroid impact in Missouri.
Molloy, Peter. Taxonomy of L. Llandovery-E. Wenlock conodonts from the Boree Creek Fm., New South Wales, Australia.
Murphy, Michael. M. Devonian of central Nevada conodonts (with S. Berkyova); integrating Lr. Devonian ostracod and conodont biostratigraphies of Nevada (with C. Dojen); Barrandian across the S-D boundary (with P. Carls); isotope studies through the M. Devonian, particularly measuring isotopes across the S-D boundary at Birch Creek (with M. Elrich); graptolite studies across the S-D boundary (with K.

Springer); Emsian study in the Sulphur Springs Range, with brachiopods, fish and conodonts present (with A. Pedder); exciting Cretaceous projects with methane seeps and Albian correlation.
Nakrem, Hans Arne. Permian and Triassic conodonts (and bryozoans) from Svalbard.
Narkiewicz, Katarzyna. European equivalent of *subterminus* fauna (MS in prep., with P. Bultynck); M. Devonian conodonts from Belarus (with S. Kruchek).
Nascimento, Sara. Conodont biostratigraphy of the lr. Itaituba Formation (Atokan, Pennsylvanian) of the Amazonas Basin, Brazil.
Navas-Parejo, Pilar. Palaeozoic stratigraphy and conodont biostratigraphy of the Maláguide Complex (Betic Cordillera, SE Spain), and related Mediterranean domains.
Nazarova, Valentina. M.-U. Devonian and Carboniferous conodonts of the Russian Platform (ongoing); conodont functional morphology.
Nemyrovska, Tamara. Palaeontology and biostratigraphy of Carboniferous conodonts of the Donets Basin (Ukraine), and the Cantabrian Mtns. (Palencia, Spain).
Nicoll, Robert. Ordovician and Permo-Triassic conodont faunas (continuing).
Norby, Rodney. *Lochriea* apparatus (with P. von Bitter); Silurian biostratigraphy (with D. Mikulic); regional CAI database (with J. Repetski, *et al.)*.
Nowlan, Godfrey. Conodont animal affinities (with S. Turner, A. Blieck *et al.*, MS submitted)
Obut, Olga. Ordovician conodont biostratigraphy.
Orchard, Michael. Triassic stage boundaries, especially IOB, OAB, CNB; sorting out M. Triassic *Neogondolella*; Cordilleran terranes; fused cluster multielement analysis.
Over, Jeffrey. Eifelian-Givetian conodonts in E. USA; M. and U. Devonian conodonts from the Alberta Platform of W. Canada (with J. Day and M. Whalen); New Albany Shale (U. Devonian) (with T. Algeo, R. Lazar and J. Schieber); Woodford (U. Devonian) in New Mexico and Texas (with S. Ruppel); U. Devonian and Carboniferous in clastics of N. Pennsylvania (with G. Baird); (still) feeding conodonts to fish and mollusks to see how they (the conodonts) come out the other end.
Park, Soo-in. Mid-Carboniferous and Permian conodonts.
Percival, Ian. E. and M. Ordovician conodonts in cherts of the Lachlan Orogon in central New South Wales (ongoing); Ordovician conodonts from S. China (with Yong-yi Zhen) (two papers accepted by *Alcheringa*); Darriwilian (M. Ordovician) conodonts from New Zealand (MS in review).
Perri, Maria Cristina. Devonian-E. Carboniferous conodonts from the Carnic Alps (S. Alps); L. Permian-Triassic conodonts from the S. Alps; events across the Frasnian-Famennian, Devonian-Carboniferous and Permian-Triassic boundaries.
Piecha, Matthias. Devonian and Carboniferous conodont biostratigraphy of the Rhenish Massif.
Plasencia Camps, Pablo. Biological aspects of conodonts, especially the Triassic conodont genus *Pseudofurnishius*; Triassic fish.
Poole, Forrest (Barney). Paleozoic conodont biofacies and zonation in dating strata for local mapping and regional correlation in Sonora and Sinaloa, Mexico, and Nevada and Utah in SW USA.
Purnell, Mark. Palaeobiology, ecology, evolution and relationships. Analysis of conodont morphology (morphometrics, complexity) and function. Analysis of surface wear and damage arising from function. Isotopes and ecology. Exceptionally preserved conodonts. (with R. Aldridge, P. Donoghue, D. Jones, A. Ozdemir, P. von Bitter)
Pyle, Leanne. Cambrian to Devonian stratigraphy in the northern Mackenzie Mtns., Franklin Mtns., and Peel Plateau and Plain (Northwest Territories).
Qi, Yuping. Carboniferous conodonts from S. China and North America (with R. Lane and L. Lambert); Cambrian conodonts from S. and N. China (with G. Bagnoli).
Randon, Carine. Devonian-Carboniferous conodonts (ongoing); P-T conodonts from Turkey (new work).
Reimers, Aleksey. Carboniferous and Permian conodonts of Iran; Ordovician, Permian & Triassic conodonts from the Russian Platform, Urals and E. Siberia (ongoing).
Repetski, John. Cambrian and Ordovician conodont biostratigraphy, USA and elsewhere; CAI and systematics; CAI maps of eastern U.S. basins; biostratigraphic support for USGS and other mapping projects; also age-dating of faunas and studies of Cambrian and Ordovician phosphatic problematica.
Rexroad, Carl. U. Mississippian in West Virginia (with J. Beuthin & M. Blake); Illinois Basin, mostly in Illinois (with J. Devera), Pennsylvanian of the midwest US and New Mexico (with L. Brown).
Rigo, Manuel. Taxonomic and biostratigraphic studies of U. Triassic conodonts from Lagonegro (S. Apennines), Sicily, S. Alps (Dolomites and Lombardy), Slovenia and N. Apennines (La Spezia); geochemical analyses of biogenetic conodont apatite, and Triassic paleoclimatology.

Rosscoe, Steve. Moscovian-Kasimovian (M. Upper Pennsylvanian) boundary interval in the Midcontinent Basin and in north-central Texas.
Ruppel, Stephen. Barnett (Mississippian) black shales and related carbonates in Texas (with D. Boardman); Woodford (Devonian) black shales in New Mexico and Texas (with J. Over).
Salinas, Jose. Pennsylvanian goniate nursery from East Mountain Shale in north-central Texas; paleoecology of the Ames Limestone from Ohio (both projects involve conodonts; ongoing, with G. Merrill).
Sandberg, Charles. L. Ordovician, Devonian, Mississippian, Pennsylvanian and E. Permian conodonts from Sonora and Sinaloa, Mexico (samples collected by F.G. Poole); conodonts from chaotic Devonian and Mississippian terrane in the southern Fish Creek Range, Nevada (with B. Poole); new and problematic Devonian conodonts (with G. Klapper); Devonian Early *rhenana* to *linguiformis* Zone faunas from Burbank Hills, Utah (with J. Morrow); conodonts from new Osagean unit in the Antler forebulge, W. Utah (with J. Morrow); Frasnian Alamo impact-related uprush deposits, W. Utah (with J. Morrow); Frasnian conodonts and radiolarians from deep-water concretions, Nevada (with N. Izokh & O. Obut).
Sanz-López, Javier. Frasnian/Famennian conodonts from the Pyrenees & correlation of Thuringian ostracode ecofacies; *Gnathodus* systematics from the Mississippian Visean-Serpukhovian boundary; Mid-Carboniferous boundary conodont faunas; Myachkovian to Kasimovian conodonts from the Cantabrian Mtns; conodont diagenesis and metamorphism from the northern Iberian Peninsula.
Sarmiento, Graciela. Ordovician and Silurian conodonts from several areas of Gondwana.
Sashida, Katsuo. Ordovician conodonts (ongoing).
Savage, Norman. Devonian and Triassic of Thailand; Devonian of SE Alaska; Devonian of southern Mexico.
Saydam-Demiray, Dilek Gulnur. E.-M. Devonian conodont biostratigraphy of the Istanbul region.
Shen, Shuzhong. L. Permian conodonts from Iran and S. China.
Slavik, Ladislav. Integrated biostratigraphy of the Lr. Devonian of Central Bohemia matched against magnetic susceptibility and gamma-ray logs in outcrops; Lochkovian conodont subdivision of the Lochkovian; Lr./M. Devonian boundary in the Barrandian (Czech Rep.) and Ossa Morena Zone (Portugal); and revision of the Pragian/Emsian GSSP (with P. Carls & N. Valenzuela-Rios).
Smith, Paul. Architecture of conodont apparatuses (with R. Dhanda, J. Repetski and P. Donoghue); taxonomy and biostratigraphy of Cambrian to M. Ordovician conodonts, particularly Laurentian faunas (with R. Raine).
Snigireva, Maria. U. Devonian of the Urals, especially the Frasnian/Famennian boundary (ongoing).
Spalletta, Claudia. U. Devonian and Lr. Carboniferous conodonts from the Carnic Alps.
Spencer, Lee. L. Cambrian through E. Ordovician conodonts from the southern Appalachians compared with Utah (ongoing).
Sudar, Milan. Triassic biostratigraphy and CAI of Serbia.
Suttner, Thomas. Siluro-Devonian conodonts from Austria (Carnic Alps, Graz Paleozoic, and southern Burgenland).
Szaniawski, Hubert. Structure, paleobiology and phylogeny of Cambrian conodonts and conodont-like fossils; stratigraphic value of Cambrian-Early Devonian conodonts.
Talent, John A. Taxonomy, CAI and age-implications of Silurian-Early Carboniferous conodonts from Pakistan and NW Xinjiang (China).
Tarabukin, Vladimir. Biostratigraphy and conodonts of the Devonian of NE Russia (in progress).
Trotter, Julie. Geochemical proxies (Sr & O isotopes, trace elements, rare earth elements) for understanding palaeoenvironment and palaeoclimatology, specifically employing high resolution *in situ* laser ablation and ion microprobe technologies; *in situ* oxygen isotope conodont thermometry methods using ion microprobe (SHRIMP).
Uyeno, Tom. M. and U. Devonian conodonts, Mackenzie Mtns., N. Cordillera, Canada.
Valenzuela-Ríos, Jose. Conodont bio- and chronostratigraphy of neritic and pelagic facies in sections from Spain (Spanish Central Pyrenees, Iberian Chains, Ossa Morena, Catalonian Coastal Ranges), Germany (Frankenwald, Rhenish Slate Mtns., Thuringia), Czech Republic (Prague Synform), USA (Central Nevada), Andorra (Tor-Casamanya Syncline), Uzbekistan (Zinzilban Gorge). Global correlation, mainly for Pridoli to Emsian, but also M. and U. Devonian. Correlation of conodont biostratigraphy with other co-occurring groups, mainly fish, brachiopods, ostracods and dacryoconarids.
Viira, Viive. Ordovician and Silurian conodont biostratigraphy (ongoing).

von Bitter, Peter. Missisissippian conodonts of Atlantic Canada and the U.S (with P. Medina-Varea, R. Norby and M. Purnell); Pennsylvanian and Permian conodonts of the U.S. and the Canadian Arctic (with G. Merrill and C. Henderson); Silurian conodont skeletons of the Eramosa Lagerstätte of Ontario (with M. Purnell and D. Jones).
Wang, Cheng-yuan. Devonian-Carboniferous boundary in south China; U. Permian conodont biostratigraphy in Qinghai and Sichuan; Palaeozoic conodonts from S. Mongolia; Silurian and Devonian conodonts of China.
Wankiewicz, Aleksandra. Carbonate sedimentology and U. Devonian conodonts (mainly Frasnian) (ongoing).
Whiteside, Joe. Biostratigraphy and chronostratigraphy of the subsurface Lr. Carboniferous, Fort Worth Basin, Texas.
Witzke, Brian. Famennian conodont biostratigraphy of Iowa.
Woroncowa-Marcinowska, Tatiana. M. and U. Devonian conodont biostratigraphy of the Holy Cross Mtns. (Poland); integrating conodont and goniatite biostratigraphy; Givetian conodont biostratigraphy (in progress).
Wu, Rongchang. Ordovician conodont biostratigraphy in S. China (Ph.D. thesis).
Yao, Jianxin. Conodont biostratigraphy in S. China, Tarim, W. Kunhlun and Tibet.
Yolkin, Evgeny. Devonian conodonts from W. Siberia (Russia) and S.Tien Shan (with N.G. Izokh) (ongoing).
Yoshida, Takashi. Age of conodonts, especially comparisons with radiolarian age.
Zhang, Huaqiao. Histology of paraconodonts and earliest euconodont.
Zhang, Shunxin. L. Ordovician conodonts from Southampton Island and L. Ordovician and M. Devonian conodonts in kimberlite xenoliths from the central Slav craton.
Zhen, Yong Yi. Ordovician conodonts from New South Wales, Western Australia, Tasmania, New Zealand and S. China.
Zhuravlev, Andrey. Conodont palaeobiology; Devonian-Permian conodonts of the East European Platform, north Urals, and Russian Far East.

The Devonian of the southern Urals: remarkable results from sustained conodont research

Viktor Maslov and **Olga Artyushkova** are remarkable conodont workers who might be described as having slipped under the Pander Society 'radar'. Viktor received a DSc. for his work in 1984. Olga is in the last stages of a DSc. thesis on a superabundance of Devonian conodonts from cherts among volcanics in the southern Urals. Viktor and Olga, if memory serves us correctly, reported in an abstract at the combined ECOS-VII/IGCP 421 Bologna-Modena meeting in 1998, the results of identifying conodonts from more than 600 localities in the southern Urals. Without seeing any illustrations or text, we were impressed, even then! And that was just the start of something much bigger!

Olga works in the field with Viktor, now 82 but still dynamic. They have boosted the number of productive Devonian conodont localities to at least 1,500 and identified about 200 species since starting their attack in 1973 on the 70,000 sq. km. or more of outcropping chert-infested sequences. Comparable results would have been obtained had they focused with similar intensity on the very rich conodont faunas in the Ordovician and Llandovery cherts of the same region.

By comparison, very few radiolarian/conodont papers have reported conodonts from chert samples acid-leached for radiolarians, though several workers have been achieving very useful results from identifications made from polished surfaces, but nothing on the scale being achieved by the Ufa conodont duo from moulds of conodonts.

Olga and Viktor's conodonts occur in such abundance that they identify nearly all of them in the field by examining weathered surfaces with a hand lens. The Institute of Geology, Ufa Scientific Centre, Russian Academy of Sciences, does not have a Stereoscan Electron Microscope. When an opportunity arises, the best of their conodonts are photographed with the SEM at the Palaeontological Institute of the Academy of Science in Moscow.

The Devonian results being presented in Olga's DSc thesis are excellent: palmatolepids (great diversity), polygnathids by the score, and tortodids are readily identifiable at species level. They are much better to work with than conodonts obtained as a by-product of acid-leaching cherts with hydrofluoric acid or identified on polished surfaces, even when the chert is relatively transparent.

The results of Viktor and Olga's research have radically changed understanding of the stratigraphy and structure of the vast southern Urals volcanic-chert region. Speculation has been replaced by hard data. Several large reports by them have been published, mainly by their institute in Ufa. Sadly, for the conodont world in general, these are relatively obscure. Using the Maslov-Artyushkova approach (in the first instance, intense use of a hand lens), the potential for significantly, perhaps even dramatically, improving time-control/calibration for Palaeozoic-?Triassic radiolarian biostratigraphies is exciting. Such a linkage is being approached by the Ufa duo with colleagues at the Institute of Petroleum Geology of the Academy of Science in Novosibirsk.

It is anticipated that Viktor and Olga's work will become more appreciated when Olga's DSc. thesis is published, we hope eventually in English so that it becomes available to a wider audience. Larger works among their many publications (all, except the third, in Russian) are:

Artyushkova, O.V. & Maslov, V.A., 1998. Palaeontological evidence for stratigraphic subdivision of the pre-Famennian volcanic deposits in the Verkneural'sk and Magnitogorsk areas, 156 pp. Institute of Geology, Ufa Scientific Centre, Russian Academy of Sciences, Ufa.
Artyushkova, O.V. & Maslov, V.A., 2005. Conodont stratigraphy of sediments overlying the Mukasovo Formation (Famennian Stage, Zilair Formation) in the South Urals. Stratigraphy and Geological Correlation 13 (2), 57-73.
Artyushkova, O.V. & Maslov, V.A., 2008. Detailed correlation of the Devonian deposits in the South Urals and some aspects of their formation. Bulletin of Geosciences 83, 391-399.
Maslov, V.A, 1980. Devonian of the eastern slope of the Southern Urals, 224 pp. Nauka, Moskva.
Maslov, V.A. & Artyushkova, O.V., 2000. Stratigraphy and Palaeozoic formations in the Uchalin region of Bashkiria, 123 pp. Institute of Geology, Ufa Scientific Centre, Russian Academy of Sciences, Ufa.
Maslov, V.A. & Artyushkova, O.V., 2002. Stratigraphy and correlation of the Devonian deposits in the Sibay-Baymak area of Bashkiria, 199 pp. Institute of Geology, Ural Scientific Centre, Russian Academy of Sciences, Yekaterinburg.
Maslov, V.A., Artyushkova, O.V. & Baryshev, V.N., 1984. Stratigraphy of the ore-bearing Devonian formations of the Sibay region, 97 pp. Bashkiria Filial of the Academy of Sciences, USSR, Ufa.
Maslov, V.A., Artyushkova, O.V. & Nurmukhametov, E.M., 1999 Frasnian formations of the Magnitogorsk Megasynclinorium, 82 pp. Institute of Geology, Ural Scientific Centre, Russian Academy of Sciences, Yekaterinburg.

(Submitted by John Talent, from Novosibirsk, Russia, March 2009)

Personal & Other Items of Interest

Albanesi-Collaboration with colleagues from different Argentinian universities and other countries, on diverse topics of historical geology from the Lr. Paleozoic of South America by means of conodont biostratigraphy, paleothermometry and chemostratigraphy.
Aldridge-presently F.W. Bennet Professor of Geology and President, Palaeontological Association for two years, starting December 2008.
Armstrong- Suspended conodont work to concentrate on industry sponsored projects on peri-glacial black shale deposition and high latitude responses to Hirnantian glaciation.
Bader-Working in industry, but still keeping up with conodont research.
Bancroft-Finished MS thesis in 2008, and began PhD studies at Ohio State University.
Bergström- Retired, but still keeps office and lab at Ohio State University, and continues with research and writing. Says that 2008 was a good one in terms of publication.
Berkyova-Ph.D. student at the Charles University, Prague.

Carey-Not currently working on conodonts.
Charpentier-Not currently active in conodont work.
Chen-After working in Canada several months, back in Nanjing working on Ph.D. thesis.
Cole-Still sampling small amount of limestone.
Corriga-Second year of Ph.D.project at University of Cagliari, Italy**.**
Ferretti-Editing special issue of Palaeogeography, Palaeoclimatology, Palaeoecology re Organic, carbon-rich sediments through the Phanerozoic: Processes, Progress and Perspectives (with Negri, Myers & Wagner).
Gedik-Interested in evolution and information with respect to dynamic systems theory; Cambrian explosion seen as exponential development of information; believes conodonts may have had a parasitic life-style.
Girard-Moved from University of Lyon to the University of Montpellier, May, 2008.
Nowlan-Reports very moderate level of conodont research at the moment. Lab continues to receive samples and reports prepared for clients. Recent data on Lr. Paleozoic conodonts has been acquired from W. Newfoundland, Yukon and Manitoba. New money received by GSC for work in Arctic Canada means that new samples will be arriving from projects in the Arctic Islands, Yukon and Northwest Territories.
Goudemand-Still working on Ph.D.
Groessens-Retirement planned for June 1, 2009, but hopes to remain active on conodont research. Working on stratigraphic projects, as well as history of geological sciences and ornamental stones.
Hairapetian-Head of Geology, Azad University.
Hall-Still chair of Environmental Studies and trying to avoid disastrous budget cuts. He is getting close to 30 years at UNCW & retirement is starting to look good to him.
Heckel-Retired from the chair position, and voting membership, in the Subcommission on Carboniferous Stratigraphy.
Henderson-Chairman of the Subcommission on Permian Stratigraphy, with focus on completing GSSP definitions for the Permian System. Most of Charles' graduate students are conducting sequence biostratigraphic and petroleum geologic studies in subsurface of Alberta and NE British Columbia, on U. Devonian to U. Triassic rocks.
Igo (Hisayoshi)-Director, Institute of Natural History
Jeppsson-Now mostly works from home; note new e-mail address.
Johnston-Not presently working on conodont-related research.
Jones (D.)-Relocating to Monash University (Melbourne, Australia) summer 2009, for an eighteen-month research visit to quantitatively examine functional morphology, complexity and morphospace occupation in conodonts.
Jones (G.)-Continues to manage Conodate Biostratigraphic Services.
Kirchgasser-Emeritus Professor of Geology, at SUNY.
Klapper-Visiting Professor, Northwestern University.
Königshof -Reports the end of a very successful IGCP 499; the project received the status OET, i.e.could use the UNESCO logo, but received no funding for the last year.
Kovács-Although very conodont little activity in 2008, maintains interest in M. to L. Triassic conodont biostratigraphy, and metamorphic alterations of conodonts.
Kresja-Emeritus Professor of Biological Sciences, Cal Poly State University, California, U.S.A.
Krumhardt-Conodont studies on hiatus at moment.
Machado-Ph.D. student
MacKenzie-No conodont studies at the moment.
Márquez-Aliaga-SWG leader of the IGCP's 458, 467 and 506.
Martinez-Perez-Completing Ph.D. dissertation (N. Valenzuela, supervisor).
Mastandrea-Triassic conodont research suspended; last five years has been involved in biomineralization and biogeochemistry research.
Mawson-Retired in 2007, but still involved with research and postgraduate supervision in palaeontology and museum studies.
McCracken-Acting Head, Stratigraphy, Paleontology & Sedimentology Subdivision & GSC PaleoLab project leader, limits time for conodont work.
McHargue-Not active in conodont research at the moment, but ever hopeful.

Moskalenko-Celebrated her 85th birthday, Feb. 9, 2009. Tamara's conodont studies are summarized in a monograph by Kanygin, A.V. *et al.* in Trofimuk Institute of Petroleum Geology and Geophysics SB RAS – Novosibirsk: Publishing House "Geo", 2008, 269pp.
Medina-Varea-Ph.D. student, Universidad Complutense de Madrid, Spain.
Miller (G.)-Reports quiet research year, with collections management overshadowing research time. Hinde's 1879 conodont collection are curation priority, as are Rhodes, Austin and Druce, 1969 collections. Specimen details of both hopefully available on the NHM web site by early 2009.
Murphy-Received award from University of California Riverside for being the most productive emeritus professor for 2007. He enjoys relatively good health in his 20th year of retirement, and visits the department, and tutors some students, once a week.
Nicoll-Working for Geoscience Australia on time-scale related information.
Nowlan-Working mainly in geoscientific outreach, currently focused on the celebration of the International Year of Planet Earth in Canada, that includes a contest for school children, careers in earth science web site and the co-writing and co-editing of a new popular book on the geology of Canada entitled "Four Billion Years and Counting: Canada's Geological Heritage.
Paull-Retired, but involved with curating specimens at University of Wisconsin-Madison Geology Museum, and the field books that accompany the fossils.
Pieracacos-Not presently working on conodonts.
Plasencia-Camps-Hopes to defend his Master's thesis (supervisors: A. Marquez-Aliaga, N. Valenzuela-Rios and F. Hirsch) in Feb. 2009.
Poole-Scientist Emeritus, USGS, Denver, Colorado, U.S.A.
Purnell-Lots of work on tooth microwear in non-conodont vertebrates and taphonimic analysis of exceptionally preserved chordates (including experimental decay) will eventually inform conodont studies.
Pyle-Her work is part of the Geological Survey of Canada's 'Mackenzie Corridor: Access to Northern Energy Resources' project.
Rosscoe-Has finished Ph.D. at Texas Tech & has moved to Abilene, Texas as Assistant Professor of Geology at Hardin-Simmons University; note new e-mail address.
Sandberg-In 15th year as emeritus & received his 4th Bradley Research Scholarship.
Sansom-Continuing research on a myriad of projects.
Simpson-Maintain a collaborative interest in some conodont projects.
Sloan. No conodont activity, but has been dabbling in visual simulation.
Sweet. Providing materials and moral support to Shilong Mei and Shuzhong Shen who are making an extensive restudy of conodonts in our collections from NW Iran, the Salt Range, and elsewhere.
Trotter-will be moving to the University of Western Australia mid-year; has had various national & international media interviews in response to recent Science publication.
von Bitter-A busy and strange year, what with retirement, beginning Eramosa Lagerstätte excavations, retirement home burning to the ground, finishing up a family history, and assembling & editing this newsletter. The ROM conodont laboratory closes July 1st. Quiet time for conodonts has been elusive.
Yoshida-retired in 2008.
Yolkin-has actively worked on Devonian conodonts for the last 30 years, and celebrated his 75th birthday on Jan. 29, 2009.
Zhang-Moderate level of conodont research. Continuing to work mainly on petroleum potential of Hudson Bay and the Foxe Basin.
Zhen-Was invited to visit Nanjing Institute of Geology and Paleontology in 2008, and participated in a field trip to Tarim Basin.

(The Chief Panderer extends his, and the Pander Society's, congratulations, best wishes and two happy faces ☺ ☺ [to be shared] to Tamara Moskalenko and Evgeny Yolkin on celebrating their 85th and 75th birthdays, respectively, earlier this year) (Must be something about the healthy living in Novosibirsk? P/)

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The fossil record clearly indicates that the Earth and its living systems have not been in a steady state over geologic time. Palaeobiodiversity and Palaeoenvironments is an international journal providing a multidisciplinary approach in the fields of Palaeobiodiversity, Palaeoenvironments, and Palaeobiogeography in Earth History. The journal incorporates original research, review papers and short notes. The scope of the journal is broad. Principal fields of interest are biodiversity of fossil organisms and their palaeoenvironment, comparison of modern and ancient sedimentary environments, palaeoecology, and palaeobiogeography. The intended readership is the Earth Science community interested in the evolution and dynamics of palaeoecosystems and the interaction with and influence by physical processes.

Aims and Scope
Palaeobiodiversity and Palaeoenvironments is a peer-reviewed international journal for the publication of high quality multidisciplinary studies in the fields of palaeobiodiversity, palaeoenvironments, and palaeobiogeography. Key criteria for acceptance of manuscripts are global scope, or implications for global scale problems significant beyond a single discipline, and a focus on diversity of fossil organisms, causes and processes of changes in earth history. Topics covered include: systematic studies of all fossil animal/plant groups with a special focus on palaeoenvironmental investigations, palaeoecosystems and climate changes in earth history, environment-organism interaction, comparison of modern and ancient sedimentary environments, and palaeoecology and palaeobiogeography.

All submitted papers, if relevant to the theme and objectives of the journal (see above), will go through an external peer-review process. Submissions must be written in English and describe original research not published nor currently under review by other journals. Parallel submissions will not be accepted. Papers should be submitted only electronically (see online manuscript submission and tracking system.)
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(submitted by Peter Königshof , editor-in-chief) Frankfurt, August 2008
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