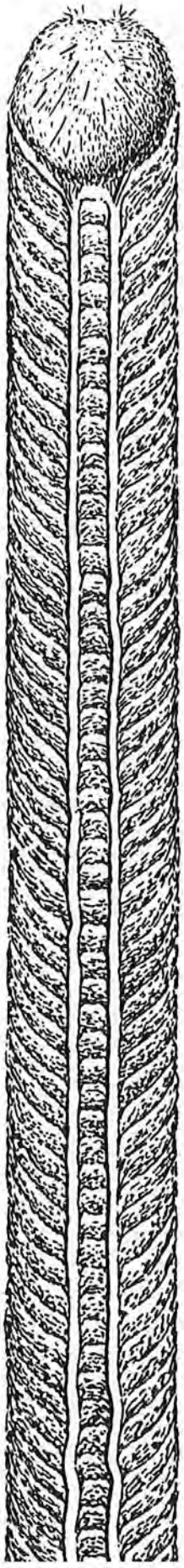
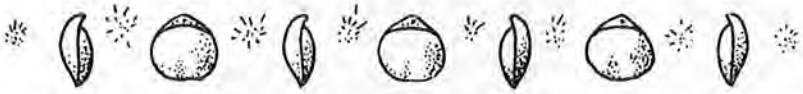
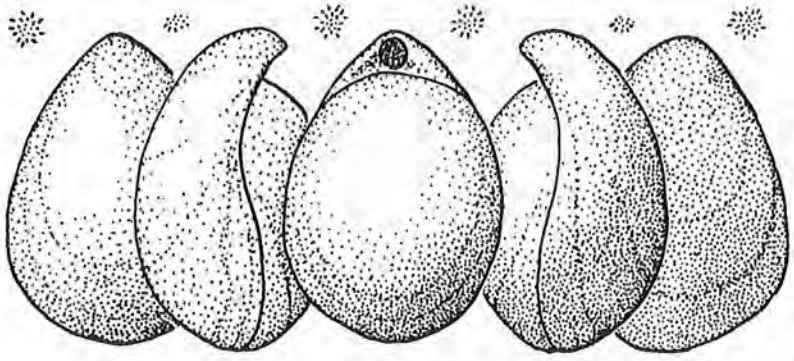


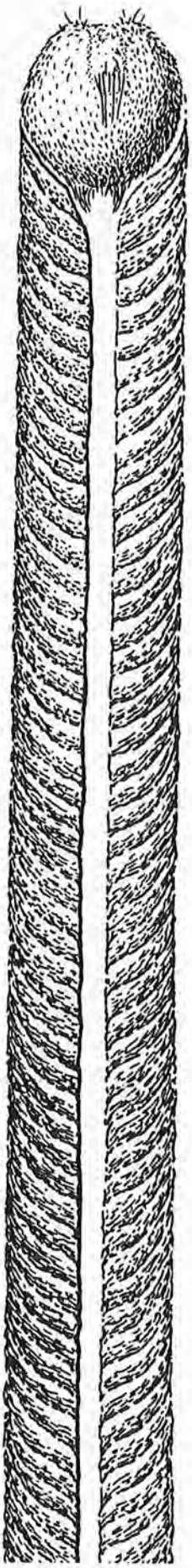


Ichnology Newsletter

Number 24
June, 2002

Andrew K. Rindsberg
&
Alfred Uchman
Coeditors





Ichnology Newsletter no. 24

Published June 2002 in Kraków
and on the Web based in Atlanta

Coeditors

Dr. Andrew K. Rindsberg
Geological Survey of Alabama
P.O. Box 869999
Tuscaloosa, AL 35486-6999
USA

Telephone (205) 349-2852
(Central Time Zone = Greenwich -6 h)
Telefax (205) 349-2861
Email arindsberg@gsa.state.al.us

Prof. Alfred Uchman
Institute of Geological Sciences
Jagiellonian University
Oleandry 2a
30-063 Kraków
Poland

Telephone (00-48-12) 633-20-70
(secretary)
or (00-48-12) 633-63-77 in. 2487
(direct)
(MET = Greenwich + 1 h)
Email FRED@ing.uj.edu.pl

Webmaster
http://www.emory.edu/GEOSCIENCE/HTML/TFW3.HTML
(click on *Ichnology Newsletter*)

Dr. Anthony J. Martin
Department of Environmental Studies
Emory University
Atlanta, GA 30322, USA
Telephone (404) 727-6476
(Eastern Time Zone = Greenwich -5 h)
Email geoam@learnlink.emory.edu

Front Cover

Ichnological frameup

Richard G. Bromley
University of Copenhagen
rullard@geo.geol.ku.dk

Left: A non-echinocardiid spatangoid echinoid producing a twin-drained *Scolicia*.
Right: An echinocardiid producing a single-drained *Bichordites*.
Bottom: Terebratulacean brachiopods and their pedicle etching traces *Podichnus*.
Top: Rhynchonellaceans and their *Podichnus*.

Subscription information

	ISSUE NO.	YEAR	US DOLLARS
Ichnology Newsletter	20	1998	24.00
	21	1999	24.00
	22	2000	24.00
	23	2001	24.00
	24	2002	24.00
	25	2003	to be announced on SKOLITHOS
Bibliographia Ichnologica	*1990-95*	2001	24.00
Bibliographia Ichnologica	*to 1899*	2003	to be announced on SKOLITHOS

The *Newsletter* is distributed by surface mail from Kraków, Poland. A delay of up to eight weeks can be expected for overseas mail. If you prefer airmail, add USD 2.50 per copy for North America, USD 4.00 for the remaining continents. For Europe, the *Newsletter* is distributed by surface mail.

Payment can also be made in German, British or Polish currency. The bank charges USD 2.50 to clear the check, so please add this sum to the price. Please send the check to Alfred Uchman:

Alfred Uchman
Institute of Geological Sciences
Jagiellonian University
Oleandry 2a
30-063 Kraków
POLAND

Wire transfers are also possible. For details, contact Alfred Uchman:
fred@ing.uj.edu.pl

To lower the cost of international banking fees by pooling checks:
ARGENTINES: Please contact Luis A. Buatois.

Please contribute your news, announcements of meetings, current activities (2001-2002), and 'ichnovaria' (humor, quotations, memories, etc.) – and especially your bibliography. Reprints are very welcome.

Ichnology Newsletter, no. 24
June 2002

Coeditors
Andrew K. Rindsberg and Alfred Uchman

Contents

Introduction

Andrew K. Rindsberg & Alfred Uchman

THE YEAR 2001 WAS BLIGHTED by turmoil in the US, Argentina, Israel, and Islamic world. Economic chaos rattled scientists in Argentina, where some of the most interesting work in ichnology is being performed today. After the terrorist attacks of 11 September, scientific discussion slowed dramatically on paleontologic listservers for months afterward. The taphonomic listserver, DDDNet, already moribund, died early in 2002.

Even so, there were several interesting developments in ichnology that made the news. Particularly impressive was the US Congress' decision to set aside dinosaur trackways at St. George (Utah) only days after the attacks (107th Congress, 1st Session, House of Representatives Bill 2385).

The debate begun by **Seilacher** and others (1998) over possible billion-year-old trace fossils in the Vindhyan Series of India continued in 2001 (Anonymous, 2002a). The discussion took an interesting new turn as **Birger Rasmussen** and others reported other trace fossils in strata 1.2 Ga old in Australia (Anonymous, 2002b; Whitfield, 2002).

Also in 2002, **Johann Koller** and others reported the world's oldest human fingerprint, about 80 ka old, in pitch from the Harz Mountains of Germany (Koller et al., 2001; Anonymous, 2002a). Because the pitch was manufactured as glue for a tool, this suggests that the Neanderthals had a more sophisticated technology than previously known.

Winfried Lachauer (2000) made a film on the life of an ichnologist, *Der Sherlock Holmes der Paläontologie – Professor Adolf Seilacher*. Late news to be sure, but interesting all the same.

Ichnos found a new publisher, Taylor & Francis. Back issues are expensive, but individual subscriptions are reasonably priced and it is a tremendous relief to have our field's flagship journal published on a regular basis again.

Biologist **Gilbert Franck** (Laboratoire d'Océanologie et de Biogéochimie, Marseille) invites us to subscribe to the Bioturbation mailing list at http://com1.com.univ-mrs.fr/listes/info/bioturb . And a new listserver, **PaleoWasteLand**, was started in 2001 for discussion of coprolites, with **Michael Orock** contributing many of the messages (PaleoWasteLand@topica.com).

L'Ichnospace, an ichnologic museum, opened in Luzech near Cahors in southern France (Anonymous, 2002c, d). The museum was conceived by **Brigitte Lange-Badre** (Université P. & M. Curie, Paris) and highlights local Upper Jurassic sauropod trackways on a 60-m² surface as well as pterosaur tracks and general exhibits.

In Golden, Colorado (USA), within walking distance of the Colorado School of Mines, a hubbub started over Cretaceous ceratopsian and other dinosaur tracks studied since 1988 by **Martin Lockley**. What should be done with the tracks as the old strip mine was converted into a golf course? After a widely reported public debate, at least limited public access was assured (Anonymous, 2001; Vendetti, 2001).

A Permian eurypterid trackway in Cape Province (South Africa) also received international attention, especially for the difficulty of casting it on a steeply dipping bedding plane (Anonymous, 2002e; Yeld, 2002). **Roger Smith** helped John **Almond** to reproduce it, first in 'pizza' dough made of flour and water, then in silicone rubber backed by plaster of Paris, and finally in fiberglass.

We are fast losing track of new websites and would appreciate your help In keeping up with them. A few new ones are listed in the references at the end of this note. Of particular interest may be CyberTracker, freeware designed for recording information about tracks in the field using a PalmPilot handheld computer.

This issue

This is the fifth issue of the new *Ichnology Newsletter*, and we would like to thank all those who have helped us produce it over the years. The best part has been the opportunity to converse with so many researchers about their work while it is happening.

We are proud to present a report by the **Frankfurt group** on their research in microbioerosion; an interview of **Florencio Acenolaza**; and reminiscences of a prominent ichnologist, **Kent Chamberlain**. In addition, there are some shorter articles, notices of events and books, and the usual features such as the bibliography.

Transitions

Congratulations to **Richard G. Bromley**, who achieved Professor Emeritus status in 2001. **Alfred Uchman** was promoted to Professor in 2001, and then elected Director of the Geological Institute in 2002. **Steve Donovan** began a new position at the Nationaal Natuurhistorisch Museum (Naturalis) (Leiden), and **Steve Hasiotis** began work at the University of Kansas (Lawrence). **Duncan McIlroy** announced a move to the University of Bergen, effective January 2003; he still holds the StatOil chair.

Among the vertebrate ichnologists, there was a real shuffle in 2002 as **Emma Rainforth** began work at Mesalands Community College (Tucumcari), taking up the position that **Adrian Hunt** vacated to become Director of the New Mexico Museum of Natural History (Albuquerque) and work with **Spencer Lucas**. And **Marilyn Wegweiser** began work at Georgia College & State University (Milledgeville).

Best wishes to **Ludvig Löwemark**, who completed his doctoral degree at the Universität Kiel (2001) and took up a new position at the Academia Sinica in Taipei. **John-Paul Zonneveld** finished his doctoral work at the University of Alberta (Edmonton) and started work with the Geological Survey of Canada (Calgary). Congratulations also to **Michael Schlirf** for completing his doctorate at the Universität Würzburg.

Congratulations also to **George Pemberton**, who was elected as a Fellow of the Royal Society of Canada (Société royale du Canada) for advancing 'our understanding of the role of organisms as sedimentologic and diagenetic entities and refining clastic facies models through the combined study of physical and biogenic sedimentary structures and their palaeoecological significance.' He is the second Canadian ichnologist to be so honored, the first being **William A.S. Sarjeant** in 1995.

Sadly, the ichnologic community lost some great men in the past year. **Stanislaw Dzulynski**, known for his work on the sedimentology of flysch, died on 28 June 2001. The celebrated explorer and ichnologist **Ardito Desio** died on 12 December 2001 at the age of 104. And on 3 February 2002 we lost **Nicolás Muñoz**, who convened the Sixth International Ichnofabric Workshop for its first time in South America. He had attended every one of the previous workshops as well. To Nicolás this volume is affectionately dedicated.

References

Anonymous. 2001. Geologist fights to save dinosaur fossils. New York Times, 19 July. http://www.nytimes.com/2001/07/23/national/23DINO.html

Anonymous, 2002a. PaleoNews. American Paleontologist, 10(1): 18-20.

Seilacher, A., Böse, P.K. & Pflüger, F. 1998. Triploblastic animals more than 1 billion years ago: trace fossil evidence from India. Science, 281(5386): 80-83, cover.

Koller, J. & Baumer, U. 2001. High-tech in the middle Palaeolithic: Neandertal-manufactured pitch identified. European Journal of Archaeology, 4(3).

Rasmussen, B., Bengtson, S., Fletcher, I.R. & McNaughton, N.J. 2002. Discoidal impressions and trace-like fossils more than 1200 million years old. Science, 296: 1112-1115.

Vendetti, J. 2001. Fossils on the fairway. Geotimes, 46(10): 10.

Whitfield, J. 2002. Oldest animal tracks? Nature, 10 May.

Websites

Anonymous. 2002b. Oldest worm trail discovered. BBC News, 9 May 2002. http://news.bc.co.uk/hi/english/sci/tech/newsid_197000/1977935.stm. Accessed 11 May 2002.

Anonymous. 2002c. L'Ichnospace: "1er musée des empreintes et des traces en Europe". http://www.ville-luzech.fr/culture/ichnospace.htm. Accessed 13 March 2002.

Anonymous. 2002d. A new French museum: L'Ichnospace, (Luzech, Lot, France): un musée consacre aux traces fossiles. Taphonomy & Diagnesis News. http://biomin.geol.u-psud.fr/tdnews/. Accessed 13 March 2002.

Anonymous. 2002e. Pizza dough saves day at scorpion fossil find. Independent Online, 13 February 2002. Accessed 15 February 2002. http://www.iol.co.za/index.php?click_id=31&art_id=qw10136112760699B261&set_id=1.

Beaudoin, A.B. 1998-2002. The Dung File. http://www.scirpus.ca/dung/dung.htm. Accessed 23 May 2002.

Cicimurri, D.J. & Everhart, M.J. 2001. An elasmosaur with stomach contents and gastroliths from the Pierre Shale (Late Cretaceous) of Kansas. Kansas Academy of Science, Transactions, 104(3-4): 129-143. Draft version including color figures: http://www.oceansofkansas.com/plesio4.html

CyberTracker. http://www.cybertracker.co.za/. Accessed 23 May 2002.

Everhart, M. 2001. Coprolites and fossilized gut contents from the Smoky Hill Chalk: more fossils from the Western Interior sea. Oceans of Kansas. http://www.oceansofkansas.com/Coprolite.html. Accessed 2 February 2002.

Genise, J.F. 2000. Paleoicnología de Insectos. http://www.ub.es/ dpep / meganeura/53ichnology.htm.

Lachauer, W. 2000. Der Sherlock Holmes der Paläontologie – Professor Adolf Seilacher. Südwest Fernsehen, Schätze des Landes. http://www.swr.de/schetze-des-landes/service/2000/03/28/. Accessed 2 May 2002.

LOB Bioturbation Group. http://www.com.univ-mrs.fr/LOB/recherche/equipe2/theme2/macrobenthos/bioturb/intro.html

Nereis Park. http://www.com.univ-mrs.fr/LOB/recherche/equipe2/theme2/macrobenthos/bioturb/npa/npa.html

Topica: Coprolites. http://www.topica.com/lists/PaleoWasteLand/read

Wilson, M.A. Bibliography of marine bioerosion. http://www.wooster.edu/geology/bioerosion/BioerosionBiblio.pdf . Accessed 23 May 2002.

Yeld, J. 2002. Tracking an ancient denizen of the deep. Independent Online, 13 February 2002. http://www.iol.co.za/index.php?click_id=31&art_id=qw10136112281245B26&set_id. Accessed 15 February 2002.

* * * * *

> Do not be surprised, therefore, Most Serene Prince, if, for a whole year's time, and, what is more, almost daily, I have said that the investigation ... was very near an end.
>
> Nicolaus Steno (1669, *Prodromus;* translated by Winter, 1916)

Microborings: current studies and goals of the Frankfurt group

Klaus Vogel[1], Marcos Gektidis[1], Ingrid Glaub[1] & Gudrun Radtke[2]

[1]Geologisch-Paläontologisches Institut,
Senckenberganlage 32-34, D-60325 Frankfurt am Main, Germany
gektidis@em.uni-frankfurt.de, I.Glaub@em.uni-frankfurt.de

[2]Hessisches Landesamt für Umwelt und Geologie,
Rheingaustraße 186, D- 65203 Wiesbaden, Germany
g.radtke@hlug.de

Introduction

The Frankfurt research project on microborings was established in 1984 by Klaus Vogel. Research interests mainly focus on the role of modern and fossil microborings in bathymetry and bioerosion. In marine environments, endolithic microorganisms are omnipresent in various calcareous substrates. By definition, the tube diameters of the resulting microborings range in size from 1 µm to 100 µm. As is so far known from modern studies, the majority of microborings is produced by cyanobacteria, green algae, red algae, fungi, and foraminifers. Distinct external features of the euendolithic soft body are copied by the morphology of the boring system. This fact favors comparison with modern fossils and aids in matching the possible producer of a fossil microboring system. For an overview of relevant publications, see Radtke et al. (1997b).

The traces of microendolithic cyanobacteria and algae turn out to be useful as bathymetric and paleobathymetric indicators, owing to the adaptation of their producers to different light intensities and wavelengths (Glaub, 1994; Vogel et al., 1995; Vogel et al., 2000). A euphotic zone (with subzones), a dysphotic, and an aphotic zone have been characterized and defined by typical ichnocoenoses. They are named according to the two or three most important ichnotaxa (fig. 1) (Glaub, 1994; Vogel et al., 1995). The essential characteristics of the bathymetric scheme of index ichnocoenoses are present from the Silurian onwards, hitherto the oldest geological period we have investigated.

Previous studies

Members of the Frankfurt research team have investigated microborings from different periods, addressing taxonomy and paleobathymetry: Silurian (Glaub & Bundschuh, 1997; Bundschuh, 2000), Devonian (Vogel et al., 1987), Permian (Balog, 1996, 1997), Triassic (Balog, 1996; Schmidt, 1990, 1992), Jurassic and Early Cretaceous (Glaub, 1994), Late Cretaceous (Hofmann & Vogel, 1992; Hofmann, 1996), and Tertiary (Radtke, 1991). The bathymetry of reefs accumulated at different ages and built by different organisms was treated by Vogel et al. (1999).

In 1991, we extended our research to modern environments: Schmidt (1990), Radtke (1993), Schmidt & Freiwald (1993), Radtke et al. (1996, 1997a, c), Kiene et al. (1995), Gektidis and Golubic (1996), Golubic et al. (1996), Gektidis (1997a, b, 1999), Kiene (1997), Krutschinna (1997), Vogel et al. (2000). Most of these publications relate to the tropical and subtropical realms.

The second focus of our studies on microendoliths consists of experimental studies on bioerosion rates of these organisms. Investigations have been carried out at the Bahamas and at the Great Barrier Reef, Australia (Kiene et al., 1995; Vogel et al., 1996, 2000; Gektidis, 1997a; Kiene, 1997).

The main controlling factor for the abundance and bathymetric distribution, as well as for bioerosion rates, of microendoliths is light. But we have also investigated the

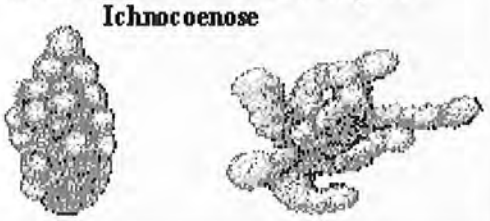
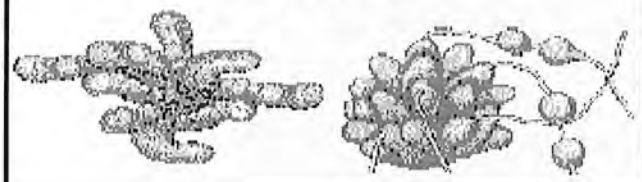
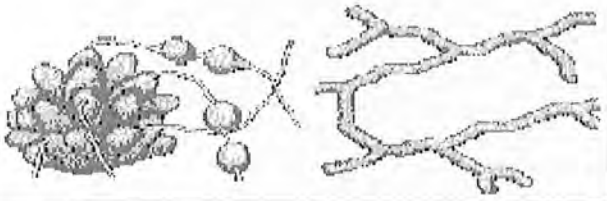
Photic Zones		Index Ichnocoenoses of Microborings	General Characteristics
Euphotic Zone	I	Index Ichnocoenose not yet defined	Dominance of cyanobacteria with sheath pigmentation
	Shallow Euphotic Zone II	*Fasciculus acinosus / Fasciculus dactylus* - **Ichnocoenose** 	Dominance of cyanobacteria, vertical orientation of borings
	Shallow Euphotic Zone III	*Fasciculus dactylus / Palaeoconchocelis starmachii* - **Ichnocoenose** 	Cyanobacteria abundant, + eucaryotes, change from vertical to horizontal orientation
	Deep Euphotic Zone	*Palaeoconchocelis starmachii / Reticulina elegans* - **Ichnocoenose** 	Dominance of eucaryotes, mainly rhodophyta and chlorophyta, horizontal orientation, heterotrophs increasing, maximum of diversity
Dysphotic Zone		Index Ichnocoenose not yet defined	Dominance of heterotrophs, + *Reticulina elegans* and/or *Scolecia filosa*
Aphotic Zone		*Succomorpha clava / Orthogonum lineare* - **Ichnocoenose** 	Only heterotrophs

FIGURE 1 Index ichnocoenoses of microborings related to the photic zonation, with general characteristics (from Glaub et al., in press).

influence of substrate types, exposure periods, and the impact of inorganic nutrients (Gektidis, 1997a, 1999; Kiene, 1997; Vogel et al., 2000). The bioerosional notch along tropical limestone coasts with its complex ecological system was studied by Radtke et al. (1996, 1997a).

Current studies

Currently, we are investigating the influence of low (non-tropical) temperature and high latitude position at Recent sites and in fossil strata. The Recent sites are in shelf regions of the North Atlantic, i.e., at the Spitsbergen Bank and Tromsø, northern Norway (Gektidis), at the west coast of Scotland and the upwelling region off Mauritania, northwestern Africa (Glaub). The fossil strata are Tertiary sediments of Alaska, USA (Vogel & Marincovich) and deposits of the same age in eastern Andalusia, Spain (Vogel & Betzler). A new project will be focused on the impact of low salinity, again with modern and fossil examples. The distribution of microendoliths in modern brackish water environments shall be tested in the Baltic Sea (northeastern Germany), and their occurrence under low-salinity conditions in fossil strata shall be studied in the Tertiary of the Vienna Basin, Austria (Vogel & Radtke).

Further on, we plan to investigate the geological record of microendoliths and of the bathymetric index ichnocoenoses. For this purpose we have started a project in the Ordovician of Ohio and Kentucky, USA (Vogel & C. Brett).

Perspectives

The long-term goal is to provide index ichnocoenoses applicable to reconstruct paleodepths in different environments, back to the early Paleozoic.

Literature of the research group

Balog, S.-J. 1996. Boring thallophytes in some Permian and Triassic reefs: bathymetry and bioerosion. In Reitner, J., Neuweiler, F. & Gunkel, F. (eds.), Global and regional controls on biogenic sedimentation. I. Reef evolution. Research Reports. Göttinger Arbeiten zur Geologie und Paläontologie, Sb2: 305-309.

Balog, S.-J. 1997. Mikroendolithen im Capitan Riff Komplex (New Mexico, USA). Courier Forschungsinstitut Senckenberg, 201: 47-55.

Bundschuh, M. 2000. Silurische Mikrobohrspuren. Ihre Beschreibung und Verteilung in verschiedenen Faziesräumen (Schweden, Litauen, Großbritannien und USA). Ph.D. Thesis, FB Geowissenschaften, Fachbereich Geowissenschaften, Johann Wolfgang Goethe-Universität Frankfurt am Main: 1-129.

Bundschuh, M. & Balog, J.S. 1999. *Fasciculus rogus* nov. isp., an endolithic trace fossil. Ichnos, 7: 149-152.

Gektidis, M. 1997a. Vorkommen, Ökologie und Taxonomie von Mikrobohrorganismen in ausgewählten Riffbereichen um die Inseln Lee Stocking Island (Bahamas) und One Tree Island (Australien)., Ph.D. Thesis, Fachbereich Biologie, Johann Wolfgang Goethe-Universität Frankfurt am Main: 1-276.

Gektidis, M. 1997b. Microbioerosion in Bahamian ooids. Courier Forschungsinstitut Senckenberg, 201: 109-121.

Gektidis, M. 1999. Development of microbial euendolithic communities: The influence of light and time. Bulletin of the Geological Society of Denmark, 45: 147-150.

Gektidis, M. 1999. Cyanobacteria and associated microorganisms characterize coarse shoarline carbonates of One Tree Island, Australia. In Charpy, L. & Larkum, A. W. D. (eds.). Marine Cyanobacteria. Bulletin de l'Institut Océanographique, Monaco, special issue.

Gektidis, M. and Golubic, S. 1996. A new endolithic cyanophyte/cyanobacterium: *H. vacans* sp. nov. from Lee Stocking Island, Bahamas. Beihefte zur Nova Hedwigia, 112: 93-100.

Glaub, I. 1988. Mikrobohrspuren in verschiedenen Faziesbereichen des Oberjura Westeuropas (vorläufige Mitteilungen). Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, 177: 135-164.

Glaub, I. 1994. Mikrobohrspuren in ausgewählten Ablagerungsräumen des europäischen Jura und der Unterkreide. Courier Forschungsinstitut Senckenberg, 174: 1-324.

Glaub, I. 1999. Paleobathymetric reconstructions and fossil microborings. Bulletin of the Geological Society of Denmark, 45: 143-146.

Glaub, I. & Bundschuh, M. 1997. Comparative studies on Silurian and Jurassic/Lower Cretaceous microborings. Courier Forschungsinstitut Senckenberg, 201: 123-135.

Glaub, I. & Königshof, P. 1997. Microborings in conodonts. Courier Forschungsinstitut Senckenberg, 201: 137-143.

Glaub, I. & Schmidt, H. 1994. Traces of endolithic microboring organisms in Triassic and Jurassic bioherms. Kaupia, 4: 103-112.

Glaub, I., Balog, S.-J., Bundschuh, M., Gektidis, M., Hofmann, K., Radtke, G., Schmidt, H. & Vogel, K. 1999. Euendolithic cyanobacteria/cyanophyta and their traces in earth history. In Charpy, L. & Larkum, A.W.D. (eds.), Marine Cyanobacteria. Bulletin de l'Institut Oceanographique, Monaco, Special Issue 19: 135-142.

Glaub, I., Vogel, K. & Gektidis, M. In press. The role of modern and fossil cyanobacterial borings in bioerosion and bathymetry. Ichnos.

Glaub, I., Gektidis, M. & Vogel, K. In review. Microborings from different North Atlantic shelf areas - Variability of the euphotic zone extension and implications for paleodepth reconstructions. Courier Forschungsinstitut Senckenberg.

Golubic, S., Al-Thukair, A. A. & Gektidis, M. 1996. New euendolithic cyanobacteria from the Arabian Gulf and the Bahama bank: *Solentia sanguinea* sp. nov. Algological Studies, 83: 291-301.

Hofmann, K. 1996. Die mikro-endolithischen Spurenfossilien der borealen Oberkreide Nordwest-Europas. Geologisches Jahrbuch, A 136: 1-153.

Hofmann, K., & Vogel, K. 1992. Endolithische Spurenfossilien in der Schreibkreide (Maastricht) von Rügen (Norddeutschland). Zeitschrift geologische Wissenschaft, 20: 51-65.

Kiene, W.E., 1997. Enriched nutrients and their impact on bioerosion: results from ENCORE. Proc. 8th internat. Coral Reef Symp. Panama City 1996: 897-902.

Kiene, W.E., Radtke, G., Gektidis, M., Golubic, S. & Vogel, K. 1995. Factors controlling the distribution of microborers in Bahamian reef environments. In: Schuhmacher, H., Kiene, W.E. and Dullo, W.-C., (eds.). Factors controlling Holocene reef growth: an interdisciplinary approach. Facies, 32: 174-188.

Krutschinna, J., 1997. Untersuchungen an der Tiefwasserkoralle *Lophelia pertusa* in verschiedenen prä- und postmortalen Stadien unter besonderer Berücksichtigung des mikroendolithischen Befalls. Unpubl. Diploma Thesis Fachbereich Biologie, Johann Wolfgang Goethe-Universität Frankfurt am Main: 1-77.

Radtke, G., 1991. Die mikroendolithischen Spurenfossilien im Alt-Tertiär West-Europas und ihre palökologische Bedeutung. Courier Forschungsinstitut Senckenberg, 138: 1-185.

Radtke, G. 1993. The distribution of microborings in molluscan shells from Recent reef environments at Lee Stocking Island, Bahamas. Facies, 29: 81-92.

Radtke, G. 1998. Mikroendolithische Bohrspuren in Gastropoden-Schalen von Sieblos/Rhön (Unter-Oligozän). In Martini, E. and Rothe, P. (eds.). Die alttertiäre Fossillagerstätte Sieblos an der Wasserkuppe/Rhön. Geologische Abhandlungen Hessen, 104: 143-155.

Radtke, G., LeCampion-Alsumard, T. & Golubic, S. 1996. Microbial assemblages of the bioerosional 'notch' along tropical limestone coasts. Algological Studies, 83: 469-482.

Radtke, G., LeCampion-Alsumard, T. & Golubic, S. 1997a. Microbial assemblages involved in tropical coastal bioerosion: an Atlantic-Pacific comparison. Proceedings of the 8th International Coral Reef Symposium Panama City 1996: 1825-1830.

Radtke, G., Hofmann, K. & Golubic, S. 1997b. A Bibliographic Overview of Micro- and Macroscopic Bioerosion. Courier Forschungsinstitut Senckenberg, 201: 307-340.

Radtke, G., Gektidis, M., Golubic, S., Hofmann, K., Kiene, W.E. & LeCampion-Alsumard, T. 1997c. The identity of an endolithic alga: *Ostreobium brabantium* Weber-van Bosse is recognized as carbonate penetrating rhizoids of *Acetabularia* (Chlorophyta, Dasycladales). Courier Forschungsinstitut Senckenberg, 201: 341-347.

Schmidt, H. 1990. Mikrobohrspuren in Fossilien der triassischen Hallstätter Kalke und ihre bathymetrische Bedeutung. Facies, 23: 109-120.

Schmidt, H. 1991. Mikrobohspuren in Makrobenthonten des Oberen Muschelkalks von SW-Deutschland. In Hagdorn, H. & Seilacher, A. (eds.). Muschelkalk. Schöntaler Symposium 1991, Sonderbände der Gesellschaft für Naturkunde in Württemberg, Stuttgart.

Schmidt, H., 1992. Mikrobohrspuren ausgewählter Faziesbereiche der tethyalen und germanischen Trias (Beschreibung, Vergleich, bathymetrische Interpretation). Frankfurter Geowissenschaftliche Arbeiten, A 12: 1-228.

Schmidt, H., & Freiwald, A. 1993. Rezente gesteinsbohrende Kleinorganismen des norwegischen Schelfs. Natur und Museum, 123: 149-155.

Vogel, K. 1987. Bohrorganismen und Fazies im Mitteldevon des Staates New York, USA. Natur und Museum, 117: 207-216.

Vogel, K. 1993. Bioeroders in fossil reefs. Facies 28: 109-114.

Vogel, K., Golubic, S. & Brett, C.E. 1987. Endolith associations and their relation to facies distribution in the Middle Devonian of New York State, U.S.A. Lethaia, 20: 263-290.

Vogel, K., Bundschuh, M., Glaub, I., Hofmann, K., Radtke, G. & Schmidt, H. 1995. Hard substrate ichnocoenoses and their relation to light intensity and marine bathymetry. Neues Jahrbuch für Geologie und Paläontologie, Abh., 195: 46-91.

Vogel, K., Kiene, W.E., Gektidis, M. & Radtke, G. 1996. Scientific results from investigation of microbial borers and bioerosion in reef environments. In Reitner, J., Neuweiler, F. Gunkel, F. (eds.). Global and regional controls on biogenic sedimentation . I. Reef evolution. Research reports. Göttinger Arbeiten zur Geologie und Paläontologie, Sb 2: 139-143.

Vogel, K., Balog, S.-J., Bundschuh, M., Gektidis, M., Glaub, I., Krutschinna, J. and Radtke, G. 1999. Bathymetrical studies in fossil reefs, with microendoliths as paleoecological indicators. Profil, 16: 181-191.

Vogel, K., Gektidis, M., Golubic, S., Kiene, W.E. & Radtke, G. 2000. Experimental studies on microbial bioerosion at Lee Stocking Island, Bahamas and One Tree Island, Great Barrier Reef, Australia: implications for paleoecological reconstructions. Lethaia, 33: 190-204.

Vogel, K. & Marincovich, L. In preparation. Paleobathymetric implications of microborings in Tertiary strata of Alaska, USA.

* * * * *

Freude trinken alle Wesen
An den Bursten der Natur;
Alle Guten, alle Bosen
Folgen ihrer Rosenspur.

Joy is drunk by every being
From kind nature's flowing breasts,
Every evil, every good thing
For her rosy footprint quests.

Friedrich Schiller (1785)
'*An die Freude* (Ode to Joy)'
Translated by William F. Wertz
Schiller Institute, Washington, DC

Interview of Dr. Florencio Aceñolaza: the rise of ichnology in South America

M. Gabriela Mángano & Luis A. Buatois
INSUGEO, San Miguel de Tucumán, Argentina
ichnolog@infovia.com.ar

The interview was conducted in Spanish by Gabriela Mángano and Luis Buatois at the Horco Molle office of the Instituto Superior de Correlación Geológica (INSUGEO) in December 2000 and subsequently translated into English. During the recent 4th Argentinean Meeting of Ichnology in San Miguel de Tucumán, Dr. Aceñolaza was awarded the 'Golden Oldhamia' in recognition of his pioneer work in South American ichnology. Gabriela and Luis thank Rodolfo Aredes, who transcribed the interview.

Q: How and when did you hear about ichnology for the first time?

A: When I started to work on my PhD dissertation on lower Paleozoic successions of northwest Argentina I had to deal with strata having abundant *Skolithos* and *Cruziana*. At that moment I contacted Borrello, who had been working along similar lines on the ichnology of the mountain ranges of southern Buenos Aires province.[1] Anyway, I didn't pay a lot of attention to ichnology at that time, but the topic remained there until 1970 or 1971. By that time, I became interested in the connection between the lower Paleozoic basin of northwest Argentina with the Precordillera and Famatina, following ideas of my former PhD supervisor Armando Leanza.[2] By the early seventies, the so-called 'crystalline basement' (Puncoviscana Formation and equivalents) of northwest Argentina was regarded as Precambrian by all geologists. One day, Juan Carlos Mirré, who was doing fieldwork, came into my office with some rocks having trace fossils that he found in the Sierras de la Ovejeria (western margin of the Aconquija Range). I immediately began to study this material and by comparison with the available literature I realized it was *Oldhamia,* a typical form of the Lower Cambrian. I couldn't believe it! The regional and chronostratigraphic implications were huge; the finding had a strong impact. Ironically, Borrello was one of the supporters of a Precambrian age. By that time he had had a heart attack and he told me 'Aceñolaza, what are you doing? This is going to cause me another heart attack!' Following ideas of Belousof and Auboin, he had produced a geologic model of northwest Argentina in his book *Los Geosinclinales de la República Argentina,* and this finding was terrible for his own model. Anyway, he was really excited about the finding of *Oldhamia*. He was cooperative even though we didn't meet very often, because traveling inside Argentina by that time was not as easy as it is now! Borrello was in La Plata, more than 1000 km from Tucumán. Then, during 1972-1973, I got more and more involved in the study of the metasedimentary basement and I made a large collection of trace fossils from the Puncoviscana Formation.

Q: By that time were you familiar with Seilacher's ideas?
A: Yes, when we started to collect specimens from the Puncoviscana Formation we became more familiar with the ichnologic literature. I had a student, Felipe Durand, who was going with me to the field and became interested in the topic. One day he told me that Seilacher was coming to Argentina, invited by Arturo Amos to give some talks, and we decided to invite him to Tucumán. When Seilacher saw the collection he was really impressed. He had planned to go with his family to Río de Janeiro after the talk, so he flew with them to Río, but came back to Tucumán to draw specimens. We were together two weeks and we took him to the field to different places in Salta and Jujuy provinces. A few months later we submitted the first general manuscript on the Puncoviscana ichnofauna to a Bulletin edited by the Geological Society of Córdoba, a rather obscure journal, but we distributed reprints among several people and it became a classic in the Precambrian-Cambrian literature [Aceñolaza & Durand, 1973]. Since then, it has been cited in many subsequent papers.

Q: It is even mentioned in chapter 2 of Frey's book [1975] as an example of ichnofossils preserved in metamorphic rocks.
A: Yes, that's right.

Q: What was the situation of ichnology in Argentina and in Iberoamerica in general when you started to work in the early seventies?
A: I think that in Argentina Borrello was the only one working besides me and he died around 1971. By the late sixties, Macsotay [1967] was working on the Cretaceous-Tertiary successions of Venezuela. However, at the beginning of the 20th century Steinman, a German working in Peru and Bolivia, did some descriptions and trace fossil collections and, of course, we had d'Orbigny [1837-42], who did a lot of work during the 19th century and proposed the ichnogenus *Cruziana* based on specimens from Bolivia. Ah! Lange [1942] was in Brazil working on *Arthrophycus* and *Fraena* (this is how they called *Didymaulichnus* by that time). We may say there was no real ichnologic school by those days, only geologists finding trace fossils and trying to take note of them. I forgot to mention, also in Brazil, Gerardo Muñiz and Antonio Carlos Fernandes. Another working on ichnology in Argentina was Rodolfo Casamiquela.[3] By that time I had found several specimens of *Orchesteropus atavus* in La Rioja and I was in contact with him.

Q: Did you meet Lucas Roselli, the Uruguayan who pioneered the study of insect nests [1938]?
A: Not really. In Uruguay, during the sixties, I was in contact with Mendez Arzola, who was a kind of Father of Uruguayan Geology. I think that it was not until a few years ago that we incorporated insect nests into the realm of ichnology, essentially due to the studies by Jorge Genise. This is interesting. I have already told you that my PhD supervisor was Leanza. Do you know who was Leanza's PhD supervisor? Frenguelli.[4] So Frenguelli becomes your great-grandfather. Leanza told me that he learnt a lot from him. He was quite productive and gave him a lot of freedom to do research.

Q: And what happened in Spain by that time?
A: Well, during Franco's time Spain was quite isolated, but the paleontologist Bermudo Meléndez [1950] paid some attention to ichnofossils in his textbooks. They had a lot of descriptions of *Cruziana*. I remember revising collections on some of my trips to Spain and finding tens of *Cruziana* ichnospecies defined! Most of the specimens were fragmentary and with minor variations in the angle of scratching or in the depth of the structure; they received different names by authors from the end of the 19th century and beginning of 20th century.

Q: Then you have the study of Azpeitia-Moros [1933] on the ichnology of turbidites. We have seen the collection at the museum in Madrid.
A: Yes.

Q: Which other ichnologists have influenced you most, either personally or through their publications?
A: Well, Seilacher, of course, and Bob Frey. I have never met personally with Bob Frey, but we were in contact by letter for a long time. Peter Crimes visited Tucumán about 15 years ago and I visited him in Liverpool in the early nineties. We were together in the field. Being in contact with all these people was really very important.

Q: Are you surprised by the ichnologic boom in Argentina?
A: I think that the boom is related to a very active group that is making interesting discoveries, such as both of you, Ricardo Melchor and Jorge Genise, people with very different backgrounds. Back in time, I think that the meeting on paleoecology that the Argentinean Paleontological Association organized in 1978 was very important.

Q: The papers were presented in a special issue of *Ameghiniana* in 1978. Your paper on lower Paleozoic ichnofacies from Argentina is there. That's interesting. Some English ichnologists considered that for them the book on paleoecology by Derek Ager (with a chapter on ichnology) [1963] was very important in promoting ichnology there.

A: Some people got interested on the topic after that and in the long term this led to the First Argentinean Ichnological Congress in La Pampa in 1993. During the nineties there was a huge expansion. I don't know how many people working on ichnology we have now, probably no more than 20 or 30 anyway.

Q: Probably there is not a huge number of ichnologists, but there is an increased number of people that are becoming aware that ichnology may provide crucial data in their fields of expertise.
A: This is important; to promote the idea that trace fossils are useful for geologists.

Q: Do you think there is something like an Argentinean school in ichnology? Any peculiarity?
A: What we have is a growing group of people; nobody is saying, 'This is what you should do,' everyone is trying to develop his or her own ideas and approach.

Q: So you see it like separate lines.
A: Yes, we had Borrello, then other people, after that there was an effort to adapt to international standards and topics, and all these led to an expansion.

Q: Definitely, the group is not isolated, it is not an endemic community. And it has crossed the linguistic barrier by publishing in international journals.
A: Yes, even publishing in Spanish we got some good diffusion. *Ichnology Newletter* was essential in this sense. It is a pity it was cut for so long.

Q: Coming back to the point of independent lines, we remember that Jorge Genise and us worked totally independent at the very beginning. We met in La Pampa in 1993 and we realized that we were working separately on topics that were totally complementary.
A: I think that the process is like opening a book. Originally the book was closed. Then Borrello came and opened the book to take a look at it. After that I opened another page, the Precambrian-Cambrian one, to subsequently move to other Paleozoic pages. Later both of you started to open other pages, now you have a PhD student opening another one. Each of us is opening different pages, but the important point is not how many pages have you opened; what is really important is that there may be another person close to you glancing at the book that gets interested and suddenly ask you to give him/her the book. It is not that one is 'teaching ichnology,' I think that the main point is being able to promote the whole thing.

Notes by MGM & LAB

1. A. Borrello did some research on ichnology, mostly in the sixties; he is the author of the first ichnologic lexicon in Spanish: *Vocabulario icnológico* (Borrello, 1971).
2. A. Leanza was an ammonoid and trilobite specialist; he was coauthor with Horacio Harrington, another Argentinean paleontologist, of *Ordovician Trilobites of Argentina* (Harrington & Leanza, 1957).
3. R. Casamiquela, an amateur naturalist, is still active in Patagonia. During the fifties, he was the author of a series of innovative ichnologic papers, mostly on vertebrates.
4. J. Frenguelli did research on insect fossil nests during the thirties [e.g., 1939].

References

Aceñolaza, F.G. 1978. El Paleozoico inferior de Argentina segun sus trazas fosiles. Ameghiniana, 15(1-2): 15-64.

Aceñolaza, F.G. & Durand, F. 1973. Trazas fosiles del basamento cristalino del noroeste Argentino. Asociación Geológica de Córdoba, Boletín, 2(1-2): 45-56.

Ager, D.V. 1963. Principles of Paleoecology: an Introduction to the Study of How and Where Animals and Plants Lived in the Past. McGraw-Hill, New York & Toronto, 371 pp.

Azpeitia-Moros, F. 1933. Datos para el estudio paleontólogico del Flysch de la Costa Cantábrica y de algunos otros puntos de España. Instituto Geológico y Minero de España, Boletín, 53: 1-65, pl. 1-19. Madrid.

Borrello, A. 1971. Vocabulario icnológico (Trazas de invertebrados – cuerpos problemáticos). Anales de la Sociedad Científica Argentina, 5-6: 223-233.

Frenguelli, J. 1939. Nidos fósiles de insectos en el Terciario del Neuquén y Río Negro. Notas del Museo de La Plata, Paleontología, 4(18): 379-402. La Plata.

Frey, R.W. 1975. The realm of ichnology, its strengths and limitations. *In* Frey, R.W. (ed.). The Study of Trace Fossils: a Synthesis of Principles, Problems, and Procedures in Ichnology. New York, Heidelberg & Berlin, Springer-Verlag, p. 13-38.

Harrington, H. & Leanza, A. 1957. Ordovician Trilobites of Argentina, University of Kansas, Department of Geology, Special Publication, 1. University of Kansas Press, Lawrence.

Lange, F.W. 1942. Restos vermiformes do 'Arnito das Furnas'. Museu Paranaense, Arquivos, 2: 3-8, pl. 1. Curitiba.

Macsotay, O. 1967. Huellas problematicas y su valor paleoecólogico en Venezuela. Universidad Central de Venezuela, Escuela de Geologia, Minas y Metalurgia, GEOS, 16: 7-79, pl. 1-18, 1 map. Caracas.

Meléndez, B. 1950. Tratado de paleontologia. Madrid.

Orbigny, A. d'. 1834-42. Voyage dans l'Amérique méridionale (le Brésil, la République Orientale d'Uruguay, la République Argentine, la Patagonie, la République du Chili, la République de Bolivia, la République du Pérou) exécuté pendant les années 1826, 1827, 1828, 1829, 1830, 1831, 1832, et 1833. Paléontologie Pitois-Leverault, Paris & Ve. Leverault, Strasbourg, 8 v.

Roselli, F.L. 1938. Apuntes de geología y paleontología uruguaya: sobre insectos del Crétacico del Uruguay o descubrimento de admirables instintos constructivos de esa época. Boletín de la Sociedad Amigos de las Ciencias Naturales 'Kraglievich-Fontana', 1: 72-102.

* * * * *

Vidi ego, quod fuerat quondam solidissima tellus,
Esse fretum: vidi factas ex aequore terras;
Et procul a pelago conchae jacuere marinae.

I myself have seen what once was quite solid ground,
now a strait; I have seen earth made from the level sea,
and seashells cast up far from the ocean.

Ovid, *Metamorphoses,* xv.262

Reminiscences of tracking,
or 'My theses was feces'

C. Kent Chamberlain
316 Call Street, Idaho Falls, ID 83402, USA
ckentc@ida.net

From my childhood, I was pre-positioned to study geology. I was always running off to the small hills around Cedar City, Utah, to pick up flint, chert, jasperoids, obsidian, and arrowheads made of these. I was predisposed to scrutinize the lay of the land, especially living on the boundary of the Great Basin and the Wasatch Plateau and amidst the wondrous parks of southern Utah. I very much admired the rock collection of a kindly, older gentlemen in Cedar City whose yard featured a rock fountain and rock walls decorated with pyrite, chalcopyrite, jasperoids, malachite, and azurite, and an agglomeration of local rocks and minerals: a sort of geologic fairyland. The log house and buildings were sheltered in large pine trees. It was a mystical place to visit.

In junior high I was an average or worse student. My parents had moved to Provo, Utah, so that one of their five children might choose to attend Brigham Young University (BYU). They bribed me to attend BY High. There I steadily got better grades. I even took advanced chemistry that allowed me to make Thermit bombs and other things that stunk or exploded.

As early as junior high, I was planning to be an architect. A neighborhood friend was going to be a geologist. We decided to work together on the Architecture and Geology Merit Badges for the Boy Scouts of America. We visited the home of a neighbor who was a professor of geology at BYU. He had a spectacular mineral collection. I was converted. From then on I was going to be a hard rock geologist. My friend became an architect and I became a geologist. I never did the Geology Merit Badge. After college I did and still do work in Scouting.

I spent half my time in high school and at home reading geology. I took many field trips to the local mining areas and known mineral sites; including deep into an abandoned mine at Park City before it was commercialized. You could see high up into the open stopes and deep down into the shafts filled with blue water. I brought back some 'ruby silver' that my mineralogy professor, Revell Phillips, suggested I give a streak test. Hematite! I always wondered if the good ol' boy that sent me after the valuable 'ruby silver' knew what he was doing.

Under the influence of J. Keith Rigby, Sr., the sponge expert, I was converted to soft rock – to paleontology, sedimentology, and stratigraphy. Taking calculus and differential equations was also an encouragement to steer clear of hard-rock mining geology.

J. Keith said there were a million trilobites in the Pennsylvanian-Permian Oquirrh Formation and that I might want to study them. I thought him wrong. At the end of the

first week of fieldwork I knew he was right and wrong. There were a billion, well silicified and throughout most of the Oquirrh Group. In some places, spread on the surface like plums. Consequently, for my Master of Science Thesis I studied and published on Mississippian through Permian trilobites from central Utah. It was selected by the Society of Sigma Xi, BYU Chapter, as the Best Thesis in the Physical Sciences for 1966-67.

When I returned to BYU after having been drafted into the US Army (too late for Korea, too early for Vietnam), I met James D. Howard. He had come to BYU from Kansas to work under Dr. Kenneth Hamblin who had joined the BYU faculty. The story was that Hamblin had discouraged Jim from coming, believing he would have a hard time adapting to BYU's special [Mormon] code of conduct. I remember walking down the hall the first day Jim was in his office and smelling coffee. I knew that was not going to last. Shortly thereafter, he was informed the code he had signed as a condition of enrollment meant no coffee anywhere or anytime he represented BYU. Jim stayed, and did well.

As graduate students, we went on a field trip to see Jim's work on the sedimentology, stratigraphy, and ichnology on the Panther Tongue (or Member), Star Point Formation, Mesaverde Group. I was fascinated with the trace fossils and their paleoenvironmental relationships in this one unit that stretched only a few miles and showed bathymetric changes in the trace-fossil assemblages. Later, Jim and I had several discussions, especially because of his disdain for taxonomy and my growing expertise in taxonomy (of trilobites). Jim had no intention of giving formal names to the trace fossils. He had recognized clusters of curving tubes and asked for a name. Flippantly I said 'pleural curving tubes.' The name stuck (Howard, 1966; Frey & Howard, 1970) until Howard and Frey (1981) gave them the longer name of *Schaubcylindrichnus*. I would have to give Jim credit for my eventual interest in trace fossils.

The summer after I finished my MS at BYU, I was accepted to the NSF-Leigh University Sediment-Organism Seminar in Bermuda. Robert Ginsburg, Keith Chaves, Gene Shinn, Bob Dunham, and some other prominent geologists were there and blew up a piece of the reef. They hauled large blocks off for slabbing and study. I probably missed my chance to go into the boring side of traces then. Shinn, an AAU champion diver according to the rumors, was able to dive about 15 feet [5 m] and swim for what seemed like several minutes along the bottom viewing and collecting. My technique was to dive down fast, grab something, rush back to the air at the surface, and then watch Shinn.

Jim went off to Sapelo Island and began his research on sedimentary structures and on modern spoor, especially in boxcores. I went to the University of Wisconsin-Madison (UW-M) in their graduate program as a PhD candidate. At Wisconsin I met Dr. Lewis Cline, who did research in the Ouachita Mountains of Oklahoma. His students did theses and dissertations ranging from sedimentology, stratigraphy, structure and biostratigraphy. He invited me to consider a thesis there. I met Jim Bird at UW-M, who had a copy of Seilacher's work on trace fossils for Humble (now Exxon). That report included trace fossils from the Ouachitas. Although not an original idea to me, I could not resist doing a dissertation on deep-water trace fossils in the Ouachitas. I did run the risk of not coming up with much new; perhaps my contribution was bringing to the public what Seilacher could not publish at the time. Before I committed to the dissertation under Cline, I learned he didn't have much time for his students. However, Dr. David L. Clark, a conodont, foram, and ammonite specialist who taught invertebrate and vertebrate paleontology, had plenty of time for his students, was active on department and university committees, and obtained grants, *and* published. It worked out well to have Cline as the field advisor and Clark as the dissertation advisor.

No one in the USA had done nor was doing a deep-water trace-fossil study of which I am aware. Essentially there was Howard's work in 1966 in the shallow Cretaceous of Utah, Frey's work in 1970 in the shallow Cretaceous Niobrara of Kansas,

Osgood's in 1970 in the shallow Ordovician of Ohio, and Siemer's (1971) in the shallow Cretaceous Dakota of Kansas.

It was probably that first summer after I went to Wisconsin that I met Dolf Seilacher on a spring field trip to the Ouachitas. (I cannot find any notes on the trip.) Although I was committed to a trace-fossil dissertation, I hadn't done much reading or research on trace fossils and naively ask Seilacher if he would send me a copy of any bibliography he had developed. He smiled, maybe smirked, and suggested something that amounted to, 'Wisconsin has a good library that I might use.' Not only did I need to have the benefit of my own literature search, I had made an unreasonable request. A few years later, after I had published some papers and spent more time with Dr. Seilacher, I mentioned the incident. He remembered it and we laughed.

(One of my favorite stories that Dr. Seilacher tells is having gone to Grand Canyon to look at the grandeur of the Canyon and to collect Cambrian trace fossils. He told of hauling many samples from the lower reaches of Grand Canyon. He also told of being without sufficient money, but having lunch at the way-stations where the tourists threw away untouched parts of the packaged lunches. He said he had had prior experience in garbage because he had applied for work in the Navaho Rodeo. They didn't need a paleontologist, but gave him work in garbage cleanup. He got many candid pictures of the Navahos as he worked among them.)

The Ouachita study was a great choice that enthralled my UW-M dissertation committee. Consequently, I breezed through the prospectus for the dissertation committee and later the defense. (Passing foreign language as a PhD candidate was not a breeze; I studied German on my own, but could never get a high pass so I combined it with a low pass in French that I had taken in high school.) The final write-up of the dissertation was weak because I had a job waiting and Clark was leaving for Spain. Nevertheless the interpretation was published in the *AAPG Bulletin* and later in the *AAPG Reprint Series,* and the systematics in the *Journal of Paleontology* (Chamberlain, 1971a, b, 1973).

For several years I was able to attend both the national Geological Society of America (GSA) and American Association of Petroleum Geologists/Society of Economic Paleontologists and Mineralogists (AAPG-SEPM) Meetings, where I was in regular contact with geologists in industry and geologists in academe (e.g., Chamberlain, 1974, 1980). The open forum of the Trace Fossil Research Group (TFRG) of SEPM was great fun and tremendous learning. Usually a free discussion of varied topics, experiences, concerns. Commonly an informal talk, slide show, or specimen display by participants. I believe that is where I first met Robert W. Frey and Richard Osgood; Chuck Siemers, and perhaps also John Warme. (He was at Rice when I lived in Houston, which is where I met Tony Ekdale when he was a graduate student.) Many discussions in the TFRG focused on taxonomy. I was adamant about following the International Code of Zoological Nomenclature (ICZN) and using the strict morphology of a type specimen. Now, although trace fossils are accepted in the ICZN, some would have us use another code and I have concerns about strict morphology when biologic affinity is known or strongly suspected.

The first trace-fossil short course in which I taught was sponsored by the US Geological Survey (USGS) and held in Golden, Colorado, in 1976. Bob Frey talked principles. My part was the field trip to the Lower Cretaceous sequences along the Front Range.

The most memorable short course to me was in 1978 and included Paul Basan, myself, Robert W. Frey, James D. Howard, Adolf Seilacher, and John E. Warme. I presented 'Recognition of Trace Fossils in Cores' (Chamberlain, 1978), a topic that I hesitated to present because I thought it was obvious. It got good reviews and comments from petroleum geologists stating that it was the most practical trace material they had seen and that it finally enabled them to understand traces they had seen in cores. My experience leading to that paper was from studying cores for Texaco, from the Deep Sea

Drilling Project (DSDP) collections, and from slabbing trace fossils from the Paleozoic of the Great Basin and Ouachitas, from the Cretaceous of the Western Interior, and from the Tertiary of Oswald West, Oregon.

A field trip to the Ouachita Mountains followed the short course (Chamberlain and Basan, 1976). The field trip was led by Basan and myself; Peter Crimes earlier provided welcome insight when he joined us for the pretrip run for the field trip. (I learned that Peter and family spent most summers in first-class berths on luxury liners going to European ports, mostly in the Mediterranean, where he gave port lectures to the tourists.) There were 43 participants on the Ouachita field trip, essentially the same people who had either presented or taken the short course (*see back cover*). I didn't recognize until now how cutting-edge those courses and field trips were.

Bob Frey had not asked me to write a chapter for his 1975 book, *The Study of Trace Fossils*. When I asked him why not, he explained he thought I was too busy, and all the appropriate topics were taken. Hummm....!?!? As a consolation he invited me to write about freshwater traces. The zoologists who were invited to write that topic had declined. I had been studying recent traces in the bayous near my home in Houston. Consequently, I agreed and wrote chapter 19, entitled 'Recent Lebensspuren in Nonmarine Aquatic Environments'. Reviews by the zoologists were that it was a weak, pedestrian chapter. Well yes, but that didn't bother me. Where were they before? It gave me the broad range of experience from deep-sea to nonmarine.

My work on the cores from Deep Sea Drilling Project (Chamberlain, 1974, 1975) came as a suggestion from Robert S. Yeats. Bob and I were teaching at Ohio University and taught Summer Field Geology in Nevada together. Bob was then, and more so later, involved in the DSDP. For me it was a natural tie to the study of deep-water traces from the Ouachita Mountains and from the Oquirrh Basin. I didn't know until later that Tony Ekdale was also deep into studying that material [Ekdale, 1973, 1977].

Overall the short courses and field trips were a great experience. The last short course I gave was for the Rocky Mountain Association of Geologists at the USGS Core Library at the Denver Federal Center nearly ten years ago. The course received good reviews. I intended to improve the course and market it to industry, but I got busy at environmental work that paid money. Geologists in petroleum companies tend to do permeability and porosity and a brief lithologic description on the expensive cores they collect. Marketing to industry requires demonstrating that defining the geometry and limits of a reservoir rock requires also defining the environments of deposition from all sources of data. The cost to collect core is high, and dictates spending the time and money to get all the data available from them. Trace fossils can give tremendous information beyond what most geologists, and especially managers, know. Marketing has been damaged by people who are weak in trace fossils using them loosely and incorrectly, tarnishing their image and diluting their usefulness.

My career has taken diverse paths that started in exploration for Texaco in Denver. Texaco wasn't supportive of my extracurricular work on the Cretaceous trace fossils and environments of deposition along the Dakota Hogback (Dinosaur Ridge) west of Denver (Chamberlain, 1976, 1980, 1998). Eventually they recognized a play in those same Cretaceous rocks and solicited my expertise. I chided them that I could not share what they had not been interested in supporting. My work on those trace fossils put me in the position to show the dinosaur tracks to Drs. Adolf Seilacher, Georges Demathieu, and Martin Lockley. They were all quite excited with them: Seilacher and Demathieu over some of the larger and less-known sets, Lockley over the large trackways. I thought the dinosaur tracks interesting, but had no clue how much public interest Lockley was going to bring to them. After all, what could a few dinosaur tracks on three or four horizons tell you about environments and paleoecology compared to the thousands of invertebrate trace fossils on numerous surfaces?

After Denver I went to Bellaire, Texas, and worked in the Texaco research lab in paleontology, mostly on palynology, and wrote an in-house trace-fossil manual. Leaving

Texaco, I taught at Ohio University, where I continued diverse trace-fossil work. Teaching summer field geology in Nevada was a great deal of fun, and exposed me to early to late Paleozoic trace fossils of the Great Basin. Enrollment declined at Ohio University at the end of the Vietnam War, and Geology was forced to cut a position (later restored, but I was already committed elsewhere). I sought and took a job back in the West at the University of Nevada at Las Vegas, where I established the short-lived Center for Trace Fossil Research. My wife was having health problems and the job did not work out well. I went back into industry with Cities Service in Denver, and did little trace-fossil work. I worked full-time in exploration, raised a family, and did community and religious service work. No time for fossil 'worm droppings'. When the petroleum industry had a 1980s boom I went through several small companies in Denver as they opened and closed. In the eventual decline I worked five years for the US Public Health Service, Department of Federal Occupational Health, doing environmental work. Mostly asbestos audits and oversight of removal – 'We got paid as geologists to take it (asbestos) out of the ground, and then we got paid to put it back in.' I got paid to go to Mount Rushmore for a week, James A. Garfield National Historical Site for a week, to Carlsbad Caverns for a few days, Fort Smith National Historical Site for a week, Las Vegas for several weeks, and numerous federal buildings in Montana, North Dakota, South Dakota, Utah, and Wyoming. I came to the Bighorn Basin with KCS Mountain Resources, who put themselves in Chapter 11 bankruptcy and left me stranded in the Bighorn Basin doing wellsite work.

The geology is spectacular. Trace fossils range from Cambrian *Skolithos* and *Rusophycus* to Tertiary freshwater traces. It has taken nearly twenty years to get a paper on Tertiary trace fossils from Oregon rejected by the *Journal of Paleontology*. Currently I am planning on updating the trace-fossil short course and marketing it to industry.

Through this career path, living in Denver, Houston, Athens, Las Vegas, Denver, and Worland, my wife Nancy and I raised two children. Our son Jason is the testing and design engineer for Specialised Bike in Morgan Hill, California, and occasionally narrates bike races for Fox Network. He has a two-year-old son who appears to be quite precocious. Our daughter Susan is a housewife in Boise, Idaho, working it out with three delightful children.

I haven't skied since I left Denver, but I do get to look at amazing outcrops. The latest traces include large, world-class *Ophiomorpha* in beach sands under a bentonitic shale, and two hundred miles away small *Ophiomorpha* in nearshore bentonitic sandstone. Both in the Mesaverde at about the same time line. What do I suppose it means? Hummmm.....!?!?

Selected references (AKR)

Chamberlain, C.K. 1970. Trace fossils and paleoecology of the Ouachita Mountains of southeast Oklahoma. Unpublished Ph.D. dissertation, University of Wisconsin-Madison, 148 pp.

Chamberlain, C.K. 1971a. Bathymetry and paleoecology of Ouachita geosyncline of southeastern Oklahoma as determined by trace fossils. AAPG Bulletin, 55: 34-50.

Chamberlain, C.K. 1971b. Morphology and ethology of trace fossils from the Ouachita Mountains, southeast Oklahoma. Journal of Paleontology, 45(2): 212-246, pl. 29-32.

Chamberlain, C.K. & Clark, D.L. 1973. Trace fossils and conodonts as evidence for deep-water deposits in the Oquirrh Basin of central Utah. Journal of Paleontology, 47(4): 663-682, 3 pl.

Chamberlain, C.K. 1974. Explaining the trace-fossil community in DSDP cores. Geological Society of America, Abstracts with Programs, 6(6): 498.

Chamberlain, C.K. 1975. Recent lebensspuren in nonmarine aquatic environments. *In* Frey, R.W. (ed.). The Study of Trace Fossils: a Synthesis of Principles, Problems, and Procedures in Ichnology. Springer-Verlag, New York, p. 431-458.

Chamberlain, C.K. 1975. Trace fossils in DSDP cores of the Pacific. Journal of Paleontology, 49:1074-1096.

Chamberlain, C.K. 1975. Biogenic sedimentary structures: trace fossils of the Ouachitas. *In* Briggs, G., McBride, E.F. & Moiola, R.J. (eds.). A Guidebook to the Sedimentology of Paleozoic

Flysch and Associated Deposits, Ouachita Mountains; Arkoma Basin, Oklahoma. Dallas Geological Society, p. 51-68. Dallas, Texas.
Chamberlain, C.K. 1976. Field guide to the trace fossils of the Cretaceous Dakota hogback along Alameda Avenue, west of Denver, Colorado. *In* Epis, R.C. & Weimer, R.J. (eds.). Studies in Colorado Field Geology. Professional Contributions of the Colorado School of Mines, 8: 242-250. Golden, Colorado.
Chamberlain, C.K. 1977. Ordovician and Devonian trace fossils from Nevada. Nevada Bureau of Mines and Geology, Bulletin, 90: 24 pp. Reno, Nevada.
Chamberlain, C.K. 1978. Recognition of trace fossils in cores. *In* Basan, P. (ed.), Trace Fossil Concepts. Society of Economic Paleontologists and Mineralogists, SEPM Short Course, no. 5: 133-183. Tulsa, Oklahoma.
Chamberlain, C.K. (ed.). 1978. A guidebook to the trace fossils and paleoecology of the Ouachita Geosyncline. Society of Economic Paleontologists and Mineralogists, 68 pp. Tulsa.
Chamberlain, C.K. 1979. Trace-fossil biofacies in the lower and middle Paleozoic of central Nevada. Brigham Young University, Geological Studies, 26(1): 9-19. Provo, Utah.
Chamberlain, C.K. 1980. Principles of studying trace fossils in cores. *In* Basan, P.B. (ed.). Trace Fossils of Nearshore Depositional Environments of Cretaceous and Ordovician Rocks, Front Range, Colorado. Society of Economic Paleontologists and Mineralogists, Rocky Mountain Section, Guidebook, Field Trip, 1: 42-48.
Chamberlain, C.K. 1980. The trace fossils of the Cretaceous Dakota Hogback along Alameda Avenue, west of Denver, Colorado (Stop 4). *In* Basan, P.B. (ed.). Trace Fossils of Nearshore Depositional Environments of Cretaceous and Ordovician Rocks, Front Range, Colorado. Society of Economic Paleontologists and Mineralogists, Rocky Mountain Section, Guidebook, Field Trip, 1: 30-41. Denver, Colorado.
Chamberlain, C.K. 1980. Synonymy, ethology, and environmental implications of *Nereites* group of trace fossils. American Association of Petroleum Geologists, Bulletin, 64(5): 690-691.
Chamberlain, C.K. 1998. Dinosaur Ridge. Ichnology Newsletter, (20): 20-21.
Chamberlain, C.K. & Frey, R.W. 1976. Seminar on trace fossils. U.S. Geological Survey, Short Course Syllabus, Golden, Colorado, 43 pp.
Chamberlain, C.K., Kauffman, E.G., Kiteley, L.M.W., Lockley, M.G. & Anonymous. 1985. Field Trip No. 3; Environments of deposition of Cretaceous sandstones of the Western Interior. In 1985 SEPM midyear meeting field guides. Society of Economic Paleontologists and Mineralogists, Rocky Mountain Section. Denver, Colorado, p. 142.
Chamberlain, C.K. & Spencer, C.W. 1980. Cores for interpreting trace fossils and environments of deposition. *In* Basan, P.B. (ed.). Trace Fossils of Nearshore Depositional Environments of Cretaceous and Ordovician Rocks, Front Range, Colorado. Society of Economic Paleontologists and Mineralogists, Rocky Mountain Section, Guidebook, Field Trip, 1: 49-65.
Ekdale, A.A. 1973. Burrowing patterns of abyssal infauna in Deep Sea Drilling Project cores (Cretaceous to Pleistocene): a preliminary report. Geological Society of America, Abstracts with Programs, 5(7): 609-610.
Ekdale, A.A. 1977. Abyssal trace fossils in worldwide Deep Sea Drilling Project cores. *In* Crimes, T.P. & Harper, J.C. (eds.). Trace Fossils 2. Geological Journal, Special Issue, 9: 163-182, 3 pl.
Frey, R.W. 1970. Trace fossils of Fort Hays Limestone Member of Niobrara Chalk (Upper Cretaceous), west-central Kansas. University of Kansas, Paleontological Contributions, Article, 53 (Cretaceous 2): 41 pp., 10 pl. Lawrence, Kansas.
Frey, R.W. & Howard, J.D. 1970. Comparison of Upper Cretaceous ichnofaunas from siliceous sandstones and chalk, Western Interior region, U.S.A. *In* Crimes, T.P. & Harper, J.C. (eds.). Trace Fossils 2. Geological Journal, Special Issue, 3: 141-166, 1 pl.
Howard, J.D. 1966. Characteristic trace fossils in Upper Cretaceous sandstones of the Book Cliffs and Wasatch Plateau. *In* Central Utah coals – a guidebook prepared for the Geological Society of America and associated societies. Utah Geological and Mineral Survey, Bulletin, 80: 35-53. Salt Lake City, Utah.
Frey, R.W. & Howard, J.D. 1981. *Conichnus* and *Schaubcylindrichnus:* redefined trace fossils from the Upper Cretaceous of the Western Interior. Journal of Paleontology, 55(4): 800-804.
Osgood, R.G., Jr. 1970. Trace fossils of the Cincinnati area. Palaeontographica Americana, 6(41): 277-444, pl. 57-83. Ithaca, New York.
Siemers, C.T. 1971. Facies distribution of trace fossils in a deltaic environmental complex: upper part of the Dakota Formation (Upper Cretaceous), central Kansas. Geological Society of America, Abstracts with Programs, 2(7): 683-684.

Evidence of a mysterious predator of land snails: an update

Aydin Örstan
13348 Cloverdale Place, Germantown, Maryland 20874, USA
bdelloid1@aol.com

Some time after I wrote the original article (Örstan, 2001), I showed the shells to Tim Pearce (Delaware Museum of Natural History) and he offered a partial solution to the puzzle. I was thinking that those parallel traces on the shell (fig. 1) had been carved from the outside by a predator. But Tim convinced me that those traces came from within and were indications that the mantle had been injured. I previously mentioned that those traces usually start at a spot where there is a large scar on the shell; they extend out spirally in the direction the shell grew, get weaker and finally disappear. Tim's explanation made sense because the scar on the shell would be the spot where the predator bit into the shell and the snail. The snail somehow survived the attack with an injury to its mantle. It repaired the shell at the site of attack, which resulted in a scar, then it continued to grow but the mantle injury resulted in those traces, which eventually disappeared because the mantle healed. However, the identity of the predator remains unknown, as does also the mechanism by which some snails escape the predator albeit injured.

A paper by Cadée (1999) got me interested in the question of how long empty snail shells last in the woods. Last May and also in September, I put out some *Neohelix* shells in the woods near my house. I have been monitoring them periodically (which involves bringing them back home and weighing them). I will let you know how it goes.

References

Cadée, G.C. 1999. Bioerosion of shells by terrestrial gastropods. Lethaia, 32(3): 253-260.
Örstan, A. 2001. Evidence of a mysterious predator of land snails. Ichnology Newsletter, 23: 24.

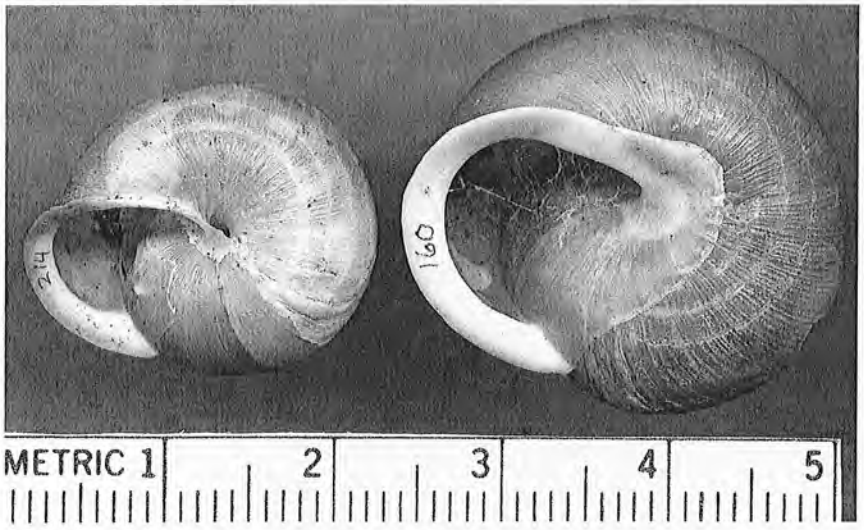


FIGURE 1 – Possible tooth traces on land snails.
Left: *Mesodon thyroidus*. Right: *Neohelix albolabris*. Collection of A. Örstan. Scale in cm.

Keeping track

Andrew K. Rindsberg
Geological Survey of Alabama
P.O. Box 869999, Tuscaloosa, AL 35486-6999, USA
arindsberg@gsa.state.al.us

Footprints are where you look for them. Ordinary language is full of idioms and phrases that refer to ichnology, especially to footprints. I often play a game with myself while reading a novel: How long will it be before the author refers to tracks or the other subject matter of ichnology? So far, I have not found a novel that does not refer to tracks, and some are full of such references. *Robinson Crusoe* and *The Lord of the Rings* each contain long sections that focus on tracking and indicate considerable thought on the matter (Defoe, 1719; Tolkien, 1954). But most authors use tracking as a metaphor for other thoughts. The English language is rich in idioms on tracking. Let's look into a few of them.

Tracks and trails and traces

Track, trace

First, we have to trace the word *track* itself. *Track* has many meanings and can be used as noun and verb. The word derives chiefly from Middle English *trak,* which came from Middle French *trac,* evidently of Germanic origin, and ultimately from a Proto-Indo-European root reconstructed as **tragh-,* to draw, drag, or move (Partridge, 1963; Barnhart, 1988; Watkins, 2000). *Trek* is a related word borrowed from Afrikaans, and attested in Middle Dutch as *treck,* to pull or haul. These words seem to be related to *drag* and *draw,* in the sense of pulling, and the connection is likely that sledges and wheeled vehicles make long grooves in the ground: *tracks*. Thus, it should not be surprising that a *track* can be a forest path, a narrow dirt road, the grooves made in the ground by cars, the imprint made by animals' feet, or an individual imprint. Each meaning led to the next, perhaps as children or other people learning the language guessed at the meaning, or perhaps as the result of creative speech in jokes or poetry.

In Middle and Modern Dutch, *trecken* or *trekken* means to draw something (especially a ship) along, and this usage was brought into English as well. We still speak of a ship's track.

A *track* can also be a racecourse (a round dirt track), the path along which anything has moved, or even the course on a map showing where something has moved. A *track* can be a sequence of events or ideas, or even the awareness of the sequence of the ideas' connection, as in *keep track* or *lose track*. A *track* can even be a remnant or vestige.

Railroad track requires a special explanation: At first such tracks were grooves cut in a hard surface for wheels to roll along; only later did grooved wheels run on the raised rails that we now call *tracks*. Many idioms using the word *track* refer to railroads: *sidetrack,* to distract, comes from a short piece of railway track next to the main route.

The verb *to track* developed much later than the noun. *To track* someone is to follow his tracks (Partridge, 1963).

With all these different meanings for *track* that developed in just one language, it will not surprise the reader to learn that English has borrowed or developed several other words related to *track,* sometimes with the sense of pulling or dragging still somewhere close to the core: *draft, drain, drawl, dray, dredge, tract, trail, train, trait, trawl, treat,* to name only the shortest. But not *tramp* or *tread* or *trip,* despite the similarity in sound.

As ichnologists, we are particularly interested in the word *trace*. In common parlance, *trace* is any sign of the passage or former existence of a person, animal, or object. This can be a footprint or trail, or in archaic usage a road. By extension, it can also be a line sketched on a rolled piece of paper by a scientific instrument, or a tiny amount of a chemical element or compound. In contrast to the word *track,* which

developed a noun from a verb, *trace* was a verb first and then a noun. It comes from Old and Middle French *tracier,* to trace, probably from an intensified form of Latin *trahere,* to draw or drag. So Germanic-derived *track* and Latin-derived *trace* have a common origin, and perhaps also Greek *trekhein,* to run (Partridge, 1963).

A *trace fossil* is ancient evidence of a trace. If the phrase had originated in English, it would probably have been *fossil trace,* but instead it originated as a translation from German *Spurenfossil* (e.g., Krejci-Graf, 1932) and French *trace fossile* (Lessertisseur, 1956); one of the earliest to use the English phrase was Simpson (195_).

Backtrack and *trace back*

To *backtrack* is literally to walk a trackway backward, generally to *retrace* one's own steps, but this core meaning is not the one that most people use in ordinary speech. They use the word in its extended sense of reversing one's position on a subject, particularly when a person contradicts himself in doing so. In this sense, *backpaddle* (reversing direction while paddling a canoe) is a synonym of *backtrack.*

One can also *trace* something *back* to its origin, but this is not the same as backtracking. In this case a hunter searches backward along a trackway. By extension, a researcher can *trace* the origin of something as abstract as a word or an idea.

Back on track

To return to the topic is to get *back on track.*

Warm and *cold trails; hot on the trail*

Obviously, footprints do not stay warm long enough for the prey to get out of sight of the hunter. But it might make a good joke to pretend that they do. Also, trackers sometimes follow a series of campfires, whose ashes may still be warm if the prey is near. Conversely, if the trail is old, it is *cold.* But a hunter who is *hot on the trail* (or a hound that is *hot on the scent*) is one who is getting warm from exercise.

Cut for sign, cut for trail

A tracker who has lost the trail (*sign*) may be able to find it again by circling abruptly (*cutting*) to the right or left. This is only occasionally used as a metaphor.

The end of the trail

The end of the trail (or *road*), is metaphorically the termination of the current work or sequence of events. Not necessarily a dead end, this may mark an opportunity for a new start.

False trail

A false or misleading clue, a trail that leads nowhere.

Eye tracks

In nineties slang, people who don't want to be watched complained that the watchers left *eye tracks* on them, as if they felt grimy. This creative use of the language was intended to be humorous, and when the joke became commonplace, it lost much of its humor. If the phrase survives, it would become a cliché, a sort of fossilized *bon mot.*

Follow in his footsteps

This one is biblical: in one translation, 'Christ also suffered for you, leaving you an example that you should follow in his footsteps' (1 Peter 2: 21). A search on Yahoo! yielded no less than 7090 references to this phrase, not all of them religious.

Gone without a trace; not a trace; no sign of him

Someone who has utterly vanished is *gone without a trace; not a trace* is left, but the mystery remains. These and similar phrases are common in speech and literature.

Kick over the traces

To kick over the traces (to cast off restraint) is actually not an ichnologic metaphor. In this case, *traces* are reins – leather straps that are pulled to control a horse. In the old days, a carthorse that literally kicked over the reins would then be out of control.

Trackless waste, traceless wilderness

A *trackless waste* or *traceless wilderness* has no road or even human sign. By extension, it is a land (or area of research) that is worthy of no one's attention, or perhaps one that has simply been overlooked.

Keep track; lost track

If one continues to pay attention to a series of footprints (or to a series of thoughts), then one *keeps track* of them. Otherwise, one *loses track*.

Make tracks

Another joke: To *make tracks* is to run, or at least to make progress.

Sidetrack, on the right (or *wrong*) *track, on* (or *off*) *track*

To sidetrack someone is to *distract* them, an interesting parallelism because the word *tract* too is a cognate of *track,* from Latin *tractus,* dragged. But the original sidetrack is a railway siding (OED), so this is not very ichnologic. Other railway usages of *track* perhaps include *on the right track* (i.e., to be deducting correctly) and *on the wrong track* (to be mistaken). More simply, one is *on track* or *off track*.

Stop still in one's tracks; halt dead in one's tracks

Variations on the theme of stopping suddenly. Originally it must have been a humorous or poetic usage, but the joke has long since worn thin.

Track in, track up, track off, track down, trail off, trail away

English is full of verbs with prepositions attached. One can *track in* dirt to a house, *track up* (dirty) a floor, *track off* (walk away, often but not necessarily angrily), or *track down* (find) a person or a clue. Something that dwindles is said to *trail off* or to *trail away*.

Tracker

A *tracker* is someone who tracks animals or persons. The occupation is rare nowadays and implies great knowledge of nature and powers of observation. Thus, when Geo (now Chevrolet) designed a sport utility vehicle, they named it 'Tracker', perhaps appropriately.

In Britain, a *tracker* can also be someone who tracks (tows) a boat (Brown, 1993).

Trailblazer

To *blaze a trail* is to mark trees or other objects along a path; from this was derived the sense of a pioneer, i.e., one who prepares the way for others (Barnhart, 1988).

Trail of Tears

In 1838-39, the United States government forcibly removed most of the Cherokee Nation from its Southeastern ancestral lands to Oklahoma. Conditions were grim and one-fourth of the Cherokees died on the way. The route is now called the *Trail of Tears*. By extension, any tragic journey could now be called a *trail of tears*.

Discussion

The English connection between *track* ('footprint') and *track* ('path', 'imprint of a wheel or sledge') is not a common one among the world's languages. The word for *track* in the sense of *footprint* has a different set of related meanings in some other languages.

In some languages, the word for footprint also means 'vestige' or 'remnant', so the phrase *lost without a trace* translates well, and the word resonates with the sense of loss and history: Japanese *ato,* Latin *vestigium*. In many languages, a *track* is a *footprint,* the imprint of a foot. In some languages, a track was originally that which was smelled by hunters' dogs (*hot on the scent*). In others, a track was seen, and in still others, it was followed or sought. The origin of Greek *ichnos* is unknown; it has no known cognates in other languages. That the current meanings of these words derives from a cultural history cannot be denied. Perhaps one day we will track down their significance.

References

Barnart, R.K. (ed.). 1988. Chambers Dictionary of Etymology (2nd edition). Chambers Harrap Publishers, Edinburgh & New York, xxvii + 1284 pp.

Brown, L. (ed.). 1993. The New Shorter Oxford English Dictionary on Historical Principles. Clarendon Press, Oxford, 2 v., 3801 pp.

Defoe, D. 1719. Robinson Crusoe.

Krejci-Graf, K. 1932. Definition der Begriffe Marken, Spuren, Fährten, Bauten, Hieroglyphen und Fucoiden. Senckenbergiana, 14: 19-39.

Lessertisseur, J. 1956. Traces fossiles d'activité animale et leur significance paléobiologique. Société Géologique de France, Mémoires, new ser., 74 (1955), 150 pp., 11 pl.

Partridge, E. 1963. Origins: a Short Etymological Dictionary of Modern English. Macmillan Company, New York, xix + 972 pp.

Simpson, S. 1957. On the trace-fossil *Chondrites*. Quarterly Journal of the Geological Society of London, 112: 475-499, pl. 21-24.

Tolkien, J.R.R. 1954. The Two Towers: Being the Second Part of the Lord of the Rings. George Allen & Unwin, London, 352 pp.

Watkins, C. (ed.). 2000. The American Heritage Dictionary of Indo-European Roots (2nd edition). Houghton Mifflin, Boston & New York, xli + 149 pp.

* * * * *

Then morning came and many a warrior
gathered, as I've heard, around the gift-hall,
clan-chiefs flocking from far and near
down wide-ranging roads, wondering greatly
at the monster's footprints. His fatal departure
was regretted by no-one who witnessed his trail,
the ignominious marks of his flight
where he'd skulked away, exhausted in spirit
and beaten in battle, bloodying the path,
hauling his doom to the demons' mere.

Beowulf, lines 836 to 845
Translated by Seamus Heaney (2000)

Alan D. Ansell, marine ecologist, 1934-1999

Andrew K. Rindsberg
Geological Survey of Alabama
P.O. Box 869999, Tuscaloosa, AL 3486-6999, USA
arindsberg@gsa.state.al.us

Alan D. Ansell was a marine ecologist who worked from 1969 onward at the Dunstaffnage Marine Research Laboratory in Oban, Scotland. He studied the behavior, functional morphology, locomotion, reproduction, predation, and other aspects of shallow-marine invertebrates, particularly bivalves (among them *Donax, Venus, Lima, Nucula, Tellina, Chlamys, Abra,* and *Petricola*). Between 1960 and 2000 he wrote at least 30 papers with significant ichnologic content, especially on the burrowing and boring behavior of bivalves, naticid gastropods, and echiurans. His findings are basic to our current understanding of invertebrate locomotion in soft substrates. He collaborated extensively in this work with E.R. Trueman, N.B. Nair, R.J.A. Atkinson, and D.J. Hughes. A scientific biography and bibliography are given in the 2000 volume of *Oceanography and Marine Biology: an Annual Review,* which was dedicated to Ansell.

Partial ichnologic bibliography of A.D. Ansell

Ansell, A.D. 1960. Observations on predation of *Venus striatula* (DA COSTA) by *Natica alderi* (FORBES). Proceedings of the Malacological Society, 34: 157-164.

Ansell, A.D. 1961. The functional morphology of the British species of Veneracea (Eulamellibranchia). Journal of the Marine Biological Association of the United Kingdom, 41: 489-515.

Ansell, A.D. 1962. Observations on burrowing in the Veneridae (Eulamellibranchia). Biological Bulletin, 123: 521-530.

Ansell, A.D. 1970. Boring and burrowing mechanisms in *Petricola pholadiformis.* Journal of Experimental Marine Biology and Ecology, 4: 211-220.

Ansell, A.D. & Nair, N.B. 1967. Shell movements in a wood boring bivalve. Nature, 216:295.

Ansell, A.D. & Nair, N.B. 1969. A comparative study of bivalves which bore mainly by mechanical means. American Zoologist, 9: 857-868.

Ansell, A.D. & Trumean, E.R. 1967. Observations on burrowing in *Glycymeris glycymeris* (L.) (Bivalvia, Arcacea). Journal of Experimental Marine Biology and Ecology, 1: 65-75.

Ansell, A.D. & Trueman, E.R. 1968. The mechanism of burrowing in the anemone, *Peachia hastata* Gosse. Journal of Experimental Marine Biology and Ecology, 2: 124-134.

Ansell, A.D. & Trueman, E.R. 1973. The energy cost of migration of the bivalve *Donax* on sandy tropical beaches. Marine Behavior and Physiology, 2: 21-32.

Gibson, R.N. 2000. Alan D. Ansell, BSc, PhD, Dsc, CBiol., FIBiol., 22 October 1934 - 18 July 1999. *In* Gibson, R. N. & Barnes, M. (eds.). Oceanography and Marine Biology: an Annual Review, 38: 1-12.

Hughes, D.J., Ansell, A.D., Atkinson, R.J.A. & Nickell, L.A. 1993. Underwater television observations of surface activity of the echiuran worm *Maxmuelleria lankesteri* (Echiura: Bonelliidae). Journal of Natural History, 27: 219-248.

Hughes, D.J., Ansell, A.D. & Atkinson, R.J.A. 1996. Sediment bioturbation by the echiuran worm Maxmuelleria lankesteri (Herdman) and its consequences for radionuclide dispersal in Irish Sea sediments. Journal of Experimental Marine Biology and Ecology, 195(2): 203-220.

Hughes, D.J., Atkinson, R.J.A. & Ansell, A.D. 1999. The annual cycle of sediment turnover by the echiuran worm *Maxmuelleria lankesteri* (Herdman) in a Scottish sea loch. Journal of Experimental Marine Biology and Ecology, 238(2): 209-223.

Massé, H. & Emig, C. 2000. Alan D. Ansell n'est plus. In EuroBrachNet. URL http://www.com.univ-mrs.fr/EuroBrachNet/ANNONCES/OBITUARIES/Ansell.htm . Accessed 16 May 2001.

Nair, N.B. & Ansell, A.D. 1968. Characteristics of penetration of the substratum by marine bivalve molluscs. Proceedings of the Malacological Society of London, 38: 179-197.

Nair, N.B. & Ansell, A.D. 1968. The mechanism of boring in *Zirphaea crispata* (L.) (Bivalvia: Pholadidae). Proceedings of the Royal Society of London, ser. B, 170(1019): 155-173.

Nickell, L.A., Atkinson, R.J.A., Ansell, A.D., Hughes, D.J. & Smith, C.J. 1994. Burrow morphology of the echiuran worm *Maxmuelleria lankestri* (Echiura: Bonelliidae) and a brief review of burrow structure and related ecology of the Echiura. Journal of Natural History, 29: 871-885.

Pinn, E.H. & Ansell, A.D. 1993. The effect of particle size on the burying ability of the brown shrimp *Crangon crangon.* Journal of the Marine Biological Association of the United Kingdom, 73: 365-377.

Trueman, E.R. & Ansell, A.D. 1969. The mechanism of burrowing into soft substrates by marine animals. Oceanography and Marine Biology: an Annual Review, 7: 315-366.

* * * * *

Ardito Desio, 1897-2001

Andrew K. Rindsberg
Geological Survey of Alabama
P.O. Box 869999, Tuscaloosa, AL 35486-6999, USA
arindsberg@gsa.state.al.us

Many of you will recognize the name of Prof. Ardito Desio, who wrote a seminal paper on Libyan trace fossils in which he named the ichnogenus *Bifungites* (1940), a significant work on the classification of trace fossils (1950), and articles on *Lorenzinia* and other trace fossils.

But Prof. Desio was also a celebrated mountaineer and explorer, whose very name, Ardito, means 'brave'. He participated in the discovery of oil in Libya. He organized an Italian expedition to K2, the world's second tallest peak, and climbed nearly to the top while two members of the team attained the summit. He wrote broadly on mountaineering, Antarctica, and caves as well as on ichnology. A Web search for his name yields hundreds of entries.

Prof. Desio lived an extraordinary life, and an extraordinarily long one. He was born before the twentieth century and died after it, only last Wednesday. He was 104 years of age.

Ichnologic bibliography of Ardito Desio

Desio, A. 1923. Sopra una *Lorenzinia* del Flysch dei dintorni di Firenze. Rivista Italiana di Paleontologia, 29: 7-10, 1 pl. Parma.

Desio, A. 1940. Vestigia problematiche paleozoiche della Libia. Museo Libico Storia Naturale, Annali, 2: 47-92, 13 pl. Tripoli.

Desio, A. 1941. Un nuovo reperto di *Lorenzinia carpatica* (Zuber) nel Flysch dell Albania settentrionale. Rivista Italiana di Paleontologia, 47:7-8. Pavia.

Desio, A. 1950. Sulla nomenclatura della vestigia problematiche fossili. Rivista Italiana di Paleontologia i Stratigrafia, 56(1): 1-5. Milano.

Desio, A. 1951. Federico Sacco. Quarterly Journal of the Geological Society of London. 106(pt. 3, no. 423), lv-lvi.

Desio, A. & Chiarugi, A. 1949. Sulla flora fossile a Lepidodendrales del Fezzan. Palaeontographia Italica, 45(15)): 77-84. Pisa.

Desio, A., Silva, P. & Ronchetti, C. R. 1977. [On the Cretaceous outcrop in the Chumarkhan and Laspur valleys, Gilgit-Chitral, NW Pakistan]. Rivista Italiana di Paleontologia i Stratigrafia, 83: 561-574.

* * * * *

Natura il fece, e poi ruppe la stampa.

Nature made him, and then broke the mold.

Ariosto, *Orlando Furioso* (canto x, stanza 84)

Nicolás Muñoz:
remembrances posted on the SKOLITHOS listserver

Luis A. Buatois
INSUGEO, San Miguel de Tucumán, Argentina
ichnolog@infovia.com.ar

3 February 2002

Dear friends,

It is with great regret that I have to inform you that Nicolás Muñoz died in Caracas a few hours ago after a brave battle against cancer. Those of us who attended the Sixth International Ichnofabric Workshop in Venezuela last year will remember how he managed to organize a superb meeting in the middle of his terrible illness. For those who were not there, it will be difficult to believe that he was in the middle of a chemotherapy treatment at the very time as the meeting, flying to Caracas to stay in the hospital for a few hours and coming back to Puerto La Cruz the same day to share with his ichnofriends what I think was one of the happiest achievements in his professional life.

I have been lucky of teaching with him several ichnology courses in Venezuela and I learnt a lot from him, particularly about how ichnology can solve practical problems in the petroleum industry. He was one of the first ichnologists to bridge the gap between the academy and the industry in his double function as university professor and independent consultant. He was highly respected and loved by his students and he will be really missed by all of us.

Jordi M. de Gibert
Departament d'Estratigrafia i Paleontologia, Universitat de Barcelona,
08028 Barcelona, Spain
gibert@geo.ub.es

I believe that many of you had the opportunity (the luck, I should say) of having met Nicolás, and so, you will be as shocked as I am with the bad news. Luis has expressed very well our shared pain for the loss. I regret now not to have gone to the Venezuelan workshop. However, I still have my memories of Nicolás. In them, I can see him laughing, making jokes and playing dominoes, showing what he was: a very enjoyable person and a good friend.

A. A. Ekdale
Department of Geology and Geophysics, University of Utah
Salt Lake City, UT 84112-0111, USA
ekdalemines.utah.edu

I am extremely sad to learn of the death of Nicolás Muñoz. He was a very nice person, a good friend, and an enthusiastic supporter of the valuable applications of ichnology in the pragmatic world of petroleum exploration. I am certain that he is truly missed by many of us who called him friend and colleague.

* * * * *

We will be known forever by the tracks we leave.

Dakota proverb

Ichnologic meetings and events, 2001 onward

Andrew K. Rindsberg[1] & Alfred Uchman[2]
1. Geological Survey of Alabama
P.O. Box 869999, Tuscaloosa, AL 35486-6999 USA
2. Institute of Geological Sciences, Jagiellonian University
Oleandry 2a, 30-063 Kraków, Poland

The *Ichnology Newsletter* is the journal of record for events in ichnology. Reviews and announcements of some of these meetings are included in this and earlier issues.

2000

19-20 April. International Conference on the Role of Paleoecology in Biological and Geological Studies (on Celebration of the 100th Anniversary of the Birth of R.F. Hecker), Paleontological Institute of the Russian Academy of Sciences, Scientific Council on Paleobiology, and Moscow Society of Nature Explorers. Summary: *Paleontological Journal*, 35(1): 105-107 (2001).

2001

19 January to 1 April. *Fossil Art* was displayed at the Pratt Museum at Amherst College (Amherst, Massachusetts, USA). Thereafter it returned home for refurbishment and expansion, and will be sent to Japan next. The exhibit continued to provoke discussion on whether art consists of made objects or of perception. Friedrich Pflüger (Vassar College) spoke on 'Incidents from Deep Time: Early Life and the Making of "Fossil Art"' at the Pratt Museum of Natural History at Amherst College on February 9. And on August 1, a roundtable discussion, 'Fossil Art – ist das Kunst? [*Fossil Art* – Is It Art?'] was held among Anette Michels (Graphischen Sammlung), Frido Hohberger (Zeicheninstitut), and Adolf Seilacher at the Tübingen Universität. For an interesting view of the exhibition, see http://www.uni-tuebingen.de/geo/gpi/ag-seilacher/fossilart.html .

3-6 June. 'Using Ichnofacies to Delineate Stratigraphic Sequences, Interpret Environments, and Improve Reservoir Characterization,' American Association of Petroleum Geologists – Society for Sedimentology Annual Convention, Denver, Colorado (USA). Convenors: James MacEachern & Stephen A. Hasiotis.

26 June to 1 July. 'New Interpretations of Complex Trace Fossils,' symposium, Seventh North American Paleontological Conference, Berkeley, California (USA). Convenor: William Miller III. Papers from this symposium will be published as a theme issue of *Palaeogeography, Palaeoclimatology, Palaeoecology*.

9-13 July. 'Burrowing Crustaceans,' 5th International Crustacean Congress (ICC5), Melbourne, Australia. Convenor: Fiona Bird.

12-14 July. Sapelo Island Ichnology and Taphonomy Field Trip, Georgia, USA. Leader: Anthony J. Martin.

14-20 July. Sixth International Ichnofabric Workshop, Isla de Margarita and Puerto La Cruz, Venezuela. Organizers: Nicolás G. Muñoz J. et al.

24-28 September. IV Reunión Argentina de Icnología y II Reunión de Icnología del Mercosur (Fourth Argentinian Meeting of Ichnology and Second Ichnology Meeting of the Mercosur), San Miguel de Tucumán, Argentina. Convenors: Luis A. Buatois & M. Gabriela Mángano. [Reviewed in this issue by Renata Guimaraes Netto and Ricardo Melchor.]

October. First Ichnology Workshop of China, Institute of Technology, Jiaozuo, Henan, China. [Sixty-five ichnologists and sedimentologists attended, spending two days with short talks and then two field days on Mesozoic lacustrine deposits (R. Goldring, written communication, 2001).]

7 November. '"Traces" of Soil Ecosystems through the Phanerozoic: New Insights into Terrestrial Paleoecology, Paleohydrology, and Paleoclimate', Geological Society of America, Annual Meeting, Boston, Massachusetts (USA). Organizers: S.T. Hasiotis & M.D. Wegweiser.

8 December. Track Meet 3, Birmingham Paleontological Society, Anniston Museum of Natural History, Anniston, Alabama (USA). Organizers: Tim Moon & Ashley Allan.

2002

14-16 February. Taphos 2002, 3rd Meeting on Taphonomy and Fossilization, Universidad Internacional Menéndez Pelayo, Valencia, Spain. Organizers: Miquel De Renzi et al. Proceedings will be published as a book, *Taphonomy and Fossilization*. Website: http://paleopolis.rediris.es/paleontologia/Taphos2002/Introduction.html

18-19 May. 'Application of Ichnology to Petroleum Reservoirs, Exploration and Sequence Stratigraphy', short course, Annual Meeting, American Association of Petroleum Geologists, Houston, Texas (USA). Organizers: Bo Henk & Murray Gingras.

6-10 July. 'Trace Fossils', symposium, First International Paleontological Congress, Macquarie University, Sydney, Australia. Organizers: Barry Webby (bwebby@laurel.ocs.mq.edu.au) & M. Gabriela Mángano (ichnolog@infovia.com.ar). Website: http://www.es.mq.edu.au/mucep/ipc2002/index.htm

8-12 July. 'Applications of Ichnology: Retrospectives, Current Perspectives and Prospects', symposium, 16th International Sedimentological Congress, International Association of Sedimentologists. Organisers: James MacEachern (jmaceach@sfu.ca) & George Pemberton (gpembert@pop.srv.ualberta.ca).

31 July to 4 August. First European Conference on Behavioural Biology, Euroepan Societies for Behavioural Biology, Münster, Germany. Organizers: Norbert Sachser & Nico Michiels. Website http://www.behaviour2002.de/

15 July to 17 August. 'Taphonomy: Learning from the Dead', field course, Friday Harbor Laboratories, University of Washington. Organizers: Michael LaBarbera (mlabarbe@midway.chicago.edu) & Michal Kowalewski (michalk@vt.edu).

4-7 September. 'Bioerosion in Reef Environments', International Society for Reef Studies (ISRS), Cambridge, England. Organizer: Marcos Gektidis (info@gektidis.de).

9-14 September. Second Workshop on Ichnotaxonomy (WIT2), Carpathians, Poland. Convenor: Alfred Uchman (fred@ing.uj.edu.pl).

11-13 September. 'Palynomorphs in Dung, a Key to Diet, the Environment and Evolution', joint meeting of British Micropalaeontological Society, North American Micropaleontology Section of the Society for Sedimentary Geology, and American Association of Stratigraphic Palynologists, University College, London, England. Organizers: Owen Davis (palynolo@geo.arizona.edu) & Suzanne Leroy (suzanne.leroy@brunel.ac.uk). Website: http://www.geo.arizona.edu/palynology/dung/

22-28 September. Fourth International Bioerosion Workshop, Caribbean Marine Research Station, Lee Stocking Island, Bahamas. Organizer: Bill Kiene (kiene@snhm@si.edu ; wkiene@wcs.org).

6-8 October. 'Tracking Dinosaurs in No Man's Land', pre-meeting field trip, 62nd Annual Meeting, Society of Vertebrate Paleontology, Oklahoma (USA). Co-leaders: Martin Lockley (mlockley@carbon.cudenver.edu) & Brooke Wilborn (paleochick@ou.edu).

9-12 October. '200 Years of Vertebrate Paleoichnology', 62nd Annual Meeting, Society of Vertebrate Paleontology, Norman, Oklahoma, USA. Convenors: Richard T. McCrea (mccrea@ualberta.ca), Emma C. Rainforth (emmar@ldeo.columbia.edu), Joanna Wright (jwright@carbon.cudenver.edu), and Paul E. Olsen (polsen@ldeo.columbia.edu). You may send an undirected email to ichno2002@ichno2002.freeservers.com. Symposium website: http://ichno2002@ichno2002.freeservers.com/index.html. Meeting website: http://www.vertpaleo.org

26 October. 'The Fossil Record of Predation', short course, Annual Meeting of the Geological Society of America, Denver, Colorado, USA. Sponsored by the Paleontological Society. Organizer: Michal Kowalewski (michalk@vt.edu).

2003

24 February. 'The Application of Ichnology to Stratigraphic Analysis', Geological Society of London, Lyell meeting. Organiser: D. McIlroy.

14-19 July. Seventh International Ichnofabric Workshop, Basel, Switzerland. Andreas Wetzel.

15 October. 63rd Annual Meeting, Society of Vertebrate Paleontology, St. Paul, Minnesota (USA). Website http:www.vertpaleo.org .

2004

April. Ichnia 2004, International Congress on Ichnology, Trelew, Patagonia, Argentina. Organizers: Jorge Genise et al. (website www.ichnia2004.com).

'Using Ichnofacies to Delineate Stratigraphic Sequences, Interpret Environments, and Improve Reservoir Characterization',

American Association of Petroleum Geologists – Society for Sedimentology Annual Convention, Denver, Colorado (USA), June 3 to 6, 2001

James A. MacEachern[1] & Stephen T. Hasiotis[2]

1. Department of Earth Sciences, Simon Fraser University
Burnaby, British Colombia V5A 1S6, Canada
jmaceach@sfu.ca

2. Department of Geology, University of Kansas
Lawrence, KS 66045-7613, USA
hasiotis@ku.edu

R.R. McDowell, D.L. Matchen, K.L. Avary. Bioturbation and reservoir flow characteristics: Where did the permeability go?

S.M. Hubbard, M.K. Gingras, S.G. Pemberton. The significance of ichnologic variability in wave-dominated estuarine deposits: Implications on the mapping of reservoir facies in the Bluesky Formation, Alberta.

F. Henk, S.G. Pemberton, S. Shaver. Reservoir Ichnology of the Subclarksville 'A' Sandstone, BSR Field, east Texas, through an integrated ichnology, petrology and reservoir properties data set.

F. Henk, G.S. Ward. The Bridport Sandstone of the Wytch Farm Oil Field, a shelf sandbody or shoreface? An ichnological and 3-D seismic sequence stratigraphic investigation into the shallow marine origin.

E.K. Kimball, C.A. Bagdan, B.A. Cheadle, A. Paul, S.G. Pemberton. Application of sedimentology and ichnology for facies delineation and reservoir characterization of the McMurray Formation, Alberta, Canada.

C.R. Harris, M.K. Gingras, S.G. Pemberton. Ichnofossil evidence from the estuarine facies of the McMurray Formation, northeast Alberta: facies interpretation and possible production enhancement.

G.W. Fong, S.G. Pemberton, M.K. Gingras, B. Henk. Assessing the reservoir quality of burrow-mottled carbonates in the Devonian Wabamun Group, Pine Creek area, northwest Alberta, Canada.

K.L. Bann, C.R. Fielding. High resolution sequence stratigraphy of reservoirs in the Permian Bowen Basin, Queensland, Australia, facilitated by ichnological analysis.

J.-P. Zonneveld, S.G. Pemberton. Ichnology of the lower Montney Formation (Lower Triassic), Kahntah River and Ring Border Fields, northeastern British Columbia, Canada.

F.E. Burns, E. Hooper. Omission colonisation surfaces within the Lower Cretaceous Mardie Greensand, northern Carnarvon Basin, NW Shelf, Australia.

D.G. Poire. *Gyrochorte* as trace fossil indicator of storm events in the Neuquen Basin, Argentina.

S.T. Hasiotis. The continental ichnology Swiss Army knife – a new and innovative tool in reservoir analysis for delineating stratigraphic sequences, interpreting environments, and understanding paleoclimates.

M.D. Wegweiser. Dinosaur trackways in the Upper Cretaceous Two Medicine Formation: dinosaur ichnofacies as a tool to improve sequence stratigraphic interpretation, an aid in identifying reservoir rock.

N.E. Tibert, H.A. Curran, J.H. Hartman, E.S. Belt, J.A. Diemer. Marine flooding intervals within the freshwater Tongue River Member (Fort Union Formation - Paleocene), western Williston Basin, U.S.A.

L. Coates, J.A. MacEachern. Ichnological and sedimentological criteria for differentiating between river-dominated deltas, wave-dominated deltas, and shorefaces: examples from the Cretaceous of western Canada.

K.L. Treptau, J.A. MacEachern, P.S. Mustard. An integrated sedimentological-ichnological analysis of a distal submarine fan succession: Upper Cretaceous Cedar District Formation, Nanaimo Group, southwest British Columbia, Canada.

J.M. de Gibert, P. Arbués, M.Puig, M. Marzo. Ichnological signatures of turbidite channels from the Eocene Ainsa Slope Complex (Spanish Pyrenees).

4th Argentinian Ichnological Meeting and 2nd Ichnological Meeting of the Mercosur, San Miguel de Tucumán, Argentina, 24 to 28 September, 2001

Renata Guimaraes Netto
Universidade do Vale do Rio dos Sinos – UNISINOS,
Av. Unisinos 950,
93022-000 São Leopoldo RS, Brazil
nettorg@euler.unisinos.br

Ricardo Melchor
Universidad Nacional de La Pampa,
Facultad de Ciencias Exactas y Naturales,
Av. Uruguay 151, 6300 Santa Rosa,
La Pampa, Argentina
melchor_r@cpsarg.com

Toward the end of September, part of the South American ichnological community joined at San Miguel de Tucumán, Argentina, to attend the 4th Argentine Meeting of Ichnology and 2nd Meeting of Ichnology of the Mercosur (the name we use for the Common Market of South America). It was a splendid meeting, full of new, interesting contributions and carefully organized by Luis Buatois and Gabriela Mángano with the assistance of undergraduate and graduate students from Tucumán. About 60 participants attended the meeting, half professionals, half students, most of them from Argentina, but with representatives from Brazil, Uruguay, Venezuela, Chile, and Paraguay. About 62 abstracts of conferences and regular contributions were printed in an abstracts volume that was ready for use at the beginning of the meeting. Richard Bromley, Alfred Uchman, Conrad Labandeira, Jordi de Gibert, Jorge Genise, James Powell and Florencio Aceñolaza were the invited lecturers, speaking on several themes in ichnology. The meeting offered also a living experience in the jungle near the city to observe insect-plant interactions, guided by Conrad, and an exciting post-meeting field trip, visiting the early Paleozoic deposits from the northwest of Argentina (Salta and Jujuy provinces), where we had the opportunity to see magnificent landscapes and outcrops with 'beautiful trace fossils' (using the newest Richard's categories to describe trace fossils).

The Argentine ichnological meetings started in 1993, at Santa Rosa, La Pampa, convened by Ricardo Melchor (Pemberton, 1994) and subsequently the meeting was held at San Juan (1995) and Mar del Plata (Poiré, 1998). Always bringing together people interested in ichnology, Argentine meetings have an interesting peculiarity: Half of the participants are professionals from various countries in South America, *but* half are graduate and undergraduate students from various places in Argentina, who go to the meeting looking for improvement in their ichnological knowledge. This was one of the original goals of the first meeting that was satisfactorily achieved in all aspects of the event. At the end of the meeting there was an informative talk about the organization and main features of the First International Congress of Ichnology (Ichnia 2004), to be held at Trelew (Patagonia, Argentina). We are confident that all the people who went to Tucumán really enjoyed the meeting as much as we did, and this is largely due to the excellent and timely organization by Luis and Gabriela.

References

Buatois, L.A. & Mángano, M.G. (eds.) 2001. Ichnology, sedimentology and sequence stratigraphy of selected lower Paleozoic, Mesozoic and Cenozoic units of northwest Argentina. Fourth Argentinean Ichnologic Meeting and Second Ichnologic Meeting of Mercosur. Field guide.

Pemberton, S.G. 1994. First Argentine Meeting of Ichnology (conference report). Ichnos, 3: 141.

Poiré, D.G. (ed.). 1998. Tercera Reunión Argentina de Icnología, Primera Reunión de Icnología del Mercosur, Mar del Plata, 31 de marzo al 3 abril de 1998, Resúmenes, 32 pp.

Program

Mariano Verde. New ichnospecies of *Gastrochaenolites* and *Rosselia* from the late Miocene Camacho Formation of Uruguay: Sedimentological significance of a densely bored surface at the top of the Camacho Formation (late Miocene) of Uruguay.

Ricardo Astini. Mid-LateOordovician *Trypanites* borings in solitary *Solenopora* from the Argentine Precordillera.

Fernando J. Gomez & Ricardo A. Astini. Ichnofabric patterns in shallow-marine carbonate tidal flats? Of the middle cambrian in the precordillera.

Ricardo Astini. Omission surfaces related to time-averaged grainstones and their bearing in Middle Ordovician carbonate remnants in the Argentine Precordillera

Elizabeth Chácón Baca, P.P. Morales, A.E. Cienfuegos, H. Beraldi & S.R.S. Cevallos-Ferriz. Preservación en sílice en pedernal asociado a Estromatolitos Cretácicos.

Jordi de Gibert. Conferencia: Convergencia evolutiva del comportamiento y trazas fósiles.

Mariano Verde & Sergio Martínez. A new crustacean trace fossil from the late Miocene Camacho Formation of Uruguay.

Jordi de Gibert, Fernando Muñiz & Eduardo Mayoral. Icnofábrica de *Gyrolithes nodosus* del Plioceno estuarino de Lepe (SO de España)

Renata Guimarães Netto, Luis A. Buatois, M. Gabriela Mángano & Patricia Balistieri. *Gyrolithes* em depósitos Permianos: uma adaptação para sobrevivência em ambientes salobros?

Noelia B. Carmona & Luis A. Buatois. Estructuras de crustaceos en el Mioceno de la Cuenca del Golfo San Jorge: implicancias paleobiologicas y evolutivas

Marcelo Engelke Grangeiro & Renata Guimarães Netto. Icnofauna de depósitos costeiros modernos do sul do Brasil.

Karen Moreno F. Icnocoenosis e icnofacies de la Formación Chacarilla (Jurasico superior - Cretácico inferior), norte de Chile.

Ricardo Melchor, Eduardo Bellosi & Silvina de Valais. Icnología de vertebrados e invertebrados en facies de Barreal, Cuenca Cuyana (Triásico), norte de Mendoza.

Silvia A. Aramayo, Teresa Manera de Bianco & Luciano M. Bocanegra. Presencia de *Taenidium* Heer, 1877 en el yacimiento paleoicnológico de Pehuen-có (Pleistoceno tardío) Provincia de Buenos Aires, Argentina.

Silvia A. Aramayo & Luciano M. Bocanegra. Icnofacies de *Scoyenia* en el Miembro Candeleros, Formación Río Limay (Grupo Neuquén, Cretácico tardío) Provincia de Neuquén, Argentina.

Ricardo Néstor Melchor. Icnología y sedimentología de una sucesión lacustre influenciada por tormentas: Formación Los Rastros (Triásico), Talampaya, La Rioja.

Pablo José Pazos. Icnología de las sucesiones glaciales-postglaciales en las Cuencas Paganzo-Calingasta/Uspallata (S. América) y Karoo-Kalahari (S. Africa).

Luis A. Buatois & Cecilia E. del Papa. Trazas fosiles de la Formacion Tarija, Carbonifero superior del norte Argentino: aspectos icnologicos de la transgresion postglacial en el oeste de Gondwana.

Pablo J. Pazos, Maria Fernanda Rodríguez, Mariela Etcheverría & Alicia Folguera. Arthropod trackways from the Villavicencio Formation (Silurian-Devonian), Precordillera of Mendoza, Argentina.

Richard G. Bromley. Conferencia: Ugly trace fossils. Tetrapod tracks deep-set in soft substrates: Recent musk oxen in fluid earth (Greenland) and Pleistocene caprines in aeolian sand (Mallorca).

Jorge F. Genise. Conferencia: Insect fossil nests in paleosols.

Verónica L. Rossi, Margarita L. Osterrieth & Gustavo A. Martínez. Icnología de la secuencia estratigráfica Mar Chiquita (Cuaternario tardío), Buenos Aires.

Jorge F. Genise, Victor H. Contreras & Gabriela Cilla . Trazas de Equisetales en paleosuelos de la Formacion Ischigualasto (Triasico) de San Juan.

Jorge F. Genise. Una nueva traza meniscada en paleosuelos de la formacion bajo tigre (cretacico inferior) de santa cruz (argentina).

Eduardo S. Bellosi, José H. Laza & Mirta G. González. Icnofaunas en paleosuelos de la Formacion Sarmiento (Eoceno-Mioceno), Patagonia Central.

C.C. Labandeira, B.A. Le Page & A.H. Johnson. Colonization of *Larix* (Pinaceae) by *Dendroctonus* bark beetles (Scolytidae): ancient association or subsequent transfer?

C.C. Labandeira. Conference: Multiple approaches toward understanding relationships among organisms and their environment: the centrality of ichnodata.

Peter Sprechmann, Claudio Gaucher & Juan Montaña. Icnofosiles de la Formacion Cerro Victoria (Nemakitiano–Daladyniano) del Grupo Arroyo del Soldado, Uruguay: bioestratigrafia y paleoecologia.

Florencio Aceñolaza & Ricardo Alonso. Abra Blanca, nueva localidad con icnofósiles de la transición Neoproterozoico-Cámbrico inferior en el noroeste Argentino.

Guillermo F. Aceñolaza. El angosto de chucalezna: una localidad clásica para el estudio de icnofósiles en el noroeste argentino.

M. Gabriela Mángano & Luis A. Buatois. *Rusophycus leiferikssoni* en la Formacion Campanario: implicancias paleobiologicas, paleoecologicas y paleoambientales.

Guillermo F. Aceñolaza, Susana B. Esteban & M. Franco Tortello. Icnofósiles del Cámbrico superior en los niveles basales de la Formación Santa Rosita en Iruya, Provincia de Salta.

Guillermo F. Aceñolaza, M. Franco Tortello, María del M. Vergel & Lucía Aráoz. Icnofósiles, trilobites y palinomorfos de la Formación Santa Rosita aflorante en la región del Abra de Zenta (Provincias de Salta y Jujuy).

Guillermo F. Aceñolaza & Florencio G. Aceñolaza. Icnología de la Formación Sepulturas (Ordovícico) en el Espinazo del Diablo, Cordillera Oriental Argentina.

Ricardo A. Astini. Recurrent trace fossil patterns in Early Ordovician tidal influenced siliciclastic settings, eastern Cordillera, northwest Argentina: prospects.

Guillermo F. Aceñolaza. Icnofósiles Cambro-Ordovícicos asociados a facies de lutitas negras: el caso de la Formación Lampazar en el noroeste Argentino.

Ricardo A. Astini. *Teichichnus*-dominated thin-bedded heterolithic facies and *Zoophycos*-dominated softgrounds in the Lipeon Formation, Eastern Cordillera, northwest Argentina.

Julio César Galeano Inchausti & Daniel G. Poiré. Primer registro de *Cruziana* y *Rusophycus* en la República del Paraguay.

Conferencia: Dinosaurios: patrones de nidificación y comportamiento reproductivo.

Jaime Powell. Icnofosiles en concreciones de la Formacion San Gregorio del Uruguay (Carbonifero superior? - Permico inferior?): implicancias paleoecologias y paleoclimaticas.

Peter Sprechmann, Jorge da Silva, Claudio Gaucher, Juan Montaña & Zarela Herrera. Icnofauna em ritmitos do topo da formaçao mafra (Permo-Carbonífero da Bacia do Paraná) em rio negro, pr: análise preliminar

Patricia Balistieri, Renata Guimarães Netto & Ernesto Luiz Correa Lavina

Francisco M. Wohnrath Tognoli & Renata Guimarães Netto. Ichnofabric patterns of wave-dominated estuarine deposits from the Permian of Paraná Basin, Brazil

Ernesto Schwarz & Daniel G. Poiré. Trazas fósiles y ambientes deposicionales de la Formación Mulichinco (Valanginiano), Cuenca Neuquina, Argentina.

Daniel G. Poiré, Andrea Carloni, Oriol Ferrer & Néstor D. Canessa. Características icnológicas de la Formación Piedra Clavada (Cretácico), Tres Lagos, Cuenca Austral, Argentina.

Roberto A. Scasso & Liliana N. Castro. Trazas fósiles y fosfogénesis en la Formación Lefipan, Cretácico superior del Chubut.

Luis A. Buatois, Richard G. Bromley, M. Gabriela Mángano, Eduardo Bellosi & Noelia Carmona. Ichnology of shallow marine deposits in the Miocene Chenque Formation of Patagonia: complex ecologic structure and niche partitioning in Neogene ecosystems.

Jordi M. de Gibert, Pau Arbués, Marta Puig & Mariano Marzo. Implicaciones sedimentológicas de *Diplocraterion* en canales turbidíticos de talud (Eoceno, Ainsa, NE de españa).

Alfred Uchman. Conferencia: Deep-sea trace fossils: on the edge of Terra Incognita.

Florencio G. Aceñolaza. Conferencia: Reflexiones sobre aspectos historicos y actuales de la icnologia en Argentina.

Alfred Uchman. *Ichnology Newsletter.*

Jordi de Gibert. SKOLITHOS listserver: grupo de discusion de icnologia en Internet.

Jorge Genise. Presentacion de la propuesta del Primer Congreso Internacional de Icnologia Ichnia 2004 a realizarse en la ciudad de Trelew.

Posters

Verónica L. Rossi; Margarita L. Osterrieth & Verónica Bernava Laborde. Bioturbaciones en sedimentos del Pleistoceno tardío–Holoceno de Punta Hermengo (partido de General Alvarado, Buenos Aires).

Rafael Gioia Martins-Neto & Oscar Florencio Gallego. A coleção paleoicnológica da Sociedade Brasileira de Paleoartropodologia

Darío Lazo. Distribucion ambiental de trazas fosiles del miembro inferior de la Formacion Agrio, Cretacico de Cuenca Neuquina.

Ester A. Farinati. Icnofacies de *Entobia* en sustratos esqueleticos del Neogeno Atlantico.

Ricardo Melchor, Eduardo Bellosi & Jorge Genise. Trazas fosiles de un delta lacustre Triásico: Formación Los Rastros, Parque Ischigualasto, San Juan.

Assunta D'Alessandro, Rafael La Perna & Neri Ciaranfi. Paleontological indications of sea-level fluctuations in the deep-sea deposits of the Bradano Trough (southern Italy, lower-middle Pleistocene).

Assunta D'Alessandro & Dario De Benedictis. Rich phosphatic large-sized *Thalassinoides* of the Serravallian Abruzzo-Campania carbonate platform (south Italy).

Assunta D'Alessandro & Dario De Benedictis. Ichnological analysis of a carbonate apron-to-basin sequence (Langhian-Tortonian, south Italy).

Ma. Fernanda Rodríguez & José L. Panza. La icnofacies de *Glossifungites* en la Formación Salamanca, paraje campamento Villegas, Chubut, Argentina.

A. Santos, E. Mayoral, F, Muñiz, T. Boski & M. Cachão. Nueva estructura bioerosiva relacionada con *Maeandropolydora sulcans* Voigt, 1965 en el Mioceno superior de Cacela (SE de Portugal).

Marcela Cosarinsky. Micromorfología del nido de *Cornitermes cumulans* (Kollar) (Isoptera, Termitidae).

Eduardo B. Olivero & María I. López C. Ichnology of syntectonic turbidite, estuarine and shelf deposits. Eocene, Punta Torcida anticline, Isla Grande de Tierra del Fuego.

Jorge F. Genise, Gerardo Cladera & Soledad Tancoff. La presencia de *eatonichnus claronensis* en el paleoceno del chubut (r. Argentina)

Oscar Bellorin. Estudio sedimentológico e icnológico de la arena I2, Formación Oficina (Mioceno inferior), Campo Mata R, Estado Anzoátegui-Venezuela.

Márcia dos Santos Nogueira, Renata Guimarães Netto & Valesca Brasil Lemos. Descrição e análise dos icnofósseis da Pedreira Itaú-Itauna, região de Trombudo Central, SC.

Susana B. Esteban. Estructuras biogenicas en facies de grano fino del Tremadociano superior (Sistema de Famatina, La Rioja, Argentina).

Silvina de Valais & Ricardo Melchor. Huellas de artrópodos de la Formación La Matilde (Jurásico medio), Santa Cruz, Argentina.

Elisa Tríbulo & M. Gabriela Mángano. Aplicaciones de la neoicnologia experimental en el estudio de huellas de artropodos.

* * * * *

Ancient people, or Paleoindians, left the first footprint on North America about 15,000 years ago. Some scientists think it might have been much earlier, yet no convincing evidence exists to support the claim. This Paleoindian lacked the drama of the first person to step on the moon. However, it altered our destiny in ways that are no less profound.

Thomas M. Bonnicksen (2000)
America's Ancient Forests, p. 54

4th Argentinian Ichnological Meeting and 2nd Ichnological Meeting of the Mercosur, San Miguel de Tucumán, Argentina, 24 to 28 September, 2001

Renata Guimaraes Netto
Universidade do Vale do Rio dos Sinos – UNISINOS,
Av. Unisinos 950,
93022-000 São Leopoldo RS, Brazil
nettorg@euler.unisinos.br

Ricardo Melchor
Universidad Nacional de La Pampa,
Facultad de Ciencias Exactas y Naturales,
Av. Uruguay 151, 6300 Santa Rosa,
La Pampa, Argentina
melchor_r@cpsarg.com

Toward the end of September, part of the South American ichnological community joined at San Miguel de Tucumán, Argentina, to attend the 4th Argentine Meeting of Ichnology and 2nd Meeting of Ichnology of the Mercosur (the name we use for the Common Market of South America). It was a splendid meeting, full of new, interesting contributions and carefully organized by Luis Buatois and Gabriela Mángano with the assistance of undergraduate and graduate students from Tucumán. About 60 participants attended the meeting, half professionals, half students, most of them from Argentina, but with representatives from Brazil, Uruguay, Venezuela, Chile, and Paraguay. About 62 abstracts of conferences and regular contributions were printed in an abstracts volume that was ready for use at the beginning of the meeting. Richard Bromley, Alfred Uchman, Conrad Labandeira, Jordi de Gibert, Jorge Genise, James Powell and Florencio Aceñolaza were the invited lecturers, speaking on several themes in ichnology. The meeting offered also a living experience in the jungle near the city to observe insect-plant interactions, guided by Conrad, and an exciting post-meeting field trip, visiting the early Paleozoic deposits from the northwest of Argentina (Salta and Jujuy provinces), where we had the opportunity to see magnificent landscapes and outcrops with 'beautiful trace fossils' (using the newest Richard's categories to describe trace fossils).

The Argentine ichnological meetings started in 1993, at Santa Rosa, La Pampa, convened by Ricardo Melchor (Pemberton, 1994) and subsequently the meeting was held at San Juan (1995) and Mar del Plata (Poiré, 1998). Always bringing together people interested in ichnology, Argentine meetings have an interesting peculiarity: Half of the participants are professionals from various countries in South America, *but* half are graduate and undergraduate students from various places in Argentina, who go to the meeting looking for improvement in their ichnological knowledge. This was one of the original goals of the first meeting that was satisfactorily achieved in all aspects of the event. At the end of the meeting there was an informative talk about the organization and main features of the First International Congress of Ichnology (Ichnia 2004), to be held at Trelew (Patagonia, Argentina). We are confident that all the people who went to Tucumán really enjoyed the meeting as much as we did, and this is largely due to the excellent and timely organization by Luis and Gabriela.

References

Buatois, L.A. & Mángano, M.G. (eds.) 2001. Ichnology, sedimentology and sequence stratigraphy of selected lower Paleozoic, Mesozoic and Cenozoic units of northwest Argentina. Fourth Argentinean Ichnologic Meeting and Second Ichnologic Meeting of Mercosur. Field guide.

Pemberton, S.G. 1994. First Argentine Meeting of Ichnology (conference report). Ichnos, 3: 141.

Poiré, D.G. (ed.). 1998. Tercera Reunión Argentina de Icnología, Primera Reunión de Icnología del Mercosur, Mar del Plata, 31 de marzo al 3 abril de 1998, Resúmenes, 32 pp.

Program

Mariano Verde. New ichnospecies of *Gastrochaenolites* and *Rosselia* from the late Miocene Camacho Formation of Uruguay: Sedimentological significance of a densely bored surface at the top of the Camacho Formation (late Miocene) of Uruguay.

Ricardo Astini. Mid-LateOordovician *Trypanites* borings in solitary *Solenopora* from the Argentine Precordillera.

Fernando J. Gomez & Ricardo A. Astini. Ichnofabric patterns in shallow-marine carbonate tidal flats? Of the middle cambrian in the precordillera.

Ricardo Astini. Omission surfaces related to time-averaged grainstones and their bearing in Middle Ordovician carbonate remnants in the Argentine Precordillera

Elizabeth Chácón Baca, P.P. Morales, A.E. Cienfuegos, H. Beraldi & S.R.S. Cevallos-Ferriz. Preservación en sílice en pedernal asociado a Estromatolitos Cretácicos.

Jordi de Gibert. Conferencia: Convergencia evolutiva del comportamiento y trazas fósiles.

Mariano Verde & Sergio Martínez. A new crustacean trace fossil from the late Miocene Camacho Formation of Uruguay.

Jordi de Gibert, Fernando Muñiz & Eduardo Mayoral. Icnofábrica de *Gyrolithes nodosus* del Plioceno estuarino de Lepe (SO de España)

Renata Guimarães Netto, Luis A. Buatois, M. Gabriela Mángano & Patricia Balistieri. *Gyrolithes* em depósitos Permianos: uma adaptação para sobrevivência em ambientes salobros?

Noelia B. Carmona & Luis A. Buatois. Estructuras de crustaceos en el Mioceno de la Cuenca del Golfo San Jorge: implicancias paleobiologicas y evolutivas

Marcelo Engelke Grangeiro & Renata Guimarães Netto. Icnofauna de depósitos costeiros modernos do sul do Brasil.

Karen Moreno F. Icnocoenosis e icnofacies de la Formación Chacarilla (Jurasico superior - Cretácico inferior), norte de Chile.

Ricardo Melchor, Eduardo Bellosi & Silvina de Valais. Icnología de vertebrados e invertebrados en facies de Barreal, Cuenca Cuyana (Triásico), norte de Mendoza.

Silvia A. Aramayo, Teresa Manera de Bianco & Luciano M. Bocanegra. Presencia de *Taenidium* Heer, 1877 en el yacimiento paleoicnológico de Pehuen-có (Pleistoceno tardío) Provincia de Buenos Aires, Argentina.

Silvia A. Aramayo & Luciano M. Bocanegra. Icnofacies de *Scoyenia* en el Miembro Candeleros, Formación Río Limay (Grupo Neuquén, Cretácico tardío) Provincia de Neuquén, Argentina.

Ricardo Néstor Melchor. Icnología y sedimentología de una sucesión lacustre influenciada por tormentas: Formación Los Rastros (Triásico), Talampaya, La Rioja.

Pablo José Pazos. Icnología de las sucesiones glaciales-postglaciales en las Cuencas Paganzo-Calingasta/Uspallata (S. América) y Karoo-Kalahari (S. Africa).

Luis A. Buatois & Cecilia E. del Papa. Trazas fosiles de la Formacion Tarija, Carbonifero superior del norte Argentino: aspectos icnologicos de la transgresion postglacial en el oeste de Gondwana.

Pablo J. Pazos, Maria Fernanda Rodríguez, Mariela Etcheverría & Alicia Folguera. Arthropod trackways from the Villavicencio Formation (Silurian-Devonian), Precordillera of Mendoza, Argentina.

Richard G. Bromley. Conferencia: Ugly trace fossils. Tetrapod tracks deep-set in soft substrates: Recent musk oxen in fluid earth (Greenland) and Pleistocene caprines in aeolian sand (Mallorca).

Jorge F. Genise. Conferencia: Insect fossil nests in paleosols.

Verónica L. Rossi, Margarita L. Osterrieth & Gustavo A. Martínez. Icnología de la secuencia estratigráfica Mar Chiquita (Cuaternario tardío), Buenos Aires.

Jorge F. Genise, Victor H. Contreras & Gabriela Cilla . Trazas de Equisetales en paleosuelos de la Formacion Ischigualasto (Triasico) de San Juan.

Jorge F. Genise. Una nueva traza meniscada en paleosuelos de la formacion bajo tigre (cretacico inferior) de santa cruz (argentina).

Eduardo S. Bellosi, José H. Laza & Mirta G. González. Icnofaunas en paleosuelos de la Formacion Sarmiento (Eoceno-Mioceno), Patagonia Central.

C.C. Labandeira, B.A. Le Page & A.H. Johnson. Colonization of *Larix* (Pinaceae) by *Dendroctonus* bark beetles (Scolytidae): ancient association or subsequent transfer?

C.C. Labandeira. Conference: Multiple approaches toward understanding relationships among organisms and their environment: the centrality of ichnodata.

Peter Sprechmann, Claudio Gaucher & Juan Montaña. Icnofosiles de la Formacion Cerro Victoria (Nemakitiano–Daladyniano) del Grupo Arroyo del Soldado, Uruguay: bioestratigrafia y paleoecologia.

Florencio Aceñolaza & Ricardo Alonso. Abra Blanca, nueva localidad con icnofósiles de la transición Neoproterozoico-Cámbrico inferior en el noroeste Argentino.

Guillermo F. Aceñolaza. El angosto de chucalezna: una localidad clásica para el estudio de icnofósiles en el noroeste argentino.

M. Gabriela Mángano & Luis A. Buatois. *Rusophycus leiferikssoni* en la Formacion Campanario: implicancias paleobiologicas, paleoecologicas y paleoambientales.

Guillermo F. Aceñolaza, Susana B. Esteban & M. Franco Tortello. Icnofósiles del Cámbrico superior en los niveles basales de la Formación Santa Rosita en Iruya, Provincia de Salta.

Guillermo F. Aceñolaza, M. Franco Tortello, María del M. Vergel & Lucía Aráoz. Icnofósiles, trilobites y palinomorfos de la Formación Santa Rosita aflorante en la región del Abra de Zenta (Provincias de Salta y Jujuy).

Guillermo F. Aceñolaza & Florencio G. Aceñolaza. Icnología de la Formación Sepulturas (Ordovícico) en el Espinazo del Diablo, Cordillera Oriental Argentina.

Ricardo A. Astini. Recurrent trace fossil patterns in Early Ordovician tidal influenced siliciclastic settings, eastern Cordillera, northwest Argentina: prospects.

Guillermo F. Aceñolaza. Icnofósiles Cambro-Ordovícicos asociados a facies de lutitas negras: el caso de la Formación Lampazar en el noroeste Argentino.

Ricardo A. Astini. *Teichichnus*-dominated thin-bedded heterolithic facies and *Zoophycos*-dominated softgrounds in the Lipeon Formation, Eastern Cordillera, northwest Argentina.

Julio César Galeano Inchausti & Daniel G. Poiré. Primer registro de *Cruziana* y *Rusophycus* en la República del Paraguay.

Conferencia: Dinosaurios: patrones de nidificación y comportamiento reproductivo.

Jaime Powell. Icnofosiles en concreciones de la Formacion San Gregorio del Uruguay (Carbonifero superior? - Permico inferior?): implicancias paleoecologias y paleoclimaticas.

Peter Sprechmann, Jorge da Silva, Claudio Gaucher, Juan Montaña & Zarela Herrera. Icnofauna em ritmitos do topo da formaçao mafra (Permo-Carbonífero da Bacia do Paraná) em rio negro, pr: análise preliminar

Patricia Balistieri, Renata Guimarães Netto & Ernesto Luiz Correa Lavina

Francisco M. Wohnrath Tognoli & Renata Guimarães Netto. Ichnofabric patterns of wave-dominated estuarine deposits from the Permian of Paraná Basin, Brazil

Ernesto Schwarz & Daniel G. Poiré. Trazas fósiles y ambientes deposicionales de la Formación Mulichinco (Valanginiano), Cuenca Neuquina, Argentina.

Daniel G. Poiré, Andrea Carloni, Oriol Ferrer & Néstor D. Canessa. Características icnológicas de la Formación Piedra Clavada (Cretácico), Tres Lagos, Cuenca Austral, Argentina.

Roberto A. Scasso & Liliana N. Castro. Trazas fósiles y fosfogénesis en la Formación Lefipan, Cretácico superior del Chubut.

Luis A. Buatois, Richard G. Bromley, M. Gabriela Mángano, Eduardo Bellosi & Noelia Carmona. Ichnology of shallow marine deposits in the Miocene Chenque Formation of Patagonia: complex ecologic structure and niche partitioning in Neogene ecosystems.

Jordi M. de Gibert, Pau Arbués, Marta Puig & Mariano Marzo. Implicaciones sedimentológicas de *Diplocraterion* en canales turbidíticos de talud (Eoceno, Ainsa, NE de españa).

Alfred Uchman. Conferencia: Deep-sea trace fossils: on the edge of Terra Incognita.

Florencio G. Aceñolaza. Conferencia: Reflexiones sobre aspectos historicos y actuales de la icnologia en Argentina.

Alfred Uchman. *Ichnology Newsletter*.

Jordi de Gibert. SKOLITHOS listserver: grupo de discusion de icnologia en Internet.

Jorge Genise. Presentacion de la propuesta del Primer Congreso Internacional de Icnologia Ichnia 2004 a realizarse en la ciudad de Trelew.

Posters

Verónica L. Rossi; Margarita L. Osterrieth & Verónica Bernava Laborde. Bioturbaciones en sedimentos del Pleistoceno tardío–Holoceno de Punta Hermengo (partido de General Alvarado, Buenos Aires).

Rafael Gioia Martins-Neto & Oscar Florencio Gallego. A coleção paleoicnológica da Sociedade Brasileira de Paleoartropodologia

Darío Lazo. Distribucion ambiental de trazas fosiles del miembro inferior de la Formacion Agrio, Cretacico de Cuenca Neuquina.

Ester A. Farinati. Icnofacies de *Entobia* en sustratos esqueleticos del Neogeno Atlantico.

Ricardo Melchor, Eduardo Bellosi & Jorge Genise. Trazas fosiles de un delta lacustre Triásico: Formación Los Rastros, Parque Ischigualasto, San Juan.

Assunta D'Alessandro, Rafael La Perna & Neri Ciaranfi. Paleontological indications of sea-level fluctuations in the deep-sea deposits of the Bradano Trough (southern Italy, lower-middle Pleistocene).

Assunta D'Alessandro & Dario De Benedictis. Rich phosphatic large-sized *Thalassinoides* of the Serravallian Abruzzo-Campania carbonate platform (south Italy).

Assunta D'Alessandro & Dario De Benedictis. Ichnological analysis of a carbonate apron-to-basin sequence (Langhian-Tortonian, south Italy).

Ma. Fernanda Rodríguez & José L. Panza. La icnofacies de *Glossifungites* en la Formación Salamanca, paraje campamento Villegas, Chubut, Argentina.

A. Santos, E. Mayoral, F, Muñiz, T. Boski & M. Cachão. Nueva estructura bioerosiva relacionada con *Maeandropolydora sulcans* Voigt, 1965 en el Mioceno superior de Cacela (SE de Portugal).

Marcela Cosarinsky. Micromorfología del nido de *Cornitermes cumulans* (Kollar) (Isoptera, Termitidae).

Eduardo B. Olivero & María I. López C. Ichnology of syntectonic turbidite, estuarine and shelf deposits. Eocene, Punta Torcida anticline, Isla Grande de Tierra del Fuego.

Jorge F. Genise, Gerardo Cladera & Soledad Tancoff. La presencia de *eatonichnus claronensis* en el paleoceno del chubut (r. Argentina)

Oscar Bellorin. Estudio sedimentológico e icnológico de la arena I2, Formación Oficina (Mioceno inferior), Campo Mata R, Estado Anzoátegui-Venezuela.

Márcia dos Santos Nogueira, Renata Guimarães Netto & Valesca Brasil Lemos. Descrição e análise dos icnofósseis da Pedreira Itaú-Itauna, região de Trombudo Central, SC.

Susana B. Esteban. Estructuras biogenicas en facies de grano fino del Tremadociano superior (Sistema de Famatina, La Rioja, Argentina).

Silvina de Valais & Ricardo Melchor. Huellas de artrópodos de la Formación La Matilde (Jurásico medio), Santa Cruz, Argentina.

Elisa Tríbulo & M. Gabriela Mángano. Aplicaciones de la neoicnologia experimental en el estudio de huellas de artropodos.

* * * * *

> Ancient people, or Paleoindians, left the first footprint on North America about 15,000 years ago. Some scientists think it might have been much earlier, yet no convincing evidence exists to support the claim. This Paleoindian lacked the drama of the first person to step on the moon. However, it altered our destiny in ways that are no less profound.
>
> Thomas M. Bonnicksen (2000)
> *America's Ancient Forests,* p. 54

'"Traces" of Soil Ecosystems through the Phanerozoic: New Insights into Terrestrial Paleoecology, Paleohydrology, and Paleoclimate',

Geological Society of America, Annual Meeting, Boston, Massachusetts (USA), November 7, 2001

Stephen G. Hasiotis[1] & Marilyn D. Wegweiser[2]

1. Department of Geology, University of Kansas
Lawrence, KS 66045-7613, USA
hasiotis@ku.edu
2. Georgia College & State University
Milledgeville, GA, USA

Talks

M.D. Wegweiser. Barbecued dinosaur bones: traces of a paleowildfire near the end of the Cretaceous.

Steven G. Driese, Cynthia A. Stiles, Claudia I. Mora, Lee C. Nordt & Larry P. Wilding. New insights into Phanerozoic terrestrial paleoclimate using plant and animal traces and element translocations observed in a modern vertisol climosequence.

Richard Beerbower. A canon for early Paleozoic continental ecosystems.

Nathan D. Sheldon. Pedogenesis and geochemical alteration of Columbia River basalt lavas.

Paul D. White & Judith A. Schiebout. Pedogenesis and global warming: a perspective from the ancient.

G.A. Ludvigson, D.F. Ufnar, L.A. Gonzalez, B.J. Witzke & R.L. Brenner. Pedogenic sphaerosiderites as traces of ancient saturated soils: new insights on changes in the hydrologic cycle during Earth history.

Natasa J. Vidic & Isabel P. Montanez. Short-term variations in paleoclimate and vegetation as revealed by stable isotope compositions of pedogenic carbonate nodules and soil organic matter in selected Chinese loess paleosols.

Emma C. Rainforth. Tetrapod ichnology of the Early Jurassic Navajo Sandstone: implications for the 'vertebrate ichnofacies' concept.

Brent H. Breithaupt, Elizabeth H., Southwell, Thomas L. Adams & Neffra A. Matthews. Preservational and morphological variations in theropod tracks and trackways on a Middle Jurassic tidal flat: implications for paleobiological and paleoecological analysis.

Gregory J. Retallack. Phanerozoic non-marine ichnofacies and atmospheric change.

Stephen T. Hasiotis. 'Traces' of hidden biodiversity in paleosols: examples from Phanerozoic terrestrial deposits.

James D. Myers & Travis J. McElfresh. A relational database schema for managing geochemical and visual data: the Aleutian Arc Data System (AADS).

* * * * *

The brown earth moves with multitudes,
unknown hordes of barbarians and sophists,
that leave broad, silvered trails, narrow
    trenches, like wheel-ruts; funnels and
    delta-fans of masticated soil.
innumerable unnamed beings
turning soil in million mouthful lots,
inheriting the earth.

D.L. Emblen (1947), "Livestock"
There are Sea Gulls on Our Lawn

'Application of Ichnology to Petroleum Reservoirs, Exploration and Sequence Stratigraphy',
AAPG, May 18-19, 2002

Bo Henk[1] & Murray Gingras[2]
1. ARCO Exploration & Production Technology,
Plano, TX 75075-8499, USA
2. Department of Geology, University of New Brunswick
Fredericton, New Brunswick E3B 5A3, Canada
mgingras@unb.ca

Objectives and content

This two-day short course is designed for all explorationists, reservoir geologists and engineers interested in improving descriptions and interpretation of bioturbated siliciclastic petroleum reservoirs. We will cover the basics of Ichnology as a science – its history, its development in the last 40 years and the applications we have arrived at today. Ichnofacies, depositional environments, marine processes/ecology and controls on assemblages will be discussed. The neoichnology and sedimentology of modern intertidal sand and mud systems will be examined from the Bay of Fundy, Canada, Willapa Bay, Washington State and the Firths of Scotland.

Applying Ichnology to core descriptions and facies analysis as well as assigning a sequence-stratigraphic significance to litho-ichno-assemblages and significant surfaces such as the *Glossifungites* Ichnofacies will be discussed. Reservoir Ichnology application will be a topic covered with numerous subsurface field examples of actual measurements where porosity and permeability is controlled by the burrowing behavior of the organisms. Core from several North Slope reservoirs will be laid out and discussed, including the Kuparuk C interval and the Shublik-Sag River interval.

Instructors

Bo Henk, President of the Pacheron Group – an oil and gas consulting company. Bo spent 19 years with ARCO in Domestic and International Exploration and Development and most recently in Research working on a PhD on reservoir ichnology under the tutelage of Dr. S.G. Pemberton at the University of Alberta in Edmonton. His time in exploration covered the globe from Greenland to Africa to Asia-Pacific and his work helped find and define large oil and gas reserves for ARCO. His interests switched to detailed reservoir descriptions and quantifying the effects of bioturbation upon reservoirs starting in 1993 when he first began working with Dr. Pemberton in Indonesia on two of ARCO's largest new finds – Terang – Sirasun and the Tanguhh project. Since that time he has examined numerous North Sea and North Slope as well as Lower 48 reservoirs which span the spectrum from carbonates to clastics. He is currently owner of his own company, enrolled as a PhD candidate at the University of Alberta, adjunct professor at Texas Christian University in Fort Worth, and sits on the board of external advisors for the TCU Science and Engineering School.

Murray Gingras, Associate Professor of Geology at University of New Brunswick, Canada. Murray received his PhD in 1998 at the University of Alberta, Edmonton under S.G. Pemberton, has completed a postdoc in 1999 (U of A, Edmonton) and has been at New Brunswick since 2000 and is currently researching neoichnology in the Bay of Fundy and the subsurface of New Brunswick and Nova Scotia and continues to run industry field trips to the Bay of Fundy, Cretaceous sands in the Tar Sands in Alberta and to Willapa Bay, Washington. Murray has examined the effects of bioturbation and quantified the porosity-permeability controls in the mid-continent carbonates as well as analyzed the biochemical diagenesis of sediments by the marine invertebrates. He is an expert in estuarine facies analysis and modern tidal flat organism-sediment relationships.

4th International Bioerosion Workshop

Lee Stocking Island, Bahamas, 22 to 28 September 2002

William E. Kiene
Asian Coral Reef Field Coordinator
Wildlife Conservation Society
wkiene@wcs.org

Theme: Using bioerosion to diagnose marine ecosystem health

This is the first announcement inviting participation in the 4th International Bioerosion Workshop.

Following on from the previous workshops held at Bornholm Denmark (1996), Ft. Pierce Florida (1998), and Barcelona Spain (2000), the next International Bioerosion Workshop will take place 22-28 September 2002 at the Caribbean Marine Research Center (CMRC) at Lee Stocking Island in the Exuma Islands of the Bahamas.

The purpose of this workshop is to evaluate the processes by which organisms erode hard substrates in the sea, and how these processes can be used to assess the health and condition of marine ecosystems. The maximum number of participants that can attend the Workshop is limited to 35 people. Therefore, if you are interested to attend, present results of recent research and help to synthesize the state of our knowledge about how bioerosion responds to environmental change, I urge you to respond soon in order to secure your participation.

CMRC and Lee Stocking Island as a venue for this workshop will provide an unprecedented opportunity for interdisciplinary scientists to observe bioerosion processes in a wide variety of living and fossil tropical marine environments. At the same time it will provide meeting and laboratory facilities where the participants can examine and discuss the organisms involved in the alteration and breakdown of hard substrates in coral reef and carbonate sedimentary environments. A wealth of knowledge about the coral reef and other habitats near Lee Stocking Island has been collected over the last decade. This knowledge makes CMRC an ideal place to host this meeting and observe how recent environmental changes may have influenced bioerosion. Within easy access of CMRC are living coral reefs, oolite shoals, fossil reef and carbonate sedimentary environments, and giant 'living" subtidal stromatolites. For more details of CMRC and Lee Stocking Island, see www.cmrc.org.

The goals of the workshop are to:

1) Review recent research on bioerosion.
2) To address how bioerosion has been used, and can be used, to assess and monitor reef and other environments for human and environmentally produced change.

The plan is to have each participant collaborate within work-groups depending on their expertise. Possible work-group subjects include microbial borers, macro-borers, and grazers (invertebrate and fishes). Each work-group would address:

1) The factors that control the distribution and abundance of particular bioeroders.
2) What the geological record has revealed about these factors.
3) How the distribution and abundance of bioeroders or their consequences (destruction, borings, traces) can be used to assess environmental conditions.
4) What bioerosion monitoring and assessment techniques can evaluate change in these environmental conditions.

It is anticipated that the results of the workshop will be published and become a valuable tool for marine researchers and managers to use in designing and undertaking studies of coral reefs and associated environments.

Cost per person including accommodation and all meals: USD 360.00.

Lee Stocking Island is located north of Great Exuma Island. Participants should make their own arrangements to arrive Sunday 22 September 2002 in Georgetown, Great Exuma. Taxi and small boat will transport you to Lee Stocking Island. Georgetown is served by American Eagle Airlines from Miami International Airport. Bahamas Air also

flies to Georgetown from Nassau (however, American Airlines via Miami is preferred). Participants will be transported back to Georgetown Airport for departure on Saturday 28 September.

To indicate your desire to participate, please send the following information via email to wkiene@wcs.org by 15 January 2001.

I am presently in Papua New Guinea leading a coral reef research team for the Wildlife Conservation Society. These studies will be ongoing in SE Asia until 2003 and I will be organizing the Workshop from a distance away (the wonders of an electronic world!). At this time I can only be contacted by email. If you would like to make direct inquiries about registration, the CMRC facilities or logistics of getting to Lee Stocking Island, you can go to www.cmrc.org or contact:

Dr. Craig Dahlgren
Science Director
Caribbean Marine Research Center
Lee Stocking Island, Bahamas
Tele. and Fax: (242) 355-5557
cdahlgren@cmrc.org

See you at Lee Stocking Island next year!

* * * * *

> We have found a strange footprint on the shores of the unknown. We have devised profound theories, one after another, to account for its origin. At last, we have succeeded in reconstructing the creature that made the footprint. And Lo! it is our own.
>
> A. S. Eddington (1920)
> *Space Time and Gravitation,* p. 201

International Ichnofabric Workshop VII: first circular

14 to 19 July 2003

Andreas Wetzel
Geologisch-Paläontologisches Institut der Universität Basel
Basel, Switzerland
andreas.wetzel@unibas.ch

Date. Monday, 14 July to Saturday, 19 July, 2003
Arrival in Basel during 13 July and
Departure from Switzerland Saturday (**late**) evening or Sunday morning.
When returning from the field trip we will pass Zürich. Those who have flights from Zürich may reach their flights (Saturday evening) or stay overnight in Zürich – I will provide a list of suitable hotels with one of the next circulars.

Presentations. Oral and Poster Session will be held in the Geological Institute of the University Basel during *Monday, Tuesday* and *Wednesday*. Depending on the number of contributions, it is planned to leave for field trip during Wednesday afternoon.

Accommodation. For the participants two types of accommodation are available, both close to the Institute.

(1) "Normal" accommodation in a **hotel** (**double room**) for those who have sufficient travel fund (about 90 CHF/night)
(2) Student hostel (**without any service, no breakfast or anything like that**) for those who a short in money, but note, there are only 6-8 of such places available (about 120 CHF for the whole stay in Basel) – single rooms

Field trip. After presentation of talks and posters a field trip will be arrange during that some classical trace fossil localities in Switzerland will be visited.

The field trip is planned for Wednesday (afternoon) to Saturday. Costs for field trip are in the order of 230 CHF per day (including accommodation, travelling, meals, but not the drinks in the evening).

Costs.	*type I*	*type II*
Accommodation in Basel (Sunday-Wednesday)	270	120
Registration including T-shirt	140	140
Field trip (Wednesday-Saturday)	690	690
Total (estimate)	1100	950
Plus additional night after field trip	120	000 in Basel

Please notice, this is a very rough estimate of the costs and I will try to keep them as low as possible. To negotiate with hotels, rent-a-car companies, etc., I need to know the number of attending people as soon as possible.

Please provide me information about the following aspects:

(1) Are you interested in attending the IIW VII?
(2) Which would you prefer: hotel accommodation or student hostel?
(3) If you choose hotel (double room), have you any preference with whom you want to stay?
(4) Have you any idea yet about your contribution, talk or poster? Or even a title?
(5) Would you like to see a special discussion round be organized during the workshop (i.e., in the evening) or during the field trip?
(6) Do you wish to visit a particular 'classical' trace fossil locality during the field trip?
(7) Please check the attached list of persons. Do you know someone who would be interested in participating and is not yet on the list? Please communicate the address and e-mail as soon as possible to me.

Please notice, to keep the costs low, I will do all the communication via e-mail. For this purpose, I would like to ask you to inform me about any change of your e-mail address.

New books on ichnology, 2001

Andrew K. Rindsberg
Geological Survey of Alabama
P.O. Box 869999
Tuscaloosa, AL 35486 USA
arindsberg@gsa.state.al.us

Alfred Uchman
Institute of Geological Sciences
Jagiellonian University
Oleandry 2a
30-063 Kraków, Poland
fred@ing.uj.edu.pl

In *Ichnology Newsletter* nos. 20 to 23, we presented lists of 81 book-length works on ichnology published from 1990 to 2001, including monographs published within serials, but not theses (which may form the basis of a future list).

Additional ichnologic books, 1990 to 2002

Bromley, R.G. 1999. Spurenfossilien – Biologie, Taphonomie und Anwendungen. Springer, 347pp. Translators P. Suhr, H. Walter & W. Engel. [German translation of the 1996 edition of Trace Fossils. A Japanese translation of the first (1990) edition was published in 1993.]

Bouchner, M. 1990. A Field Guide in Colour to Animal Tracks. Leicester, Blitz Books.

Bouchner, M. 1994. Przewodnik – Sladami zwierzat. Warszawa.

Bouchner, M. 1998. Animal Tracks: A Field Guide in Colour. Leicester, Silverdale Books, 264 pp. ISBN 1-85605-442.

Buatois, L., Mángano, G. & Acenolaza, F. 2002. Trazas Fosiles: Señales de Comportamiento en el Registro Estratigráfico. Museo Paleontologico Egidio Feruglio, Editión Especial, 2: 350 pp. Trelew, Argentina. [See table of contents in this issue.]

Bullion, S. 2001. A Key to Mammal Tracks and Signs. Field Studies Council & Mammal Society.

Elbroch, M. & Marks, E. 2001. Bird Tracks & Sign: a Guide to North American Species. Stackpole Books, Mechanicsburg, Pennsylvania, 456 pp. ISBN 0-8117-2696-7.

Halfpenny, J.C. 1997. Tracking: Mastering the Basics. A Naturalist's World, videocassette, 180 minutes.

Halfpenny, J.C. & Telander, T. 2001. Scats and Tracks of the Rocky Mountains (2nd edition). Falcon Publishing, Helena, Montana, 144 pp. ISBN 0762712414. [First edition: 1998.]

Halfpenny, J.C. & Bruchac, J. 2002. Scats and Tracks of the Southeast: a Field Guide to the Signs of Seventy Wildlife Species. Falcon (Globe Pequot Press), Guilford, Connecticut, xxxvii + 149 pp. ISBN 0-7627-1140-X.

Liebenberg, L. 1990. The Art of Tracking: the Origin of Science. David Philip, Cape Town.

Mángano, M.G., Buatois, L.A., West, R.R. & Maples, C.G. 2002. Ichnology of a Pennsylvanian Equatorial Tidal Flat – the Stull Shale Member at Waverly, Eastern Kansas. Kansas Geological Survey, Bulletin 245.

Strachan, R. 1995. Mammal Detective. London, Whittet Books, 128 pp. ISBN 1873580207.

Stuart, C. & Stuart, T. 2000. A Field Guide to the Tracks and Signs of Southern and Eastern African Wildlife (2nd edition). Halfway House, Southern Book, 310 pp. ISBN 1868127648.

Uchman, A. & Rindsberg, A.K. 2001. Bibliographia Ichnologica, 1990-1995, 154 pp. Kraków. [Available from Alfred Uchman; see announcement, this issue.]

Other books of interest to ichnologists

Briggs, D.E.G. & Crowther, P.R. 2001. Paleobiology II (2nd edition). Blackwell Science Ltd., Oxford, xv + 583 pp.

Goldring, R. 1999. Field Palaeontology (2nd edition). Longman, Harlow, UK, xv + 191 pp. ISBN 0-582-35625-3.

Martin, A.J., 2001, Introduction to the Study of Dinosaurs: Blackwell Science, Malden, Massachusetts; Winnipeg, Manitoba; Carlton, Victoria; Abingdon, UK, xiv + 426 pp. Perfect bound, ISBN 0-632-04436-5, blackwellscience.com. USD 75.

2002. Current Topics on Taphonomy and Fossilization. Valencia, 544 pp.

* * * * *

Bibliographies of ichnology

Andrew K. Rindsberg
Geological Survey of Alabama
P.O. Box 869999, Tuscaloosa, AL 35486-6999, USA
arindsberg@gsa.state.al.us

Scientists since the days of Newton have complained that it is difficult to keep up with the surge of new literature. The ichnologic literature is more scattered than most, but Alfred Uchman and I are attempting to compile it as a digital work-in-progress. This Bibliographia Ichnologica now stands at about 24,800 references. No paper copies exist.

Since 1998, we have been compiling annual bibliographies of ichnology for the *Ichnology Newsletter* – following the custom begun in the original series of the *Ichnology Newsletter* from 1968 to 1990. The literature from 1968 to 1973 was gathered for a special issue of the old *Newsletter.* Of course, copies of old issues are now hard to find.

For those who are in need of ichnologic bibliographies without delay, there are several excellent printed sources in addition to commercial databases and website bibliographies. Among the website bibliographies I especially recommend those of Wilson (*Bibliography of Marine Bioerosion*), Neto de Carvalho (*Bibliography of the Ichnology of Portugal*), and Beaudoin (*The Dung Files*).

Printed sources include general bibliographies, topical bibliographies (borings, microborings, coprolites, invertebrate trace fossils, vertebrate trace fossils), regional bibliographies (Brazil, France, Germany, Great Britain, Japan, South America). There are also bibliographies of individuals, which are posted on many researchers' websites, but in print are generally posthumous.

References

Beaudoin, A.B. 2000. The dung file. URL http://www.ualbertaca/~abeaudoi/stuff/dung/human.htm

Bromley, R.G., 1996, Trace fossils: biology, taphonomy and applications (2nd edition): Chapman & Hall, London, xvi + 361 pp.

Casamiquela, R.M., Demathieu, G.R., Haubold, H., Leonardi, G. & Sarjeant, W.A.S. 1987. Glossary and manual of tetrapod footprint palaeoichnology. Brazil, Departamento Nacional da Producao Mineral, 117 pp., 20 pl. Brasilia.

Clapp, W. F. & Kenk, R. 1963. Marine borers: an annotated bibliography. U.S. Department of the Navy, Office of Naval Research, ACR-74: 1336 pp.

Fernandes, A.C.S. 1993. Bibliografia indexada sobre estudios e registros de estruturas biogenicas no Brasil [Indexed bibliography of studies and accounts of biogenic structures in Brazil]. Acta Geologica Leopoldensia, 16(37): 49-106.

Frey, R.W. (ed.). 1975. The study of trace fossils: a synthesis of principles, problems, and procedures in ichnology. New York, Springer Verlag, 568 pp. [Well-chosen references at end of each chapter, unfortunately now out of date.]

Häntzschel, W. 1965. Vestigia invertebratorum et Problematica. Fossilium Catalogus, ser. 1. Animalia, 108: 142 pp. [Bibliography of invertebrate trace fossils and problematica. Most references also included in the *Treatise*.]

Häntzschel, W. 1975. Trace fossils and problematica. In Teichert, C. (ed.). Treatise on Invertebrate Paleontology, part W, Miscellanea, supplement 1, W269 pp. Boulder, Colorado, Geological Society of America, and Lawrence, Kansas, University of Kansas Press.

Häntzschel, W., El-Baz, F. & Amstutz, G.C. 1963. Coprolites: an annotated bibliography. Geological Society of America, Memoirs, 108: 132 pp., 11 pl.

Kobluk, D.R. & Kahle, C.F. 1977. Bibliography of the endolithic (boring) algae and fungi and related processes. Bulletin of Canadian Petroleum Geology, 25(1): 208-223.

Kuhn, O. 1963. Ichnia tetrapodorum [Ichnites of tetrapods]. Fossilium Catalogus, ser. 1. Animalia, 101: 176 pp., 12 pl.

Leonardi, G. 1994. Annotated atlas of South America tetrapod footprints (Devonian to Holocene). Brasília, Ministério de Minas e Energia, Companhia Pesquisa de Recursos Minerais, xxiv + 248 pp., 35 pl.

Lessertisseur, J. 1956. Traces fossiles d'activité animale et leur signification paléobiologique [Fossil traces of animal activity and their paleobiologic significance]. Mémoires de la Société Géologique de France, 37(74) (for 1955): 150 pp., 11 pl. [Includes a long and relatively complete bibliography with particular emphasis on French literature.]

Neto de Carvalho, C. 1999. Gondwana palaeoichnology bibliographical index (Portugal). In Braddy, Simon. Dr Simon J. Braddy. URL
http://palaeo.gly.bris.ac.uk/personnel/braddy/gbswgbib.html

Noda, H. 1982. Introduction to study of trace fossils, Part 2. Check list and bibliography of trace fossils and related forms in Japan (1889-1980) and neighbourhood (1928-1980). University of Tsukuba, Institute of Geoscience, 80 pp., 7 pl. Ibaraki. [Also printed in an edition in Japanese.]

Sarjeant, W.A.S. 1974. A history and bibliography of the study of fossil vertebrate footprints in the British Isles. Palaeogeography, Palaeoclimatology, Palaeoecology, 16(4): 265-378.

Schäfer, W. 1962. Aktuo-Paläontologie nach Studien in der Nordsee. Frankfurt am Main, Waldemar Kramer, 666 pp., 36 pl. [Emphasis on neoichnology of German Bight.]

Schäfer, W. 1972. Ecology and palaeoecology of marine environments. Edinburgh, Oliver & Boyd, and Chicago, University of Chicago Press, 568 pp., 39 pl. [English translation and revision of Schäfer, 1962.]

Wilson, M.A. 2000-02. Bibliography of marine bioerosion. URL
http://www.wooster.edu/geology/Bioerosion/BioerosionBiblio.pdf

* * * * *

I once wrote a paper on the burrowing habits of the brachiopod *Lingula*. It was accepted for publication in our own Transactions. If I remember rightly, it ran to some 20 pages in length. Seventeen years later, I can convey my point more briefly. The essence of my story was that *Lingula* burrows vertically, anterior end uppermost and always did.

G.Y. Craig (1969,
'Communication in geology', Scottish Journal of Geology, 5: 306)

Review of *Introduction to the Study of Dinosaurs* by Anthony J. Martin

David C. Kopaska-Merkel
Geological Survey of Alabama
P.O. Box 869999, Tuscaloosa AL 35486-6999 USA
davidkm@gsa.state.al.us

Cool cover! The photograph would be just as appropriate on a book of horrific verse, and what better recommendation could there be for the cover of a volume aimed at undergraduate students? Inside, Martin's new book does not disappoint, but before I get into the nitty-gritty, I should answer this question: What is there that's ichnological about a book on dinosaurs? What's ichnological about it? What isn't! Tony Martin has almost, but not quite, put too much ichnology in what is, after all, a textbook on dinosaurs. One of the book's best features is the seamless, pervasive, and persuasive way in which traces (and the behavior and ecology they illumine) are married to bone studies and sedimentology to present a well-rounded picture of what dinosaurs were all about.

Introduction to the Study of Dinosaurs is organized in five sections, though they are not labeled as such. Chapter 1 is an introduction to what dinosaurs are, including their influence on popular culture. Chapters 2 and 3 cover the scientific method and basic principles of geology and paleontology. This section accounts for 47 pages, and could be skipped if the book is used for a graduate course. Chapters 4 through 10 are the meat of the book as far as I am concerned, and encompass about 170 pages. This section addresses the history of dinosaur studies, dinosaur paleobiology (including skeletal anatomy, taphonomy, tracks, eggs and nests, and feeding habits), and dinosaur evolution. Martin is actually using this section to teach not just dinosaurs but paleobiology itself, and doing a pretty good job. Some things cannot really be covered in a book that focuses almost exclusively on vertebrates, but it may be surprising how many principles can be explicated this way. Section four includes chapters 11 through 15 (120 pages) and covers the major groups of dinosaurs. Each chapter focuses on constituent clades and species, paleobiogeography and evolutionary history, and dinosaurs as living animals. The final chapter deals with the extinction of dinosaurs, as well as their relationship to birds.

I particularly like the time spent in showing how to do paleontology right. Multiple lines of evidence, multiple working hypotheses, peer review, quantitative studies, uniformitarianism, and so on, are all included in the most natural way possible. I also like the way Martin has explained and used cladistics. The method can be confusing to novices, but I don't think many will be confused by the clear presentation in this book. Another strong point of the book: the questions for discussion at the end of each chapter. Discussion-questions are often afterthoughts, and these are even labeled 'Dino Afterthoughts', but they are anything but. These questions are actually thought-provoking and will test students' comprehension in fruitful ways.

I hate the price. Maybe I'm old-fashioned, or maybe it's because my eldest is a freshman in college right now, but USD 75 seems too much for one textbook, especially one that is not a hardback. I don't really think textbooks should be published in paperback anyway. This book was written to last and it should have been made to last. Another thing I don't care for is the absence of references, which have been replaced by web links. The Internet is an unstable medium, and I don't see the point of putting web links in a textbook. It would have been better to have a book website, which could have been updated as needed (this is something the author wanted to do, by the way).

If you are teaching a course about dinosaurs to intelligent and motivated college freshmen, or any other group able to work at the same level, you should be using this book. It is modern, well written, comprehensive, coherent, well organized, and well illustrated. The book will work just as well in a graduate course or a class for scientifically literate adults. Or what about a summer workshop for high-school earth-science teachers

or for anyone with sufficient time and interest? You can teach paleontology using dinosaurs as a sort of extended case study, and covering why we do it, what paleontology teaches us and why that is important, how it's done, how it's *not* done, and what makes it so much fun. *Introduction to the Study of Dinosaurs* is made for a course like that.

If you are not a vertebrate paleontologist, and you like dinosaurs, you should read this book. The going will be rough for those lacking college-level science training, because the book is not dumbed down. However, a serious effort has been made to help the motivated student 'get' the material. There is a pretty good glossary, which, if you are an amateur dino-enthusiast, you will probably soon be familiar with. The book is probably beyond the reach of most high-school students.

For the vertebrate paleontologist there will be little that is new; the book is, after all, a textbook. Still, I recommend reading it. Good writing and an interesting subject make for reading pleasure, and I enjoyed this book.

Reference

Martin, A.J., 2001, Introduction to the Study of Dinosaurs: Blackwell Science, Malden, Massachusetts; Winnipeg, Manitoba; Carlton, Victoria; Abingdon, UK, xiv + 426 pp. Perfect bound, ISBN 0-632-04436-5, blackwellscience.com. USD 75.

* * * * *

> ... Native Americans learned to be attuned to their 'natural' environment. They could see and interpret tracks on the ground that the literate could neither see nor interpret. Were their brains any different? Not before the pruning of maturation had set in.
>
> Will the information age change how our brains work? Undoubtedly. But how?
>
> That is the sixty-four-dollar question. In this technological world of abstract, nonverbal symbols, our brains may be developing an entirely different, nonlinear way of organizing information. Perhaps we will use not lists and definitions to organize our world, but trees, trees covered with pictures and symbols to which none of them have words attached. Could we become more like native Americans following a trail than Abe Lincoln at the fireside reading a book?
>
> Harold Klawans (2000)
> 'One of these things is not like the others: How literacy changes the brain,' *Strange Behavior: Tales of Evolutionary Neurology,* p. 120

Review of *The Tracker,* directed by John Guillermin

Andrew K. Rindsberg
Geological Survey of Alabama
P.O. Box 869999
Tuscaloosa, AL 35486 USA
arindsberg@gsa.state.al.us

In *The Tracker,* a Western movie made for television, Kris Kristofferson plays the role of Noble Adams, a former Army scout who has settled down as a rancher in Arizona. His son (Mark Moses) has just completed law school in Philadelphia, and has some impressive skills, but still has much to learn. Enter Red Jack Stillwell (Scott Wilson), the leader of a small band of escaped convicts who leave a trail of bodies. Noble Adams does not want his son to see the old, dark side of his life as a tracker of men, but the sheriff (David Huddleston) persuades him to come out of retirement to pursue the killers.

The plot is simple and the acting is not as good as it should be, but one cannot fault the scenery. I saw no signs of modern activity in this film, neither asphalt roads nor wires. I did see sagebrush, sandstone, basalt, shallow rivers, pueblos, and other beautiful views typical of northern New Mexico and southwestern Colorado.

The long search for the outlaws includes several scenes that emphasize the importance of close observation and especially of tracking. It does not start out well. Immediately after accepting the sheriff's request to come out of retirement, Adams turns around and asks "Who's there?" as someone comes out of the house behind him. As there are only two people in the house and he has known both of them for years, a good tracker should not have to ask. However, after this false start, Adams proves his mettle and it is satisfying for the evidence of footprints to be shown on film. Still, there is an awful lot of killing in this film, and some of it is surprisingly brutal for television. *The Killer* would have been an equally appropriate title.

The Tracker is not a great movie; its best feature is the natural Western landscape. However, as one of the few films that includes tracking at all, it may be worth your attention.

Videography

Guillermin, J. (director). 1988. The Tracker: Lance Hool Production, 100 minutes. DVD edition: 2000, including brief cast biographies and the option for subtitles in English, French, and Spanish.

* * * * *

> There is no den in the wide world to hide a rogue. Commit a crime and the earth is made of glass. Commit a crime, and it seems as if a coat of snow fell on the ground, such as reveals in the woods the track of every partridge, and fox, and squirrel.
>
> Ralph Waldo Emerson

Trazas fosiles:
Señales de comportamiento en el registro estratigráfico

Luis Buatois, Gabriela Mángano & Florencio Acenolaza

Tabla de contenidos

Buatois, L., Mángano, G. & Acenolaza, F. 2002. Trazas Fosiles: Señales de Comportamiento en el Registro Estratigráfico. Museo Paleontologico Egidio Feruglio, Edition Especial, 2: 350 pp. Trelew, Chubut, Argentina.

Repositories of type and other specimens of trace fossils, 2

Andrew K. Rindsberg
Geological Survey of Alabama
P.O. Box 869999, Tuscaloosa, AL 35486-6999, USA
arindsberg@gsa.state.al.us

with help from

Dávid Árpád, Radek Mikuláš, Renata G. Netto, Bhawanisingh G. Desai & Mariano Verde

For the convenience of ichnotaxonomists, here is a list of a few of additional (or corrected) repositories of trace fossils, especially type specimens, arranged by author. Dates are given where known. If you know of corrections or additional repositories, please inform us so that they may be published in the next issue. It will be of great help to taxonomists, not least to the authors of the revised *Treatise* on trace fossils.

Repositories

Aceñolaza, Florencio G. Facultad de Ciencias Naturales e Instituto Miguel Lillo & INSUGEO, Universidad Nacional de Tucumán, San Miguel de Tucumán, Argentina (R.G. Netto, written communication, 2001).

Agardh, Carl Adolf (1758-1859). Mainly at Herbarium of the Botanical Museum, Lund, Sweden (Stafleu & Cowan, 1976). Correspondence: Lund University Library.

Andrae, Carl Justus (1816-1885). Paleontological Collection, University of Bonn, Germany (Stafleu & Cowan, 1976).

Árpád Dávid. Department of Geography, Károly Eszterházy College, Eger, Hungary (Árpád D., written communication, 2001).

Artis, Edmund Tyrell (1789-1847). British Museum (Natural History), London, UK (Stafleu & Cowan, 1976).

Badve (Badwe), R.M. Agarkar Research Institute, Pune, India (B.G. Desai, written communication, 2001).

Barrande, Joachim (1799-1883). Some material in Sedgwick Museum, Cambridge, UK (Sherborn, 1940).

Bornemann, Johann Georg (1831-1896). Jena, Germany (Stafleu & Cowan, 1976).

Bouek, Bedich (1904-1975). Národní Muzeum (National Museum), Praha, Czech Republic; eský geologický ústav (Czech Geological Survey), Praha, Czech Republic (Mikuláš, written communication, 2001).

Braun, Carl Friedrich Wilhelm (1800-1864). Unknown (Stafleu & Cowan, 1976).

Carruthers, William (1830-1922). British Museum (Natural History), London, UK (Stafleu & Cowan, 1976).

Castelnau, François Louis Nompar de Caumont de Laporte (1810-1880). Museum National d'Histoire Naturelle, Paris, France (Stafleu & Cowan, 1976).

Chiplonkar, G.W. Agarkar Research Institute, Pune, India (B.G. Desai, written communication, 2001).

Chlupá, Ivo (1931-). Národní Muzeum (National Museum), Praha, Czech Republic (Mikuláš, written communication, 2001).

Clarke, John Mason (1857-1925). Unknown (Stafleu & Cowan, 1976).

Cockerell, Theodor Dru Alison (1866-1948). University of Colorado, Boulder, Colorado, USA (Stafleu & Cowan, 1976).

Crié, Louis Auguste (1850-1912). Rennes, France (Stafleu & Cowan, 1976).

Debey, Matthias Dominikus Hubert Maria (1817-1884). Unknown (Stafleu & Cowan, 1976).

Deecke, Johannes Ernst Wilhelm (1862-1934). Freiburger geologisches Institut, Freiburg, Germany (Stafleu & Cowan, 1976).

Delgado. See **Nery Delgado**.

Demidow, Anatoli Nikolajewitsch (1812-1870). Various collections (Stafleu & Cowan, 1976).

Eaton, Amos (1776-1842). Surviving specimens at Yale University, New Haven, Connecticut, USA (Stafleu & Cowan, 1976).

Ehrenberg, Christian Gottfried (1795-1876). Institut für Paläontologie der Humboldt Universität, Berlin, Germany (Stafleu & Cowan, 1976).

Etheridge, Robert, Jr. (1847-1920). British material: British Museum (Natural History), London, UK (Stafleu & Cowan, 1976).

Ettingshausen, Constantin von (1826-1897). Main collection: British Museum (Natural History), London, UK (Cleevely, 1983). Perhaps also Naturhistorisches Museum, Wien, Austria (Stafleu & Cowan, 1976).

Felix, Johannes Paul (1859-1941). Paläontologisches Museum, Leipzig, Germany (Stafleu & Cowan, 1976).

Fischer von Waldheim, [Johann] Gotthelf [Friedrich (1771-1853). Some collections destroyed in Moskva in 1812; others surviving in Moskva and St. Petersburg, Russia (Stafleu & Cowan, 1976).

Fliche, Paul Henri Maria Thérèse André (1836-1908). Unknown (Stafleu & Cowan, 1976).

Fontaine, William Morris (1835-1913). Perhaps University of Virginia, Charlottesville, Virginia, USA (Stafleu & Cowan, 1976).

Forbes, Edward (1815-1854). British Museum (Natural History), London, UK; other collections (Stafleu & Cowan, 1976).

Forchhammer, Johan Georg (1794-1865). Some material at Universität Kiel, Germany (Stafleu & Cowan, 1976).

Forti, Achille Italo (1878-1937). Mainly at Padova, Italy, and Muséum Nationale d'Histoire Naturelle, Paris, France; perhaps also Pavia, Italy; Bruxelles, Belgium (Stafleu & Cowan, 1976).

Gába, Zdenk. (collections made ~1965 to present). Vlastivdné Muzeum (Homeland Museum), Šumperk, Czech Republic (Mikuláš, written communication, 2001).

Geinitz, Franz Eugen (1854-1925). Mecklenburgisches geologisches Landesmuseum, Germany (Stafleu & Cowan, 1976).

Germar, Ernst Friedrich (1786-1853). Geiseltalmuseum, Martin-Luther-Universität, Halle-Wittenberg, Germany (Stafleu & Cowan, 1976).

Germs, Gerald. Natural History Museum and Geological Survey Paleontological Collection, Cape Town, South Africa (R.G. Netto, written communication, 2001).

Ghare, M.A. Agarkar Research Institute, Pune, India (B.G. Desai, written communication, 2001).

Göppert (Goeppert), [Johann] Heinrich Robert (1800-1884). Uniwersytetu Wroklawkiego, Wroklaw, Poland (Stafleu & Cowan, 1976).

Gothan, Walther Ulrich Eduard Friedrich (1879-1954). Botanischer Garten und Botanisches Museum Berlin-Dahlem, Germany (possibly burned in 1943) (Stafleu & Cowan, 1976).

Gümbel, Carl Wilhelm von (1823-1898). Unknown (Stafleu & Cowan, 1976).

Gutbier, Christian August von (1798-1866). Unknown (Stafleu & Cowan, 1976).

Hall, James (1811-1898). Scattered, but a good place to start is the American Museum of Natural History, New York, USA (R.G. Netto, written communication, 2001). The University of California (Whitfield Collection) holds some of Hall's trace fossils, though no types (Peck & McFarland, 1954).

Herzer, Herman[n] (1833-1912). Possibly Marietta College, Marietta, Ohio, USA (Stafleu & Cowan, 1976).

Hirmer, Max (1893-?). Staatssammlung für Paläontologie und historische Geologie, München, Germany (Stafleu & Cowan, 1976).

Hitchcock, Edward (1793-1864). Primary collection at Pratt Museum of Natural History, Amherst College, Amherst, Massachusetts; additional specimens at American Museum of Natural History, New York, USA (R.G. Netto, written communication, 2001).

Hollick, [Charles] Arthur (1857-1933). Herbarium, New York Botanical Garden, New York, USA; Staten Island Institute of Arts and Sciences, New York, USA (Stafleu & Cowan, 1976).

Holub, Vlastimil (collections made ~1960 to 1975, publications coauthored by Harald Kozur). Partly eský geologický ústav (Czech Geological Survey), Praha, Czech Republic; partly unknown or lost (Mikuláš, written communication, 2001).

Hutton, William (1798-1860). Newcastle Museum, Newcastle, UK (Stafleu & Cowan, 1976).

Keyserling, Alexander Friedrich Michael Leberecht Arthur von, [Andreevich] (1815-1891). St. Petersburg, Russia (Stafleu & Cowan, 1976).

Kidston, Robert (1852-1924). Department of Botany, University of Glasgow, Scotland, UK (Stafleu & Cowan, 1976).

Knorr, Georg Wolfgang (1705-1761). Unknown (Stafleu & Cowan, 1976).

Knowlton, Frank Hall (1860-1926). National Museum of Natural History, Washington, DC, USA (Stafleu & Cowan, 1976).

Kí, Jií (collections made ~1965 to present). eský geologický ústav (Czech Geological Survey), Praha, Czech Republic (Mikuláš, written communication, 2001).

Kurr, Johann Gottlob von (1798-1870). Probably Institut für Biologie, Tübingen, Germany (Stafleu & Cowan, 1976).

Lamouroux, Jean(in) Pierre Péthion (1797-1866). Unknown (Stafleu & Cowan, 1976).

Lang, Veleslav (collections made ~1940 to 1980). Private collection accessible through the Palacký University, Olomouc, Czech Republic (Mikuláš, written communication, 2001).

Lorenzo, Nora. Collection del Departamento de Paleontología de la Facultad de Ciencias, Montevideo, Uruguay (M. Verde, written communication, 2001).

Ludwig, Rudolph August Birminhold Sebastian (1812-1880). Unknown (Stafleu & Cowan, 1981).

Mägdefrau, Karl (1907-). München and Universität Tübingen, Germany (Stafleu & Cowan, 1981).

Malmgren, Anders Johan (1834-1897). Botanical Museum, University of Helsinki, Finland (Stafleu & Cowan, 1981).

Mansel-Pleydell, John Clavell (1817-1902). Dorset Natural History and Archaeological Society, Dorchester, UK; also Herbarium, Department of Botany, British Museum (Natural History); Herbarium, Royal Botanic Gardens, Kew, Richmond, UK; Manchester Museum, University of Manchester, UK (Stafleu & Cowan, 1981).

Mantell, Gideon Algernon (1790-1852). British Museum (Natural History) (Stafleu & Cowan, 1981).

Marck, Wilhelm von der (1814-1900). Botanisches Insitut der Universität Bonn, Germany; Landemuseum für Naturkunde, Münster, Germany (Stafleu & Cowan, 1981).

Marion, Antoine-Fortuné (1846-1900). Unknown (Stafleu & Cowan, 1981).

Massalongo, Abramo Bartolomeo (1824-1860). Most in Sezione di Botanica, Museo Civico di Storia Naturale, Verona, Italy (Stafleu & Cowan, 1981).

MCoy, Frederick (1817-1899). Unknown (Stafleu & Cowan, 1981).

Meneghini, Giuseppe Giovanni Antonio (1811-1889). Most at Istituto Botanico dell'Università, Pisa, Italy; also Herbarium Universitatis Florentinae, Istituto Botanico, Firenze, Italy; Rijksherbarium, Leiden, Netherlands (Kützing Herbarium) (Stafleu & Cowan, 1981).

Meschinelli, Aloysius (Luigi) (1865-?). Unknown (Stafleu & Cowan, 1981).

Mikuláš, Radek (1964-). Národní Muzeum (National Museum), Praha, Czech Republic; eský geologický ústav (Czech Geological Survey), Praha, Czech Republic; Muzeum B. Horáka (B. Horák's Museum), Rokycany, Czech Republi (Mikuláš, written communication, 2001).

Miller, Samuel Almond (1837-1897). 'Unknown' (Stafleu & Cowan, 1981).

Miquel, Friedrich Anton Wilhelm (1881-1871). Most at Institute for Systematic Botany, Utrecht, Netherlands (Stafleu & Cowan, 1981).

Morière, Pierre Gilles ('Jules') (1817-1888). Herbier du Laboratoire de Botanique, Faculté des Sciences, Caen, France (Stafleu & Cowan, 1981).

Morris, John (1810-1886). British Museum (Natural History), UK (Stafleu & Cowan, 1981).

Moseley, Henry Nottidge (1844-1890). British Museum (Natural History), UK; National Museum of Ireland, Dublin, Eire; Herbarium of the Royal Botanic Garden, Edinburgh, Scotland, UK (Stafleu & Cowan, 1981).

Münster, Georg von (1776-1844). München, Germany (Stafleu & Cowan, 1981).

Murchison, Roderick Impey (1792-1871). Paleobotanical material at British Museum (Natural History), UK (Stafleu & Cowan, 1981).

Murray, George Robert Milne (1858-1911). British Museum (Natural History), UK (Stafleu & Cowan, 1981).

Nathorst, Alfred Gabriel (1850-1921). Sections for Botany and Palaeobotany, Swedish Museum of Natural History (Naturhistorika Rijksmuseet), Stockholm, Sweden (Stafleu & Cowan, 1981).

Nery Delgado, Joaquim Filippe. Direcção dos Trabalhos Geologicos, Lisboa, Portugal (Stafleu & Cowan, 1976).

Newberry, John Strong (1822-1892). National Museum of Natural History, Washington, DC, USA; Herbarium, New York Botanical Garden, New York, USA; Ohio State Geological Museum, Columbus, Ohio, USA (Stafleu & Cowan, 1981).

Nicholson, Henry Alleyne (1844-1899). Royal Scottish Museum, Edinburgh, Scotland, UK (Benton, 1979).

Noll, Fritz (1858-1908). Unknown (Stafleu & Cowan, 1981).

Oersted (Örsted, Ørsted), Anders Sandö (1816-1872). Chiefly at Botanical Museum and Herbarium, Copenhagen, Denmark; material widely scattered (Stafleu & Cowan, 1981).

Orbigny, Alcide Dessalines d' (1802-1857). Mostly at Muséum National d'Histoire Naturelle, Paris, France, and at Conservatoire et Jardin Botaniques, Génève, Switzerland; some at Naturhistorisches Museum, Wien, Austria (Stafleu & Cowan, 1981).

Otto, Ernst von (1799-1863). Unknown (Stafleu & Cowan, 1981).

Packard, Alpheus Spring (1839-1905). Unknown (Stafleu & Cowan, 1983).

Pek, Ilja (1945-1998): Palacký University, Olomouc, Czech Republic (partly destroyed by flood in 1997); Mstské muzeum (Municipal Museum), Moravská Tebová, Czech Republic (Mikuláš, written communication, 2001).

Prantl, Ferdinand (collections made ~1940 to 1950). Národní Muzeum (National Museum), Praha, Czech Republic (Mikuláš, written communication, 2001).

Pia, Julis (von) (1887-1943). Naturhistorisches Museum, Wien, Austria (Stafleu & Cowan, 1983).

Pomel, Auguste Nicolas (1821-1898). Herbier du Laboratoire de Botanique de la Faculté des Sciences, Université d'Alger, Alger, Algeria (Stafleu & Cowan, 1983).

Porter, Cedric Lambert (1905-). Rocky Mountain Herbarium, University of Wyoming, Laramie, Wyoming, USA; duplicates in numerous museums (Stafleu & Cowan, 1983).

Potonié, Henry (1857-1913). 'BHU' and Herb. Arbeitstelle für Paläobotanik, Deutsche Akademie der Wissenschaften zu Berlin (Stafleu & Cowan, 1983).

Printz, [Karl] Henrik [Oppegaard] (1888-1978). Botanical Museum, Oslo, Norway (Stafleu & Cowan, 1983).

Quekett, John Thomas (1815-1861). Unknown (Stafleu & Cowan, 1983).

Raciborski, Marjan (Marian, Maryan) (1863-1917). Collections in many museums (Stafleu & Cowan, 1983).

Rafinesque(-Schmaltz), Constantin Samuel (1783-1840). Collections in many museums, though most specimens were discarded or scattered on his death (Stafleu & Cowan, 1983).

Renier, Armand-Marie-Vincent-Joseph (1876-1951). Unknown (Stafleu & Cowan, 1983).

Robertson, David (1806-1896). British Museum (Natural History), UK, and 'GLAM' (Stafleu & Cowan, 1983).

Roemer, [Carl] Ferdinand (1818-1891). Universität Berlin, Germany; Herbarium, Forschungsinsitut und Naturmuseum Senckenberg, Frankfurt, Germany (Stafleu & Cowan, 1983).

Rogers, Henry Darwin (1809-1866). Unknown (Stafleu & Cowan, 1983).

Rojas, Alejandra. Collection del Departamento de Paleontologia de la Facultad de Ciencias, Montevideo, Uruguay (M. Verde, written communication, 2001).

Rothpletz, [Friedrich] August (1853-1918). Paläontologische Staatssammlung, München, Germany (Stafleu & Cowan, 1983).

Rüppell (Rüppel), [Wilhelm Peter] Eduard [Simon] (1794-1884). Herbarium, Forschungsinsitut und Naturmuseum Senckenberg, Frankfurt, Germany (Stafleu & Cowan, 1983).

Saporta, (Louis Charles Joseph) Gaston de (1823-1895). Some material at Muséum National d'Histoire Naturelle (including Laboratoire de Cryptogamie), Paris, France (Stafleu & Cowan, 1985).

Savi, Paolo (1798-1871). Some material at 'M' (Stafleu & Cowan, 1985).

Schafhäutl, [Karl Franz] Emil (1803-1890). Geol. Staatssamml., München, Germany (Stafleu & Cowan, 1985).

Schenk, [Joseph] August [von] (1815-1891). Destroyed at Botanisches Institut der Universität, Würzburg, Germany, and Herbarium, Botanisches Institut der Karl-Marx-Universität, Leipzig, Germany; some material preserved in other museums (Stafleu & Cowan, 1985).

Schimper, Wilhelm Philipp (1808-1880). Main collection destroyed at Botanischer Garten und Botanisches Museum Berlin-Dahlem, Germany, in 1943 (Stafleu & Cowan, 1985).

Schlotheim, Ernst Friedrich von (1764-1832). Museum für Naturkunde, Bereich Paläontolgoisches Museum, Humboldt Universität, Berlin, Germany (Stafleu & Cowan, 1985).

Schröter, Carl [Joseph] (1855-1939). Main collection at Herbarium, Institut für Spezielle Botanik, Eidg. Technische Hochschule, Zürich, Switzerland (Stafleu & Cowan, 1985).

Scott, Dukinfield Henry (1854-1934). Geol. Department, British Museum (Natural History), and Department of Botany, National Museum of Wales, Cardiff, UK (Stafleu & Cowan, 1985).

Serres, [Pierre] Marcel [Toussaint] de (1780/83-1862). Unknown (Stafleu & Cowan, 1985).

Seward, Albert Charles (1863-1941). Main collection at Cambridge (Stafleu & Cowan, 1985).

Sordelli, Ferdinando (1837-1916). Most material destroyed at Botanischer Garten und Botanisches Museum Berlin-Dahlem, Germany, in 1943 (Stafleu & Cowan, 1985).

Squinabol, Senofonte [Xenofonte] (1861-?). Unknown (Stafleu & Cowan, 1985).

Staub, Moriz (Móricz, Moritz) (1842-1904). Department of Botany, Museum of Natural History, Budapest, Hungary (Stafleu & Cowan, 1985).

Stefani, Carlo de (1851-1924). Conservatoire et Jardin Botaniques, Génève, Switzerland (Stafleu & Cowan, 1985).

Steinmann, [Johann Heinrich Conrad Gottfried] Gustav (1856-1929). Unknown (Stafleu & Cowan, 1985).

Sternberg, Kaspar (Caspar) Maria von (1761-1838). Herbarium of the Botanical Department of the National Museum, Praha, Czech Republic (Stafleu & Cowan, 1985).

Stiehler, August Wilhelm (1797-1878). Universität Halle, Germany (Stafleu & Cowan, 1986).

Stopes, Marie [Charlotte Carmichael] (1880-1958). British Museum (Natural History), UK; also Herbarium, New York Botanical Garden, New York, USA (Stafleu & Cowan, 1986).

Stur, Dionys [Rudolf Josef] (Štur, Dionýz) (1827-1893). Botanischer Garten und Botanisches Museum Berlin-Dahlem, Germany ('extant; in herb. zool.-bot. Ver. Wien); other material in MW' (Stafleu & Cowan, 1986).

Sze, Hsing-chien (Ssu, H.C.) (1902- Institute of Paleontology, Nanking, China (Stafleu & Cowan, 1986).

Tate, George Ralph (1835-1874). British Museum (Natural History), Manchester Museum, Manchester University, Manchester, UK; Department of Botany, National Museum of Wales, Cardiff, Wales, UK; County Museum, Warwick, UK (Stafleu & Cowan, 1986).

Tate, Ralph (1840-1901). Most likely British Museum (Natural History) (Stafleu & Cowan, 1986).

Thomson, Paul William (1892-1957). Unknown (Stafleu & Cowan, 1986).

Torell, Otto Martin (1828-1900). Unknown (Stafleu & Cowan, 1986).

Toula, Franz (1845-1920). Unknown (Stafleu & Cowan, 1986).

Turek, Vojtch (collections made ~1970 to 1975). Národní Muzeum (National Museum), Praha, Czech Republic (Mikuláš, written communication, 2001).

Unger, Franz [Joseph Andreas Nicolaus] (1800-1870). Main collection at Steirn. Landesmuseums Johanneum, Graz, Austria (Stafleu & Cowan, 1986).

Verde, Mariano. Collection del Departamento de Paleontología de la Facultad de Ciencias, Montevideo, Uruguay (M. Verde, written communication, 2001).

Viviani, Domenico (1772-1840). Main collection destroyed at Botany School, Cambridge, UK (Stafleu & Cowan, 1986).

Zajíc, Jaroslav (1954-). eský geologický ústav (Czech Geological Survey), Praha, Czech Republic (Mikuláš, written communication, 2001).

Zapletal, Jan (collections made ~1965 to present, mostly with Ilja Pek). Palacký University, Olomouc, Czech Republic (Mikuláš, written communication, 2001).

Zasadil, Boek (Collections made ~1970 to present including *Eocavum* isp.). Muzeum araukarit (Museum of Araucarires), Louny. Czech Republic (Mikuláš, written communication, 2001).

Acknowledgments

Some of this information was gathered as a result of a request made public in 2001 on the listserver SKOLITHOS. Thanks to all who participated!

References

Benton, M.J., 1979. H.A. Nicholson (1844-1899), invertebrate palaeontologist: bibliography and catalogue of his type and figured material. Royal Scottish Museum, Information Series, Geology, 7: 94 pp. Edinburgh.

Cleevely, R.J. 1983. World Palaeontological Collections. British Museum (Natural History), Mansell Publishing Limited, London, 365 pp.

Peck, J.H., Jr. & McFarland, H.B. 1954. Whitfield Collection types at the University of California. Journal of Paleontology, 28(3): 297-309, pl. 29.

Stafleu, F.A. and Cowan, R.S., 1976-1988. Taxonomic Literature: a Selective Guide to Botanical Publications and Collections with Dates, Commentaries and Types (2nd edition). Bohn, Scheltema and Holkema, Utrecht; dr. W. Junk b.v., Publishers, The Hague, 1: 1136 pp. (1976), 2: 999 pp. (1979), 3: 980 pp. (1981), 4: 1214 pp. (1983), 5: 1066 pp., 6: 926 pp., 7: 653 pp. (1988), supplements.

Bibliographia Ichnologica 2001 with complementary data for 1990 to 2000

Alfred Uchman[1] & Andrew K. Rindsberg[2]
1. Institute of Geological Sciences, Jagiellonian University
Oleandry 2a, 30-063 Kraków, Poland
2. Geological Survey of Alabama
P.O. Box 869999, Tuscaloosa, AL 35486-6999 USA

This part of the ongoing *Bibliographia Ichnologica* includes some new features. Now that the section for 1990 to 1995 has been published (Uchman & Rindsberg, 2001), we can now update the list with material dating back to 1990. Also included is an index of the new ichnotaxa named in the current bibliography, insofar as we have been able to check.

Abbassi, N. & Momeni, I. 2001. Utility of *Ophiomorpha* in the sedimentary environment interpretation, Roksha Unit (Miocene), Makran Range, SE Iran. Journal of Science of the University of Tehran, 27(1): 27-38. [In Persian, English abstract]. # *Ophiomorpha annulata, O. nodosa*

Abbassi, N. & 60 others. 2001. Current activities of ichnologists. Ichnology Newsletter, 23: 116-142. # current activities

Abbott, S.T. 2000. Detached mud prism origin of highstand systems tracts from mid-Pleistocene sequences, Wanganui Basin, New Zealand. Sedimentology, 47(1): 15-29. # bioturbation

Aceñolaza, F.G. 2001. Reflexiones sobre aspectos históricos y actuales de la icnología en Argentina. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 7. # general

Aceñolaza, F.G. & Aceñolaza, G.F. 2000. Trazas fosiles del Terciario marino de Entre Rios (Formación Paraná, Mioceno Medio), República Argentina [Trace fossils of the marine Tertiary of Entre Rios (Paraná Formation, middle Miocene]. Boletin de la Academia Nacional de Ciencias, 64: 209-235. Córdoba (Argentina). # *Cylindrichnus concentricus, Ophiomorpha irregulaire, Polykladichnus irregularis, Skolithos linearis, Taenidium satanassi, Thalassinoides paradoxicus, T. suevicus, Trypanites,* Miocene, Argentina

Aceñolaza, F.G., Aceñolaza, G.F. & Esteban, S. 1999. Biostratigraphía de la Formación Puncoviscana y unidades equivalents el noa. *In* Gonzáles B.G. et al. (eds.), Geología del Nordeste Argentino, I: p. 91-126. Salta. # *Asaphoidichnus trifidus, Cochlichnus, Didymaulichnus, Dimorphichnus, Glockeria, Gordia, Helminthoida miocenica, Monomorphichnus, Multipodichnus holmi, Nereites saltensis, Oldhamia antiqua, O. flabellata, O. radiata, Phycodes pedum, Planolites, Protichnites, Protopaleodictyon, Protovirgularia, Scolicia, Squamodictyon, Tasmanadia cachii, Torrowangea,* Precambrian, Cambrian, Ordovician, Argentina

Aceñolaza, F.G. & Alonso, R. 2001. Abra Blanca, nueva localidad con icnofósiles de la transición Neoproterozoico-Cámbrico Inferior en el Noroeste Argentino. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 17. # *Cochlichnus anguineus, Gordia marina, Helminthopsis abeli, Helminthoidichnites, Neonereites biserialis, N. uniserialis, Oldhamia flabellata, O. radiata, Planolites montanus,* Precambrian, Cambrian, Argentina

Aceñolaza, F.G. & Toretello, M.F. 2000. El Alisal: a new locality with trace fossils of the Puncoviscana Formation (Late Precambrian-Early Cambrian) in Salta Province. *In* Aceñolaza, G.F. & Peralta, S. (eds.), The Cambrian from the southern edge. Instituto Superior de Correlación Geológica (INSUGEO), Miscelánea, 6: 67-69. Tucumán. # *Asaphoidichnus, Beltanelliformis, Cochlichnus, Didymaulichnus, Dimorphichnus, Diplichnites, Glockeria, Gordia, Helminthoida, Helminthopsis, Helminthorhaphe, Helminthoidichnites, Monomorphichnus, Multipodichnus, Neonereites, Nereites, Oldhamia, Phycodes, Planolites,*

Protichnites, Protopaleodictyon, Protovirgularia, Scolicia, Sekwia, Squamodictyon, Tasmanadia, Torrowangea, Treptichnus, Argentina

Aceñolaza, F.G. & Yanev, SI. 2001. El Ordovícico del sector occidental de Stara Planina (Montes Balcanes), Bulgaria: Icnofósiles e implicaciones paleobiogeográficas. Museo Argentino de Ciencias Naturales 'Bernardino Rivadavia', n.s., 3(1): 55-72. # *Cochlichnus anguineus, Chondrites, Diplocraterion parallelum, Dictyodora simplex, Glockerichnus, Gordia marina, Helicodromites, Helminthopsis abeli, Helminthopsis tenuis, Hormosiroidea florentina, Monocraterion, Palaeophycus, Phycodes palmatum, Planolites, Scolicia, Skolithos, Spirophycus bicornis, Spirophyton, Teichichnus,* Ordovician

Aceñolaza, G.F. 2001. El Angosto de Chucalezna: una localidad clásica para el estudio de icnofósiles en el Noroeste Argentino [El Angosto de Chucalezna: a classic locality for the study of ichnofossils in northwestern Argentina]. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 7. # *Arenicolites, Bergaueria, Conostichus, Cruziana, Didymaulichnus, Dimorphichnus, Diplichnites, Diplocraterion, Gordia, Isopodichnus, Monocraterion, Monomorphichnus, Palaeophycus, Phycodes, Planolites, Rusophycus, Skolithos, Syringomorpha, Teichichnus,* Cambrian, Argentina

Aceñolaza, G.F. 2001. Icnofósiles Cambro-Ordovícicos asociados a facies de lutitas negras: el caso de la Formación Lampazar en el Noroeste Argentino [Cambro-Ordovician associated with the black lutite facies: the case of the Lampazar Formation in northwestern Argentina]. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 18. # *Cruziana, Dimorphichnus, Isopodichnus, Planolites, Rusophycus, Skolithos, Tomaculum problematicum,* Cambrian, Ordovician, Argentina

Aceñolaza, G.F. & Aceñolaza, F.G. 2000. The Cambrian System in northwest Argentina. *In* Aceñolaza, G.F. & Peralta, S. (eds.), The Cambrian from the southern edge. Instituto Superior de Correlación Geológica (INSUGEO), Miscelánea, 6: 46-50. Tucumán. # *Cruziana, Dimorphichnus, Diplichnites, Nereites saltensis, Oldhamia antiqua, Oldhamia flabellata, O. radiata, Rusophycus, Sekwia, Skolithos, Tasmanadia*

Aceñolaza, G.F. & Aceñolaza, F.G. 2001. Icnología de la Formación Sepulturas (Ordovícico) en el Espinazo del Diablo, Cordillera Oriental Argentina [Ichnology of the Sepulturas Formation (Ordovician) in the Espinazo del Diablo, Western Cordillera, Argentina]. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 20. # *Diplichnites, Monomorphichnus, Palaeophycus, Petalichnus, Planolites, Skolithos, Thalassinoides,* Ordovician, Argentina

Aceñolaza, G.F. & Gutiérrez-Marco, J.C. 1999. Icnofósiles del Ordovíco terminal (Pizarras Chavera, Pizzaras de Orea: Hirnantienze de algunos localidades Espaolas). Boletin Geológico y Minero, 110: 123-134. # *Allocotichnus palmatus* isp. n., *Arenicolites, Asaphoidichnus, Cochlichnus, Curvolithus, Diplichnites, Didymaulichnus, Gordia, Helicorhaphe, Helminthopsis, Laevicyclus, Monomorphichnus, Neonereites, Palaeophycus, Palaeophycus,* Ordovician, Spain

Aceñolaza, G.F., Esteban, S.B. & Tortello, M.F. 2001. Icnofósiles del Cámbrico Superior en los niveles basales de la Formación Santa Rosita en Iruya, Provincia de Salta. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 21. # *Asaphoidichnus, Cruziana, Diplichnites,* Cambrian, Argentina

Aceñolaza, G.F., Tortello, M.F., M. Vergel, M. del, Aráoz, L. 2001. Icnofósiles, trilobites y palinomorfos de la Formación Santa Rosita aflorante en la región del Abra de Zenta (Provincias de Salta y Jujuy). 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 22. # *Asaphoidichnus, Bergaueria, Diplichnites, Isopodichnus, Petalichnus, Planolites, Rusophycus, Taphrhelminthopsis*, Ordovician, Silurian, Argentina

Adams, T. L. 2001. The "Yellow Brick Road"; Middle Jurassic dinosaur tracks in the northeastern Bighorn Basin, Wyoming. Journal of Vertebrate Paleontology. 21(3, Suppl.): 27. # Jurassic, Reptilia

Aigars, J. & Carman, R. 2001. Seasonal and spatial variations of carbon and nitrogen distribution in the surface sediments of the Gulf of Riga, Baltic Sea. Chemosphere, 43(3): 313-320.

Al Eidan, A.J., Wethington, W.B. & Davies, R. 1998. Sedimentology to 3-D geological model, impact on reservoir development upper Burgan Reservoir, northern Kuwait. *In* Al H., M.I. (ed.), The Middle East, Catalyst for E&P Technology, GEO'98, 3rd Middle East Geoscience Conference and Exhibition, Conference Abstracts. Gulf Petrolink in Bahrain, Manama, Bahrain, GeoArabia (Manama), 3: 46. # biogenic structures, bioturbation, oil, Cretaceous

Al Hanbali, H. 1999. Manganese: a monitor for ventilation conditions in the Arctic Ocean? *In* European Union of Geosciences Conference Abstracts, EUG 10. Journal of Conference Abstracts, 4: 216. Cambridge. # biogenic structures, bioturbation, Cenozoic, Quaternary

Albertsson, J. & Leonardsson, K. 2000. Impact of a burrowing deposit-feeder, *Monoporeia affinis,* on viable zooplankton resting eggs in the northern Baltic Sea. Marine Biology, 136(4): 611-619. # bioturbation, arthropods, recent

Alexander, R.R. & Dietl, G.P. 2001. Shell repair frequencies in New Jersey bivalves: a recent baseline for tests of escalation with Tertiary mid-Atlantic congeners. Palaios, 16(4): 354-371. # modern, intertidal environment, *Anadara ovalis, Anomia simplex, Argopecten irradians, Astarte castanea, Crassostrea virginica, Divalinga quadrisulcata, Donax variabilis, Ensis directus, Geukensia demissa, Mercenaria mercenaria, Mya arenaria, Mytilus edulis, Petricola pholadiformis, Spisula solidissima, Tagelus plebeius*

Allmon, W.D. 2001. Invertebrates. Geotimes, 46(7): 33-34. # Precambian, India

Amaral, M.J. & Costa, M. H. 1999. Macrobenthic communities of saltpans from the Sado estuary (Portugal). Acta Oecologica, 20(4): 327-332. # bioturbation, *Capitella, Chironomus salinarius, Polydora ciliata*

Ambert, P., Colomer, A. & Galant, P. 2000. Datations mesolithiques des empreintes humaines de l'etage Cathala de la grotte d'Aldene (Cesseras, Herault) [Mesolithic dates and human imprints of the Cathala Stage from Aldene Cave (Cesseras, Herault)]. Comptes Rendus de l'Academie des Sciences, Serie II. Sciences de la Terre et des Planetes, 331(1): 67-74. # human footprints, Holocene, France

Ambrose, W.G., Jr., Dawson, M., Ledkovsky, P., O'Leary, S., Tassinari, B., Vogel, H. & Wilson, C. 1998. Effects of baitworm digging on the soft-shelled clam, Mya arenaria. Abstracts, 27th Benthic Ecology Annual Meeting, Melbourne, Florida, 1: 15. # modern, taphonomy, Bivalvia, *Mya arenaria*

Amorosi, A. & Centineo, M.C. 2000. Anatomy of a condensed section: the lower Cenomanian glaucony-rich deposits of Cap Blanc-Nez (Boulonnais, northern France). *In* Glenn, C. R., Prevot, L.L. & Lucas, J. (eds.), Marine authigenesis: from global to microbial. Society for Sedimentary Geology (SEPM), Special Publication, 66:405-413. # biogenic structures; bioturbation, Cretaceous

Andersen, T.J., Mikkelsen, O.A., Moller, A.L. & Pejrup, M. 2000. Deposition and mixing depths on some European intertidal mudflats based on ^{210}Pb and ^{137}Cs activities. Continental Shelf Research, 20(12-13): 1569-1591.

Andrews, C. & Williams, R.B.G. 2000. Limpet erosion of chalk shore platforms in southeast England. *In* Robinson, D.A. (ed.), Weathering Processes, Products and Environments. Wiley & Sons, Chichester. Earth Surface Processes and Landforms, 25(12): 1371-1381. # *Patella vulgata*, bioerosion, Holocene, Great Britain

Anonymous. 1998. Mosasaur bite marks might be limpets. American Paleontologist, 6(4): 18. # Cretaceous, Tomoki Kase (1998)

Anonymous. 1998. A new consensus on the Cambrian explosion? American Paleontologist, 6(4): 17. # Precambrian, India, Adolf Seilacher

Anschutz, P., Hyacinthe, C., Carbonel, P., Jouanneau, J.-M., Jorissen, F. & Dedieu, K. 1999. Benthic chemistry of Mn, Fe, N, and P in the S-E Bay of Biscay sediments: shelf vs. slope processes. *In* European Union of Geosciences Conference Abstracts; EUG 10. Journal of Conference Abstracts, 4: 241. Cambridge. # bioturbation

Anschutz, P., Hyacinthe, C., Carbonel, P., Jouanneau, J.-M. & Jorissen, F. 1999. The distribution of inorganic phosphorus in modern sediments of the Bay of Biscay. Comptes Rendus de l'Academie des Sciences, Serie II A. Sciences de la Terre et des Planetes, 328(11): 765-771. # bioturbation

Anschutz, P., Sundby, B., Lefrancois, L., Luther, G.W., III & Mucci, A. 2000. Interactions between metal oxides and species of nitrogen and iodine in bioturbated marine sediments. Geochimica et Cosmochimica Acta, 64(16): 2751-2763. # bioturbation

Aquino, R., Buatois, L.A., Somoza, D., Briceo, M. & Moreno, J. 2001. Integration of ichnology, palynology, foraminiferal paleoecology, sedimentology and sequence stratigraphy in reservoir characterization: Oligocene-lower Miocene, Pirital Field, north of Monagas, Oriental Basin of Venezuela. *In* VI International Ichnofabric Workshop, Venezuela 2001, Isla Margarita & Puerto La Cruz, July 14-20, 2001, Core Workshop. [5 pp., no pagination, also Spanish version]. Sociedad Venezolana de Geólogos & PDVSA. # *Arenicolites, Asterosoma, Chondrites, Diplocraterion, Ophiomorpha, Planolites, Palaeophycus, Rhizocorallium, Taenidium, Thalassinoides, Skolithos* ichnofacies, *Cruziana* ichnofacies, *Glossifungites* ichnofacies, Venezuela

Aquino, R., Buatois, L.A., Somoza, D., Briceo, M. & Moreno, J. 2001. Integration of ichnology, palynology, foraminiferal paleoecology, sedimentology and sequence stratigraphy in reservoir characterization: Oligocene-lower Miocene, Pirital Field, north of Monagas, Oriental Basin of Venezuela. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001, Abstracts. Sociedad Venezolana de Geólogos, PDVSA, [2 pp., no pagination]. # *Arenicolites, Asterosoma, Chondrites, Diplocraterion, Ophiomorpha, Palaeophycus, Planolites, Rhizocorallium, Taenidium, Thalassinoides, Skolithos* ichnofacies, *Cruziana* ichnofacies, *Glossifungites* ichnofacies, Venezuela

Aramayo, S.A., Bianco, T.M. de & Bocanegra, L.M. 2001. Presencia de *Taenidium* Heer, 1877 en el yacimiento paleoicnológico de Pehuen-Có (Pleistoceno Tardío) Provincia de Buenos Aires, Argentina. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 24. # *Taenidium barretti*, Pleistocene, Argentina

Aramayo, S.A. & Bocanegra, L.M. 2001. Icnofacies de *Scoyenia* en el Miembro Candeleros, Formación Río Limay (Grupo Neuquén, Cretácico Tardío) Provincia de Neuquén, Argentina. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 23. # *Beaconites coronus, Helminthopsis hieroglyphica, Scoyenia gracilis, Skolithos,* Cretaceous

Arenas, C., Gutierrez, F., Osacar, C. & Sancho, C. 2000. Sedimentology and geochemistry of fluvio-lacustrine tufa deposits controlled by evaporite solution subsidence in the central Ebro Depression, NE Spain. Sedimentology, 47(4): 883-909.

Arenas, C. & Pardo, G. 2000. Neogene lacustrine deposits of the north-central Ebro Basin, northeastern Spain. *In* Gierlowski-Kordesch, E.H. & Kelts, K.R. (eds.), Lake basins through space and time. American Association of Petroleum Geologists, Studies in Geology, 46: 395-406. # bioturbation, Miocene

Aronowsky, A. 2001. Naticid gastropod drillholes: an integrative approach involving re-analysis of published data, experimental test, and internal biology. *In* Paleontology in the New Millennium, North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 25. Berkeley. # *Polinices duplicatus*, [*Oichnus*], borings, predation

Asgaard, U. & Bromley, R.G. 2001. Smusene og korsridderne kapitel 2. Varv, 2001(3): 3-10.

Ash, S. 2000. Evidence of oribatid mite herbivory in the stem of a Late Triassic tree fern from Arizona. Journal of Paleontology, 74(6): 1065-1071. # borings, coprolites, insects, USA

Asmus, R.M., Jensen, M.H., Jensen, K.M., Kristensen, E., Asmus, H. & Wille, A. 1998. The role of water movement and spatial scaling for measurement of dissolved

nitrogen fluxes in intertidal sediments. Estuarine, Coastal, and Shelf Science, 46(2): 221-232. # modern, Germany, North Sea, intertidal environment, biogeochemistry, bioturbation, nitrogen

Aspoeck, H., Auer, H. & Picher, O. 1999. Parasites and parasitic diseases in prehistoric human populations in central Europe. Helminthologia, 36(3): 139-145. # coprolites

Associated Press. 2000. Dinosaur lovers make tracks for Utah. Atlanta Journal-Constitution, (23 April): D5. # Utah, USA, tracks, Vertebrata Dinosauria, popular article, S. Johnson

Astini, R. 2001. Mid-Late Ordovician *Trypanites* borings in solitary *Solenopora* from the Argentine Precordillera. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 26.

Astini, R. 2001. Omission surfaces related to time-averaged grainstones and their bearing in Middle Ordovician carbonate remnants in the Argentine Precordillera. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 27.

Astini, R.A. 2001. Recurrent trace fossil patterns in early Ordovician tidal influenced siliciclastic settings, Eastern Cordillera, northwest Argentina: prospects. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 28. # *Arenicolites, Skolithos*

Astini, R.A. 2001. *Teichichnus*-dominated thin-bedded heterolithic facies and *Zoophycos*-dominated softgrounds in the Lipeon Formation, Eastern Cordillera, northwest Argentina. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 25. # *Chondrites,* bioturbation

Ataabadi, M.M. & Sarjeant, W.A.S. 2000. Eocene mammal footprints from eastern Iran: a preliminary study. Comptes Rendus de l'Académie des Sciences, Série II. Sciences de la Terre et des Planetes, 331(8): 543-547.

Atkinson, R.J.A., Froglia, C., Arneri, E. & Antolini, B. 1998. Observaciones sobre las madrigueras y comportamiento enterrador de *Brachynotus gemmellari* y otras especies de los fondos de *Squilla* en Acona Adriatico Central [Observations on the burrows and burrowing behaviour of *Brachynotus gemmellari* and on the burrows of several other species occurring on *Squilla* grounds off Ancona, central Adriatic]. Scientia Marina, 62(1-2): 91-100. # modern, Adriatic Sea, Mediterranean Sea, Italy, *Brachynotus gemmellari,* Echiura, Bivalvia *Solecurtus strigilatus,* Arthropoda Crustacea Decapoda *Upogebia tipica,* Pisces *Gobius niger*

Avanzini, M. 2000. *Synaptichnium* tracks with skin impressions from Anisian (Middle Triassic) of the Southern Alps (Val di Non - Italy). Ichnos, 7(4): 243-251. # *Brachichirotherium, Chirotherium storetonense, C. barthi, C. gallicum, Isochirotherium delicatum, Rhynchosauroides hyperbates,* footprints, reptiles, dinosaurs

Bábek, O., Mikuláš, R., Zapletal, J., Lehotský, T. & Pluskalová, J. 2001. Litofacie a fosilní stopy jemnozrnného turbiditního systému jiní ásti moravického souvrství moravskoslezského kulmu, eský masiv (Lithofacies and ichnofossilsof the mud-dominated turbidite system of the Moravice Formation, Bohemian Massif). Zprávy o geologických výzkumech na Morav a ve Slezsku, 2000: 38-41. [In Czech, English abstract.] # *Chondrites intricatus, Cosmorhaphe timida, Dictyodora liebeana, Falcichnites lophoctenoides, Phycosiphon incertum, Pilichnus, Planolites, Protopaleodictyon, Spinorhaphe rubra,* Carboniferous

Babcock, L.E., Zhang, W. & Leslie, S.A. 2001. The Chengjiang biota: record of the Early Cambrian diversification of life and clues to exceptional preservation of fossils. GSA Today, 11(2): 4-9. # Atdabanian, Yunnan, China, bioturbation

Bábek, O., Zapletal, J. & Mikuláš, R. 2001. Facies architecture of Upper Viséan mud-dominated turbidite systém of the Moravice Formation (Bohemian Massif, Czech Republic). Geolines, 13: 45-46. # Carboniferous, Czech Republic

Badenas, B. & Aurell, M. 2001. Proximal-distal facies relationships and sedimentary processes in a storm dominated carbonate ramp (Kimmeridgian, northwest of the

Iberian Ranges, Spain). Sedimentary Geology, 139(3-4): 319-340. # bioturbation, Jurassic

Baghai Riding, N.L. & Dibenedetto, J.N. 2001. An unusual dinosaur coprolite from the Campanian Aguja Formation, Texas. American Association of Petroleum Geologists, Bulletin, 85(9): 1697. # Cretaceous, USA

Bagla, P. 2000. Team rejects claim of early Indian fossils. Science, 289(5483): 1273. # ichnofossils, Cambrian, Precambrian, India

Bahamondie, J.R., Vera, C. & Colmenero, J.R. 2000. A steep-fronted Carboniferous carbonate platform: clinoformal geometry and lithofacies (Picos de Europa, NW Spain). Sedimentology, 47(3): 645-664. # bioturbation, fecal pellets

Bahk, J.J., Chough, S.K., Jeong, K.S. & Han, S. J. 2001. Sedimentary records of paleoenvironmental changes during the last deglaciation in the Ulleung Interplain Gap, East Sea (Sea of Japan). Global and Planetary Change, 28(1-2): 241-253

Balek, C.L. 2002. Buried artifacts in stable upland sites and the role of bioturbation: a review. Geoarchaeology, 17(1): 41-52.

Balistieri, P., Netto, R.G. & Correa Lavina, E.L. 2001. Icnofauna em ritmitos do topo da Formação Mafra (Permo-Carbonífero da Bacia do Paraná) em Rio Negro, PR: análise preliminar. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 29. # *Diplichnites, Palaeophycus, Protichnites,* Permian, Carboniferous, Brazil

Banta, G.T., Holmer, M., Jensen, M.H. & Kristensen, E. 1999. Effects of two polychaete worms, *Nereis diversicolor* and *Arenicola marina,* on aerobic and anaerobic decomposition in a sandy marine sediment. Aquatic Microbial Ecology, 19(2): 189-204. # bioturbation

Bard, E. 2001. Paleoceanographic implications of the difference in deepsea sediment mixing between large and fine particles. Paleoceanography, 16(3): 235-239.

Barlow, C. 2000. The Ghosts of Evolution: Nonsensical Fruit, Missing Partners, and Other Ecological Anachronisms. Basic Books (Perseus Books Group), New York, xii + 291 pp. # coprophagy

Barnett, C.R. 2001. Ichnology, sedimentology, and stratigraphy of the Jurassic Bug Creek Group, Richardson Mountains and Mackenzie Delta, Northwest Territories, Canada. American Association of Petroleum Geologists, Bulletin, 85(11): 2047.

Barrett, T.L. & Schieber, J. 2000. Observations on sediment reworking and bioturbation in the Camp Run Member of the New Albany Shale group, Indiana. Geological Society of America, Abstracts with Programs. 32(3): 2. # Devonian, USA

Baturin, G.N. 2000. Formation and evolution of phosphorite grains and nodules on the Namibian shelf, from Recent to Pleistocene. *In* Glenn, C.R., Prevot, L.L. & Lucas, J. (eds.), Marine authigenesis: from global to microbial. Society for Sedimentary Geology (SEPM), Special Publication, 66: 185-199. # coprolites

Baumiller, T.K. 2001. Cost-benefit analysis as a guide to the ecology of drilling platyceratids. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 29. Berkeley. # borings, *Polinices*

Beck, A. & Labandeira, C.C. 1988. Early Permian insect folivory on a gigantopterid-dominated riparian flora from north-central Texas. Palaeogeography, Palaeoclimatology, Palaeoecology, 142(3/4): 139-173.

Bednarik, R.G. 1998. Microscopic analysis of 'engraved plaques' and other objects from Devil's Lair. Journal of the Royal Society of Western Australia, 81(3): 165-175. # archaeology, ichnofossils, Pleistocene

Behling, H., Cohen, M.C.L. & Lara, R.J. 2001. Studies on Holocene mangrove ecosystem dynamics of the Braganca Peninsula in north-eastern Para, Brazil. Palaeogeography, Palaeoclimatology, Palaeoecology, 167(3-4): 225-242. # bioturbation, Quaternary

Bejarano, C. 2001. Puerto La Cruz, Stop No. 4, Oligocene *Skolithos* ichnofacies outcrops. *In* VI International Ichnofabric Workshop, Venezuela 2001, Isla Margarita &

Puerto La Cruz, July 14-20, 2001, Field Excursions. [6 pp., no pagination]. Sociedad Venezolana de Geólogos & PDVSA. # *Skolithos*, fan delta, Venezuela

Bellosi, E.S., Laza, J.H. & González, M.G. 2001. Icnofaunas en paleosuelos de la Formación Sarmiento (Eoceno-Mioceno), Patagonia Central. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 7. # *Beaconites, Celliforma, Coprinisphaera, Feoichnus, Taenidium, Teisseirei*, paleosols, nonmarine, Eocene, Miocene, Argentina

Benda, T. L. & Steel, R. J. 1999. Architecture, facies, and sequence stratigraphy of a fourth-order clastic wedge, Williams Fork Formation, Upper Cretaceous Mesaverde Group, NW Colorado. Geological Society of America, Abstracts with Programs, 31(7): 291. # bioturbation, USA

Benedetti-Cecchi, L., Bulleri, F. & Cinelli, F. 1998. Density dependent foraging of sea urchins in shallow subtidal reefs on the west coast of Italy (western Mediterranean). Marine Ecology Progress Series, 163: 203-211. # modern, Italy, bioerosion, Echinoidea *Arbacia lixula, Paracentrotus lividus*

Benner, J.S. & Ekdale, A.A. 1999. Lower Ordovician macroborings in western Utah: innovative adaptation for colonizing hard substrates by infauna. Geological Society of America, Abstracts with Programs, 31(7): 172. # USA

Bentley, S.J., Sr. 1998. The emplacement and evolution of sedimentary fabric: physical biological influences in three contrasting depositional environments. SUNY at Stony Brook, New York, United States, PhD Thesis, 275 pp. # burrows, bioturbation, California, Florida, USA

Bentley, S.J., Sr., Furukawa, Y. & Vaughan, C.W. 2000. Record of event sedimentation in Mississippi Sound. American Association of Petroleum Geologists, Bulletin, 84(10): 1672. # bioturbation, Quaternary, USA

Bentley, S.J. & Nittrouer, C.A. 1999. Physical and biological influences on the formation of sedimentary fabric in an oxygen-restricted depositional environment: Eckernforde Bay, southwestern Baltic Sea. Palaios, 14(6): 585-600. # bioturbation

Benton, M.J. 2000. Vertebrate paleontology. Blackwell Science, Oxford, 452 pp.

Berelson, W.M., Heggie, D., Longmore, A., Kilgore, T., Nicholson, G. & Skyring, G. 1998. Benthic nutrient recycling in Port Phillip Bay, Australia. Estuarine, Coastal, and Shelf Science, 46(6): 917-934. # bioturbation, bioirrigation

Bergman, K.M. 1999. Cretaceous Sussex Sandstone in House Creek Field (Wyoming, USA): transgressive incised shoreface deposits. *In* Bergman, K.M. & Snedden, J.W. (eds.), Isolated shallow marine sand bodies: sequence stratigraphic analysis and sedimentologic interpretation. Society for Sedimentary Geology (SEPM), Special Publication, 64: 297-319. # biogenic structures, bioturbation

Bertling, M. 1999. Taphonomy of trace fossils at omission surfaces (Middle Triassic, East Germany). Palaeogeography, Palaeoclimatology, Palaeoecology, 149(1-4): 27-40. # *Glossifungites, Trypanites* ichnofacies

Bhattacharya, J.P. & Willis, B.J. 2001. Lowstand deltas in the Frontier Formation, Powder River basin, Wyoming: implications for sequence stratigraphic models. American Association of Petroleum Geologists, Bulletin, 85(2): 261-294. # ichnofacies, Cretaceous, USA

Bianchi, T.S., Johansson, B. & Elmgren, R. 2000. Breakdown of phytoplankton pigments in Baltic sediments: effects of anoxia and loss of deposit-feeding macrofauna. Journal of Experimental Marine Biology and Ecology, 251(2): 161-183. # deposit-feeding benthic amphipod, bioturbation

Bird, F. 2001. 'Burrowing Crustaceans', 5th International Crustacean Congress (ICC5), Melbourne, Australia, July 9 to 13, 2001. Ichnology Newsletter, 23: 54. # conference announcement, Victoria, Australia

Bird, F.L., Ford, P.W. & Hancock, G.J. 1999. Effect of burrowing macrobenthos on the flux of dissolved substances across the water-sediment interface. Marine and Freshwater Research, 50(6): 523-532. # *Biffarius arenosus, Echinocardium cordatum, Neocallichirus limosus*, bioturbation

Blackham, M. 2000. Distinguishing bioturbation and trampling using pottery sherd measures, Tell Fendi, Jordan. Geoarchaeology, 15: 469-497. # Quaternary, Holocene, archaeology

Blair, T.C. 2001. Outburst flood sedimentation on the proglacial Tuttle Canyon alluvial fan, Owens Valley, California, U.S.A. Journal of Sedimentary Research, 71(5): 657-679. # continental environment, USA

Blanchard, G.F., Paterson, D., Stal, L. ., Richard, P., Galois, R., Huet, V., Kelly, J., Honeywill, C., de Brouwer, J., Dyer, K., Christie, M. & Seguignes, M. 2000. The effect of geomorphological structures on potential biostabilization by microphytobenthos on intertidal mudflats. Continental Shelf Research, 20(10-11): 1243-1256. # modern, intertidal environment, biofilms

Boetius, A., Ferdelman, T. & Lochte, K. 2000. Bacterial activity in sediments of the deep Arabian Sea in relation to vertical flux. Deep-Sea Research, part II, Tropical Studies in Oceanography, 47(14): 2835-2875. # modern, Arabian Sea, Indian Ocean, deepsea environment, tiering

Borghi, L. & Fernandes, A.C.S. 2001. A new trace fossil from the Devonian of Paraná State (Paraná Basin), Brazil. Boletim do Museu Nacional, nova série, Geologia, 58: 1-12. Rio de Janeiro. # Devonian, Furnas Formation, Paraná Basin, Paraná, Brazil, new taxa, *Cruziana* ichnofacies, *Didymaulichnus lyelli, Furnasichnus langei* n.igen. n.isp., *Palaeophycus* tubularis; species list includes *Arenicolites* isp., *Arthrophycus alleghaniensis, Circulichnus* [*Circulichnis*] isp., *Conostichus* isp., *Cruziana* isp., *Cylindrichnus concentricus, Lockeia* isp., *Monocraterion* isp., *Palaeophycus alternatus, Palaeophycus* isp., *Planolites* isp., *Rusophycus* isp., *Skolithos ayalis, Skolithos linearis*

Borghi, L., Metelo, C.M.S. & Fernandes, A.C.S. 1999. Novas ocorrencias de icnofosseis na Formação Pimenteira (Devoniano, Bacia do Paranaiba) no Municipio de Sao Raimundo Nonato, Estado do Piaui. Anais da Academia Brasileira de Ciencias, 71: 151-152. Rio de Janeiro. # Devonian, Brazil

Bortolus, A. & Iribarne, O. 1999. Effects of the SW Atlantic burrowing crab *Chasmagnathus granulata* on a *Spartina* salt marsh. Marine Ecology Progress Series, 178: 79-88. # Argentina, Arthropoda Crustacea Decapoda *Chasmagnathus granulata*

Bottjer, D.J. & Hagadorn, J.W. 1999. The Cambrian substrate revolution and evolutionary paleoecology of the Mollusca. Geological Society of America, Abstracts with Programs, 31(7): 335. # bioturbation, Precambrian, Vendian

Bottjer, D.J., Hagadorn, J.W. & Dornbos, S.Q. 2000. The Cambrian Substrate Revolution. GSA Today, 10(9): 1-7. # *Taphrhelminthopsis,* Precambrian

Botto, F. & Iribarne, O. 1999. Effect of the burrowing crab *Chasmagnathus granulata* (Dana) on the benthic community of a SW Atlantic coastal lagoon. Journal of Experimental Marine Biology and Ecology, 241(2): 263-284. # recent

Botto, F. & Iribarne, O. 2000. Contrasting effects of two burrowing crabs (*Chasmagnathus granulata* and *Uca uruguayensis*) on sediment composition and transport in estuarine environments. Estuarine Coastal and Shelf Science, 51(2): 141-151. # recent

Botto, F., Palomo, G., Iribarne, O. & Martinez, M.M. 2000. The effect of Southwestern Atlantic burrowing crabs on habitat use and foraging activity of migratory shorebirds. Estuaries, 23(2): 208-215. # recent

Bown, T.M., Hasiotis, S.T., Genise, J.F., Maldonado, F. & Brouwers, E.M. 1997. Trace fossils of Hymenoptera and other insects and paleoenvironments of the Claron Formation (Paleocene and Eocene), southwestern Utah. U.S. Geological Survey Bulletin, 2153-C: 41-57. # *Eatonichnus utahensis* igen. n., *Eatonichnus claronensis* isp. n., *Celliforma, Parowanichnus formicoides* n. igen., n. isp., insects, wasp traces

Boynton, H. & Moseley, J. 1999. The geology of the Brand, Charnwood Forest, Leicestershire. Transactions of the Leicester Literary and Philosophical Society, 93: 32-38. # *Teichichnus,* ichnofossils, Precambrian, Cambrian, Great Britain

Braddy, S.J. 1997. Arthropod trackways from South Africa. Geoscientist, 8(7): 4-6. # *Paleohelcura dunbari, Permichnium, Petalichnus capensis, Siskemia, Tasmanadia, Umfolozia,* Permian

Braddy, S.J. 1997. Keeping track of Palaeozoic terrestrial arthropods. Palaeontology Newsletter, 36: 18-19.

Braddy, S.J. xxxx. Terrestrial trace fossils from the Robledo Mountains ichnofauna (Lower Permian) of southern New Mexico. Geoscientist, 9(7): 5-6. # *Batrachichnus, Dimetropus, Diplichnites, Diplopodichnus, Eisenachichnus, Gilmoreichnus, Hyloidichnus, Ispodichnus, Kouphichnium, Limnopus, Lunichnium, Mirandichnium, Octopodichnus, Paleohelcura, Palmichnium, Permichnium, Pterichnus, Punctichnium, Robledoichnius, Rotterodichnium, Shalemichnus,* USA

Braddy, S.J. 2001. Eurypterid palaeoecology: palaeobiological, ichnological and comparative evidences for a 'mass–moult–mate' hypothesis. Palaeogeography, Palaeoclimatology, Palaeoecology, 172(1-2): 115-132. # *Daedalus, Metaichna, Palmichnium antarcticum,* Ordovician, Silurian, Devonian, Ontario, Canada, South Africa, Antarctica, India

Braddy, S.J. xxxx. Trackways – arthropod locomotion. *In* Fossils and Living Organisms. p. 389-393. # *Angulichnus alternipes, Cruziana semplicata, Diplichnites cuithensis, Habelia optata, Kouphichnium variabilis, Lithographus hieroglyphicus, Octopodichnus didactylus, Paleohelcura triadactyla, Palmichnium antarcticum, Permichnium voelckeri, Petalichnus brandenburgensis, Siskemia bipediculus, Umfolozia sinuosa*

Braddy, S.J. & Dunlop, J.A. 2000. Early Devonian eurypterids from the Northwest Territories of Arctic Canada. Canadian Journal of Earth Sciences, 37(8): 1167-1175. # coprolites

Bradshaw, C. 1997. The effect of crustaceans on the taphonomy of reefs in Phuket, south Thailand. Unpublished Ph.D. thesis, University of Edinburgh, Edinburgh, UK, 222 p. # bioturbation rate, Arthropoda Crustacea Decapoda Alpheidae, Callianassidae

Bradshaw, C. & Scoffin, T.P. 2001. Differential preservation of gravel-sized bioclasts in alpheid- versus callianassid-bioturbated muddy reefal sediments. Palaios, 16(2): 185-191. # Thailand, bioturbation, Arthropoda Crustacea Decapoda Alpheidae, Callianassidae

Brandt, D.S. 2000. Some notes on *Isotelus* (Trilobita) paleoecology. Geological Society of America, Abstracts with Programs, 32(4): 6. # *Asaphoidichnus, Rusophycus carleyi*

Brett, C.E., Sageman, B.B. & Murphy, A.E. 1999. High resolution analysis of coupled biotic and geochemical events in the Middle-Upper Devonian Appalachian Basin. Geological Society of America, Abstracts with Programs, 31(7): 439. # bioturbation, USA

Briggs, D.E.G. & Crowther, P.R. 2001. Paleobiology II. Blackwell Science Ltd., 583 pp.

Bromley, R.G. 2001. Pleistocene tourists on Mallorca. Ichnology Newsletter, 23: 1. # Quaternary, Spain, tracks, Vertebrata, Mammalia, Artiodactyla, *Myotragus balearicus*

Bromley, R.G. 2001. Ichnofabrics in Pleistocene aeolianites, Mallorca, western Mediterranean, produced by ruminant goats: new results. VI International Ichnofabric Workshop, Venezuela 2001, Isla Margarita & Puerto La Cruz, July 14-20, 2001, Abstracts [1 p., no pagination]. Sociedad Venezolana de Geólogos & PDVSA. # tetrapods, mammals, footprints, Quaternary, Spain

Bromley, R.G. 2001. *Zoophycos:* structural and ethological overview. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 35.

Bromley, R.G. 2001.Tetrapod tracks deeply set in unstable substrates: recent musk oxen in fluid earth (East Greenland) and Pleistocene caprines in aeolian sand (Mallorca). Bulletin of the Geological Society of Denmark, 48: 209-215. # *Ovibos moscatus, Myotragus balearicus,* mammals, footprints, trackways, Spain

Bromley, R.G. 2001. Ugly trace fossils. Tetrapod tracks deep-set in soft substrates: recent musk oxen in fluid earth (Greenland) and Pleistocene caprines in aeolian sand (Mallorca). 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 8. # tetrapods, mammals, Spain

Bromley, R.G., Gregory, M., Uchman, A. & Martin, A. 2001. A mystery trace fossil revisited: the work of deposit-feeding bivalve, Palaeocene, California, U.S.A. The Palaeontological Museum, 45th Annual Meeting, 15th-19th December, 2001,

Geological Museum, University of Copenhagen. Paleontological Association Newsletter, 48: 6. # *Lockeia, Lophoctenium, Protovirgularia,* Paleocene, deep-sea, channel, USA

Bromley, R.G. & Mørk, A. 2000. The trace fossil *Phoebichnus trochoides* in the condensed Triassic-Jurassic boundary strata of Svalbard. Zentralblatt für Geologie und Paläontologie, Teil I, 11-12: 1431-1439. # *Chondrites, Phycosiphon incertum, Planolites, Rhizocorallium irregulare, Thalassinoides,* Norway

Bromley, R. & Uchman, A. 2001. Young Holocene beach rock ichnofabrics from Rhodes, Greece. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # *Macaronichnus,* tetrapod footprints

Brustur, T. 2001. *Cicindela* (Coleoptera) activity in the sand of Sf. Gheorghe Beach (Danube Delta, Romania). Ichnology Newsletter, 23: 27-29. # modern, Black Sea, eolian environment, Insecta

Brustur, T., tiuc, E. & Costea, C. 1999. Consideration on the fecal pellets of *Trachelipus troglobius* (Isopoda, Oniscida) in the Movile Cave (south Dobrogea). Revue Roumaine de Géologie, 43: 35-43. # *Bactryllium, Oniscoidichnus miocenicus,* Triassic, recent

Buatois, L.A., Bromley, R.G., Mángano, M.G., Bellosi, E. & Carmona, N. 2001. Ichnology of shallow marine deposits in the Miocene Chenque Formation of Patagonia: complex ecologic structure and niche partitioning in Neogene ecosystems. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 33. # *Asterosoma, Chondrites, Helicodromites, Ophiomorpha, Palaeophycus, Phycosiphon, Planolites, Schaubcylindrichnus, Scolicia, Taenidium, Teichichnus, Terebellina, Zoophycos,* Miocene

Buatois, L.A., Gingras, M.K., MacEachern, J., Mángano, M.G., Martin, A.J., Netto, R.G., Pemberton, S.G. & Zonneveld, J.-P. 2001. Colonization of brackish-water environments through time: evidence from the trace fossil record. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001, Abstracts. Sociedad Venezolana de Geólogos, PDVSA, [2 p., no pagination]. # *Gyrolithes, Thalassinoides,* estuarine environment, *Glossifungites* ichnofacies, *Skolithos* ichnofacies, *Cruziana* ichnofacies, general, Cambrian, Ordovician, Carboniferous, Permian, Triassic, Jurassic, Argentina, Brazil, Canada, Czech Republic, Jordan, USA

Buatois, L.A. & Mángano, M.G. (eds.). 2001. Ichnology, Sedimentology and Sequence Stratigraphy of Selected Lower Paleozoic, Mesozoic and Cenozoic Units of Northwest Argentina, Fourth Argentinean Ichnologic Meeting and Second Ichnologic Meeting of Mercosur, September 29th - October 1st, Field Guide, 78 pp. Tucumán.

Buatois, L.A. & Mángano, M.G. 2001. Ichnology, sedimentology and sequence stratigraphy of the Cambrian Mesón Group in northwest Argentina. *In* Buatois, L.A. & Mángano, M.G. (eds.), Ichnology, Sedimentology and Sequence Stratigraphy of Selected Lower Paleozoic, Mesozoic and Cenozoic Units of Northwest Argentina, Fourth Argentinean Ichnologic Meeting and Second Ichnologic Meeting of Mercosur, September 29th - October 1st, Field Guide, p. 8-16. Tucumán. # *Arenicolites, Cruziana problematica, C. semplicata, Diplichnites, Diplocraterion, Helminthoidichnites tenuis, Palaeophycus tubularis, Planolites, Rusophycus leiferikssoni, Skolithos linearis, Syringomorpha nilssoni*

Buatois, L.A. & Mángano, M.G. 2001. Ichnology, sedimentology and sequence stratigraphy of the Upper Cambrian to Tremadoc Santa Rosita Formation in northwest Argentina. *In* Buatois, L.A. & Mángano, M.G. (eds.), Ichnology, Sedimentology and Sequence Stratigraphy of Selected Lower Paleozoic, Mesozoic and Cenozoic Units of Northwest Argentina, Fourth Argentinean Ichnologic Meeting and Second Ichnologic Meeting of Mercosur, September 29th - October 1st, Field Guide, p. 17-25. Tucumán. # *Archaeonassa, Arthrophycus, Bergaueria, Conostichus, Cruziana omanica, C. problematica, C. semplicata, C. tortworthi, Helminthopsis abalei, Monomorphichnus bilinearis, M. multilinetatus, Palaeophycus tubularis, Phycodes palmatus, Planolites montanus, Rusophycus carbonarius, R. latus, R. polonicus, Skolithos linearis, Trichophycus,* Ordovician

Buatois, L.A., Mángano, M.G., Aceñolaza, F.G. & Esteban, S.B. 2000. The Puncoviscana ichnofauna of northwest Argentina: a glimpse into the ecology of the Precambrian transition. *In* Aceñolaza, G.F. & Peralta, S. (eds.), The Cambrian from the southern edge. Instituto Superior de Correlación Geológica (INSUGEO), Miscelánea, 6: 82-84. Tucumán. # *Cochlichnus, Glockerichnus, Helminthopsis, Helminthorhaphe, Helminthoidichnites, Monomorphichnus, Nereites, Oldhamia, Protopaleodictyon, Squamodictyon, Treptichnus*

Buatois, L.A., Mángano, M.G., Fregenal-Martínez, M.A. & Gibert, J.M. de. 2000. Short-term colonization trace-fossil assemblages in a carbonate lacustrine Konservat-Lagerstätte (Las Hoyas fossil site, Lower Cretaceous, Cuenca, central Spain). Facies, 43: 145-156, pl. 30-31. Erlangen. # Lower Cretaceous, Las Hoyas site, La Huérgina Limestone Formation, Spain, lacustrine environment, oxygen, *Mermia* ichnofacies, systematics, *Cruziana problematica, Helminthoidichnites tenuis, Lockeia* isp., *Palaeophycus tubularis, Treptichnus pollardi, Undichna,* track, Vertebrata Reptilia Crocodilia, Pterosauria

Buatois, L.A., Mángano, M.G. & Genise, J.F. 2000. Icnofacies continentales: nuevas perspectivas. Resúmenes de la Reunión de Comunicaciones de la Asociación Paleontológica Argentina, Tucumán, 1999. Ameghiniana 37(4), Suplemento: 7R.

Buatois, L.A., Mángano, M.G. & Sylvester, Z. 2001. A diverse deep-marine ichnofauna from the Eocene Tarcau Sandstone of the eastern Carpathians, Romania. Ichnos, 8(1): 23-62. # *Acanthorhaphe delicatula, Belorhaphe zickzack, Cardioichnus, Chondrites, Circulichnus montanus, Cochlichnus anguineus, Cosmorhaphe graclis, C. sinuosa, Desmograpton alternum, D. dertonensis, D. pamiricus, Fustiglyphus annulatus, Glockerichnus alata, Gordia marina, Halopoa annulata, Helicolithus sampelayoi, Helminthopsis hieroglyphica, Helminthorhaphe flexuosa, H. japonica, Lorenzinia nowaki, L. plana, L. pusilla, L. pustulosa, Megagrapton submontanum, Nereites irregularis, Ophiomorpha annulata, Palaeophycus striatus, P. tubularis, Paleodictyon maximum, P. miocenicum, P. minimum, P. strozzii, Paleomeandron biseriale, P. robustum, Phycodes palmatus, Planolites beverleyensis, Polykampton eseri, Protopaleodictyon incompositum, Scolicia plana, S. prisca, S. strozzii, Spirophycus bicornis, S. involutissimus, Spirorhaphe involuta, Taenidium serpentinum, Teredolites, Thalassinoides suevicus, Treptichnus meandrinus, Urohelminthoida dertonensis, Zoophycos,* flysch

Buatois, L.A., Mángano, M.G., Wu, X. & Zhang, G. 2000. Jurassic lake deposits from the Anyao Formation, Jiyuan-Yima Basin, central China. *In* Gierlowski-Kordesch, E. H. & Kelts, K. R. (eds.), Lake basins through space and time. American Association of Petroleum Geologists, Studies in Geology, 46: 189-194.

Buatois, L.A. & Papa, C.E. del. 2001. Trazas fosiles de la Formación Tarija, Carbonifero Superior del Norte Argentino: aspectos icnológicos de la transgresión postglacial en el Oeste de Gondwana. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 32 [in suplement]. # *Diplopodichnus biformis, Gordia marina, Helminthoidichnites tenuis, Helminthopsis tenuis, Mermia crickens,* Carboniferous, Argentina

Bucheit, A.K. & Donovan, R.N. 1998. Lower Jurassic borings and fissures: a rocky shoreline composed of Cambro-Ordovician limestone, Isle of Skye, Scotland. The Compass, 74(2): 47-54. # *Trypanites,* UK

Buchheim, H.P. & Loewen, M.A. 2000. The climate of Eocene Fossil Lake (Green River Formation, Wyoming) as determined from vertical and lateral facies trends. Geological Society of America, Abstracts with Programs, 33(3): 69. # bioturbation, USA

Buckley, G.D. 2001. Ruth Dixon Turner, 1914-2000: pioneering marine biologist. Ichnology Newsletter, 23: 35-36. # modern, xylic borings, boring, Bivalvia, Teredinidae, biography, R.D. Turner

Buckman, J.O. 2001. *Parataenidium*, a new *Taenidium*-like ichnogenus from the Carboniferous of Ireland. Ichnos, 8(2): 83-97. # *Cylindrichnus, Eione moniliformis, Hormosiroidea, Margaritichnus reptilis, Muensteria, Parataenidium mullaghmorensis* igen. n., isp. n., *Petromonile*

Budd, G.E. 2001. Ecology of nontrilobite arthropods and lobopods in the Cambrian. *In* Zhuravlev, A.Yu. & Riding, R. (eds.), The Ecology of the Cambrian Radiation. Columbia University Press, New York, p. 404-427. # trace fossil

Bumby, A.J., Eriksson, P.G., van der Merwe, R., Simpson, E.L., Eriksson, K.A. & Steyn, G.L. 2000. Desert sedimentation and microbial fossils from the Makgabeng Formation, Waterberg Group. Journal of African Earth Sciences (1994), 31(1A): 9-10. # bioturbation, Proterozoic

Burton, J. & Walker, R.G. 1999. Linear transgressive shoreface sandbodies controlled by fluctuations of relative sea level: Lower Cretaceous Viking Formation in the Joffre-Mikwan-Fenn area, Alberta, Canada. *In* Bergman, K.M. & Snedden, J.W. (eds.), Isolated shallow marine sand bodies: sequence stratigraphic analysis and sedimentologic interpretation. Society for Sedimentary Geology (SEPM), Special Publication, 64: 255-272. # bioturbation, Cretaceous

Cadée, G.C. 1999. Bioerosion of shells by terrestrial gastropods. Lethaia, 32(3): 253-260.

Cadée, G.C. 2000. Herring gulls feeding on a recent invader in the Wadden Sea, *Ensis directes*. *In* Taylor, E.M. & Crame, J.A. (eds), The evolutionary biology of the Bivalvia. Geological Society of London, Special Publications, 177: 459-464. # birds, recent

Cadée, G.C. 2001. Sediment dynamics by bioturbating organisms. *In* Riese, K. (ed.), Ecological comparisons of sedimentary shores. Ecological Studies, 151: 127-148. Springer. # bioturbation, *Arenicola marina,* crabs, *Buccinum,* gastropods, *Callianassa filholi, Callianassa subterranea, Callianassa major, Callianassa japonica, Callianassa longiventris, Callianassa californensis, Mya truncata, Heteromastus, Hydrobia ulvae, Corophium volutator,* shellduck, birds, flamingoes, general, recent

Cadée, G.C. 2001. Herring gulls learn to feed on a recent invader in the Dutch Wadden Sea, the Pacific oyster *Crassostrea gigas*. Basteria, 65: 33-42. # birds, recent, Netherlands

Cadée, G.C., González, H. & Schnack-Schiel, S.B. 1992. Krill diet affects faecal string settling. Polar Biology, 12: 75-80. # fecal pellets, recent, Antarctica

Cadée, G.C., Walker, S.E. & Flessa, K.W. 1997. Gastropod shell repair in the intertidal of Bahia la Choya (N. Gulf of California). Palaeogeography, Palaeoclimatology, Palaeoecology, 136: 67-78. # Mexico

Çagatay, N.M., Borowski, W.S. & Ternois, Y.G. 2001. Factors affecting the diagenesis of Quaternary sediments at ODP Leg 172 in western North Atlantic: evidence from pore water and sediment geochemistry. Chemical Geology, 175(3-4): 467-484. # bioturbation

Caldwell, C.D., Harpole, K.J. & Gerard, M.G. 2000. Reservoir characterization of the Upper Permian Grayburg Formation in preparation for a horizontal-well CO_2 flood, South Cowden Unit, west Texas. *In* Johnson, K.S. (ed.), Platform Carbonates in the Southern Midcontinent, 1996 Symposium. University of Oklahoma. Norman, p. 339-353. # bioturbation

Calvo, J.O. & Lockley, M.G. 2001. The first pterosaur tracks from Gondwana. Cretaceous Research, 22: 585-590.

Cameron, B., Domanski, D. & Jones, J.R. 1990. Contributions to the vertebrate paleontology of the Late Triassic-Early Jurassic Fundy Group along the Scots Bay-Cape Blomidon Coast. *In* MacDonald, D.R. (ed.), Department of Mines and Energy, Nova Scotia, Report 90-3, Program and Summaries, Fourteenth Annual Open House and Review of Activities, p. 36. Halifax, Nova Scotia. # *Anchisauripus, Atreipus acadiadnus, Brachychirotcherium parvum, Chirotherium lulli, Eubrontes, Rhynchosaurides brunswicki,* shark, coprolites

Campagna, T. 2002. The PT interview: Louis Psihoyos. Prehistoric Times, 51: 9-13. # Cretaceous, Colorado, USA, M.G. Lockley, tracks, Vertebrata Dinosauria Sauropoda

Campbell, H.J. 2000. The marine Permian of New Zealand. *In* Yin, H., Dickins, J.M., Shi, G.R. & Tong, J. (eds.), Permian-Triassic evolution of Tethys and Western Circum-Pacific. Elsevier, Amsterdam, p. 111-125.

Campbell, K.A. & Nesbitt, E.A. 2000. High-resolution architecture and paleoecology of an active margin, storm-flood influenced estuary, Quinault Formation (Pliocene), Washington. Palaios, 15(6): 553-579. # USA, estuarine environment, new taxa, *Skolithos-Cruziana* ichnofacies, *Glossifungites* ichnofacies, *Skolithos* ichnofacies, *Chondrites, Cylindrichnus, Diplocraterion, Macaronichnus, Ophiomorpha,* cf. *Phycodes, Piscichnus?, Psilonichnus,* cf. *Scalarituba, Skolithos, Teichichnus, Teredolites, Thalassinoides,* Polychaeta Capitellidae, Bivalvia *Spisula albaria,* Arthropoda Crustacea Decapoda *Upogebia pugettensis*

Cantrill, D.J. & Falcon-Lang, H.J. 2001. Cretaceous (late Albian) Coniferales of Alexander Island, Antarctica. 2. Leaves, reproductive structures and roots. Review of Palaeobotany and Palynology, 115(3-4): 119-145.

Caracuel, J.E., Monaco, P. & Olóriz, F. 2000. Taphonomic tools to evaluate sedimentation rates and stratigraphic completeness in Rosso Ammonitico facies (epioceanic Tethyan Jurassic). Rivista Italiana di Paleontologia e Stratigraphia, 106(3): 353-368. # *Chondrites intricatus, C. targionii, Helminthopsis, Planolites, Skolithos, Thalassinoides, Trypanites,* bioturbation, tiering

Carcaillet, C. 2001. Soil particles reworking evidences by AMS ^{14} C dating of charcoal. Comptes Rendus de l'Académie des Sciences, Série II. Sciences de la Terre et des Planetes, 332(1): 21-28. # bioturbation

Carey, K.R. 2000. The origin of clay rich, laminated lacustrine sediments, Swift County, Minnesota; distal deltaic sediments of glacial Lake Benson. Geological Society of America, Abstracts with Programs, 32(4): 7-8. # biogenic structures, bioturbation, Pleistocene, USA

Carmona, N.B. & Buatois, L.A. 2001. Estructuras de crustaceos en el Mioceno de la Cuenca del Golfo San Jorge: implicancias paleobiologicas y evolutivas. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 34. # *Callichirus major, Ophiomorpha nodosa, Spongeliomorpha, Thalassinoides,* Miocene, Argentina

Carney, J.N. 1999. Revisiting the Charnian Supergroup: new advances in understanding old rocks. Geology Today, 15(6): 221-229. # Precambrian, Cambrian, England

Carpenter, M.C. & Mead, J.I. 1999. Late Pleistocene vertebrate communities of the lower Grand Canyon: Rampart and Muav caves. Journal of Vertebrate Paleontology, 19: 36. # coprolites, USA

Carriker, M.R. & Gruber, G.L. 1999. Uniqueness of the gastropod accessory boring organ (ABO): comparative biology, an update. Journal of Shellfish Research, 18: 579-595. # modern, morphology, predation, drilling

Carrion, J.S., Brink, J.S., Scott, L. & Binneman, J.N.F. 2000. Palynology and palaeoenvironment of Pleistocene hyaena coprolites from an open-air site at Oyster Bay, eastern Cape coast, South Africa. South African Journal of Science, 96(8): 449-453.

Carvalho, I.d.S. 2000. Geological environments of dinosaur footprints in the intracratonic basins of northeast Brazil during the Early Cretaceous opening of the South Atlantic. Cretaceous Research, 21(2-3): 255-267.

Casertano, S.A., Zarate, M.A. & Monetti, L.N. 1998. Estructuras biogenicas de invertebrados y episodios de inundación en la planicie aluvial del Rio Quequen Grande, Buenos Aires. *In* Osterrieth, M., Lopez, d.A.A. & Tomas, M. (eds.), Actas de las V Jornadas Geológicas y Geofísicas Bonaerenses, 5(1): 19-27. # alluvial plains, Holocene, Argentina

Casshyap, S.M. & Khan, A. 1997. Trace fossils from the Talchir sediments of Mohpani area, Satpura Gondwana Basin, central India. Indian Minerals, 51(3-4): 279-284. # Paleozoic

Cassinis, G., Di Stefano, P., Massari, F., Neri, C. & Venturini, C. 2000. Permian of South Europe and its interregional correlation. *In* Yin, H., Dickins, J.M., Shi, G.R. & Tong, J. (eds.), Permian-Triassic evolution of Tethys and western Circum-Pacific. Elsevier, Amsterdam. Developments in Palaeontology and Stratigraphy, 18: 37-70.

Chakrabarti, A. 2001. Are meandering structures found in Proterozoic rocks of different ages of the Vindhyan Supergroup of central India biogenic? A scrutinity. Ichnos, 8(2): 131-139. # *Cochlichnus anguineus,* pseudo-trace fossils, gobiid fish, nudibranchs, gastropods, tidal flats, recent, Precambrian

Chin, K. & Kirkland, J.I. 1998. Probable herbivore coprolites from the Upper Jurassic Mygatt-Moore Quarry, western Colorado. Modern Geology, 23: 249-275. # Upper Jurassic, USA, Vertebrata

Chui, G. 2001. Fossil detectives have footprint, but not body. Science & Health, July 17, p. 1F and 5F. San Jose. # *Chondrites, Cosmorhaphe, Lorenzinia, Nereites, Spirorhaphe, Paleodictyon, Zoophycos,* popular

Ciarelli, S., Kater, B.J. & van Straalen, N.M. 2000. Influence of bioturbation by the amphipod *Corophium volutator* on fluoranthene uptake in the marine polychaete *Nereis virens*. Environmental Toxicology and Chemistry, 19(6): 1575-1581.

Cibaj, I., Wiweko, A. & Mora, S. 2000. Miocene deltaic deposition patterns of the Mahakam area. American Association of Petroleum Geologists, Bulletin, 84(9): 1412.

Cici,uri, D.J. & Everhardt, M.J. 2001. An elasmosaur with stomach contents and gastroliths from the Pierre Shale (Late Cretaceous) of Kansas. Kansas Academy of Sciences, Transactions, 104(3-4): 129-143. # tetrapods

Cieszkowski, M., Gedl, E., Iczka, A. & Uchman, A. 2001. Stop C2 - Rzyki village. *In* Cieszkowski, M. & Iczka, A. Silesian & Subsilesian units. 12th Meeting of the Association of European Geological Societies & LXXII Zjazd Polskiego Towarzystwa Geologicznego. Pastwowy Instytut Geologiczny, p. 115-118. Kraków. # *Arthrophycus tenuis, Chondrites intricatus, Phycosiphon incertum, Planolites, Protovirgularia pennatus, P. obliterata, Scolicia, Thalassinoides, Zoophycos,* flysch, oxygenation, Lower Cretaceous, Poland

Cilek, V. 2001. The loess deposits of the Bohemian Massif: silt provenance, palaeometeorology and loessification processes. *In* Derbyshire, E. (ed.), Loess and palaeosols: characteristics, stratigraphy, chronology and climate; a contribution to IGCP413. Quaternary International, 76-77: 123-128. # Czech Republic

Cilla, G. & Genise, J.F. 2000. Nest architecture and nesting behavior of *Alepidosceles filitarsis* (Vachal) (Apidae, Anthophorinae). Abstracts of the XXI International Congress of Entomology. Foz de Iguazú, Brasil, August, I, p. 441. # insects

Clark, J.M., Norell, M.A. & Chiappe, L.M. 1999. An oviraptorid skeleton from the Late Cretaceous of Ukhaa Tolgod, Mongolia, preserved in an avianlike brooding position over an oviraptorid nest. American Museum Novitates, 3265: 36 pp.

Clark, N.D.L. 2001. Dinosaur tracks, helicopters, and broken bones. Geological Curator, 7(5): 163-166. # tracks, Jurassic, United Kingdom

Clark, T. & Morton, B. 1999. Relative roles of bioerosion and typhoon-induced disturbance on the dynamics of a high latitude scleractinian coral community. Journal of the Marine Biological Association of the United Kingdom, 79(5): 803-820.

Clemmensen, L.B., Lisborg, T., Fornós, J.J. & Bromley, R.G. 2001. Cliff-front aeolian and colluvial deposits, Mallorca, western Mediterranean: a record of climatic and environmental change during the last glacial period. Bulletin of the Geological Society of Denmark, 48: 217-232. # *Myotragus balearicus,* Pleistocene, Spain

Coates, L. & MacEachern, J.A. 2000. Integrating ichnology and sedimentology to differentiate between river-dominated deltas, wave-dominated deltas, and shorefaces: examples from the Cretaceous of western Canada. Geological Society of America, Abstracts with Programs, 32(6): 7. # *Cruziana* ichnofacies

Coe, A. L. 1996. Unconformities within the Portlandian Stage of the Wessex Basin and their sequence-stratigraphical significance. *In* Hesselbo, S.P. & Parkinson, D.N. (eds.), Sequence Stratigraphy in British Geology. Geological Society of London, Special Publications, 103: 109-143. # Jurassic, Great Britain, England

Collins, A.G., Lipps, J.H. & Valentine, J.W. 2000. Modern mucociliary creeping trails and the bodyplans of Neoproterozoic trace-makers. Paleobiology, 26(1): 47-55.

Collinson, M.E. 1999. Plants and animal diets. *In* Jones, T.P. & Rowe, N.P. (eds.), Fossil Plants and Spores: Modern Techniques. Geological Society, London, p. 316-319.

Coniglio, M. 1999. Manitoba's Tyndall Stone. WAT on Earth, 12(2): 15-18. # *Thalassinoides,* Ordovician, Canada

Conti, M.A., Mariotti, N., Nicosia, U. & Pittau, P. 1997. Succession of selected bioevents in the continental Permian of the southern Alps (Italy): improvements in intrabasinal and interregional correlations. *In* Dickins, J.M. (ed.), Late Palaeozoic and Early Mesozoic Circum-Pacific Events and their Global Correlation. World and Regional Geology, 10: 51-65.

Cook, A.G. 1998. Late Carboniferous freshwater trace fossils from the Jericho Formation, Alpha, CQ. *In* Geoscience for the New Millennium, Abstracts. Geological Society of Australia, Sydney, 49: 89. # Carboniferous

Cook, A.G. & Bann, K. 2000. Trace fossils from the Upper Carboniferous Jericho Formation, central Queensland. Memoirs of the Queensland Museum, 45(2): 235-251. # *Alphaichnus alphaensis, Rusophycus devisi, Tasmanadia glaessneri, Wadeichnus maryae*

Corsetti, F.A. & Hagadorn, J.W. 2000. Terminal Neoproterozoic-Lower Cambrian transition II; White-Inyo Mountains, CA. Geological Society of America, Abstracts with Programs, 33(3): 72. # Precambrian, USA

Cosarinsky, M. 2001. Micromorfología del nido de *Cornitermes cumulans* (Kollar) (Isoptera, Termitidae) [Micromoprhology of the nest of *Cornitermes cumulans* (Kollar) (Isoptera, Termitidae)]. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 36. # termites, insects, recent

Cotillon, P., Banvillet, M., Gaillard, C., Groshény, D. & Olivero, D. 1998. Les surfaces *Rhizocorallium* sur la bordure méridionale du bassin vocontien: premiere manifestation de l'évenement anoxique de l'Aptien inférieur [*Rhizocorallium* horizons on the southern border of the Vocontian Basin: first manifestation of the lower Aptian anoxic event]. STRATI 2000, 2ème Congres Français de Stratigraphie, Paris, 8-11 Septembre 1998, Résumé, p. 63. # Cretaceous

Cotillon, P., Banvillet, M., Gaillard, C., Groshény, D. & Olivero, D. 2000. Les surfaces *Rhizocorallium* de l'Aptien inférieur sur la bordure méridionale du bassin vocontien (France Sud-Est), marqueurs de dynamiques locales: leur relation avec un événement anoxique global [Lower Aptian *Rhizocorallium* surfaces on the southern border of the Vocontian Basin (southeastern France), markers of local dynamics: their relationship with a global anoxic event]. Bulletin de la Societé Géologique du France, 171(2): 229-238. # Cretaceous

Courel, L. & Demathieu, G.R. 2000. *Coelurausaurichnus grancieri,* a new ichnospecies from the Upper Triassic of Ardeche, France. Geodiversitas, 22(1): 35-46. *Coelurausaurichnus grancieri* isp. n., tetrapods, footprints

Covich, A.P., Palmer, M.A. & Crowl, T.A. 1999. The role of benthic invertebrate species in freshwater ecosystems. Bioscience, 49(2): 119-128. # bioturbation

Crimes, T.P. 2001. Evolution of the deep-water benthic community. *In* Zhuravlev, A.Yu. & Riding, R. (eds.), The Ecology of the Cambrian Radiation. Columbia University Press. New York, p. 275-297. # Cambrian, Precambrian

Critelli, S. & Nilsen, T.H. 2000. Provenance and stratigraphy of the Eocene Tejon Formation, western Tehachapi Mountains, San Emigdio Mountains, and southern San Joaquin Basin, California. Sedimentary Geology, 136(1-2): 7-27.

Cui, Z. 1999. The environmental implication of the trace fossil *Ophiomorpha* from the Upper Permian of the Yily Basin, Xinjiang, China. Acta Sedimentologica Sinica, 17(2): 209-213. # lacustrine environment

Curran, H.A. 2001. Intertidal mounds of tropical calianassids provide substrates for complex upogebiid shrimp burrows: modern and Pleistocene examples from the Bahamas. North American Paleontological Convention 2001, Program & Abstracts.

Museum of Paleontology, University of California, Berkeley, p. 44. # *Glyptyrus acanthochirus, Upogebia vasquezi*

Curran, H.A. 2001. Substrates, traces, and ichnofabrics of a modern tropical carbonates tidal flat. VI International Ichnofabric Workshop, Venezuela 2001, Isla Margarita & Puerto La Cruz, July 14-20, 2001, Abstracts [1 p., no pagination]. Sociedad Venezolana de Geólogos & PDVSA. # *Glyptyrus acanthochirus, Upogebia vesquezi,* crustaceans, Bahamas

D'Alessandro, A. & Benedictis, D. de. 2001. Rich phosphatic large-sized *Thalassinoides* of the Serravallian Abruzzo-Campania Carbonate Platform (south Italy). 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 37. # *Chondrites intricatus, C. targionii, Phycosiphon incertum, Planolites, Zoophycos,* Miocene

D'Alessandro, A. & Benedictis, D. de. 2001. Ichnological analysis of a carbonate apron-to-basin sequence (Langhian-Tortonian, south Italy). 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 38. # *Desmograpton, Didymaulichnus lyelli, Helminthopsis tenuis, Ophiomorpha annulata, Palaeophycus crenulatus, P. tubularis, Paleodictyon, Parahaentzschelinia surlyki, Phycodes circinatus, Planolites, Taenidium satanassi, Teichichnus zigzag, Thalassinoides suevicus, Urohelminthoida, Zoophycos,* Miocene

D'Alessandro, A., Perna, R. la, Ciaranfi, N. 2001. Paleontological indications of sea-level fluctuations in the deep-sea deposits of the Bradano Trough (southern Italy, lower-middle Pleistocene). 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 39. # *Chondrites intricatus, Zoophycos*

Dam, G., Nohr, H.H., Christiansen, F.G., Bojesen, K.J.A. & Laier, T. 1998. The oldest marine Cretaceous sediments in West Greenland (Umiivik-1 Borehole): record of the Cenomanian-Turonian anoxic event? Danmarks og Grnlands Geologiske Undersgelse, Bulletin, 180: 128-137. # bioturbation

Damrow, D.F., Lipps, J.H. & Gershwin, L.A. 2001. Is *Climactichnites* really a trace fossil? Geological Society of America, Abstracts with Programs, 33(6): 16. # Cambrian, USA

Damuth, J., Behrensmeyer, A.K., DiMichele, W.A., Labandeira, C.C., Potts, R. and Wing, S.L. 1997. ETE Database Manual. Evolution of Terrestrial Ecosystems Consortium, Washington, DC, vii + 250 pp.

Dávid, Á. 1996. Paleopathological phenomena on the shells of late Oligocene molluscs (Eger, Hungary). Proceedings of the Fourth International Congress on Medical and Applied Malacology, 8(1): 26.

Dávid, Á. 1999. Naticid predation on the shells of middle Miocene corbulids – a comparison (Ipolydamasd, Börzsöny Mountains, Hungary). Biology and Evolution of the Bivalvia, Paper and Poster Abstracts, Cambridge.

Dávid, Á. 2000. Activity of predatory gastropods on the shells of late-Oligocene (Egerian) molluscs collected from Wind Brickyard, Eger, Hungary. Molluscs 2000 (Understanding Molluscan Biodiversity in our Region into the 21st Century), Abstracts, Sydney: p. 26-27.

Dávid, Á. 2000. Macrobioerosion on middle-Miocene (Carpathian) pebbles (Dédestapolcsány, Hungary). Third International Bioerosion Workshop, Contributions, Barcelona: p. 41.

David, Á. 2001. Activity of predatory gastropods on the shells of late Oligocene (Egerian) molluscs (Wind Brickyard, Eger, Hungary). North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 26. # [*Oichnus*], borings, predation

David, Á. 2001. The *Entobia* ichnogenus in Hungarian Tertiary formations. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 26. # borings, *Entobia cateniformis, E. geometrica, E. laquea, E. megastoma, E. ovula, E. paradoxa, E. retiformis*

David, Á. 2001. Occurrence and distribution of *Gastrochaenolites* in middle Miocene (Carpathian) age abrasion pebbles of two localities – a comparison (Nagyvisnyo & Dedestapolcsany Bükk Mountains, Hungary). North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 26. # borings, *Gastrochaenolites lapidicus, G. cor, G. cluniformis, G. orbicularis, G. torpedo, G. turbinatus*

Davies, R., Hollis, C., Bishop, C., Gaur, R. & Haider, A.A. 2000. Reservoir geology of the Middle Minagish Member (Minagish Oolite), Umm Gudair Field, Kuwait. *In* Alsharhan, A. S. & Scott, R. W. (eds.), Middle East models of Jurassic/Cretaceous carbonate systems. Society for Sedimentary Geology (SEPM), Special Publication, 69: 273-286. # bioturbation, burrows, Cretaceous

Dávila, M.E., Buatois, L.A. & Toro, M. 2001. Trace fossils and sedimentary facies in cores from Upper Cretaceous shallow marine and deltaic successions, Maturin Sub-Basin, eastern Venezuela. *In* VI International Ichnofabric Workshop, Venezuela 2001, Isla Margarita & Puerto La Cruz, July 14-20, 2001, Core Workshop. [3 pp., no pagination, also Spanish version]. Sociedad Venezolana de Geólogos & PDVSA. # *Arenicolites, Chondrites, Conichnus, Cylindrichnus, Diplocraterion, Ophiomorpha, Palaeophycus, Phycosiphon, Rhizocorallium, Rosselia, Teichichnus, Thalassinoides, Zoophycos, Skolithos* ichnofacies, *Cruziana* ichnofacies, *Glossifungites* ichnofacies

Dávila, M.E., Buatois, L.A. & Toro, M. 2001. Trace fossils and sedimentary facies in cores from Upper Cretaceous shallow marine and deltaic successions, Maturin Sub-Basin, eastern Venezuela. *In* VI International Ichnofabric Workshop, Venezuela 2001, Isla Margarita & Puerto La Cruz, July 14-20, 2001, Abstracts [1 p., no pagination]. Sociedad Venezolana de Geólogos & PDVSA. # *Arenicolites, Chondrites, Conichnus, Cylindrichnus, Diplocraterion, Ophiomorpha, Palaeophycus, Phycosiphon, Rhizocorallium, Rosselia, Teichichnus, Thalassinoides, Zoophycos, Skolithos* ichnofacies, *Cruziana* ichnofacies, *Glossifungites* ichnofacies

Delgado, M., Kabbabe, T., Sampson, E. & Chacartegui, F. 2001. Ichnofossils as tool for environmental interpretation, Pajui and Misoa Formation, Barúa and Montán Field, Zulia and Trujillo Stages, Venezuela. *In* VI International Ichnofabric Workshop, Venezuela 2001, Isla Margarita & Puerto La Cruz, July 14-20, 2001, Core Workshop. [2 pp., no pagination, also Spanish version]. Sociedad Venezolana de Geólogos & PDVSA. # *Arenicolites, Asterosoma, Bergaueria, Chondrites, Conichnus, Diplocraterion, Helminthopsis, Ophiomorpha, Palaeophycus, Planolites, Rhizocorallium, Rosselia, Subphyllochorda, Teichichnus, Terebellina, Thalassinoides, Skolithos* ichnofacies, *Cruziana* ichnofacies, Venezuela

Delgado, M., Kabbabe, T., Sampson, E. & Chacartegui, F. 2001. Ichnofossils as tool for environmental interpretation, Pajui and Misoa Formation, Barúa and Montán Field, Zulia and Trujillo Stages, Venezuela. *In* VI International Ichnofabric Workshop, Venezuela 2001, Isla Margarita & Puerto La Cruz, July 14-20, 2001, Abstracts. [1 p., no pagination]. Sociedad Venezolana de Geólogos & PDVSA. # *Arenicolites, Asterosoma, Bergaueria, Chondrites, Conichnus, Diplocraterion, Helminthopsis, Ophiomorpha, Palaeophycus, Planolites, Rhizocorallium, Rosselia, Subphyllochorda, Teichichnus, Terebellina, Thalassinoides, Skolithos* ichnofacies, *Cruziana* ichnofacies, Venezuela

Demathieu, G. R. & Sciau, J. 1999. Large dinosaur footprints in the Hettangian of Peyre (Aveyron, France). Geobios, 32(4): 609-616. # *Eubrontes divaricatus*, Jurassic

De Troch, M., Fiers, F. & Vincx, M. 2000. Range extension and microhabitat of *Lightiella incisa* (Cephalocarida). Journal of Zoology, 251(2): 199-204.

Diamond, J. K., Bishop, D. & Gilardi, J. D. 1999. Geophagy in New Guinea birds. Ibis, 141:181-193. # modern, New Guinea, Aves

Dias, L.R. & Rossetti, D.d.F. 1999. Analise faciologica e estratigrafica de depositos do Cretaceo superior, leste da Bacia do Grajau, Maranhao. *In* Dias, B.D. de C.J.C. & Rohn, R. (eds.), 1er Simposio sobre el Cretacico de America del Sur. UNESP, IGCE, Departamento de Geologia Sedimentar, Rio Claro, Brazil, Boletim do Simposio sobre o Cretaceo do Brasil, 5: 237-241. # Cretaceous, Brazil

Dibble, H.L., Chase, P.G., McPherron, S.P. & Tuffreau, A. 1997. Testing the reality of a 'living floor' with archaeological data. American Antiquity, 62(4): 629-651. # modern, archaeology, bioturbation

Dickinson, W.R. 2000. Geomorphology and geodynamics of the Cook-Austral Island-seamount chain in the South Pacific Ocean: implications for hotspots and plumes. *In* Ernst, W.G. & Coleman, R.G. (eds.), Tectonic Studies of Asia and the Pacific Rim. Bellwether Publishing *for* the Geological Society of America. Columbia, Maryland, p. 7-43. # bioerosion

Diedrich, C. 2001. Vertebrate track bed stratigraphy of the Röt and basal lower Muschelkalk (Anisian) in Winreswijk (east Netherlands). Geologie en Mijnbouw, 80(2): 31-39. # tetrapods, footprints, Triassic

Diego, T.d. & Douglas, R.G. 1999. Oxygen-related sediment microfabrics in modern 'black shales', Gulf of California, Mexico. Journal of Foraminiferal Research, 29(4): 453-464. # bioturbation, Cretaceous

Dietl, G., Kapitzke, M., Rieter, M., Schweigert, G., Zügel, P. & Hugger, R. 1998. The Nusplinger Plattenkalk (White Jurassic) excavation campaign 1997. Jahreshefte der Gesellschaft für Naturkunde in Württemberg, 154: 67-69.

Dietl, G.P. & Alexander, R.R. 1997. Predator-prey interactions between the naticids *Euspira heros* Say and *Neverita duplicata* Say and the Atlantic surfclam *Spisula solidissima* Dillwyn from Long Island to Delaware. Journal of Shellfish Research, 16: 413-422. # modern, Delaware, New Jersey, New York, USA

Dietl, G.P. & Alexander, R.R. 2000. Post-Miocene shift in stereotypic naticid predation on confamilian prey from the mid-Atlantic shelf: coevolution with dangerous prey. Palaios, 15: 414-429. # Tertiary, lower Miocene, Delaware; upper Miocene, Maryland; Quaternary, lower Pleistocene, North Carolina; modern, New Jersey, USA, predation, coevolution, drillholes, methods, boring Gastropoda Naticidae *Euspira heros, Neverita duplicata*

Dietl, G.P., Alexander, R.R. & Bien, W.F. 2000. Escalation in Late Cretaceous-early Paleocene oysters (Gryphaeidae) from the Atlantic Coastal Plain. Paleobiology, 26: 215-237. # USA, coevolution, drillholes in Bivalvia Gryphaeidae

Dietl, G.P., Alexander, R.R., Kelly, P.H. & Hansen, T.A. 2001. Stereotypy of naticid predation on bivalves since the Cretaceous trends, controlling factors, and implications for escalation. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 46. # *Natica*, borings, [*Oichnus*], predation

Dornbos, S.Q. & Bottjer, D.J. 2000. Evolutionary paleoecology of the earliest echinoderms: helicoplacoids and the Cambrian substrate revolution. Geology, 28(9): 839-842. # biogenic structures, bioturbation

Dornbos, S.Q. & Bottjer, D.J. 2000. Radular grazing traces in the Lower Cambrian of China: implications for the Cambrian substrate revolution. *In* Anonymous (ed.), 2000 California Paleontology Conference, Abstracts. PaleoBios, 20(1, Suppl.): 1-2.

Dominici, S. 2001. Taphonomy and paleoecology of shallow marine macrofossil assemblages in a collisional setting (late Pliocene-early Pleistocene, western Emilia, Italy). Palaios, 16(4): 336-353. # bioerosion, bioturbation

Donovan, S.K. 2000. *The Eternal Trail: A Tracker Looks at Evolution*. Ichnos, 7(4): 317-318. # book review of Lockley (1999)

Donovan, R.N. 2000. Initiation of the Arbuckle Platform: view from the Slick Hills, Oklahoma. *In* Johnson, K.S. (ed.), Platform Carbonates in the Southern Midcontinent, 1996 Symposium. University of Oklahoma. Norman, p. 47-56.

Donovan, S.K. 2001. 'Dinosaur Tracks and Other Fossil Footprints of Europe' by Martin Lockley and Christian Meyer. Geoscientist, 11(4): 14-15. # book review of Lockley (2000)

Donovan, S.K., Harper, D.A.T., Pickerill, R.K. & Portell, R.W. 2001. Palaeoenvironmental analysis and tectonics: the middle Miocene Grand Bay Formation of Carriacou, the Grenadines. Abstracts, Workshop on the Geochemistry of the Caribbean Plateau and

Cretaceous Island Arc Terranes, and their Implications for the Geodynamics of the Caribbean, Leiceister, April, p. 1.

Donovan, S.K. & Rowe, D.A.C. 2000. Spatangoid echinoids from the Eocene of Jamaica. Journal of Paleontology, 74(4): 654-661.

Dorojatun, A., Kusnin, A., Hutabarat, M., Suchecki, R.K. & Pemberton, S.G. 1996. Geological Reservoir heterogenity of Talang Akar depositional system in the Jatibarang Sub-basin, offshore NW Java, Indonesia. Proceedings, Indonesian Petroleum Association, Twenty-Fifth Silver Anniversary Convention, October, 1996, p. 357-373. # *Asterosoma, Chondrites, Cylindrichnus, Ophiomorpha, Palaeophycus, Planolites, Teichichnus, Thalassinoides,* Oligocene, Miocene

Draganits, E., Braddy, S.J. & Briggs, D.E.G. 2001. A Gondwanan coastal arthropod ichnofauna from the Muth Formation (Lower Devonian, northern India): paleoenvironment and tracemaker behavior. Palaios, 16(__): 126-147. # *Arenicolites, Chondrites, Didymaulichnus lyelli, Didymaulyponomus rowei, Diplichnites gouldi, Diplopodichnus biformis, Monocraterion, Palaeophycus, Palmichnium antarcticum, Pholeus, Planolites, Selenichnites, Skolithos, Taenidium barretti*

Droppo, I.G. & Amos, C.L. 2001. Structure, stability, and transformation of contaminated lacustrine surface fine-grained laminae. Journal of Sedimentary Research, 71(5): 717-726. # bioturbation, biostabilization, Ontario, Canada

Droser, M.L., Jensen, S. & Gehling, J.G. 2000. Plastered on Cambrian sediments. 2000 California Paleontology Conference, Abstracts. PaleoBios, 20(1, Suppl.): 2. # *Gyrolithes, Planolites, Treptichnus pedum*

Droser, M.L., Jensen, S., Gehling, J.G., Myrow, P.M. & Narbonne, G.M. 2001. North American Paleontological Convention 2001, Firm Cambrian substrates in the lowermost Cambrian: evidence from ichnofabrics in the Chapel Island Formation, Newfoundland. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 47. # *Gyrolithes, Planolites, Rusophycus avalonensis, Skolithos, Treptichnus pedum,* Canada

Droser, M.L., Jensen, S., Wood, R., Gehling, J. & Runnegar, B. 1999. The Precambrian-Cambrian radiation and the diversification of sedimentary fabrics. Geological Society of America, Abstracts with Programs, 31(7): 334. # *Treptichnus*

Droser, M.L. & Li, X. 2001. The Cambrian radiation and the diversification of sedimentary fabrics. *In* Zhuravlev, A.Yu. & Riding, R. (eds.), The Ecology of the Cambrian Radiation. Columbia University Press. New York, p.137-169. # bioturbation

Dumbauld, B.R., Armstrong, D.A. & Feldman, K.L. 1996. Life-history characteristics of two sympatric thalassinidean shrimps, *Neotrypaea californiensis* and *Upogebia pugettensis,* with implications for oyster culture. Journal of Crustacean Biology, 16: 689-708.

Dunn, R., Mullineaux, L.S. & Mills, S.W. 1999. Resuspension of postlarval soft-shell clams *Mya arenaria* through disturbance by the mud snail *Ilyanassa obsoleta*. Marine Ecology Progress Series, 180: 223-232.

Duringer, P., Brunet, M., Cambefort, Y., Beauvilain, A., Mackaye, H.T., Vignaud, P. & Schuster, M. 2000. Des boules de bousiers fossiles et leurs terriers dans les sites a Australopitheques du Pliocene tchadien. Bulletin de la Société Géologique de France, 171(2): 259-269. # bioturbation, burrows, Pliocene, Chad

Duringer, P., Cambefort, Y., Schuster, M., Brunet, M., Vignaud, P., Likius, A. 1999. L'Incroyable découverte de boules de bousiers fossiles dans les sites pliocenes a Australopitheques du Tchad. 7e Congres Français de Sédimentologie, 33:135-136. # dung balls, fluvial environment, Pliocene, Chad

Eberth, D.A., Berman, D.S., Sumida, S.S. & Hopf, H. 2000. Lower Permian terrestrial paleoenvironments and vertebrate paleoecology of the Tambach Basin (Thuringia, central Germany): the upland Holy Grail. Palaios, 15(4): 293-313. # root traces, tracks, *Ichnotherium, Tambia spiralis,* Vertebrata Reptilia

Eberth, D.A. & McCrea, R.T. 2001. Were large theropods gregarious? Journal of Vertebrate Paleontology. 21(3, Suppl.): 46-47. # tracks, Alberta, Canada, Argentina, Cretaceous

Egenhoff, S.O., Weber, B. & Soria, J. 1998. Ichnofauna trends in a shallowing-and coarsening-upward succession: an example from the Arenigian of southern Bolivia. *In* Canaveras, J. C., Garcia, d.C.M.A., Soria, J., Melendez, H.A. & Soria, A.R. (eds.), 15th International Sedimentological Congress, Abstracts. Alicante, Spain, p. 311. # Ordovician

Eiserhardt, K.-H., Koch, L. & Eiserhardt, W.L. 2001. Revision des Ichnotaxon *Tomaculum* Groom, 1902. Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, 221(3): 325-358. # *Alcyonidiopsis longobardiae, A. pharmaceus, Coprulus, Syncoprulus, Tomaculum problematicum,* Ordovician, Germany

Ekdale, A.A. 2001. Substrate-controlled development of composite bioturbation-bioerosion trace fossils. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 48. # *Thalassinoides,* Cambrian, Ordovician, Cretaceous, Tertiary, Sweden, USA, Utah, Denmark, New Zealand

Ekdale, A.A. 2001. Stromatolite-influenced ichnofabrics and Cambro-Ordovicician limestones, Great Basin of western Utah, U.S.A. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001, Abstracts. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # *Thalassinoides paradoxicus,* Cambrian, USA

Ekdale, A.A. & Bromley, R.G. 2001. A day and night in the life of a cleft-foot clam: *Protovirgularia-Lockeia-Lophoctenium*. Lethaia, 34: 119-124. # *Lockeia siliquaria, Protovirgularia dichotoma,* Carboniferous, Arkansas, USA

Ekdale, A.A. & Bromley, R.G. 2001. Bioerosional innovation for living in carbonate hardgrounds in the Early Ordovician of Sweden. Lethaia, 34: 1-12. # *Gastrochaenolites oleandicus* isp. n., *Trypanites,* borings

El Araby, A. & Abdel, M.A. 1999. Depositional facies of the Cambrian Araba Formation in the Taba region, east Sinai, Egypt. Journal of African Earth Sciences, 29(3): 429-447. # bioturbation

Elbroch, M. & Marks, E. 2001. Bird Tracks and Sign: a Guide to North American Species. Stackpole Books, Mechanicsburg, Pennsylvania, 457 pp.

Erdogan, B., Uchman, A., Güngör, T. & Özgül, N. 2001. Stratigraphy and trace fossil assemblages of the Lower Cambrian succession in the Sandikli region, southwestern Turkey. Fourth International Turkish Geology Symposium, Abstracts, 24-28 September, 2001. Cukurova University, Adana, p. 263. # *Arenicolites, Cruziana, Diplichnites, Phycodes, Planolites, Rusophycus, Skolithos, Treptichnus*

Erickson, G.M. 1999. Breathing life into *Tyrannosaurus rex*. Scientific American, 281(3): 42-49. # coprolites

Escandón, G. 2001. Modelo sedimentologico de las arenas B-2.6, B-3 y B-4, de la Formación Misoa, Campo Motatan Domo Norte. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # oil, Eocene, Oligocene, Miocene, Pliocene, Venezuela

Esteban, S.B. 2001. Estructuras biogenicas en facies de grano fino del Tremadociano Superior (Sistema de Famatina, La Rioja, Argentina) [Biogenic structures in the fine-grained facies of the upper Tremadocian (Famatina System, La Rioja, Argentina)]. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 40. # *Gyrophyllites, Tomaculum,* Ordovician

Etter, W. 1999. Community analysis. *In* Harper, D.A.T. (ed.), Numerical Palaeobiology: Computer-based Modelling and Analysis of Fossils and their Distributions. John Wiley & Sons, Chichester, p. 85-360. # general

Evans, J.E. & Welzenbach, L.C. 2000. Lacustrine limestones and tufas in the Cadron Formation (late Eocene), Badlands of South Dakota, U.S.A. *In* Gierlowski-Kordesch,

E.H. & Kelts, K.R. (eds.), Lake basins through space and time. American Association of Petroleum Geologists, Studies in Geology, 46: 349-358. # *Planolites*

Everhart, M.J. 1999. Evidence of feeding on mosasaurs by the Late Cretaceous lamniform shark, *Cretoxyrhina mantelli*. Journal of Vertebrate Paleontology, 17(3, Supplement): 43A-44A.

Eyles, N., Daniels, J., Osterman, L.E. & Januszczak, N. 1999. Ocean Drilling Program Leg 178 (Antarctic Peninsula): sedimentology of glacially-influenced continental shelf 'topsets' and 'foresets'. Geological Society of America, Abstracts with Programs, 31(7): 56. # bioturbation, Pliocene, Miocene, Antarctica

Farinati, E.A. 2001. Icnofacies de *Entobia* en sustratos esqueléticos del Neogeno Atlantico. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 41. # *Entobia, Gastrochaenolites, Maeandropolydora,* borings, Neogene, Argentina

Farke, A.A., Varriale, F.J., Lien, D.B., Cavin, J.L. & Sankey, J.T. 2001. First trackway evidence of vertebrate animals from the Fall River Formation (Lower Cretaceous) of western South Dakota, USA. Journal of Vertebrate Paleontology. 21(3, Suppl.): 48. # Crocodilia, Diapsida, USA

Farlow, J.O. 2001. Intraspecific variability in pedal size and shape in alligators and emus; implications for archosaurian ichnology. Journal of Vertebrate Paleontology. 21(3, Suppl.): 48-49. # vertebrates, tracks, neoichnology

Fedonkin, M.A. 2001. Faunal succession in the Vendian (terminal Proterozoic) deposits of the White Sea region, north of the Russian Platform. American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 50. # Precambrian, bioturbation

Feldman, K.L., Armstrong, D.A., Dumbauld, B.R., DeWitt, T.H. & Doty, D.C. 2000. Oysters, crabs, and burrowing shrimp: review of an environmental conflict over aquatic resources and pesticide use in Washington State's (USA) coastal estuaries. Estuaries, 23(2): 141-176. # *Neotrypaea californiensis, Upogebia pugettensis,* recent

Felix, H.P. 2000. Paleosols on Pleistocene dunes as indicators of paleo-monsoon events in the Sahara of east Niger. Catena, 41(1-3): 43-60.

Fermann, E.J. & Derry, L.A. 1999. Changes in Early Cambrian bioturbation and the carbon cycle. Geological Society of America, Abstracts with Programs, 31(7): 226.

Fernandes, A.C.S. 2001. A paleoicnofauna brasileira de artropodes; estado atual de seu conhecimento. Estudos Tecnologicos, 24(52-53): 359-372.

Fernandes, A.C.S. & Carvalho, I. de S. 2001. O icnogênero *Gastrochaenolites* Leymerie, 1842 na Formação Pirabas, Oligoceno-Mioceno do estado do Pará. Boletim do Museu Nacional, nova série, Geologia, 60: 1-9. Rio de Janeiro. # Tertiary, borings, *Gastrochaenolites lapidicus,* boring Bivalvia *Lithophaga?*

Fernandes, A.C.S. & Fonseca, V.M.M.d. 2001. Catalogo de fosseis-tipo e figurados da colecao de paleoinvertebrados do Museu Nacional, Rio de Janeiro. Museu Nacional. Rio de Janeiro, Brazil, p. 60. # collections

Fichter, J. 2000. A new find of tetrapod trackway from the middle Muschelkalk near Lamerden, Germany. Philippia, 9(3): 215-217. # Triassic

Fodor, R. 2001. Traces of bioerosion from test on Upper-Oligocene solitary corals (Wind Brickyard, Eger, NE Hungary). Földtani Közlöny 131(1-2): 179-196. [In Hungarian]. # borings

Fodor, R. 2001. Traces of bioerosion of polychaete worms on the tests of Egerian age solitary corals (Wind Brickyard, Eger, Hungary). Folia Historico Naturalia Musei Matraensis, 25(5): 24. [In Hungarian]. # borings, Miocene

Ford, R.B., Thrush, S.F. & Probert, P.K. 1999. Macrobenthic colonisation of disturbances on an intertidal sandflat: the influence of season and buried algae. Marine Ecology Progress Series, 191: 163-174. # bioturbation, Arthropoda Crustacea Amphipoda Corophiidae *Paracorophium excavatum*

Fornes, W.L., DeMaster, D.J. & Smith, C.R. 2001. A particle introduction experiment in Santa Catalina Basin sediments: testing the age-dependent mixing hypothesis.

Journal of Marine Research, 59(1): 97-112. # California Continental Borderland, biodiffusion, bioturbation, nutrients

Fortey, R. & Owens, R. 1999. New approaches to trilobite autecology: feeding and breeding. European Union of Geosciences Conference Abstracts, EUG 10. Cambridge Publications, Journal of Conference Abstracts, 4: 278. # *Cruziana*

Foster, J.R. 2001. Salamander tracks (*Ambystomichnus?*) from the Cathedral Bluffs Tongue of the Wasatch Formation (Eocene), northeastern Green River basin, Wyoming. Journal of Paleontology, 75(4): 901-904. # amphibians, *Ambystomichnus*, USA

Francois, F., Dalegre, K., Gilbert, F. & Stora, G. 1999. Specific variability within functional groups. Study of the sediment reworking of two Veneridae bivalves, *Ruditapes decussatus* and *Venerupis aurea*. Comptes Rendus de l'Académie des Sciences Série III Sciences de la Vie, 322(4): 339-345.

Francus, P. 2001. Image analysis to quantify bioturbation in hemipelagic sediments. *In* Wortmann, U.G. & Funk, H. (eds.), International Association of Sedimentologists, 21st Meeting, 3-5 September 2001, Davos, Switzerland, Abstract & Programme, p. 115. # methods, ichnofabrics

Francus, P. 2001. Quantification of bioturbation in hemipelagic sediments via thin-section image analysis. Journal of Sedimentary Research, Section A: Sedimentary Petrology and Processes, 71(3): 501-507. # methods, ichnofabrics

Friedman, V. 2001. A new Upper Cretaceous (Cenomanian) fossiliferous locality in north central Texas. Geological Society of America Abstracts with Programs. 33(5): 54. # coprolites, Cretaceous, USA

Froede, C.R., Jr. 2001. Rhizolith evidence in support of a late Holocene sea-level highstand at least 0.5 m higher than present at Key Biscayne, Florida. Geology, 30(3): 203-206. # Quaternary, USA, water depth, rhizoliths, *Thalassia testudinum* turtle grass

Fürsich, F.T. 1998. Environmental distribution of trace fossils in the Jurassic of Kachchh (western India). Facies, 39: 243-272.

Fürsich, F.T., Berndt, R., Scheuer, T. & Gahr, M. 2001. Comparative ecological analysis of Toarcian (Lower Jurassic) benthic faunas from southern France and east-central Spain. Lethaia, 34(3): 169-199. # life position, Bivalvia

Gabdullin, R.R., Guzhikov, A.J., Bogachkin, A.B., Bondarenko, N.A., Lubimova, T.V. & Widrik, A.B. 1999. Periodites below and above the K/T boundary. Bulletin de l'Institut Royal des Sciences Naturelles de Belgique. Sciences de la Terre, 69(Suppl.): 87-101. # ichnofossils

Gabet, E.J. 2000. Gopher bioturbation: field evidence for non-linear hillslope diffusion. Earth Surface Processes and Landforms, 25(13): 1419-1428. # recent, USA

Gage, J.D., Levin, L.A. & Wolff, G.A. 2000. Benthic Processes in the Deep Arabian Sea: Biogeochemistry, Biodiversity and Ecology. Pergamon, Oxford, 375 pp. # bioturbation

Gaillard, C., Bernier, P., Barale, G., Bourseau, J.P., Broin, F. de, Buffetaut, E., Demathieu, G., Ezquerra, R., Gall, J.-C., Renous, S. & Wenz, S. 2001. Giant sea turtle trackways from Upper Jurassic lithographic limestones: implication for the evolution of turtles and environmental significance. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001, Abstracts. Sociedad Venezolana de Geólogos, PDVSA, [2 pp., no pagination]. # tetrapods, reptiles

Gaines, R. R. 2000. Ichnofabric, taphonomy and soft-bodied preservation in the Middle Cambrian Wheeler Shale, Millard County, Utah. 2000 California Paleontology Conference, Abstracts. PaleoBios, 20(1, Suppl.): 3. Berkeley. # USA

Gaines, R.R. & Droser, M.L. 1999. Ichnofabric and taphonomy of the Lower Cambrian Latham Shale, San Bernardino County, California: clues for the decline of soft-bodied preservation. Geological Society of America, Abstracts with Programs, 31(7): 363. # USA

Gaines, R.R. & Droser, M.L. 1999. The ichnological record in Ordovician mudstones: examples from the Cincinnatian strata of Ohio and Kentucky (U.S.A.). Acta Universitatis Carolinae – Geologica, 43: 163-165.

Galeano Inchausti, J.C. & Poiré, D. 2001. Primer registro de *Cruziana* y *Rusophycus* en la República del Paraguay. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 42. # *Arenicolites, Cruziana imbricata, Curvolithus, Gordia, Paleophycus, Phycodes palamatum, Planolites, Scolicia,* Ordovician, Silurian

Gambi, M.C. & Bussotti, S. 1999. Composition, abundance and stratification of soft-bottom macrobenthos from selected areas of the Ross Sea shelf (Antarctica). Polar Biology, 21(6): 347-354.

Gámez Vintaned, J.A., Mayoral, E. & Gozalo, R. 2000. Lower and Middle Cambrian trace fossils from Láncara and Oville formations in the area of Presa del Porma (Cantabrian Zone, northern Spain). *In* Aceñolaza, G.F. & Peralta, S. (eds.), The Cambrian from the southern edge. Instituto Superior de Correlación Geológica (INSUGEO), Miscelánea, 6: 91-94. Tucumán. # *Bergaueria, Cochlichnus, Cylindrichnus concentricus, Helminthopsis, Monocraterion, Neonereites, Planolites annularis, P. beverleyensis, Psammichnites, Rhizocorallium, Sericichnus mureroensis, Teichichnus*

Gámez Vintaned, J.A., Palacios, T., Fernández-Remolar, D. & Lián, E. 2000. The lowermost Cambrian in the Valdelascasa Anticline (central Spain): some new palaeontological data. *In* Aceñolaza, G.F. & Peralta, S. (eds.), The Cambrian from the southern edge. Instituto Superior de Correlación Geológica (INSUGEO), Miscelánea, 6: 95-96. Tucumán. # *Dactyloidites, Monomorphichnus lineatus, Phycodes pedum, Psammichnites gigas, Rusophycus, Treptichnus bifurcus*

Gammon, P.R. & James, N.P. 2001. Palaeogeographical influence on Late Eocene biosiliceous sponge-rich sedimentation, southern Western Australia. Sedimentology, 48: 559-584. # *Chondrites, Planolites, Skolithos, Thalassinoides*

Gandhi, M.S., Seetharamaiah, J. & Murthy, P.B. 2000. Sediment characteristics in the depositional environments of the Krishna Delta, east coast of India. Indian Journal of Marine Sciences, 29(2): 128-132.

Gangloff, R.A. & American Association for the Advancement of Science. 1999. Arctic dinosaurs and their Cretaceous record in Alaska. *In* Anderson, P.A. (ed.), Science in the North, 50 Years of Change, Program and Abstracts. American Association for the Advancement of Science, Arctic Division, Fairbanks, Alaska, 50: 288-289. # tracks

Gadzicka, E., Gierliski, G. & Smole, J. 2001. Dinosaur footprints in the Upper Jurassic of Poland. Polska Grupa Roboczas Systemu Jurajskiego - Jurassica, II Spotkanie, Starachowice, 27-29.09.2001. Polskie Towarzystwo Geologiczne, p. 7-8. [In Polish]. # tetrapods

Gadzicki, A., Michalík, J. & Tomašových, A. 2000. *Parafavreina* coprolites from the uppermost Triassic of the western Carpathians. Geologica Carpathica, 51(4): 245-250. # *Parafavreina thoronetensis,* Slovakia

Gee, H. 2000. Mitrates on the move. Nature, 407: 849-851. # trails, Echinodermata

Genise, J.F. 1998. Fossil bee cells from the Asencio Formation (Late Cretaceous-Early Tertiary) of Uruguay, South America. Proceedings of the First Paleoentomological Conference, Moscow, p. 27-32.

Genise, J.F. 2000. The ichnofamily Celliformidae for *Celliforma* and allied ichnogenera. Ichnos, 7(4): 267-282. # Celliformidae ifam. n., *Brownichnus favorites* igen. n., *Cellicalichnus chubutensis* igen. n., isp. n., *Celliforma spirifer, Corimbatichnus fernandezi, Ellipsoideichnus meyeri, Palmiraichnus castellanosi, Rosellichnus arabicus, Uruguay auroranormae,* Pleistocene, Miocene, Tertiary, Cretaceous, Kenya, Argentina, USA, Uruguay

Genise, J.F. 2000. Nidos fósiles de insectos en paleosuelos. Notas del Curso de Actualización sobre Icnología: aplicaciones en la geología sedimentaria y la industria petrolera. II Congreso Latinoamericano de Sedimentología y VII Reunión Argentina de Sedimentología, p. 46-60. # insects

Genise, J.F. 2000. Insect fossil nests. Abstracts of the I International Meeting on Paleoarthropodology. Riberão Preto, Brazil, September, p. 114-115.

Genise, J.F. 2000. The revolution of insect trace fossils. Abstracts of the I International Meeting on Paleoarthropodology. Riberão Preto, Brazil, September, p. 110-111.

Genise, J.F. 2000. Insect paleoichnology in South America: Past and Present. Abstracts of the I International Meeting on Paleoarthropodology. Riberão Preto, Brazil, September, p. 28-29.

Genise, J.F. 2001. Insect fossil nests in paleosols. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 9. # general

Genise, J.F. 2001. Una nueva traza meniscada en paleosuelos de la Formación Bajo Tigre (Cretacico Inferior) de Santa Cruz (Argentina). 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 43. # *Taenidium barretti,* Cretaceous, Argentina

Genise, J.F. 2001. Ichnia 2004: I International Congress on Ichnology, Trelew, Patagonia, Argentina, Museo Paleontologico Egidio Feruglio, April 2004. Ichnology Newsletter, 23: 62. # conference announcement

Genise, J.F., Archangelsky, M. and Cilla, G. 2000 Possible chironomid cases (Insecta: Diptera) from the Middle Triassic Los Rastros Formation (Ischigualasto-Villa Unión Basin), Western Argentina. Abstracts of the I International Meeting on Paleoarthropodology, Riberão Preto, Brazil, September, p. 118-119.

Genise, J.F., Bellosi, E.S. & González, M.G. 2001. Ichnofabrics and paleosols: an approach. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001, Abstracts. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # nonmarine environments, soil, general, Argentina, Uruguay, Egypt

Genise, J.F., Cladera, G. & Tancoff, F. 2001. La presencia de *Eatonichnus claronensis* en el Paleoceno del Chubut (Argentina). 4th Reunión Argentina de Icnologia y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 45. # insects, Paleocene, *Coprinisphaera* ichnofacies

Genise, J.F., Contreras, V.H. & Cilla, G. 2001. Trazas de equisetales en paleosuelos de la Formación Ischigualasto (Triásico) de San Juan. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 46. # plants, Triassic, Argentina

Genise, J.F. & Engel, M.S. 2000. The evolutionary history of sweat bees (Hymenoptera, Halictidae): integration of paleoentomology, paleoichnology, and phylogeny. Abstracts of the I International Meeting on Paleoarthropodology. Riberão Preto, Brazil. September, p. 116-117.

Genise, J.F. & Petrulevicius, J.F. 2001. Caddisfly cases from the early Eocene of Chubut, Patagonia Argentina. Second International Congress on Palaeoentomology, Kraków, p. ??.

Genise, J.F., Sciutto, J.C., Laza, J.H., González, M.G. & Bellosi, E.S. 2002. Fossil bee nests, coleopteran pupal chambers and tuffaceous paleosols from the Late Cretaceous Laguna Palacios Formation, central Patagonia (Argentina). Palaeogeography, Palaeoclimatology, Palaeoecology, 177: 215-235.

Gerdes, G., Klenke, T. & Noffke, N. 2000. Microbial signatures in peritidal siliciclastic sediments: a catalogue. Sedimentology, 47(2): 279-308. # bioturbation

Ghilardi, R.P. & Simoes, M.G. 2000. Bivalves fosseis como indicadores da dinamica sedimentar; um estudo de casos do Paleozoico superior da Bacia do Parana, Brasil. Estudos Tecnologicos, 23(51): 3-20. # bioerosion, Permian, Brazil

Geyer, G. & Landing, E. 2000. The Cambrian in Israel and Jordan – the feather edge of the Mediterranean Realm. *In* Aceñolaza, G.F. & Peralta, S. (eds.), The Cambrian from the southern edge. Instituto Superior de Correlación Geológica (INSUGEO), Miscelánea, 6: 98-101. Tucumán. # *Cruziana, Monocraterion, Planolites*

Gibert, J.M. de. 2001. Convergencia evolutiva del comportamiento y trazas fósiles. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 10. # general

Gibert, J.M. de. 2001. SKOLITHOS: one year (almost) of e-ichnological discussion: report of 2000 on the listserver. Ichnology Newsletter, 23: 9-10. # listserver review

Gibert, J.M. de. 2001. *Undichna gosiutensis,* isp. nov.: a new fish trace fossil from the Jurassic of Utah. Ichnos, 8(1): 15-22. # *Asteriacites lumbricalis, Gyrochorte comosa, Lockeia, Megagrapton, Palaeophycus, Planolites beverleyensis, P. montanus, Scalarituba missouriensis, Undichna gosiutensis* isp. n., USA

Gibert, J.M. de, Arbués, P., Puig, M. & Marzo, M. 2001. Implicaciones sedimentológicas de *Diplocraterion* en canales turbidíticos de Talud (Eoceno, Ainsa, NE de España). 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 48. # *Chondrites, Ophiomorpha, Paleodictyon,* Eocene, Spain

Gibert, J.M. de, Fregenal Martinez, M.A., Buatois, L.A. & Mángano, M.G. 2000. Trace fossils and their palaeoecological significance in Lower Cretaceous lacustrine conservation deposits, El Montsec, Spain. Palaeogeography, Palaeoclimatology, Palaeoecology, 156(1-2): 89-101. # *Cochlichnus anguineus, Gordia arcuata, Hamipes didactylus, Steinsfjordichnus brutoni, Undichna britannica*

Gibert, J.M. de, Muiz, F. & Mayoral, E. 2001. Estuarine *Gyrolithes nodosus* ichnofabric from the Pliocene of Lepe (Spain). VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001, Abstracts. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # *Cylindrichnus, Ophiomorpha nodosa, Palaeophycus, Planolites, Skolithos linearis, Teichichnus nodosus, Teichichnus rectus, Thalassinoides,* Miocene

Gibert, J.M. de, Muiz F. & Mayoral, E. 2001. Icnofábrica de *Gyrolithes nodosus* del Plioceno estuarino De Lepe (SO de España). IV Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 7. # *Cylindrichnus concentricus, Ophiomorpha nodosa, Palaeophycus, Planolites, Psilonichnus, Teichichnus rectus*

Gierliski, G., Niedwiecki, G. & Piekowski G. 2001. Gigantic footprint of a theropod dinosaur in the Early Jurassic of Poland. Acta Palaeontologica Polonica, 46(3): 441-446. # *Anchisauripus, Anomoepus, Kayentapus soltykovensis, Lockeia, Megalosauripus, Parabrontopodus, Spongeliomorpha,* vertebrates, reptiles

Gil, J., Segura, M. & García-Hidalgo, J.F. 2001. Characterización de los rizolitos en el Cenomaniense Superior de Torrelaguna (Madrid): Significado sedimentológico y estratigráfico. Boletín de la Real Sociedad Española de Historia Natural (Seccion Geológica), 96(3-4): 39-47. # rhizoliths, Cretaceous, Spain

Gilardi, J.D. & others. 1999. Biochemical functions of geophagy in parrots: detoxification of dietary toxins. Journal of Chemical Ecology, 25: 897-922. # modern, geophagy, Aves

Gingras, M.K., MacEachern, J.A. & Pemberton, S.G. 1998. A comparative analysis of the ichnology of wave- and river-dominated allomembers of the Upper Cretaceous Dunvegan Formation. Bulletin of Canadian Petroleum Geology, 46(1): 51-73. # *Anconichnus, Asterosoma, Chondrites, Helminthopsis, Macaronichnus, Palaeophycus, Planolites, Rhizocorallium, Siphonichnus, Skolithos, Teichichnus, Terebellina, Thalassinoides, Zoophycos,* fugichnia, Alberta, Canada

Gingras, M.K., McMillan, B. & Balcom, B.J. 2001. Using magnetic resonance imaging and petrographic techniques to understand the textural attributes and porosity distribution in burrowed media. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001, Abstracts. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # *Macaronichnus segregatis*, methods

Gingras, M.K. & Pemberton, S.G. 2000. A field method for determining the firmness of colonized sediment substrates. Journal of Sedimentary Research, 70(6): 1341-1344. # *Arenicolites, Diplocraterion, Gastrochaenolites, Glossifungites, Teredolites,* methods

Gingras, M.K., Pemberton, S.G., & Saunders, T.D.A. 2000. Firmness profiles associated with tidal creek deposits: the temporal significance of *Glossifungites* assemblages.

Journal of Sedimentary Research, 70(5): 1017-1025. # *Arenicolites, Diplocraterion, Gastrochaenolites, Gyrolithes, Palaeophycus, Planolites, Psilonichnus, Skolithos, Thalassinoides, Petricola pholadiformis, Polydora, Heteromastus,* methods, Pleistocene, Washington, USA

Gingras, M.K., Pemberton, S.G. & Saunders, T. 2001. Bathymetry, sediment texture, and substrate cohesiveness: their impact on modern *Glossifungites* trace assemblages at Willapa Bay, Washington. Palaeogeography, Palaeoclimatology, Palaeoecology, 169(1-2): 1-21. # resin casts, *Glossifungites* ichnofacies, cf. *Arenicolites,* cf. *Diplocraterion,* cf. *Gastrochaenolites,* cf. *Psilonichnus,* cf. *Thalassinoides,* Polychaeta Nereididae *Nereis,* Spionidae *Polydora proboscidea,* Terebellidae, Bivalvia *Petricola pholadiformis,* Arthropoda Crustacea Decapoda *Hemigrapsus oregonensis, Upogebia pugettensis,* Amphipoda *Corophium volutator,* Pleistocene, modern, Quaternary, Washington, USA

Gingras, M.K., Pemberton, S.G., Saunders, T.D.A. & Clifton, H.E. 1999. The ichnology of modern and Pleistocene brackish-water deposits at Willapa Bay, Washington: variability in estuarine settings. Palaios, 14(4): 352-374. # *Arenicolites, Chondrites, Cylindrichnus, Diplocraterion, Gyrolithes, Macaronichnus, Ophiomorpha, Palaeophycus, Planolites, Rhizocorallium, Siphonichnus, Skolithos, Thalassinoides, Trichichnus, Polydora, Corophium, Heteromastus, Paraonis, Nereis, Saccoglossus, Callianassa californiensis, Petricola, Upogebia, Nephtys, Macoma*, terebellids, maldanids, estuarine environment, USA

Giraud, F., Girard, C., Olivero, D., Reboulet, S., Aucour, A.M., Baudin, F., Bucher, H. 2000. Quantification de l'évolution biologique: caractérisation et signification des variations intra et intergroupes [Quantification of biologic evolution: characterization and significance of intra- and intergroup variation]. Colloque Actions thématiques innovantes 1998-1999 Sciences de l'Univers, Paris, 20-21 décembre 2000, p. 52-58.

Giraud, F., Olivero, D., Baudin, F., Reboulet, S., Pittet, B. & Proux, O. 2001. The OAE 1D (Latest Albian, SE France): organic facies, carbonate production and nannoplankton evolution. 7th International Conference on Paleoceanography, Sapporo (Japan), 16-22 September 2001, Abstracts, p. 107-108.

Giraud, F., Reboulet, S., Baudin, F., Olivero, D. & Aucour, A.M. 2000. Characterization and significance of calcareous nannoplancton during an 'anoxic' event: the Breistroffer level (Upper Albian, SE France). 8th International Nannoplankton Association Conference, September 11-15, 2000, Bremen, Germany, p. 102.

Gladenkov, A. Y. 1999. Kogda vpervyye otkrylsya Beringov proliv? Priroda, 1999(9): 29-31. # *Thalassinoides,* Russia

Glaub, I., Balog S.-J., Bundschuh, M., Gektidis, M., Hofmann, K., Radtke, G., Schmidt, H. & Vogel, K. 1999. Euendolithic Cyanobacteria/Cyanophyta and their traces in Earth history. *In* Charpy, L. & Larkum, A.W.D. (eds.), Marine Cyanobacteria. Bulletin de l'Institut Oceanographique, Monaco, no. special, 19: 135-142. # microborings, general

Glud, R.N., Holby, O., Hoffmann, F. & Canfield, D.E. 1998. Benthic mineralization and exchange in Arctic sediments (Svalbard, Norway). Marine Ecology Progress Series, 173: 237-251. # modern, Arctic Ocean, bioirrigation, bioturbation

Glynn, P.W. 1997. Coral reef bleaching: facts, hypotheses and implications. Global Change Biology, 2(6): 495-509. # bioerosion

Goedert, J.L., Peckmann, J. & Reitner, J. 2000. Worm tubes in an allochthonous cold-seep carbonate from lower Oligocene rocks of western Washington. Journal of Paleontology, 74(6): 992-999.

Goldring, R. 1999. Field Palaeontology (2nd edition). Longman, Harlow, UK, xv + 191 pp. # paleontology, ichnology, textbook (1st edition: *Fossils in the Field,* 1991)

Gomez, F.J. & Astini, R. 2001. Ichnofabric patterns in shallow-marine carbonate tidal flats? of the Middle Cambrian in the Precordillera. IV Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 49. # bioturbation

Gong, Y. 1999. Trace fossils and ichnofabrics from the Hercynian and Indosinian orogenic belts of the northwestern China and their palaeoenvironmental significance. *In* Yin, H. & Tong, J. (eds.), Proceedings of the International Conference on Pangea

and the Paleozoic-Mesozoic Transition. China University of Geosciences Press, Wuhan, China, p. 110-111.

Gong, Y. 2000. Behavioral diversity and complexity indicated by metazoan traces at a topological level since Proterozoic. Special Issue for the 31st International Geological Conference, China University of Geosciences, Hubei, China. Journal of China University of Geosciences, 11(3): 312-318.

Gong, Y. 2001. Trace fossils from the flysch sequences of the Silurian, Carboniferous and Triassic of the Tianshan and Kunlun-Qinling orogenic belts of northwestern China. Acta Palaeontologica Sinica, 40(2): 177-188. # *Helminthopsis hieroglyphica, Neonereites biserialis, N. uniserialis, Palaeophycus serratus, P. striatus, P. tubularis, Paleodictyon imperfectum, Phycodes circinnatum, P. incertum, Planolites annularis, P. beverleyensis, P. montanus, Rhizocorallium, Scalarituba missouriensis, Skolithos, Spirorhaphe, Sublorenzinia, Tambia, Taphrhelminthopsis auricularis, Teichichnus, Thalassinoides*

Gonzalez, B.G., Herrera, G.L.A. & Rosales, L.A. 1998. Catalogo de localidades fosiliferas de la Cuenca Buenavista-San Jose del Cabo, Baja California Sur, Mexico (Parte I: Tropico de Cancer-San Jose del Cabo). *In* Perrilliat, M.M.d.C. (ed.), Memoria del VI Congreso Nacional de Paleontologia. Sociedad Mexicana de Paleontologia, A.C., Mexico, 6: 25.

Gouramanis, C. 2000. Sedimentology and ichnology of Mount Bepcha, western Grampians, Victoria. 14th Victorian Universities Earth Sciences Conference. Geological Society of Australia, Abstracts, 62: 6. Sydney. # Devonian

Gran, V. & Pitkanen, H. 1999. Denitrification in estuarine sediments in the eastern Gulf of Finland, Baltic Sea. Hydrobiologia, 393: 107-115. # bioturbation

Grangeiro, M.E. & Netto, R.G. 2001. Icnofauna de depósitos costeiros modernos do Sul do Brasil. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 50. # *Chasmagnatus, Metasesarma, Callinectes, Psilonichnus,* recent, Brazil

Gravestock, D.I. & Shergold, J.H. 2001. Australian Early and Middle Cambrian sequence biostratigraphy with implications for species diversity and correlation. *In* Zhuravlev, A.Yu. & Riding, R. (eds.), The Ecology of the Cambrian Radiation. Columbia University Press, New York, p.107-136. # Australia

Gray, A.E., Mulligan, T.J. & Hannah, R.W. 1997. Food habits, occurrence, and population structure of the bat ray, *Myliobatis californica,* in Humboldt Bay, California. Environmental Biology of Fishes, 49: 227-238. # modern, USA

Gregory, M.R. 2001. The '*Phoebichnus* look like' – a fossilized root system? (and a large composite ichnofossil). North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 58. # Holocene, New Zealand

Gregory, M.R. 2001. *Protovirgularia* – local record of a seldom-recognized ichnotaxon. Abstracts and Programme, Geological Society of New Zealand Annual Conference 2001, 'Advances in Geosciences', Hamilton, New Zealand, 110A. # Miocene, Waitemata Group, New Zealand, cf. *Nereites* or *Polykampton, Protovirgularia, Scolicia;* modern, Bivalvia *Yoldia*

Gregory, M.R. & Campbell, K.A. 2001. Ichnofabrics of Quaternary dunes from Aupuri and Karikari peninsulas, northern New Zealand. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001, Abstracts. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # *Phoebichnus, Planolites, Skolithos, Thalassinoides,* nonmarine

Grey, M., Boulding, E. & Brookfield, M. 2001. Predator-prey interactions of moon snails and their bivalve prey. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 59. # [*Oichnus*], borings, predation

Groenewald, G.H., Welman, J. & MacEachern, J.A. 2001. Vertebrate burrow complexes from the Early Triassic *Cynognathus* zone (Driekoppen Formation, Beaufort Group) of

the Karoo Basin, South Africa. Palaios, 16(2): 148-160. # burrows, Vertebrata Cynodontia *Trirachodon*

Gupta, A. 1999. Early Permian palaeoenvironment in Damodar Valley coalfields, India: an overview. Gondwana Research, 2(2): 149-165.

Gürsu, S. & Göncüoglu, M.C. 2001. Characteristic features of the late Precambrian felsic magmatism in western Anatolia: implications for the pan-African evolution in NW Perigondwana. Gondwana Research, 4(2): 169-170. # *Cruziana, Diplichnites, Phycodes, Rusophycus,* Lower Cambrian, Turkey

Haag, T. 2000. Across the Karoo. Lapidary Journal, 53(11): 40-43, 48-49. # coprolites

Habgood, K. 1997. Coprolites as evidence of nutrient cycling in early terrestrial environments. Palaeontology Newsletter, 36: 22-23. # coprolites, Silurian, Devonian, England

Habrant, N. & Lathulière, B. 2000. Jurassic corals as emersion indicators. Lethaia, 33(4): 341-344. # Oxfordian, borings in Scleractinia Microsolenidae *Comoseris meandrinoides*

Hagadorn, J.W. 1998. Restriction of a late Neoproterozoic biotope: Ediacaran faunas, microbial structures, and trace fossils from the Proterozoic-Phanerozoic transition, Great Basin, USA. PhD Thesis, University of Southern California, Los Angeles, 198 pp.

Hagadorn, J.W. & Corsetti, F.A. 2000. Terminal Neoproterozoic-Lower Cambrian transition I: White-Inyo Mountains, CA. Geological Society of America, Abstracts with Programs, 33(3): 72. # Precambrian, USA

Hagadorn, J.W., Dott, R.H., Jr. & Damrow, D. 2000. Stranded on a Late Cambrian shoreline: medusoids of the Mt. Simon Formation, Wisconsin. 2000 California Paleontology Conference, Abstracts. University of California, Museum of Paleontology, Berkeley, California. PaleoBios. 20(1): 4.

Hagadorn, J.W., Pflüger, F. & Bottjer, D.J. (eds.). 1999. Unexplored microbial worlds. Palaios, 14:1-93. Tulsa.

Haines, P.W. 2000. Problematic fossils in the late Neoproterozoic Wonoka Formation, South Australia. Precambrian Research, 100(1-3): 97-108.

Hakenkamp, C.C. & Morin, A. 2000. The importance of meiofauna to lotic ecosystem functioning. Freshwater Biology, 44(1): 165-175.

Hanken, N.-M., Bromley, R.G. & Thomsen, E. 2001. Trace fossils of the bivalve *Panopea faujasi*, Pliocene, Rhodes, Greece. Ichnos, 8(2): 117-130. # *Scalichnus phiale* igen. n., isp. n.

Hansen, K., King, G.M. & Kristensen, E. 1996. Impact of the soft-shell clam *Mya arenaria* on sulfate reduction in an intertidal sediment. Aquatic Microbial Ecology, 10(2): 181-194.

Harris, P.T., Brancolini, G., Armand, L., Busetti, M., Beaman, R.J., Giorgetti, G., Presti, M. & Trincardi, F. 2001. Continental shelf drift deposit indicates non-steady state Antarctic bottom water production in the Holocene. Marine Geology, 179(1-2): 1-8. # bioturbation, Antarctica

Hasiotis, S.T. 1999. The origin and evolution of freshwater crayfish based on crayfish body and trace fossils. Proceedings of the Twelfth Symposium of the International Association of Astacology, Augsburg, Germany, 3-9 August, Freshwater Crayfish, 12: 49-70. # Pennsylvanian to modern, review article, freshwater environment, burrows, burrowing, Arthropoda Crustacea Decapoda Astacidae, Cambaridae, Parastacidae

Hasiotis, S.T. 2000. The invertebrate invasion and evolution of Mesozoic soil ecosystems: the ichnofossil record of ecological innovations. *In* Gastaldo, R.A. & DiMichele, W.A. (eds.), Phanerozoic terrestrial ecosystems. Paleontological Society Papers. 6: 141-169.

Hasiotis, S.T. 2000. Distribution and occurrence of trace fossils in the Upper Jurassic Morrison Formation, Rocky Mountains: interpreting how organism behavior reflects paleoenvironment and paleoclimate. Geological Society of America, Abstracts with Programs, 32(4): 16.

Hasiotis, S.T. 2001. Integrating ichnology and paleopedology to reconstruct Upper Jurassic Morrison terrestrial and freshwater paleoecosystems. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 63. # nonmarine, general

Hasiotis, S.T. 2001. Recognition and interpretation of complex ichnofossils of social organisms: understanding their evolution and roles in terrestrial peleoecosystems. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 63-64. # nonmarine, general

Hasiotis, S.T., Demko, T.M. & Dubiel, R.F. 2000. Shinarump incised valley cut-and-fill deposits, paleosols, and ichnofossils in the lower part of the Upper Triassic Chinle Formation, Petrified Forest National Park, Arizona: It really does exist, and it has regional stratigraphic implications. Geological Society of America, Abstracts with Programs, 33(4): 23. # USA

Hasiotis, S.T. & MacEachern, J. 2001. 'Using Ichnofacies to Delineate Stratigraphic Sequences, Interpret Environments, and Improve Reservoir Characterization', American Association of Petroleum Geologists - Society for Sedimentology, Annual Convention, Denver, Colorado (USA), June 3 to 6, 2001. Ichnology Newsletter, 23: 52. # conference announcement, Colorado, USA

Hasiotis, S.T., Miller, M.F., Isbell, J., Babcock, L.E. & Collinson, J.W. 1999. Triassic trace fossils from Antarctica: burrow evidence of crayfish or mammal-like reptiles? Resolving crayfish from tetrapod burrows. Proceedings of the Twelfth Symposium of the International Association of Astacology, Augsburg, Germany, 3-9 August, Freshwater Crayfish, 12: 71-81. # Lower Triassic, Pagoda Formation, Antarctica, Arthropoda Crustacea Decapoda crayfish; Permian, Karoo Basin, South Africa, burrows, Vertebrata Therapsida

Haughton, P.D.W. 2000. Evolving turbidite systems on a deforming basin floor, Tabernas, SE Spain. Sedimentology, 47(3): 497-518. # bioturbation

Hayden, M.C., Kirkland, J.I., Johnson, S., Lockley, M.G., Policelli, J. & Smith, J.A. 2001. A new dinosaur tracksite in St. George, Utah provides opportunities for science, education, and community involvement. Journal of Vertebrate Paleontology. 21(3, Suppl.): 59. # *Grallator*, Jurassic, USA

Hayward, J.L., Zelenitsky, D.K., Smith, D.L., Zaft, D.M. & Clayburn, J.K. 2000. Eggshell taphonomy at modern gull colonies and a dinosaur clutch site. Palaios, 15(4): 343-355. # Upper Cretaceous, Alberta, Canada, eggs, nests; modern, Washington, USA, eggs, nests, taphonomy, experiment, Vertebrata Aves Laridae *Larus californicus, L. delawarensis, L. glaucescens*

Heinze, M., Koehler, M. & Saenger, H. 1999. Biotic and abiotic factors influencing the long-term stability of covers on waste rock piles in the uranium mining district of Saxony and Thuringia (Germany). *In* Bengson, S.A. & Bland, D.M. (eds.), Proceedings of the 16th Annual National Meeting of the American Society for Surface Mining and Reclamation, Mining and Reclamation for the Next Millennium. Proceedings of the Annual National Meeting, 16(2): 435-443. # bioturbation

Hendry, J.P., Wilkinson, M., Fallick, A.E. & Trewin, N.H. 1998. Disseminated dolomite in highly bioturbated shelf sandstones: implications for syndepositional diagenesis. 15th International Sedimentological Congress, Alicante, Spain, p. 418-419.

Herring, P. 2002. The biology of the deep ocean. Oxford University Press, Oxford & New York, ix + 314 pp.

Hertweck, G. & Flessa, K.W. 2000. Zonacion de facies de las planicies de marea de Bahia la Choya, norte del Golfo de California – Facies zonation of the Bahia la Choya tidal flats, northern Gulf of California. *In* Cupul, M.L. (ed.), V Reunion Internacional Sobre Geologia de la Peninsula de Baja California. Universidad Autónoma de Baja California, Universidad Nacional Autónoma de México, Sociedad Geológica Peninsular. Loreto, Mexico, 5: 73-75. # bioturbation

Heydari, E. 2000. Sedimentologic characteristics of Upper Cretaceous Selma Chalk in Mississippi. American Association of Petroleum Geologists, Bulletin, 84(10): 1680. # *Chondrites*, *Planolites, Thalassinoides,* USA

Hilton, J., Wang, S., Galtier, J. & Li, C. 2001. An Early Permian plant assemblage from the Taiyuan Formation of northern China with compression/ impression and permineralized preservation. Review of Palaeobotany and Palynology, 114(3-4): 175-189. # coprolites

Hines, A.H., Whitlach, R.B., Thrust, S.F., Hewi, H.J.I., Cunnings, V.J., Dayton, P.K. & Legendre, P. 1997. Nonlinear foraging response of a large marine predator to benthic prey: eagle ray pits and bivalves in a New Zealand sand flat. Journal of Experimental Marine Biology and Ecology, 216: 191-210. # modern

Hippensteel, S.P. & Martin, R.E. 2001. Spatial variability of bioturbation in coastal salt marshes: implications for infaunal foraminiferal distributions and recovery of ecological signals. Geological Society of America, Abstracts with Programs, 33(6): 15. # recent, modern, USA

Hodell, D.A., Charles, C.D. & Sierro, F.J. 2001. Late Pleistocene evolution of the ocean's carbonate system. Earth and Planetary Science Letters, 192(2): 109-124. # Quaternary, South Atlantic Ocean, ODP Site 1089

Hoffmeister, A.P. & Kowalewski, M. 2001. Spatial and environmental variation in the fossil record of drilling predation: a case study from the Miocene of central Europe. Palaios, 16(6): 566-579. # Tertiary, early to middle Miocene, Burdigalian, Langhian, Serravallian, borings, predation, biogeography, Austria, Belgium, France, Germany, Hungary, Netherlands, Slovakia, drillholes in Bivalvia, Gastropoda

Hoffmeister, A.P., Kowalewski, M., Bambach, R.K. & Baumiller, T.K. 2001. Evidence for predatory drilling in late Paleozoic brachiopods and bivalve molluscs from west Texas. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 66-67. # [*Oichnus*], predation, borings, Permian, USA

Hofmann, H.J. & Mountjoy, E.W. 2001. *Namacalathus-Cloudina* assemblage in Neoproterozoic Miette Group (Byng Formation), British Columbia: Canada's oldest shelly fossils. Geology, 29(12): 1091-1094. # *Helminthoidichnites, Planolites*

Hollocher, T.C., Chin, K., Hollocher, K.T. & Kruge, M.A. 2001. Bacterial residues in coprolite of herbivorous dinosaurs: role of bacteria in mineralization of feces. Palaios, 16(6): 547-565. # Cretaceous, Montana, USA, Vertebrata Dinosauria

Holmes, K.E. 2000. Effects of eutrophication on bioeroding sponge communities with the description of new West Indian sponges, *Cliona* spp. (Porifera: Hadromerida: Clionidae). Invertebrate Biology, 119(2): 125-138. # *Cliona macgeachii, C. vastifica,* borings, Barbados

Holmes, K.E., Edinger, E.N., Hariyadi Limmon, G.V. & Risk, M J. 2000. Bioerosion of live massive corals and branching coral rubble on Indonesian coral reefs. Marine Pollution Bulletin, 40(7): 606-617.

Holmes, R. 2001. Vertebrate Paleontology, 2nd ed. – Michael J. Benton; Blackwell Science, Oxford, 2000, 452 pages, ISBN 0-362-05614-2, $24.95. Palaeogeography, Palaeoclimatology, Palaeoecology, 166(3-4): 423-424. # review of Benton (2000)

Holub, R. 2001. Palaeontology (translated by Mikuláš, R. & Rindsberg, A. K.). Ichnology Newsletter, 23: 160. # poem

Horne, D.J. 1999. Ocean circulation modes of the Phanerozoic: Implications for the antiquity of deep-sea benthonic invertebrates. Crustaceana, 72(8): 999-1018. Leiden.

Hubbard, S.M., Gingras, M.K. & Pemberton, S.G. 2000. The Bluesky Formation in the Cadotte Region of Alberta: an example of an economically significant estuarine deposits. Geoscience Canada, GAC/SPG Annual Meeting, Calgary, Core Conference, C.D. Volume, Paper 1229: 1-4. # Cretaceous, Canada

Hubbard, S.M., Pemberton, S.G. & Howard, E.A. 1999. Regional geology and sedimentologty of the basal Cretaceous Peace River Oil Sand deposit, north-central Alberta. Bulletin of Canadian Petroleum Geology, 47(3): 270-297. # *Asterosoma,*

Chondrites, Cylindrichnus, Diplocraterion, Gyrolithes, Macaronichnus, Palaeophycus, Planolites, Rosselia, Schaubcylindrichnus, Skolithos, Subphyllochorda, Teichichnus, Teredolites, Thalassinoides, roots, barrier, estuarine environment, Canada

Hughes, D.J., Atkinson, R.J.A. & Ansell, A.D. 1999. The annual cycle of sediment turnover by the echiuran worm *Maxmuelleria lankesteri* (Herdman) in a Scottish sea loch. Journal of Experimental Marine Biology and Ecology, 238(2): 209-223.

Hughes, D.J., Marrs, S.J., Smith, C.J. & Atkinson, R.J.A. 1999. Observations of the echiuran worm *Bonellia viridis* in the deep basin of the northern Evoikos Gulf, Greece. Journal of the Marine Biological Association of the United Kingdom, 79(2): 361-363. # *Callianassa subterranea, Nephrops norvegicus*

Hughes, J.E. 1996. Size-dependent, small-scale dispersion of the capitellid polychaete, *Mediomastus ambiseta*. Journal of Marine Research, 54(5): 915-937. # Rhode Island, USA, bioturbation, fecal pellets

Hunt, A.P. & Lucas, S.G. 2001. Nonmarine fossils from late Paleozoic redbeds in New Mexico and the timing of the ancestral Rocky Mountain Orogeny. Geological Society of America, Abstracts with Programs, 33(5): 45. # Carboniferous, Permian, USA

Hunt, A., Lucas, S.G. & Lockley, M.G. 2001. Vertebrate ichnofauna of the Upper Triassic Redonda Formation (Chinle Group), east-central New Mexico. Geological Society of America, Abstracts with Programs, 33(5): 56. # tracks, USA

Hunter, M. 1999. Evolution of a large Gondwanan coastal plain during the Devonian: evidence from the Falkland Islands. European Union of Geosciences Conference Abstracts; EUG 10. Cambridge Publications, Cambridge. Journal of Conference Abstracts, 4: 742-743. # *Cruziana, Skolithos,* bioturbation

Hutchings, P. 1998. Biodiversity and functioning of polychaetes in benthic sediments. Biodiversity and Conservation, 7(9): 1133-1145. # bioturbation, deposit-feeding

Hyacinthe, C., Anschutz, P., Carbonel, P., Jouanneau, J.-M. & Jorissen, F.J. 2001. Early diagenetic processes in the muddy sediments of the Bay of Biscay. Marine Geology, 177(1-2): 111-128. # biodiffusion, bioturbation, deepsea environment, France

Hymel, S.N. & Plante, C.J. 2000. Fate of bacteria transiting the gut of the deposit *feeder Abarenicola pacifica:* influence of temperature and sediment food concentration. Aquatic Microbial Ecology, 22(1): 93-101.

Horne, D.J. 1999. Ocean circulation modes of the Phanerozoic: implications for the antiquity of deep-sea benthonic invertebrates. Crustaceana, 72(8): 999-1018. # general

Iljina, L.B. 2001. On the possible predation of nonmarine gastropods. Paleontological Journal, 35(6): 589-590. # modern, Puerto Rico, Caribbean region, brackish environment, drillholes, borings in Gastropoda *Neritidae "Neritina" reclivata;* upper Meotian, Duabian, Chaudian, Khazarian, Khvalynian, Holocene, modern, Caspian Sea, former USSR, drillholes in Gastropoda Neritidae *Theodoxus pallasi*

Iljina, L.B. 2001. [On the possible predation of nonmarine gastropods]. Paleontologicheskii Zhurnal, 2001(6): 25-27. # modern, Puerto Rico, Caribbean region, brackish environment, drillholes, borings in Gastropoda Neritidae "Neritina" reclivata; upper Meotian, Duabian, Chaudian, Khazarian, Khvalynian, Holocene, modern, Caspian Sea, former USSR, drillholes in Gastropoda Neritidae *Theodoxus pallasi*

Ivantsov, A.Y. & Fedonkin, M.A. 2001. Locomotion trails of the Vendian invertebrates preserved with the producer's body fossils, White Sea, Russia. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 66-67. # *Kimberella, Yorgia*

Ivany, L.C. 2002. What's going on all in one place: Paleobiology II, edited by Derek E.G. Briggs and Peter R. Crowther ... American Paleontologist, 10(1): 12-14. # review of Briggs & Crowther (2001)

Jefferies, R.P.S. 2001. Ichnological evidence on the behaviour of mitrates: comments on the reply. Lethaia, 34(4): 262. # Lower Devonian, Hunsrück Slate, Germany, trails, mitrates, *Rhenocystis latipedunculata;* reply to Sutcliffe et al. (2000)

Jensen, S. 2001. *Conichnus* Männil 1966, not *Conichnus* Myannil 1966. Ichnos, 8(2): 141-142.

Jensen, S., Gehling, J.G., Runnegar, B.N. & Droser, M.L. 1999. Trace fossils and bioturbation in the Proterozoic. European Union of Geosciences Conference Abstracts; EUG 10. Cambridge Publications, Cambridge. Journal of Conference Abstracts, 4: 264-265.

Jensen, S. & Mens, K. 2001. Trace fossils *Didymaulichnus* cf. *tirasensis* and *Monomorphichnus* isp. from the Estonian Lower Cambrian, with a discussion on the early Cambrian ichnocoenoses of Baltica. Proceedings of the Estonian Academy of Sciences, Geology = Eesti Teaduste Akadeemia Toimetised, Geoloogia, 50(2): 75-85.

Jewell, Z.C., Alibhai, S.K. & Law, P.R. 2001. Censusing and monitoring black rhino (*Diceros bicornis*) using an objective spoor (footprint) identification technique. Journal of Zoology, London 254: 1-16. # footprints

Jimenez Hidalgo, E., Rueda Gaxiola, J. & Jimenez Renteria, J. 1998. Nuevas huellas de dinosaurios en el Jurasico medio de la Mixteca Alta Oaxaquena. *In* Perrilliat, M.M.d.C. (ed.), Memoria del VI Congreso Nacional de Paleontología. Sociedad Mexicana de Paleontología, A.C., México, México, Memoria del ... Congreso Nacional de Paleontología. Resumenes, 6: 36-37. # footprints, Jurassic

Joeckel, R.M., Cunningham, J., Phillips, P.L., Ludvigson, G.A., Witzke, B.J., Corner, R.G. & Brown, G.W. 2001. The first report of dinosaur tracks from Nebraska. Journal of Vertebrate Paleontology. 21(3, Suppl.): 66. # tracks, Cretaceous, USA

Johannesson, L.T., Stevens, R.J. & Alexanderson, J.H. 2000. Sediment character in a micro-tidal, harbor-estuary environment, Goteborg, Sweden. Estuaries, 23(3): 400-410. # bioturbation

Johnson, D.L. 2002. Darwin would be proud: bioturbation, dynamic denudation, and the power of theory in science. Geoarchaeology, 17(1): 7-40.

Johnson, S.C. & Lucas, S.G. 2001. Coniacian and Santonian selachian faunas, central New Mexico. Journal of Vertebrate Paleontology. 21(3, Suppl.): 66. # coprolites, Cretaceous, USA

Johnson, S.D., Flint, S., Hinds, D. & Ville Wickens, H. de, 2001. Anatomy, geometry and sequwence stratigraphy of basin floor to slope turbidite systems, Tanqua Karoo, South Africa. Sedimentology, 48: 987-1023. # *Chondrites, Cosmorhaphe, Gordia, Granularia, Helminthoida, Helminthopsis, Lophoctenium, Lorenzinia, Paleodictyon,* Permian

Johnston, C.A. 2001. Wetland soil and landscape alteration by beavers. In Richardson, J. L. & Vepraskas, M. J. (eds.), Wetland Soils: Genesis, Hydrology, Landscapes, and Classification. Lewis Publishers. Boca Raton, Florida, p. 391-408. # bioturbation

Jones, A.P., Shimazu, H., Oguchi, T., Okuno, M. & Tokutake, M. 2001. Late Holocene slackwater deposits on the Nakagawa River, Tochigi Prefecture, Japan. Geomorphology, 39(1-2): 39-51. # bioturbation

Jumars, P.A. 1996. Acoustic remote sensing of benthic activity: a statistical approach. Limnology and Oceanography, 41(6): 1220-1241. # modern, California, USA, water depth 91 m, methods, bioturbation, Echinoidea *Brissaster latifrons*

Juvigne, E. 1997. Les résultats palynologiques obtenus par Bruno Bastin en collaboration avec la Laboratoire de Géomorphologie et du Quaternaire de l'Université de Liege [Palynologic results obtained from Bruno Bastin in collaboration with the Laboratory of Geomorphology and the Quaternary, University of Liege]. Bulletin de la Société Belge de Géologie = Bulletin van de Belgische Vereniging voor Geologie, 106: 19-29. # bioturbation, Quaternary, Pleistocene

Kalashnikov, N.V. 1997. Sledy 'zhizni' v pozdnepaleozoyskikh otlozheniyakh yevropeyskogo severa. *In* Yushkin, N.P. (ed.), Syktyvkarskiy Paleontologicheskiy Sbornik, n. 2. Akademiya Nauk SSSR, Komi Filial, Institut Geologii, Syktyvkar, Russian Federation. Institut Geologii, Trudy, 91: 95-102. # upper Paleozoic, Russia

Kalbfleisch, W. B. C. & Jones, B. 1998. Sedimentology of shallow, hurricane-affected lagoons: Grand Cayman British West Indies. Journal of Coastal Research, 14(1): 140-160. # bioturbation

Kaplan, P. & Baumiller, T.K. 2001. A misuse of Occam's Razor that trims more than just the fat. Palaios, 16(5): 525-527. # Upper Ordovician, USA, borings in hardgrounds, drillholes in Brachiopoda, reply to Wilson & Palmer (2001)

Karvonen, R.L. 1997. Sedimentology, ichnology and stratigraphy of the Ostracode Member (Lower Cretaceous) in the Jenner-Suffield area, southeast Alberta. *In* Reinson, G.E. (ed.). Modern and ancient examples of clastic tidal deposits: a core and peel workshop. Second international research symposium on clastic tidal deposits, Aug. 22-25, 1989. Canadian Society of Petroleum Geologists. Calgary, Alberta. 103-123. # *Arenicolites, Bergaueria, Chondrites, Gyrolithes, Ophiomorpha, Palaeophycus, Planolites, Rhizocorallium, Rosselia, Skolithos, Thalassinoides,* barrier environment, bioturbation, Canada

Karvonen, R.L. & Pemberton, S.G. 1997. The Upper Manville in southeast Alberta, Canada: an example of multiple incised valley fill deposits. *In* Pemberton, S.G. & James, D.P. (eds.). Petroleum geology of the Cretaceous Mannville Group, western Canada. Canadian Society of Petroleum Geologists, Memoir, 18: 124-139 # *Skolithos,* fluvial environments, roots, Canada

Katari, K., Tauxe, L. & King, J. 2000. A reassessment of post-depositional remanent magnetism: preliminary experiments with natural sediments. Earth and Planetary Science Letters, 183(1-2): 147-160. # fecal pellets

Kauffman, M.E. 1999. Eocambrian, Cambrian, and transition to Ordovician. *In* Shultz, C.H. (ed.), The Geology of Pennsylvania. Geological Survey of Pennsylvania, Special Publication, p. 58-73. # *Skolithos,* USA

Kaufmann, R.S. & Smith, K.L., Jr. 1997. Activity patterns of mobile epibenthic megafauna at an abyssal site in the eastern North Pacific: results from a 17-month time-lapse photographic study. Deep-Sea Research, Part 1, Oceanographic Research Papers, 44(4): 559-579. # modern, deepsea environment, bioturbation, Holothuroidea *Abyssocucumis abussorum, Elpidia minutissima, Peniagone vitrea*

Kazanci, N., Emre, O. & Alcicek, M.C. 2001. Animal burrowing and associated formation of large desiccation cracks as factors of a rapid restoration of soil cover in flooded farmlands. Environmental Geology, 40(8): 964-967. Berlin. # bioturbation, burrows, floodplains, Turkey

Kelley, P.H., Hansen, T.A., Graham, S.E. & Huntoon, A.G. 2001. Temporal patterns in the efficiency of naticid gastropod predators in the Cretaceous and Cenozoic of the United States Coastal Plain. Palaeogeography, Palaeoclimatology, Palaeoecology, 166: 165-176. # predation, drillholes, Upper Cretaceous, Maastrichtian, Tertiary, Paleocene, Eocene, Oligocene, Miocene, Pliocene, Quaternary, Pleistocene, Alabama, Georgia, Louisiana, Maryland, Mississippi, North Carolina, Texas, Virginia, USA

Kemp, R.A., Derbyshire, E. & Meng, Xingmin. 2001. A high-resolution micromorphological record of changing landscapes and climates on the western Loess Plateau of China during oxygen isotope stage 5. Palaeogeography, Palaeoclimatology, Palaeoecology, 170(1-2): 157-169. # paleosols, loess, bioturbation, coprolites, Lanzhou, China, Quaternary

Kercsmar, Z. 2001. Ichnofossil-record (rock-borers) and taphonomical reconstruction (nummulite accumulations) of initial Eocene sequences in the eastern margin of the Eocene Tatabanya Basin, Hungary. *In* Wortmann, U.G. & Funk, H. (eds.), International Association of Sedimentologists, 21st Meeting, 3-5 September 2001, Davos, Switzerland, Abstract & Programme, p. 113. # *Aspidopholas, Lithophaga,* borings, bioerosion

K dzierski, M. & Uchman, A. 2001. Ichnofabrics of the Upper Cretaceous marlstones in the Opole region, southern Poland. Acta Geologica Polonica, 51(1): 81-91. # *Chondrites, Ophiomorpha, Palaeophycus, Phycosiphon, Planolites, Taenidium, Teichichnus, Thalassinoides suevicus, Trichichnus linearis*

Kelley, P.H. & Hansen, T.A. 1996. Recovery of the naticid gastropod predator-prey system from the Cretaceous-Tertiary and Eocene-Oligocene extinctions. In Hart, M.B. (ed.), Biotic recovery from mass extinction events. Geological Society of London Special Publication, 102: 373-386.

Kelley, P.H., Hansen, T.A., Graham, S.E. & Huntoon, A.G. 2001. Temporal patterns in the efficiency of naticid gastropod predators during the Cretaceous and Cenozoic of the United States Coastal Plain. Palaeogeography, Palaeoclimatology, Palaeoecology, 166: 165-176. # Upper Cretaceous, Maastrichtian, Tertiary, Paleocene, Eocene, Oligocene, Miocene, Pliocene, Quaternary, Pleistocene, Alabama, Georgia, Louisiana, Maryland, Mississippi, North Carolina, Texas, Virginia, USA, predation, drillholes, borings, Gastropoda Naticidae

Kendall, M.A. & Widdicombe, S. 1999. Small scale patterns in the structure of macrofaunal assemblages of shallow soft sediments. Journal of Experimental Marine Biology and Ecology, 237(1): 127-140. # modern, bioturbation, shallow marine environment, Annelida, Mollusca, Crustacea

Kershaw, S. & Guo, L. 2001. Marine notches in coastal cliffs: indicators of relative sea-level change, Perachora Peninsula, central Greece. Marne Geology, 179(3-4): 213-228. # Quaternary, Holocene, Greece, bioerosion

Key, H.__., Kelly, P.H., Dietl, G.P. & Hansen, T.A. 2001. Muricid vs. naticid gastropod predation on Cretaceous to Recent coastal plain mollusc assemblages: drilling cycles of different periodicities. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 78. # [*Oichnus*], predation, borings, Eocene, Oligocene, Miocene, Pliocene, Pleistocene, USA

Kidwell, S.M., Rothfus, T.A. & Best, M.M.R. 2001. Sensitivity of taphonomic signature to sample size, sieve size, damage scoring system, and target taxa. Palaios, 16(1): 26-52. # especially modern, Panama, Caribbean Sea, methods, drillholes, bioturbation

Kirby, M.X. 1999. Stable isotope sclerochronology and paleoecology of Cenozoic oysters (*Crassostrea*). Unpublished Ph.D. thesis, University of California, Davis, Davis, California, United States, 120 p. # Tertiary, Quaternary, coevolution, borings in Bivalvia Ostreidae *Crassostrea*

Klaus, G. & others. 1998. Geophagy by large mammals at natural licks in the rain forest of the Dxanga National Park, Central African Reublic. Journal of Tropical Ecology, 14: 829-839. # coprolites

Kluessendorf, J. 1997. Silurian (Llandovery-?Ludlow) ichnofaunal trend in Wisconsin and Illinois. Geological Society of America, Abstracts with Programs, 29(4): 26. # *Chondrites, Palaeophycus, Planolites, Rhizocorallium, Sinusites, Thalassinoides,* USA

Knaust, D. 2001. Environmental significance of ichnofabrics with *Siphonichnus* and *Lingulichnus* in the Mesozoic of Norway. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001. Sociedad Venezolana de Geólogos, PDVSA, Abstracts. [1 p., no pagination]. # *Asterosoma, Conichnus, Macaronichnus, Phycosiphon, Planolites, Rosselia, Scolicia, Teichichnus, Terebellina,* Jurassic, Cretaceous

Knaust, D. 2001. Ichnology and *Cruziana* stratigraphy of a Cambro-Ordivician succession of SW-Norway: trilobite faunal provincionalism on Baltica? VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001. Sociedad Venezolana de Geólogos, PDVSA, Abstracts. [1 p., no pagination]. # *Cruziana barbata, C. furcifera, C. semplicata, Didymaulichnus rouaulti, Cruziana* ichnofacies, *Skolithos* ichnofacies

Kohl, J. & Martin, R.E. 1999. Bioturbation rates in Delaware salt marshes: implications for the recognition of ecological signals. Geological Society of America, Abstracts with Programs, 31(3): 56. # recent, USA

Komatsu, T., Saito, R. & Fürsich, F. 2001. Mode of occurrence and composition of bivalves of the Middle Jurassic Mitarai Formation, Tetori Group, Japan. Paleontological Research, 5(2): 121-129. # *Beaconites, Palaeophycus, Phycosiphon, Skolithos, Spirophycus, Teredolites*

Kourampas, N. & Robertson, A.H.F. 2000. Controls on Plio-Quaternary sedimentation within an active fore-arc region: Messenia Peninsula (SW Peloponnese), S. Greece. *In* Panayides, I., Xenophontos, C. & Malpas, J. (eds.), Proceedings of the Third International Conference on the Geology of the eastern Mediterranean. Ministry of

Agriculture, Natural Resources and Environment, Geological Survey Department. Nicosia, Cyprus, p. 255-285. # bioturbation, Pliocene, Pleistocene, Quaternary

Kowalewski, M. 2001. Applied marine paleoecology: an oxymoron or reality? Palaios, 16(4) :309-310. # editorial, taphonomy

Kowalewski, M., Simes, M.G., Torello, F.F., Mello, F.H.C.& Ghilardi, F.P. 2000. Drill holes in shells of Permian benthic invertebrates. Journal of Paleontology, 74(3): 532-543. # [*Oichnus*], predation, borings, Texas, USA, Brazil, Russia, Greece

Kowalska, K., McDaniel, D. & Hasiotis, S.T. 2000. Hymenopteran cocoons from the Upper Triassic Chinle Formation, Arizona: comparison with other Mesozoic and Cenozoic hymenopteran ichnofossils. Geological Society of America, Abstracts with Programs, 32(4): 22. # insects, Utah, USA

Kristensen, E. 2000. Organic matter diagenesis at the oxic/anoxic interface in coastal marine sediments, with emphasis on the role of burrowing animals. Hydrobiologia, 426(1-3):1-24. # bioturbation

Kristensen, E. & Holmer, M. 2001. Decomposition of plant materials in marine sediment exposed to different electron acceptors (O_2, NO_3 and SO_4^{-2}), with emphasis on substrate origin, degradation kinetics, and the role of bioturbation. Geochimica et Cosmochimica Acta, 65(3): 419-433.

Krull, E.S. & Retallack, G.J. 2000. $\delta^{13}C$ depth profiles from paleosols across the Permian-Triassic boundary in Antarctica: evidence for methane release. Geological Society of America Bulletin, 112: 1459-1472.

Krull, E.S., Retallack, G.J., Campbell, H.J. & Lyon, G.L. 2000. $\delta^{13}C_{org}$ chemostratigraphy of the Permian-Triassic boundary in the Maitai Group, New Zealand: evidence for high latitude methane release. New Zealand Journal of Geology and Geophysics, 43: 21-32.

Krutak, P.R. & Sablina, Y. 1999. Codell Sandstone (Turonian) hydrocarbon potential, west-central Denver Basin, Colorado, USA. Geological Society of America, Abstracts with Programs, 31(7): 62. # bioturbation, Cretaceous, USA

Kuleta, M., Niedwiedzki, G. & Ptaszyski, T. 2001. Tropy kr gowców z retu Barnowa, Góry wi tokrzyskie (Vertebrate tracks from the Roethian of Barnów (Holy Cross Mts, Central Poland). Przegld Geologiczny, 49(4): 325-327. # *Capitosaurides, Chirotherium barthi, Rhynchosauroides schochardti,* footprints, dinosaurs, reptiles, Triassic

Labandeira, C.C. 1996. Book review of: *Invasions of the Land: the Transitions of Organisms from Aquatic to Terrestrial Life,* by M.S. Gordon and E.C. Olsen [Columbia University Press, 1995, 312 pp.] Écoscience, 3(2): 127-128.

Labandeira, C.C. 1997. Permian pollen eating. Science, 277: 1422-1423.

Labandeira, C.C. 1997. Insect mouthparts: ascertaining the paleobiology of insect feeding strategies. Annual Review of Ecology and Systematics, 28: 153-193.

Labandeira, C.C. 1988. Early history of arthropod and vascular plant associations. Annual Review of Earth and Planetary Sciences, 26: 329-377.

Labandeira, C.C. 1988. How old is the flower and the fly? Science, 280: 57-59.

Labandeira, C.C. 1988. The role of insects in Late Jurassic to middle Cretaceous ecosystems. *In* Lucas, S.G., Kirkland, J.I. & Estep, J.W. (eds.), Lower and Middle Cretaceous Terrestrial Ecosystems. New Mexico Museum of Natural History and Science Bulletin, 14: 105-124. Albuquerque.

Labandeira, C.C. 2000. The paleobiology of pollination and its precursors. *In* Gastaldo, R.A. & DiMichele, W.A. (eds.), Phanerozoic Terrestrial Ecosystems. Paleontological Society Papers, 6: 233-269.

Labandeira, C.C. 2001. Multiple approaches toward understainding relationships among organisms and their environment: the centrality of ichnodata. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 11. # general

Labandeira, C.C. 2001. The rise and diversification of insects. *In* Briggs, D.E.G. & Crowther, P.R., (eds.), Palaeobiology II. Blackwell Science, Oxford, pp. 82-88. # pellets, herbivory

Labandeira, C.C., Le Page, B.B. & Johnson, A.H. 2001. Colonization of *Larix* (Pinaceae) by *Dendroctonus* bark beetles (Scolytidae): ancient association or subsequent transfer? 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 51. # insects, wood borings

Labandeira, C.C. & Phillips, T.L. 1996. Insect fluid-feeding on Upper Pennsylvanian tree ferns (Palaeodictyoptera, Marattiales) and the early history of the piercing-and-sucking functional feeding group. Annals of the Entomological Society of America, 89(2): 157-183.

Labandeira, C.C. & Phillips, T.L. 1996. A Late Carboniferous petiole gall and the origin of holometabolous insects. Proceedings of the National Academy of Sciences of the United States, 93: 8470-8474.

Lamond, R.E. 2001. Quaternary lacustrine and peri-lacustrine ichnofabrics in the Turkana Basin of northern Kenya. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001, Abstracts. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # nonmarine environments, Africa

Lange, B.B. & Lafon, J.P. 2000. Découverte de pistes de dinosaures théropodes dans le Lias inférieur des environs de Figeac (Lot). Comptes Rendus de l'Académie des Sciences, Série II. Sciences de la Terre et des Planetes, 330(5): 379-384. # *Eubrontes,* tetrapods, footprints, Jurassic, France

Larkin, N.R., Alexander, J. & Lewis, M.D. 2000. Using experimental studies of recent faecal material to examine hyaena coprolites from the West Runton Freshwater Bed, Norfolk, U.K. Journal of Archaeological Science, 27(1): 19-31.

Larsen, M., Piasecki, S., Preuss, T., Seidler, L., Stemmerik, L., Therkelsen, J. & Vosgerau, H. 1998. Petroleum geological activities in East Greenland in 1997. Danmarks og Grnlands Geologiske Undersgelse, 180: 35-42. # bioturbation, Cretaceous, Jurassic, Triassic, Permian

Lazo, D. 2001. Distribución ambiental de trazas fósiles del miembro inferior de la Formación Agrio, Cretácico de Cuenca Neuquina. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 52. # *Chondrites, Gyrochorte, Planolites, Protovirgularia, Rosselia, Scolicia, Teichichnus, Thalassinoides,* Cretaceous, Argentina

Lebold, J.G. 2000. Quantitative analysis of epizoans on Silurian stromatoporoids within the Brassfield Formation. Journal of Paleontology, 74(3): 394-403. # Lower Silurian, Llandoverian, Ohio, USA, borings in Porifera Stromatoporoidea

Lech, R.R., Aceñolaza, F.G. & Griznik, M.M. 2000. Icnofacies *Skolithos-Ophiomorpha* en el Neogeno del valle inferior del río Chubut, provincia del Chubut, Argentina. *In* Aceñolaza, F.G. & Herbst, R. (eds.), El Neógeno de Argentina. INSUGEO, Serie Correlación Geológica, 14: 147-161. Tucumán. # *Conostichus, Cylindrichnus concentricus, Ophiomorpha nodosa, Planolites beverleyensis, Polykladichnus irregularis, Rosselia socialis, Skolithos linearis, Thalassinoides suevicus,* Miocene, Pliocene, Argentina

Lee, S.Y. 1999. Tropical mangrove ecology: Physical and biotic factors influencing ecosystem structure and function. Australian Journal of Ecology, 24(4): 355-366.

Lee, Y.-N. & Huh, M. 2002. Manus-only sauropod tracks in the Uhangri Formation (Upper Cretaceous), Korea and their paleobiological implications. Journal of Paleontology, 76(3): 558-564. # tracks, natichnia, Vertebrata Dinosauria Sauropoda

Lee, Y.N., Yu, K.M. & Wood, C.B. 2001. A review of vertebrate faunas from the Gyeongsang Supergroup (Cretaceous) in South Korea. Palaeogeography, Palaeoclimatology, Palaeoecology, 165(3-4): 357-373. # tracks

Lefebvre, B. & David, B. 2001. Ichnological evidence on the behaviour of mitrates: reply. Lethaia, 34(4): 260-261. # Lower Devonian, Germany, trails, Echinodermata, mitrates, *Rhenocystis latipedunculata;* reply to Sutcliffe et al. (2000)

Lehrmann, D.J. 1999. Early Triassic peritidal cycles: an example of anachronistic carbonate facies from the Nanpanjiang Basin, Guizhou Province, south China. Geological Society of America, Abstracts with Programs, 31(7): 280. # bioturbation

Lehrmann, D.J.; Wan, Yang; Wei, Jiaoyong; Yu, YouYi & Xiao, Jiafei. 2001. Lower Triassic peritidal cyclic limestone: an example of anachronistic carbonate facies from the Great Bank of Guizhou, Nanpanjiang Basin, Guizhou province, South China. Palaeogeography, Palaeoclimatology, Palaeoecology, 173(3-4): 103-123. # bioturbation, Olenikian

Leigh, D. 1998. Evaluating artifact burial by eolian vs. bioturbation processes, South Carolina Sandhills, USA. Geoarchaeology, 13: 309-330. # modern, archaeology, bioturbation

Leighton, L.R. 1999. Possible latitudinal predation gradient in middle Paleozoic oceans. Geology, 27: 47-50.

Leighton, L.R. 2001. Evaluating the accuracy of drilling frequency as an estimate of prey preference and predation intensity. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 83. # [*Oichnus*], predation

Lerner, A. J., Lucas, S.G. & Haubold, H. 2001. First occurrence of *Amphisauropus* and *Varanopus* in the Lower Permian Abo Formation, central New Mexico. Geological Society of America, Abstracts with Programs, 33(5): 46. # USA

Levis, L. 2002. *T-rex:* speed walker, not runner. Geotimes, 47(4): 11. # Cretaceous, tracks, locomotion, Vertebrata Dinosauria *Tyrannosaurus rex,* news report about John R. Hutchinson & Mariano Garcia, popular

Li, R. & Zhang, G. 2001. A preliminary study of nonmarine trace fossils from the Laiyang Group (Early Cretaceous). Laiyang Basin, eastern China. Acta Palaeontologica Sinica, 40(2): 252-261. [In Chinese, English abstract]. # *Cochlichnus anguineus, Diplocraterion parallelum, Helminthoidichnites tenuis, Palaeophycus tubularis, Paragrallator yangi, Planolites montanus, Scolicia, Scoyenia gracilis, Taenidium cameroensis, Thalassinoides,* tetrapod footprints, fluvial, lacustrine environment

Lichte, M. 2000. Bioturbation responsible for the concentration of stonelines? Zeitschrift für Geomorphologie, 44(4): 533-534.

Lidz, B. H. & Hallock, P. 2000. Sedimentary petrology of a declining reef ecosystem, Florida reef tract (U.S.A.). Journal of Coastal Research, 16(3): 675-697.

Liebig, K., Westall, F. & Schmitz, M. 1996. A study of fossil microstructures from the Eocene Messel Formation using transmission electron microscopy. Neues Jahrbuch für Geologie und Paläontologie. Monatshefte, 1996(4): 218-231. # microborings

Lindsay, S.M., Wethey, D.S. & Woodin, S.A. 1996. Modeling interactions of browsing predation, infaunal activity, and recruitment in marine soft-sediment habitats. American Naturalist, 148(4): 684-699. # bioturbation, disturbance, Polychaeta Arenicolidae *Abarenicola pacifica*

Lipps, J.H. & Fedonkin, M.A. 1998. Icnofósiles en la Formación Wyman, Neoproterozoica, del sureste de California [Ichnofossils in the Wyman Formation, Neoproterozoic of southeastern California]. *In* Perrilliat, M.M.d.C. (ed.), Memoria del VI Congreso Nacional de Paleontologia. Sociedad Mexicana de Paleontologia, A.C., Mexico, Resumenes, 6: 38. # *Scolicia, Planolites*, Neoproterozoic, Upper Precambrian, California, USA

Lobza, V. & Schieber, J. 1999. Ichnofacies: burrow community, or hierarchy of emplacement? Examples from the Dowelltown Member of the Chattanooga Shale, Upper Devonian, central Tennessee. Geological Society of America, Abstracts with Programs, 31(7): 104. # *Chondrites, Palaeophycus, Planolites, Teichichnus*, USA

Lockley, M. 2000. This brand of faith: this faith of Brand. Ichnos, 7(4): 307-316. # book review of Brown (1999)

Lockley, M. 2001. *The Science and Art of Tracking.* Ichnos, 8(1): 77-81. # book review of Brown (1999)

Lockley, M.G. 2001. A decade of dinosaur tracking at Dinosaur Ridge. Mountain Geologist, 38(3): 119-135. # Jurassic, USA

Lockley, M.G., Hook, N. & Taylor, A. 2001. A brief history of paleontological research and public education on Dinosaur Ridge. Mountain Geologist, 38(3): 87-95. # Jurassic, USA

Lockley, M.G., Meyer, C.A. & Moratalla, J.J. 1998. *Therangospodus:* trackway evidence for the widespread distribution of a Late Jurassic theropod with well-padded feet. Gaia, 15: 339-353. # *Therangospodus oncalensis,* Portugal, Turkmenistan, Utah, Colorado, USA

Lockley, M.G., Meyer, C.A. & Santos, V.F. dos, 1996. *Megalosauripus, Megalosauropus* and the concept of megalosaur footprints. Museum of Northern Arizona Bulletin, 60: 113-118. Flagstaff. # Jurassic, Cretaceous, Turkmenistan

Lockley, M.G., Meyer, C.A. & Santos, V.F., dos, 1998. *Megalosauripus* and the problematic concept of megalosaur footprints. Gaia, 15: 313-337. Lisboa. # *Eubrontes glenrosensis, Eutynichnium lusitanicum, Megalosauripus uzbekistanicus* comb. nov., *M. teutonicus,* Jurassic, Cretaceous, Canada, Portugal, Spain, Turkmenistan, Arizona, Texas, Utah, USA

Lockley, M.G., Ritts, B.D. & Leonardi, G. 1999. Mammal track assemblages from the Early Tertiary of China, Peru, Europe and North America. Palaios, 14(4): 398-404. # Eutheria, Perissodactyla

Lockley, M G., Wright, J.L. & Matsukawa, M. 2001. A new look at *Magnoavipes* and so-called 'big bird' tracks from Dinosaur Ridge (Cretaceous, Colorado). Mountain Geologist, 38(3): 137-146. # *Magnoavipes caneeri,* USA

Löwemark, L. 2001. Biogenic traces as palaeoceanographic indicators in Late Quaternary sediments from the SW Iberian margin. Berichte - Reports, Institut für Geowissenschaften, Universität Kiel, 14: 1-138 + I-V. # *Chondrites, Palaephycus, Phycosiphon, Planolites, Scolicia, Thalassinoides, Trichichnus, Zoophycos,* mycelia, deep sea, Holocene, Portugal

Löwemark, L. & Werner, F. 2001. Dating errors in high-resolution stratigraphy: a detailed X-ray radiograph and AMS-^{14}C study of *Zoophycos* burrows. Marine Geology, 177(3-4): 191-198. # methods, Iberian continental slope, North Atlantic Ocean, also equatorial Atlantic Ocean, Mediterranean Sea, Pacific Ocean, Quaternary, Pleistocene

Löwemark, L., Werner, F. & Schäfer, P. 2001. Ethological implications from a detailed X-ray radiograph and ^{14}C-study of the modern deep-sea *Zoophycos*. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination].

Loope, D.B. & Dingus, L. 1999. Mud-filled *Ophiomorpha* burrows from the Upper Cretaceous continental redbeds of southern Mongolia: ichnologic clues to the origin of detrital, grain-coating clays. Geological Society of America, Abstracts with Programs, 31(7): 281-282.

Lopez, M.N. & Ardevol, L. 1999. Hallazgo de *Dactyloidites ottoi* (Geinitz, 1849) en la Arenisca de Aren (Cretacico superior surpirenaico). Revista Española de Paleontologia, Numero extraordinario: 129-133. # Upper Cretaceous, Spain

Lucas, C.H. & Holligan, P.M. 1999. Mature and ecological implications of algal pigment diversity on the Molenplaat tidal flat (Westerschelde Estuary, SW Netherlands). Marine Ecology Progress Series, 180: 51-64. # modern, bioturbation, Polychaeta Arenicolidae *Arenicola marina*

Lucas, S.G. 2001. Taphotaxon. Lethaia, 34(1): 30. # new term

Luckenbach, M. W. & Orth, R. J. 1999. Effects of a deposit-feeding invertebrate on the entrapment of *Zostera marina* L. seeds. Aquatic Botany, 63(1): 235-247. # *Clymenella torquata*

Macchioni, F. 2000. Bioeroded and/or encrusted ammonite moulds and their taphonomic implications. Rivista Italiana di Paleontologia e Stratigrafia. Milano, 106(3): 337-352.

Macchioni, F. & Parisi, G. 1999. Effects of compaction in ammonite moulds and their taphonomic implications, an example from the Rosso Ammonitico of the Northern Apennines (early-middle Toarcian, Umbria-Marche, Italy). Berichte der Geologischen Bundesanstalt, 46: 77. # borings, bioerosion

MacEachern, J.A., Stelck, C.R. & Pemberton, S.G. 1999. Marine and marginal marine mudstone deposition: paleoenvironmental interpretations based on the integration of ichnology, palynology and foraminiferal paleoecology. *In* Bergman, K.M. & Snedden, J.W. (eds.), Isolated shallow marine sand bodies: sequence stratigraphic analysis and sedimentologic interpretation. Society for Sedimentary Geology (SEPM), Special Publication, 64: 205-225. # *Anconichnus, Arenicolites, Asterosoma, Chondrites, Cylindrichnus, Diplocraterion, Helminthopsis, Lockeia, Ophiomorpha, Palaephycus, Phycosiphon, Planolites, Rhizocorallium, Rosselia, Schaubcylindrichnus, Siphonichnus, Skolithos, Subphyllochorda, Teichichnus, Terebellina, Thalassinoides, Zoophycos,* fugichnia, Cretaceous, Canada

MacEachern, J.A., Zaitlin, B.A. & Pemberton, S.G. 1998. High-resolution sequence stratigraphy of early transgressive deposits, Viking Formation, Joffre Field, Alberta, Canada. American Association of Petroleum Geologists, Bulletin, 82(5A): 729-756. # *Asterosoma, Bergaueria, Conichnus, Cylindrichnus, Diplocraterion, Helminthopsis, Lockeia, Ophiomorpha, Palaeophycus, Rosselia, Siphonichnus, Teichichnus, Terebellina,* escape structures, *Glossifungites* ichnofacies, *Cruziana* ichnofacies, *Skolithos* ichnofacies, Cretaceous

MacEachern, J.A., Zaitlin, B.A. & Pemberton, S.G. 1999. Coarse-grained, shoreline-attached, marginal marine parasequences of the Viking Formation, Joffre Field, Alberta, Canada. *In* Bergman, K. M. & Snedden, J. W. (eds.), Isolated shallow marine sand bodies: sequence stratigraphic analysis and sedimentologic interpretation. Society for Sedimentary Geology (SEPM), Special Publication, 64: 273-296. # *Anconichnus, Arenicolites, Asterosoma, Bergaueria, Conichnus, Cylindrichnus, Diplocraterion, Gastrochaenolites, Helminthopsis, Lockeia, Macaronichnus, Ophiomorpha, Palaeophycus, Rhizocorallium, Rosselia, Schaubcylindrichnus, Siphonichnus, Skolithos, Teichichnus, Terebellina, Thalassinoides, Zoophycos,* escape structures, roots, *Glossifungites* ichnofacies, *Cruziana* ichnofacies, *Skolithos* ichnofacies, Cretaceous, Canada

MacNaughton, R.B., 2001. Sir William E. Logan: the contributions to ichnology of Canada's 'greatest scientist'. Ichnology Newsletter, 23: 32-34. # *Climactichnites, Protichnites, Skolithos*, Cambrian, Canada

MacNaughton, R.B. & Lane, L.S., 2001. Evidence for behavioural evolution in the early lineage of the Cambrian trace fossil *Oldhamia*, British Mountains, Yukon. Canadian Paleontology Conference, Program and Abstracts, 11: 32.

MacNaughton, R.B., Lukie, T.D., Cole, J.M., Dalrymple, R.W., Braddy, S.J., & Briggs, D.E.G., 2001. Arthropod trackways from Cambro-Ordovician aeolian sandstone, Nepean Formation, southeastern Ontario: the earliest non-marine trace fossils? Alberta Palaeontological Society, Fifth Annual Symposium, Abstracts Volume, p. 47.

MacNaughton, R.B., Narbonne, G.M. & Dalrymple, R.W. 2000. Neoproterozoic slope deposits, Mackenzie Mountains, northwestern Canada: implications for passive-margin development and Ediacaran faunal ecology. Canadian Journal of Earth Sciences = Revue Canadienne des Sciences de la Terre, 37(7): 997-1020. # *Cyclomedusa, Pteridinium,* Ediacaran, Precambrian

Magalhaes, R.C.M. & Souto, P.R.d.F. 1999. Fragmentos de cascas de ovos fosseis e coprolitos da Bacia Bauru (KS): aplicação na interpretação paleoambiental. *In* Dias, B.D. de, C.J.C. & Rohn, R. (eds.), Fourth Annual Conference of IGCP Project 381; South Atlantic Mesozoic Correlations. UNESP, IGCE, Departamento de Geologia Sedimentar, Rio Claro, Brazil, Boletim do Simposio sobre o Cretaceo do Brasil, 5: 501-507. # coprolites, Cretaceous, Brazil

Maldonado, M. & Uriz, M.J. 1999. Microrefuge exploitation by subtidal encrusting sponges: patterns of settlement and post-settlement survival. Marine Ecology Progress Series, 174: 141-150. # modern, larval settlement, bioturbation

Malpas, J.A. 2000. Integrated sedimentology and palaeontological analysis of marine flooding surfaces: a case study of the Miocene, Nukhul Formation, Gulf of Suez. American Association of Petroleum Geologists, Bulletin. 84(11): 1867-1868. # Egypt

Malpas, J., Pollard, J.E. & Gawthorphe, R.L. 2001. Trace fossil and ichnofabric analysis of offshore to shoreface carbonate clastic sediments and related surfaces: a case

study to the syn-rift, Nukhul Formation (Miocene), Suez Rift, Egypt. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001, Abstracts. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # *Chondrites, Gastrochaenolites, Laminites, Ophiomorpha, Planolites, Thalassinoides*

Mandic, O. & Piller, W.E. 2001. Pectinid coquinas and their palaeoenvironmental implications: examples from the early Miocene of northeastern Egypt. Palaeogeography, Palaeoclimatology, Palaeoecology, 172(3-4): 171-191. # bioturbation, *Ophiomorpha, Thalassinoides,* boring Porifera, boring Bivalvia *Lithophaga,* Tertiary, Burdigalian

Mángano, M.G. & Buatois, L.A. 2000. Ichnology, sedimentology dynamics, and sequence stratigraphy of the Mesón Group: a Cambrian macrotidal shallow-marine depositional system in northwest Argentina. *In* Aceñolaza, G.F. & Peralta, S. (eds.), The Cambrian from the southern edge. Instituto Superior de Correlación Geológica (INSUGEO), Miscelánea, 6: 109-110. Tucumán. # *Arenicolites, Diplocraterion, Cruziana, Diplichnites, Helminthoidichnites, Palaeophycus, Planolites, Rusophycus, Skolithos, Syringomorpha nilssoni*

Mángano, M.G. & Buatois, L.A. 2001. The *Syringomorpha* ichnofabric: pervasive bioturbation and the Cambrian explosion. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001, Abstracts. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # *Daedalus, Diplocraterion, Skolithos, Syringomorpha nilssoni,* Argentina

Mángano, M.G. & Buatois, L.A. 2001. *Rusophycus leiferikssoni* en la Formación Campanario: implicancias paleobiológicas, paleoecológicas y paleoambientales. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 54. # *Syringomorpha, Cruziana,* Cambrian, Ordovician, Argentina

Mángano, M.G. & Buatois, L.A. 2001. Stop 1: The Cambrian Mesón Group at Angosto de Perchel. *In* Buatois, L.A. & Mángano, M.G. (eds.), Ichnology, Sedimentology and Sequence Stratigraphy of Selected Lower Paleozoic, Mesozoic and Cenozoic Units of Northwest Argentina, Fourth Argentinean Ichnologic Meeting and Second Ichnologic Meeting of Mercosur, September 29th - October 1st, Field Guide, p. 39-44. Tucumán. # *Arenicolites, Cruziana problematica, Diplichnites, Diplocraterion, Palaeophycus tubularis, Planolites, Rusophycus leiferikssoni, Skolithos linearis, Syringomorpha nilssoni,* Argentina

Mángano, M.G. & Buatois, L.A. 2001. Stop 2A: The Cambrian Mesón Group at Angosto de Chucalezna. *In* Buatois, L.A. & Mángano, M.G. (eds.), Ichnology, Sedimentology and Sequence Stratigraphy of Selected Lower Paleozoic, Mesozoic and Cenozoic Units of Northwest Argentina, Fourth Argentinean Ichnologic Meeting and Second Ichnologic Meeting of Mercosur, September 29th - October 1st, Field Guide, p. 45-49. Tucumán. # *Arenicolites, Diplocraterion, Rusophycus leiferikssoni, Skolithos, Syringomorpha nilssoni,* Argentina

Mángano, M.G. & Buatois, L.A. 2001. Stop 3: The Upper Cambrian to Tremadoc Santa Rosita Formation at Quebrada del Salto Alto. *In* Buatois, L.A. & Mángano, M.G. (eds.), Ichnology, Sedimentology and Sequence Stratigraphy of Selected Lower Paleozoic, Mesozoic and Cenozoic Units of Northwest Argentina, Fourth Argentinean Ichnologic Meeting and Second Ichnologic Meeting of Mercosur, September 29th - October 1st, Field Guide, p. 45-59. Tucumán. # *Conostichus, Cruziana omanica, C. problematica, C. semplicata, C. tortworthi, Helminthopsis abeli, Monomorphichnus bilineatus, M. multilineatus, Palaeophycus tubularis, Rusophycus carbonarius, R. latus,* Ordovician, Argentina

Mángano, M.G., Buatois, L.A. & Muiz-Guinea, F. 2001. Stop 2B: The Upper Cambrian to Tremadoc Santa Rosita Formation at Angosto de Chucalezna. *In* Buatois, L.A. & Mángano, M.G. (eds.), Ichnology, Sedimentology and Sequence Stratigraphy of Selected Lower Paleozoic, Mesozoic and Cenozoic Units of Northwest Argentina, Fourth Argentinean Ichnologic Meeting and Second Ichnologic Meeting of Mercosur, September 29th - October 1st, Field Guide, p. 50-54. Tucumán. # *Arenicolites, Arthrophycus, Bergaueria, Cruziana furcifera, C. semplicata, Didymaulichnus, Dimorphichnus,*

Diplichnites, Monocraterion, Monomorphichnus, Palaeophycus tubularis, Phycodes palmatus, Rusophycus latus, R. polonicus, Skolithos linearis, Teichichnus rectus, Trichophycus, Argentina

Mángano, G., Droser, M. & Jensen, S. 2001. The Great Ordovician Biodiversification Event: evidence from trace fossils and ichnofabric. PaleoBios, 21(2, Suppl. 2): 7. # *Cruziana, Nereites, Thalassinoides*, USA

Manni, R., Nicosia, U. & Nobili, G. 1999. An unusual tetrapod trackway from Lower Jurassic marine sediments of central Italy: *Accordiichnus natans* n. ichnogen., n. ichnosp. Geologica Romana, 35: 167-187. # tracks, reptiles

Marquillas, R. 2001. Stromatolites of the Yacoraite Formation in the Cabra Corral Dam. *In* Buatois, L.A. & Mángano, M.G. (eds.), Ichnology, Sedimentology and Sequence Stratigraphy of Selected Lower Paleozoic, Mesozoic and Cenozoic Units of Northwest Argentina, Fourth Argentinean Ichnologic Meeting and Second Ichnologic Meeting of Mercosur, September 29th - October 1st, Field Guide, p. 60-62. Tucumán. # circular structures, lacustrine, nonmarine, Maastrichtian, Paleocene, Argentina

Martin, A.J. 1998. Trace fossils in the tree root *Stigmaria* (Lower Pennsylvanian) indicating early feeding behavior of xylic substrates. Bulletin of the Georgia Academy of Science, 56: 60. # Carboniferous, Tennessee, USA

Martin, A.J. 2001. Evidence for insect nesting anjd its paleoenvironmental significance in the Two Medicine Formation (Late Cretaceous), Choteau, Montana. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 88. # *Palmiraichnus, Coprinisphaera* ichnofacies, USA

Martin, A.J. 2001. An ichnologist learns from 'The Tracker': a review of an Advanced Tracking Course taught by Tom Brown, Jr. Ichnology Newsletter, 23: 39-43. # course review, ethnoichnology, tracking, education, biography, T. Brown Jr.

Martin, A.J. 2001. 'New Methods in Paleoichnology': review of a symposium at the 31st International Geological Congress, Rio de Janeiro, Brazil, August 7 to 8, 2000. Ichnology Newsletter, 23: 44-46. # conference review, Brazil

Martin, A.J. 2001. Sapelo Island Ichnology and Taphonomy field trip. Ichnology Newsletter, 23: 55-56. # conference announcement, Sapelo Island, Georgia, USA, field trip

Martin, A.J. 2001. Probable mammal burrows in the Two Medicine Formation (Late Cretaceous) of Choteau, Montana. Journal of Vertebrate Paleontology. 21(3, Suppl.): 77-78.

Martin, A.J., Buatois, L.A. & Mángano, M.G. 1998. A tale of two estuaries: an ichnologic comparison of early and late Paleozoic estuarine sequences, USA. *In* Canaveras, J.C., Garcia, d.C.M.A., Soria, J., Melendez, H.A. & Soria, A.R. (eds.), 15th International Sedimentological Congress: Sedimentology at the Dawn of the Third Millennium, Abstracts. Alicante, Spain, p. 534. # Georgia, Kansas, Tennessee, USA

Martin, D. 2000. Ruth D. Turner, 85, expert on the wood-eating mollusk. New York Times, 9 May(C): 30. # biography, Ruth D. Turner, xylic borings, boring Bivalvia Teredinidae

Martin, J.E., Schumacher, B.A., Parris, D.C. & Grandstaff, B.S. 1998. Fossil vertebrates of the Niobrara Formation in South Dakota. Dakoterra, 5: 39-54. # Cretaceous, USA, coprolites, Vertebrata Reptilia

Martin, M.W., Grazhdankin, D.V., Bowring, S.A., Evans, D.A.D., Fedonkin, M.A. & Kirschvink, J.L. 2000. Age of Neoproterozoic bilaterian body and trace fossils, White Sea, Russia: Implications for Metazoan evolution. Science, 288(5467): 841-845. # *Kimberella*, Ediacaran, Precambrian, Precambrian, Russia

Martinez Fregenal, M.A. & Melendez, N. 2000. The lacustrine fossiliferous deposits of the Las Hoyas Subbasin (Lower Cretaceous, Serrania de Cuenca, Iberian Ranges, Spain). *In* Gierlowski-Kordesch, E.H. & Kelts, K.R. (eds.), Lake basins through space and time. American Association of Petroleum Geologists, Studies in Geology, 46: 303-314. # Spain

Martins-Neto, R. & Gallego, O.F. 2001. A Coleção Paleoicnológica da Sociedade Brasileira de Paleoartropodologia. 4th Reunión Argentina de Icnología y Segunda

Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 55. # Carboniferous, Cretaceous, Oligocene, Brazil

Martire, L. & Torta, S. 2000. Pseudoborings in ammonite molds: The combined result of predation and taphonomic-reworking (Bajocian, Normandy, N. France). Palaios, 15(4): 356-362. # Jurassic

Marvin-DiPasquale, M.C. & Capone, D.G. 1998. Benthic sulfate reduction along the Chesapeake Bay central channel. I. Spatial trends and controls. Marine Ecology Progress Series, 168: 213-228. # USA, estuarine environment, bioturbation

Matisoff, G. & Wang, X. 2000. Particle mixing by freshwater infaunal bioirrigators: Midges (Chironomidae: Diptera) and mayflies (Ephemeridae: Ephemeroptera). Journal of Great Lakes Research, 26(2): 174-182. # recent, insects, lacustrine, bioturbation

Matisoff, G., Wang, X. & McCall, P.L. 1999. Biological redistribution of lake sediments by tubificid oligochaetes: *Branchiura sowerbyi* and *Limnodrilus hoffmeisteri/Tubifex tubifex*. Journal of Great Lakes Research, 25(1): 205-219. # Lake Erie, USA, freshwater environment, bioturbation, fecal pellets, advection

Matsumoto, K., Broecker, W.S., Clark, E., McCorkle, D.C., Martin, W.R. & Hajdas, I. 2001. Can deep ocean carbonate preservation history inferred from atmospheric pCO_2 account for ^{14}C and $\%CaCO_3$ profiles on the Ontong-Java Plateau? Earth and Planetary Science Letters, 192(3): 319-329. # bioturbation, Pacific Ocean

May, J.A. & Warme, J.E. 2000. Sequence stratigraphy of a middle Eocene submarine-canyon complex and related strata, San Diego, California. Geological Society of America, Abstracts with Programs, 33(3): 35.

May, K.C. & American Association for the Advancement of Science. 1999. First documented dinosaur and bird tracks from the Late Cretaceous Prince Creek Formation, National Petroleum Reserve, Alaska. *In* Anderson, P.A. (ed.), Science in the North: 50 Years of Change, Program and Abstracts, Arctic Science Conference, 50: 213. Fairbanks, Alaska.

Mayor, A. & Sarjeant, W.A.S. 2001. The folklore of footprints in stone: from classical tomes to present. Ichnos, 8(2): 143-163. # history, tetrapods

Mayoral, E. & Muiz, F. 2001. New ichnospecies of *Cardioichnus* from the Miocene of the Guadalquivir Basin, Huelva, Spain. Ichnos, 8(1): 69-76. # *Arenicolites, Cardioichnus reniformis* isp. n., *Conichnus, Cylindrichnus, Dactyloidites, Gyrolithes, Lithoplaision, Macanopsis, Ophiomorpha, Palaeophycus, Phycodes, Psilonichnus, Rosselia, Scalarituba, Scolicia, Skolithos, Spongeliomorpha, Taenidium, Teichichnus, Thalassinoides*

Mazzetta, G.V. & Blanco, R.E. 2001. Speeds of dinosaurs from the Albian-Cenomanian of Patagonia and sauropod stance and gait. Acta Palaeontologica Polonica, 46(2): 235-246. # *Sauropodichnus giganteus*, tetrapods, trackways, footprints, reptiles, Cretaceous, Argentina

Mazik, K. & Elliott, M. 2000. The effects of chemical pollution on the bioturbation potential of estuarine intertidal mudflats. Helgoland Marine Research, 54(2-3): 99-109.

Mazin, J.M., Hantzpergue, P., Bassoulet, J.P., Bernier, P., Buchy, M.C., Gaillard, C., Lafaurie, G., Métayer, F., Olivero, D. & Vignaud, P. 1998. Upper Jurassic high biodiversity: the Tithonian 'lagerstätte' of Crayssac (Lot, Quercy, France). Congres International: Paléodiversifications: Terres et Mers Comparées - Lyon, 6-8 juillet 1998, p. 44.

Mazin, J.M., Hantzpergue, P., Bassoulet, J.P., Bernier, P., Buchy, M.C., Gaillard, C., Lafaurie, G., Métayer, F., Olivero, D. & Vignaud, P. 1998. A high biodiversity revealed by ichnites in the lower Tithonian of Crayssac (Quercy, France). Congres International: Paléodiversifications: Terres et Mers Comparées - Lyon, juillet 1998 [poster].

McConaughy, D.T. & Engelder, T. 2001. Joint initiation in bedded clastic rocks. Journal of Structural Geology, 23: 203-221. # burrows, trace fossils, tectonics, Devonian, New York, USA

McCrea, R.T., Lockley, M.G. & Meyer, C.A. 2001. Global distribution of purported ankylosaur track occurrences. In Carpenter, K. (ed.), The Armored Dinosaurs. Indiana University Press, Bloomington & Indianopolis, p. 413-454. # Jurassic, Aalenian to Bajocian, Cretaceous, Valanginian to Maastrichtian, tracks, Vertebrata Dinosauria Ankylosauridae, Nodosauridae, *Deltapodus brodericki, Ligabuichnium bolivianum, Macropodosaurus gravis, Metatetrapous gravis, Tetrapodosaurus borealis*

McCrea, R.T. & Sarjeant, W.A.S. 2001. New ichnotaxa of bird and mammal footprints from the Lower Cretaceous (Albian) Gates Formation of Alberta. *In* Tanke, D.H. & Carpenter, K. (eds.), Mesozoic Vertebrate Life. New Research Inspired by the Paleontology of Philip J. Currie. Indiana University Press, Bloomington & Indianapolis, p. 453-478. # *Aquatilavipes swiboldae, A. curriei, Fuscinapeda, Tricorynopus brinkmani*

McDowell, T.A. & Miller, M.F. 2000. Facies distribution of trace fossils and bioturbation in Permian and Mesozoic fluvial deposits, Colorado Plateau. Geological Society of America, Abstracts with Programs, 32(5): 33. # Triassic

McKay, R.M. 2000. The Cambrian Jordan Sandstone at Point Ann, Pikes Peak State Park, and in McGregor. *In* Anderson, R.R. & Bunker, B.J. (eds.), The Natural History of Pikes Peak State Park, Clayton County, Iowa. Geological Society of Iowa Guidebook, 70: 13-23. # *Skolithos,* Cambrian, USA

McKinney, F. K. 1997. Fecal pellet disposal in marine bryozoans. Invertebrate Biology, 116: 151-160. # modern, fecal pellets

McLaurin, B.T., Wroblewski, A.F.J. & Steel, R.J. 1999. Tidal and brackish water indicators in 'fluvial' successions: Castlegate Sandstone (Campanian: Book Cliffs, Utah), Ferris and Hanna formations (Maastrichtian-Thanetian: southern Wyoming). Geological Society of America, Abstracts with Programs, 31(7): 283. # *Cylindrichnus, Ophiomorpha, Thalassinoides,* Cretaceous, Paleocene, Utah, USA

Mehling, C.M. 2001. Additions to the Upper Cretaceous vertebrate fauna of Ramanessin Brook, New Jersey. Journal of Vertebrate Paleontology. 21(3, Suppl.): 80. # bioturbation, burrows

Mehrotra, R.C., Mandaokar, B.D., Tiwari, R.P. & Rai, V. 2001. *Teredolites clavatus* from the Upper Bhuban Formation of the Aizawl District, Mizoram, India. Ichnos, 8(1): 63-68. # Miocene

Melchor, R.N. 2001. Icnología y sedimentología de una sucesión lacustre influenciada por tormentas: Formación Los Rastros (Triásico), Talampaya, La Rioja. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 56. # *Bifurculapes, Cochlichnus anguineus, Cruziana problematica, Didymaulichnus lyelli, Diplichnites, Diplopodichnus biformis, Gordia marina, Helminthoidichnites tenuis, Palaeophycus tubularis, Protichnites, Treptichnus pollardi, Undichna britannica, U. bina, U. insolenta*, Triassic, Argentina

Melchor, R., Bellosi, E., Genise, J. 2001. Trazas fosiles de un delta lacustre Triásico: Formación Los Rastros, Parque Ischigualasto, San Juan. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 57. # *Archaeonassa fossulata, Cochlichnus anguineus, Didymaulichnus, Gordia marina, Helminthoidichnites tenuis, Helminthopsis hieroglyphica, Palaeophycus tubularis, Rhynchosauroides, Undichna britannica*, lacustrine, Triassic, Argentina

Melchor, R., Bellosi, E. & Valais, S. de 2001. Icnología de vertebrados e invertebrados en facies de barreal, Cuenca Cuyana (Triásico), Norte de Mendoza. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 58. # *Aulichnites, Brachychirotherium, Chirotherium barthi, Dicynodontipus, Diplichnites, Diplopodichnus biformis, Helminthoidichnites tenuis, Palaeophycus tubularis, Rigalites, Treptichnus pollardi, Rusophycus carbonarius, R. stromnessi,* tetrapods, footprints, Triassic, Argentina

Melchor, R.N., Genise, J.F. & Verde, M. 2001. Invertebrate trace fossils from Triassic continental sequences of San Juan province, Argentina. VII International Symposium Mesozoic Terrestrial Ecosystems, Publicación Especial, I 7: 127-131.

Melendez, A., Soria, A.R. & Melendez, N. 2000. A coastal lacustrine system in the lower Barremian from the Oliete Subbasin, Central Iberian Range, northeastern Spain. *In* Gierlowski-Kordesch, E.H. & Kelts, K.R. (eds.), Lake basins through space and time. American Association of Petroleum Geologists, Studies in Geology, 46: 279-284. # bioturbation

Menzies, P. & D'Aluisio, F. 2000. Biobots. Discover, 21(9): 86-93. # modern, robots, trackways

Messina, P. 2000. Footprints as inquiry-based learning tools. Journal of Geoscience Education, 48(5): 667-672. # Jurassic, modern, Connecticut, USA, tracks, Vertebrata Dinosauria

Metz, R. 2000. Triassic trace fossils from lacustrine shoreline deposits of the Passaic Formation, Douglassville, Pennsylvania. Ichnos, 7(4): 253-266. # *Cochlichnus anguineus, Helminthoidichnites tenuis, Helminthopsis hieroglyphica, Scoyenia gracilis, Spongeliomorpha mildfordensis, Treptichnus pollardi*

Metz, R. 2001. Trace fossils in Silurian and Devonian strata from the Delaware Water Gap National Recreation Area, New Jersey. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 93. Berkeley. # *Cruziana, Chondrites, Palaeophycus, Planolites, Rusophycus, Skolithos,* USA

Meyer, C.A., Lockley, M.G., Leonardi, G. & Anaya, F. 1999. Late Cretaceous vertebrate ichnofacies of Bolivia: facts and implications. Journal of Vertebrate Paleontology, 19: 63. # footprints, tetrapods

Meyer, G.A. & Wood, S.H. 1999. Alluvial fan deposits as recorders of fire and geomorphic response. Geological Society of America, Abstracts with Programs, 31(7): 312. # bioturbation, Holocene, USA

Mezga, A. & Bajraktarevic, Z. 1999. Cenomanian dinosaur tracks on the islet of Fenoliga in southern Istria, Croatia. Cretaceous Research, 20(6): 735-746. # footprints, vertebrates

Michalski, M. 1999. Mosasaur bites or punctured limpet home scars? Acta Paleontologica Polonica, 44(3): 347-348. # paper review of Kase et al. (1998), predation

Mikuláš, R. 2000. Fosilní stopy (ichnofosilie) v díle K.M. Sternberga. Muzejní a Vlastivedná Práce, 38: 161-165. [In Czech, English summary]. # *Chondrites cretaceus, Chondrites targionii var. expansus, Fucoides, Hydrancylus, Muensteria hoessi, Nereites irregularis,* collections, K.M. Sternberg, Jurassic, Cretaceous, Czech Republic, Germany, Austria

Mikuláš, R. 2000. Geologické aspekty innosti vel (Hymenoptera: Apoidea) v recentních ekosystémech eské republiky (Geological aspects of life activities of bees (Hymenoptera: Apoidea) in Recent ecosystems of Czech Republic). Klapalekiana 36: 275-282. # *Celliforma pinturensis, Colletes daviesanus, Pterostichus*, bioerosion, insects, terrestrial environment

Mikuláš, R. 2000. Poznámky k projecvu°m bioturbace na archeologických nalezis^tích. Biogenní pr^ecracování archeologických nalezis^t^ v kvartérnich osypech pískovcových pr^evisu° v severozápadni c^ásti chko kokor^ínkso (Notes on the manifestation of bioturbation on archaeological sites: the biogenic readjustment of archaeological sites in the Quaternary cover of a sandstone ledge in the north-western part of the Kokor^ín Nature Reserve). Archeologické rozhledy, 52: 101-113. Praha. # Quaternary, Czech Republic, paleosols, root traces, burrows, Insecta, Vertebrata Amphibia frog, Mammalia Rodentia ground squirrel, vole, Carnivora badger, fox

Mikuláš, R. 2001. The trace fossil *Rejkovicichnus necrofilus* Mikuláš et al., 1996 (Middle Cambrian, Czech Republic): an early example of 'gardening'. Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, 2001(1): 56-64.

Mikuláš, R. 2001. Ichnofosilie metamorfovaného paleozoika Vyhnanického hbetu (?ordovik, v echy) (Trace fossils from the Palaeozoic metamorphic rocks at Vyhnanice [?Ordovician, east Bohemia, Czech Republic]). Zprávy o geologických výzkumech v roce 2000: 36-38. Praha. # *Pragichnus fascis, Skolithos linearis*

Mikuláš, R. 2001. Nález ichnofosilie *Chondrites* Sternberg, 1833, ve „scyphocrinitovém horizontu" (devon Barrandienu) (A find of the ichnofossil *Chondrites* Sternberg, 1833, in the so-called „*Scyphocrinites* Horizon" [Devonian, Barrandian area, Czech Republic]). Zprávy o geologických výzkumech v roce, 2000: 38-39. Praha. [In Czech, English abstract.] # *Chondrites intricatus,* Devonian

Mikuláš, R. 2001. Nález ichnofosilií v tenickém souvrství (tremadok, ordovik Barrandienu) od Libeova (A find of trace fossils in the Tenice Formation at Libeov [Tremadocian, Ordovician, Czech Republic]). Zprávy o geologických výzkumech v roce, 2000: 39-40. Praha. [In Czech, English abstract.] # *Bergaueria langi, Planolites, Phycodes, Skolithos*

Mikuláš, R. 2001. Nález ichnofosilií v kídových sedimentech eskobudjovické pánve (zlivské s.) u Zahájí (A find of ichnofossils in the Cretaceous sediments of the eské Budjovice Basin (Zliv Formation) at Zahájí, south Bohemia, Czech Republic). Zprávy o geologických výzkumech v roce, 2000: 41-43. Praha. [In Czech, English abstract.] # *Monomorphichnus, Planolites*

Mikuláš, R. & Dvoák, Z. 2001. Fossil biogenic structures (?invertebrate eggs) attached to mollusc shells (Miocene; North Bohemian Brown Coal Basin, Czech Republic). Journal of the Czech Geological Society, 46(3-4): 289-292. # biogenic structures

Mikuláš, R., Fejfar, O., igová, A. & Kadlecová, E. 2001. Ichnofabric in terrestrial volcanic context (Déta locality, Oligocene, Czech Republic). VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001, Abstracts. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # nonmarine environments, *Celliforma*, root traces

Mikuláš, R., Kadlecová, E. & Dvoák, Z. 2001. Gnawing traces on reptile and mammal bones from Ahníkov (North Bohemian brown-coal basin, Miocene, Czech Republic). *In* J. Pešek, Opluštil, S. & Pešková, J. (eds.), 9th Coal Geology Conference, Prague 2001, Abstracts, p. 30. # Miocene, bones, tetrapods

Mikuláš, R. & Nehyba, S. 2001. Ichnofosilie v horninách pedpokládaného spodnokambrického stáí v podloí hornin Karpatské pedhlubn na Jiní Morav (Trace fossils of the presumed Lower Cambrian underlying the fill of the Carpathian fore-deep [south Moravia, Czech Republic]). Zprávy o geologických výzkumech na Morav a ve Slezsku, 2000: 47-49. [In Czech, English abstract.] # *Diplocraterion, Skolithos, Planolites*

Miller, M.F. 2000. Benthic aquatic ecosystem across the Permian-Triassic transition: record from biogenic structures in fluvial sandstones, central Transantarctic Mountains. Journal of African Earth Sciences, 31(1): 157-164. # shafts, horizontal, bilobed traces, nonmarine, insects

Miller, M.F. 2001. Styles of behavioral complexity record by Paleozoic trace fossils. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 94. # *Cruziana, Diplocraterion, Palaeophycus, Planolites, Skolithos, Zoophycos,* Devonian, New York, USA

Miller, M.F. & Curran, H.A. 2001. Behavioral plasticity of modern and Cenozoic burrowing thalassinidean shrimp. Palaeogeography, Palaeoclimatology, Palaeoecology, 166(1-2): 219-236. # *Ophiomorpha nodosa, Thalassinoides, Neotrypaea californiensis,* Miocene, Pleistocene, USA, California, Maryland, Bahamas

Miller, M.F., Hasiotis, S.T., Babcock, L.E., Isabell, J.L. & Collinson, J.W. 2001. Tetrapod and large burrows of uncertain origin in Triassic high paleolatitude floodplain deposits, Antarctica. Palaios, 16(__): 218-232. # nonmarine, reptiles

Miller, M.F. & Smail, S.E. 1997. Permian and Triassic nonmarine aquatic infaunal activity assessed semi-quantitatively using bedding-plane bioturbation indices. Geological Society of America, Abstracts with Programs, 29(7): 61

Miller, R.F. 1996. Location of trace fossils and problematica of George Frederic Matthew from Part W, *Treatise on Invertebrate Paleontology*. Journal of Paleontology, 70(1): 169-171. # museum catalog

Miller, W., III. 2000. Trace fossil assemblages in Cretaceous-Paleogene pelagic limestones of the Belluno area, northeastern Italy. Memorie di Scienze Geologiche, 52(2): 175-192. Padova. # *Chondrites intricatus, C. targionii, ?Cladichnus fischeri, ?Cosmorhaphe, Phycodes palmatus, Planolites, Scolicia, Taenidium barretti, Thalassinoides paradoxicus, T. suevicus, Rhizocorallium, Zoophycos*

Miller, W., III. 2001. *Thalassinoides-Phycodes* compound burrow systems in Paleocene deep-water limestone, southern Alps of Italy. Palaeogeography, Palaeoclimatology, Palaeoecology, 170: 149-156. # *Phycodes palmatus, Planolites, Scolicia, Thalassinoides suevicus, Zoophycos*

Miller, W., III. 2001. An introduction to complex trace fossils. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 94. # *Zoophycos,* general

Miller, W., III. 2001. 'New Interpretations of Complex Trace Fossils', North American Paleontological Convention, Berkeley, California (USA), June 26 to July 1, 2001. Ichnology Newsletter, 23: 53. # conference announcement, California, USA

Miller, W., III & D'Alberto, L. 2001. Paleoethologic implications of *Zoophycos* from Late Cretaceous and Paleocene limestones of the Venetian Prealps, northeastern Italy. Palaeogeography, Palaeoclimatology, Palaeoecology, 166: 237-247. # *Chondrites, Phycodes, Planolites, Thalassinoides*

Moczydlowska, M., Jensen, S., Ebbestad, J.O.R., Budd, G.E. & Marti, M.M. 2001. Biochronology of the autochthonous Lower Cambrian in the Laisvall-Storuman area, Swedish Caledonides. Geological Magazine, 138(4): 435-453.

Moghadam, H.V. & Paul, C.R.C. 2000. Trace fossils of the Jurassic, Blue Lias, Lyme Regis, southern England. Ichnos, 7(4): 283-306. # *Arenicolites lymensis, Chondrites, Kulindrichnus, Palaeophycus, Planolites, Rhizocorallium, Taenidium, Thalassinoides*

Molgat, M. & Arnott, R.W.C. 2001. Combined tide and wave influence on sedimentation patterns in the Upper Jurassic Swift Formation, south-eastern Albherta. Sedimentology, 48: 1353-1369. # *Chondrites, Helminthopsis, Planolites, Skolithos, Teichichnus,* Canada

Molnar, R.E. & Clifford, H.T. 2000. Gut contents of a small ankylosaur. Journal of Vertebrate Paleontology, 20: 188-190. # cololites, Vertebrata Dinosauria

Molnar, R.E. & Clifford, H.T. 2001. An ankylosaurian cololite from the Lower Cretaceous of Queensland, Australia. In Carpenter, K. (ed.), The Armored Dinosaurs. Indiana University Press, Bloomington & Indianapolis, 399-412. # Lower Cretaceous, Albian, Allaru Formation, Queensland, Australia, cololites, Vertebrata Dinosauria Minmi; modern, Queensland, Australia, gut contents, scats, Reptilia Squamata Agamidae *Pogona barbata,* Aves *Dromaius novaehollandiae* emu, *Cereopsis novaehollandiae* Cape Barren goose, Mammalia *Tichosurus vulpecula* common brushtail possum

Monaco, A., Biscaye, P.E. & Laborde, P. 1999. The ECOFER (ECOsysteme du Canyon du Cap-FERret) experiment in the Bay of Biscay: introduction, objectives and major results. *In* Monaco, A., Biscaye, P.E. & Laborde, P. (eds.), France-JGOFS/ ECOMARGE, Particle Fluxes and Ecosystem Response on the Northeast Atlantic Continental Margin, the ECOFER (Ecosysteme du Canyon du Cap Ferret) Experiment. Deep-Sea Research, Part II: Topical Studies in Oceanography, 46: 1967-1978. # bioturbation

Monaco, P. 1996. Oxygenation history and substrate characteristics by means of trace fossil tiering in the central Apennines during the Toarcian. Soc. Geol. It., 78th, Geologia delle Dolomiti, Extended Abstracts, San Cassiano: 121. # Lower Jurassic, Italy, tiering

Monaco, P. 1999. Taphonomic characteristics and biological overprints in the Calcari Grigri, Pliensbachian, Trento platform (northern Italy). Rivista de Museo Civico de Scense Naturale 'E. Caffi' Bergamo, 20: 137-138. # Lower Jurassic

Monaco, P. 2000. Decapod burrows (*Thalassinoides, Ophiomorpha*) and crustacean remains in the Calcari Grigri, Lower Jurassic, Trento Platform (Italy). 1st Workshop on Mesozoic and Tertiary Decapod Crustaceans, Vicenza, 6-8 October: 55-57. #

Pliensbachian, *Chondrites* isp., *Ophiomorpha irregulaire, Ophiomorpha* ispp., *Thalassinoides,* Arthropoda Crustacea Decapoda Erymidae *Phlyctisoma*

Monaco, P. 1999. Computer database as tool to investigatigate taphonomy and events in carbonate platform environments. Palaeopelagos, Special Publication, 2: 105-122. # *Chondrites, Ophiomorpha, Planolites,* methods, Jurassic, Italy

Monaco, P. 2000. Decapod burrows (*Thalassinoides, Ophiomorpha*) and crustacean remains in gthe Calcari Grigi, Lower Jurassic, Trento Platform (Italy). 1st Workshop on Mesozoic and Tertiary Decapod Crustaceans. Studi e Ricerche, Associazionen Amici del Museo – Museo Civicio 'G. Zannato' Montecchio Maggiore (Vicenza), 6 Octiober, 2000, p. 55-57. # *Ophiomorpha irregulaire, O. nodosa, Thalassinoides suevicus, Chondrites*

Monaco, P. & Garassino, A. 2001. Burrows and body fossil of decapod crustaceans in the Calcare Grigi, Lower Jurassic, Trento Platform (Italy). Geobios, 34(3): 291-301. # *Chondrites, Ophiomorpha irregulaire, Planolites, Skolithos, Thalassinoides suevicus, Callianassa*

Monaco, P. & Gianetti, A. 2000. Stratigraphia tafonomica nel Giurassico Inferiore dei Calcari Grigi della Piattaforma di Trento. Atti Ticinesi di Scienza della Terra, 42: 175-209. # *Chondrites, Ophiomorpha irregulaire, O. nodosa, Thalassinoides suevicus,* Jurassic, Italy

Monks, J. 2001. Early Pennsylvanian tetrapod ichnites of Warren Co., Indiana. Journal of Vertebrate Paleontology. 21(3, Suppl.): 81. # Carboniferous, USA

Moodley, L., Heip, C.H.R. & Middelburg, J.J. 1999. Benthic activity in sediments of the northwestern Adriatic Sea: sediment oxygen consumption, macro- and meiofauna dynamics. Journal of Sea Research, 40(3-4): 263-280. # water depth 18 m, tiering, meiofauna, macrofauna, Foraminiferida, Nematoda, Bivalvia *Corbula gibba, Mysella* sp., Gastropoda *Hyala* sp., Arthropoda Crustacea Amphipoda *Ampelisca* sp.

Moravec, B.G., Wright, J.L. & Spencer, M. 2001. 2-D coordinate landmark analysis of small tridactyl dinosaur footprints. Journal of Vertebrate Paleontology. 21(3, Suppl.): 81. # Jurassic, Triassic, USA

Moreno F.K. 2001. Icnocoenosis e icnofacies de la Formación Chacarilla (Jurásico Superior - Cretácico Inferior), norte de Chile. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 7. # tetrapods, vertebrates, Jurassic

Morrisey, D.J., DeWitt, T.H., Roper, D.S. & Williamson, R.B. 1999. Variation in the depth and morphology of burrows of the mud crab *Helice crassa* among different types of intertidal sediment in New Zealand. Marine Ecology Progress Series, 11(182): 231-242. # recent

Mossman, D.J. & Grantham, R.G. 1999. Vertebrate trackways in the Parrsboro Formation (Upper Carboniferous) at Rams Head, Cumberland County, Nova Scotia. Atlantic Geology, 35(3): 186-196. # *Cursipes dawsoni, Dromilopus quadrifidus, Herpetichnus erneri, Hylopus hardingi, Pseudobradypus,* footprints, Canada

Muecke, A. 2000. Environmental conditions in the Late Cretaceous African Tethys: conclusions from a microscopic-microchemical study of ooidal ironstones from Egypt, Sudan and Nigeria. Journal of African Earth Sciences and the Middle East, 30(1): 25-46.

Muggler, C.C. & Buurman, P. 2000. Erosion, sedimentation and pedogenesis in a polygenetic oxisol sequence in Minas Gerais, Brazil. Catena, 41(1-3): 3-17. # soils

Muiz, F. & Mayoral, E. 2001. El icnogénero *Spongeliomorpha* en el Neógeno superior de la Cuenca del Guadalquir (área de Lepe-Ayamonte, Huelva, Espaa). Revista Espaola de Paleontología, 16(1): 115-130. # *Spongeliomorpha chevronensis* isp. n., *Spongeliomorpha sinuostriata* isp. n., *S. sicula*, Neogene, Spain

Muiz, F. & Mayoral, E. 2001. *Macanopsis plataniformis* nov. ichnosp. from the Lower Cretaceous and upper Miocene of the Iberian Peninsula. Geobios, 34(1): 91-98. # *Macanopsis plataniformis* isp. n., shallow marine, Spain

Muiz, F., Mayoral, E., Bromley, R., Alonso, F. & García, E. 2001. Una pista fósil perteneciente a aff. *Phoebichnus* en el Mioceno de Tíjola (Almería, SE de Espaa). *In* Meléndez, G., Herrera, Z., Delvena, G. & Azanza, B. (eds.), Los Fósiles y la

Paleogeografía. 17 Jornadas de la Sociedad Espaola de Paleontología. Publicaciones del Seminario de Paleontología de Zaragoza, 5(2): 361-367. # Miocene, Spain

Muoz J., N.G. 2001. VI International Ichnofabric Workshop, Isla Margarita and Puerto La Cruz, Venezuela, July 14 to 20, 2001. Ichnology Newsletter, 23: 57-59. # conference announcement, Venezuela, field trip

Muoz, N.G. 2001. Margarita, Stop No. 1, *Nereites* ichnofacies in Margarita Eocene calcarenitic flysch sequence. *In* VI International Ichnofabric Workshop, Venezuela 2001, Islam Margarita & Puerto La Cruz, July 14-20, 2001, Field Excursions. [18 pp., no pagination]. Sociedad Venezolana de Geólogos & PDVSA. # *Granularia, Helminthoida, Paleodictyon, Taphrhelminthopsis, Zoophycos,* Venezuela

Muoz, N.G. 2001. *Nereites* ichnofacies in Margarita Island and Boca de Uchire, Venezuelan flysch. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # *Cosmorhaphe, Granularia, Helminthoida, Paleodictyon, Spirorhaphe, Zoophycos*

Muoz, N.G. & Buatois, L.A. 2001. Perto La Cruz, Stop. No. 3, Guarico Formation: excellent *Nereites* ichnofacies hyporelief traces of *Spirorhaphe, Cosmorhaphe, Paleodictyon, Helminthoida*. *In* VI International Ichnofabric Workshop, Venezuela 2001, Isla Margarita & Puerto La Cruz, July 14-20, 2001, Field Excursions. [7 pp., no pagination]. Sociedad Venezolana de Geólogos & PDVSA. # flysch, Paleocene, Eocene, Venezuela

Mustoe, G.E. 2001. Enigmatic origin of ferruginous 'coprolites': evidence from the Miocene Wilkes Formation, southwestern Washington. Geological Society of America Bulletin, 113(6): 673-681. # USA

Myo Myint. 1997. Paleoichnological study of the Paleogene Shiramizu Group in Fukushima Prefecture, Japan. Unpublished Ph.D. thesis, University of Tsukuba, Tsukuba, Japan, 240 pp.

Myo Myint. 2001. *Psilonichnus quietis* isp. nov. from the Eocene Iwaki Formation, Shiramizu Group, Joban Coal Field, Japan. Ichnos, 8(1): 1-14. # new taxa, new terms, *Psilonichnus quietis* n.isp., *P. tubiformis*

Myrick, J.L. & Flessa, K.W. 1996. Bioturbation rates in Bahia la Choya, Sonora, Mexico--Razones de bioturbacion en Bahia la Choya, Sonora, Mexico. Ciencias Marinas, 22(1): 23-46.

Nakajo, T. & Maejima, W. 1998. Morpho-dynamic development and facies organization of the Tertiary delta system in the Taishu Group, Tsushima Islands, southwestern Japan. Chishitsugaku Zasshi = Journal of the Geological Society of Japan, 104(11): 749-763. # bioturbation

Nara, M. 2000. Paleoecological and paleoenvironmental studies from trace fossils. *In* Nara, M. (ed.), Dynamic paleoecology. Interactions between paleoenvironments and fossil benthic communities. Paleontological Society of Japan, Topics in Paleontology, 1: 69-95. # general, *Rosselia socialis, Teichichnus rectus,* terebellid polychaete, Japan

Nebelsisck, J.H. 2001. Drilling predation on echinoid prey: changes in intensity and site selectivity through time. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 96. # [*Oichnus*], predation, borings, recent

Nelson, W.J., Masters, J.M. & Follmer, L.R. 1999. Evolution of lower Ohio and Tennessee rivers, Miocene-Recent. Geological Society of America, Abstracts with Programs, 31(7): 48. # bioturbation, fluvial, USA

Nesbitt, S.J. 2001. New fossil vertebrate material from the Holbrook Member, Moenkopi Formation (Middle Triassic) from northern Arizona. Journal of Vertebrate Paleontology. 21(3, Suppl.): 83. # coprolites

Neto de Carvalho, C. 2001. Implicaçes geométricas na etologia do productor de *Dictyodora tenuis* (M'Coy) no Arenigiano de Barrancos (Portugal): custos e benefícios de ser um pioneiro. *In* Meléndez, G., Herrera, Z., Delvena, G. & Azanza, B. (eds.),

Los Fósiles y la Paleogeografía. 17 Jornadas de la Sociedad Espaola de Paleontología. Publicaciones del Seminario de Paleontología de Zaragoza, 5(2): 369-378. # Ordovician, Portugal

Neto de Carvalho, C. & Farinha, C. 2001. Génese e significado paleoambiental da associaço *Gastrochaenolites-Trypanites* no Jurassico Superior da Bacia Lusitanicas (Portugal). *In* Meléndez, G., Herrera, Z., Delvena, G. & Azanza, B. (eds.), Los Fósiles y la Paleogeografía. 17 Jornadas de la Sociedad Espaola de Paleontología. Publicaciones del Seminario de Paleontología de Zaragoza, 5(2): 379-387. # *Gastrochaenolites ornatus, Thalassinoides,* hardground, Jurassic, Portugal

Neto de Carvalho, C. & Pessoa e Costa, N. 2001. Formas compuestas de *Asterosoma ludwigae* Schlirf, 2000 en el. Jurásico de la Cuenca Lusitánica (Portugal): análisi icnotaxonómico. *In* Meléndez, G., Herrera, Z., Delvena, G. & Azanza, B. (eds.), Los Fósiles y la Paleogeografía. 17 Jornadas de la Sociedad Espaola de Paleontología. Publicaciones del Seminario de Paleontología de Zaragoza, 5(2): 388-396. # Jurassic, Portugal

Netto, R.G., Buatois, L.A. & Mángano, M.G. 2000. 'The Paleoichnological Approach in Geology': pre-congress short course, 31st International Geological Congress, Rio de Janeiro, Brazil, August 4 to 5, 2000. Ichnology Newsletter, 22: 58. # conference announcement, Brazil

Netto, R.G. 2001. Icnologia e estratigrafia de seqü ncias. *In* Severiano Ribeiro, H.J.P. (ed.), Estratigrafia de Seqü ncias – Findamentos e Aplicaçes. EDUNISINOS, So Leopoldo, pp. 219-259. # *Arenicolites, Chondrites, Diplocraterion parallelum, Gyrolithes, Helminthopsis, Palaeophycus heberti, Phycosiphon, Planolites, Thalassinoides,* ichnofabric, ichnofacies, general, sequence stratigraphy, general, Brazil

Netto, R.G., Buatois, L.A., Mángano, M. & Balistieri, P. 2001. *Gyrolithes* em depósitos Permianos: uma adaptaço para sobreviv ncia em ambientes salobros? 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 60. # *Cruziana, Dimorphichnus, Monomorphichnus, Ophiomorpha, Rusophycus, Thalassinoides,* Permian, Brazil

Netto, R.G. & Rossetti, D.F. de, 2001. Salinity changes and ichnofabrics: a key to recognize estuarine systems. VI International Ichnofabric Workshop, Venezuela 2001, Isla Margarita & Puerto La Cruz, July 14-20, 2001, Abstracts. [1 p., no pagination]. Sociedad Venezolana de Geólogos & PDVSA. # *Arenicolites, Cylindrichnus, Diplocraterion, Ophiomorpha, Palaeophycus, Planolites, Rhizocorallium, Taenidium, Teichichnus, Thalassinoides, Glossifungites* ichnofacies, *Cruziana* ichnofacies, Miocene

Neumann, C. 2000. Evidence of predation on Cretaceous sea stars from northwest Germany. Lethaia, 33(2): 65-70.

Neuweiler, F., Mehdi, M. & Wilmsen, M. 2001. Facies of Liassic sponge mounds, central High Atlas, Morocco. Facies, 44: 243-264. # coprolites, *Favreina, Palaxius,* Jurassic

Nevesskaya, L.A. 1999. Etapy razvitiya bentosa fanerozoyskikh morey: Mezozoy, Kaynozoy. Rossiyskaya Akademiya Nauk, Paleontologicheskiy Institut, Moscow, 274: 503 pp.

Nielsen, K.S.S. & Nielsen, J.K. 2001. Bioerosion in Pliocene to late Holocene tests of benthic and planktonic foraminiferans, with a revision of the ichnogenera *Oichnus* and *Tremichnus*. Ichnos, 8 (2): 99-116. # *Dipatulichnus rotundus* igen. n., isp. n., *Oichnus asperus* isp. n., *Oichnus coronatus* isp. n., *Oichnus gradatus* isp. n., *O. ovalis, O. paraboloides, O. simplex, Stellatichnus radiatus* igen. n., isp. n., borings, microborings, Pleistocene, Holocene, Greece, Durban, India, South China Sea, Tasman Sea, Great Australia Bight, Gulf of Panama, Gulf of Biscay, West Greenland, Java Trench

Nicosia, U., Mariano, M., Mariotti, N., Muraro, C., Pianigutti, S., Petti, F.M. & Sacchi, E. 1999. The Late Cretaceous dinosaur tracksite near Altamura (Bari, southern Italy). II – *Apulosauripus federicianus* new ichnogen. and new ichnosp. Geologica Romana, 35: 237-247. # tracks, reptiles, *Apulosauripus federicianus* igen. n., isp. n.

Nicosia, U., Ronchi, A. & Santi, G. 2000. Permian tetrapod footprints from W Orobic Basin (northern Italy): biochronological and evolutionary remarks. Geobios, 33(6):

753-768. # *Amphisauropus imminutus, A. latus, Dromopus lacertoides, Varanopus curvidactylus*, vetebrates, trackways

Nilsen, T.H. 2000. The Hilt Bed, an Upper Cretaceous compound basin-plain seismoturbidite in the Hornbrook Forearch Basin of southern Oregon and northern California, USA. Sedimentary Geology, 135(1-4): 51-63.

Nilsson, H.C. & Rosenberg, R. 1997. Benthic habitat quality assessment of an oxygen stressed fjord by surface and sediment profile images. Journal of Marine Systems, 11(3-4): 249-264. # Sweden, biogeochemistry, oxygen, bioturbation

Nkem, J.N., Lobry de Bruyn, L.A., Grant, C.D. & Hulugalle, N.R. 2000. The impact of ant bioturbation and foraging activities on surrounding soil properties. Pedobiologia, 44(5): 609-621. # insects, recent, ants

Noble, J.C. 1999. Fossil features of mulga *Acacia aneura* landscapes: possible imprinting by extinct Pleistocene fauna. Australian Zoologist, 31(2): 396-402. # bioturbation, plants

Noffke, N. 1998. Das Untere Arenig (Ordovizium) der Synform von Roquebrun, Montagne Noire, Frankreich [The lower Arenig (Ordovician) of the Roquebrun Synform, Montagne Noire, France]. Sediment'98, Abstracts, 9-13 June 1998, # Lower Ordovician, *Cruziana, Daedalus halli, Phycodes circinnatum*

Nogueira, M.S., dos, & Netto, R.G. 2001. Icnofauna da Formaço Rio do Sul (Grupo Itararé, Permiano da Bacia do Paraná) na pedreira Itaú-Itaina, Santa Catarina, Brasil. Acta Geologica Leopoldensia, 24(52/53): 397-406. # *Cruziana, Diplichnites, Diplopodichnus, Gluckstadtella, Helminthoidichnites, ?Hormosiroidea, Neonereites, Rusophycus, Umfolozia*, Permian, Brazil

Nogueira, M.S. dos, & Netto, R.G. 2001. A presença de *Cruziana* nos sedimentos da Formaço Rio do Sul (Grupo Itararé, Permo-Carbonífero da Bacia do Paraná) na pedreira Itaú-Itaina, Santa Catarina, Brasil. Acta Geologica Leopoldensia, 24(52/53): 387-396. # *Cruziana, Diplichnites, Dimorphichnus, Monomorphichnus, Oldhamia, Rusophycus, Umfolozia,* Permian, Carboniferous, Brazil

Nomann, B.E. & Pennings, S.C. 1998. Fiddler crab-vegetation interactions in hypersaline habitats. Journal of Experimental Marine Biology and Ecology, 225(1): 53-68. # Georgia, USA, salt marsh enivronment, intertidal environment, bioturbation, Arthropoda Crustacea Decapoda Ocypodidae *Uca*

Nouidar, M. & Chellai, E.H. 2001. Facies and sequence stratigraphy of an estuarine incised-valley fill: lower Aptian Bouzergoun Formation, Agadir Basin, Morocco. Cretaceous Research, 22(1): 93-104. # bioturbation, Cretaceous

Nummedal, D. & Riley, G. 1999. The origin of the Tocito Sandstone and its sequence stratigraphic lessons. *In* Bergman, K.M. & Snedden, J.W. (eds.), Isolated shallow marine sand bodies: sequence stratigraphic analysis and sedimentologic interpretation. Society for Sedimentary Geology (SEPM), Special Publication, 64: 227-254. # bioturbation, Cretaceous, USA

Nyborg, T.G. & Santucci, V.L. 1999. Late Tertiary vertebrate tracks from Death Valley National Park, California. Journal of Vertebrate Paleontology, 19: 66-67.

Oaie, G. 1999. Structuri sedimentare biogene (trace fossils) în depozitele ale Dobrogei de Nord. Studii i Cercetri de Geologia, 43-44: 59-68. [In Romanian, English abstract]. # *Chondrites, Helminthoida, Helminthopsis, Nereites, Planolites, Protopaleodictyon, Scolicia,* Devonian

Obata, K. 1999. The trace fossils from the Miocene Chichibu Bonchi Group in the district of Onohara, Chichibu City, Saitama Prefecture, central Japan, and discussion on their paleoenvironment. Saitama Kenritsu Shizenshi Hakubutsukan Kenkyu Hokoku = Bulletin of the Saitama Museum of Natural History, 17:31-45.

Örstan, A. 2001. Evidence of a mysterious predator of land snails. Ichnology Newsletter, 23: 24. # Maryland, USA, bioerosion, gnawing traces, predation by Vertebrata Mammalia Rodentia *Tamaias striatus*? on Gastropoda *Mesodon thyroidus, Neohelix albolabris*

O'Geen, A.T. & Busacca, A.J. 2001. Faunal burrows as indicators of paleo-vegetation in eastern Washington, USA. Palaeogeography, Palaeoclimatology, Palaeoecology, 169(1-2): 23-37. # loess, burrows, insects, cicadas, Quaternary, Pleistocene

Ogg, C.M., Baker, J.C. & Edmonds, W.J. 2001. Quartzite-cobble weathering in alluvial-fan soils of the Virginia Blue Ridge. Soil Science, 166(2): 127-136. # *Skolithos,* Miocene, Tertiary

Olivero, D. 2001. Evolution of *Zoophycos* in the Vocontian Trough (southeastern France) from Lower Jurassic to Upper Cretaceous. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 99.

Olivero, E.B. & López C., M.I. 2001. Ichnology of syntectonic turbidite, estuarine and shelf deposits. Eocene, Punta Torcida Anticline, Isla Grande de Tierra del Fuego. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 7. # *Chondrites, Curvolithus, Diplocraterion, Gyrochorte, Macaronichnus, Monocraterion, Palaeobullia, Palaeophycus, Planolites, Protopaleodictyon, Rhizocorallium, Schaubcylindrichnus, Taenidium, Tasselia, Teichichnus, Terebellina, Zoophycos,* Argentina

Olóriz, F. & Rodríguez-Tovar, F.J. 1999. Analisis paleoicnologico del perfil de Puerto Lorente (Kimmeridgiense, Sierra de Cazorla, prebetico externo). Revista Espanola de Paleontologia, Numero extraordinario: 15-28. # *Chondrites, Planolites, Thalassinoides,* Jurassic

Olóriz, F. & Rodríguez-Tovar, F.J. 1999. *Diplocraterion:* a useful marker for sequence stratigraphy and correlation in the Kimmeridgian, Jurassic (Prebetic Zone, Betic Cordillera, southern Spain). Palaios, 15(6): 546-552. # Upper Jurassic, *Cruziana* ichnofacies, *Skolithos-Cruziana* ichnofacies, *Diplocraterion parallelum, Planolites, Skolithos, Thalassinoides*

Oloriz, F., Rodriguez-Tovar, F.J. & Soria, J. 1998. Ichnologic support for substrate interpretation: ecology and deposition in a Kimmeridgian rhythmite (Prebetic Zone, south Spain). *In* Canaveras, J.C., Garcia, d.C.M.A., Soria, J., Melendez, H.A. & Soria, A.R. (eds.), 15th International Sedimentological Congress, Abstracts. Alicante, Spain, p. 585. # Jurassic

Olsson, M., Bignert, A., Eckhell, J. & Jonsson, P. 2000. Comparison of temporal trends (1940s-1990s) of DDT and PCB in Baltic sediment and biota in relation to eutrophication. Ambio, 29(4-5): 195-201.

Omori, M., Ishida, Y. & Adachi, H. 1992. On the *Gyrolithes chosiensis* n. sp. from the Kimigahama Formation (Lower Cretaceous) in the district of Chosi City, Chiba Prefecture, Japan. Journal of the Faculty of General Education, Azubu University, 25: 113-119.

Orit, F. & Rosell, L. 2000. Evaporative systems and diagenetic patterns in the Calatayud Basin (Miocene, central Spain). Sedimentology, 47(3): 665-685. # bioturbation

Orr, P.J. 1999. Quantitative approaches to the resolution of taxonomic problems in invertebrate ichnology. *In* Harper, D.A.T. (ed.), Numerical Palaeobiology: computer-based modelling and analysis of fossils and their distributions. John Wiley & Sons, Chichester, p. 396-431. # *Dictyodora scotica, Gordia marina, Isopodichnus stromnessi, Nereites cambriensis, N. macleayi, Rusophycus,* methods, Cambrian, Ordovician, Silurian, Carboniferous, Canada, Spain, Maine, USA

Osterrieth, M.L., Zucol, A. & Lopez, d.A.A. 1998. Presencia de restos vegetales carbonizados en secuencias sedimentarias costeras del Holoceno Tardio de Mar Chiquita, Buenos Aires, Argentina. *In* Osterrieth, M.L., Lopez, d.A.A. & Tomas, M. (eds.), Actas de las 5^{las} Jornadas Geológicas y Geofísicas Bonaerenses, 2: 251-254. # bioturbation, paleosols, Quaternary, Holocene, Argentina

Ostrowski, S., Daley, G.M. & Geary, D.H. 2001. Environmentally and ecologically controlled variation in predatory and epibiont patterns in *Chione cancellata* from the Fort Thompson Formation (Pleistocene) of Florida. Geological Society of America, Abstracts with Programs, 33(6): 11. # borings, burrows

Otto, M. 2000. Supposed soft tissue preservation in the Hunsrückschiefer (Lower Devonian, Rheinisches Schiefergebirge): the example of brachiopods. Paläontologische Zeitschrift, 74(1-2): 79-89. # trace fossils, Germany

Owen, G. & Hawley, D. 2000. Depositional setting of the Lower Old Red Sandstone at Pantymaes Quarry, central South Wales, new perspectives on the significance and occurrence of 'Senni Beds' facies. *In* Friend P.F. & Williams B.P.J. (eds.), New perspectives on the Old Red Sandstone. Geological Society Special Publications, 180: 389-400.

Owens, R.M., Owen, A.W. & Rushton, A.W.A. 1999. Arenig to Ashgill of North Wales. *In* Rushton, A.W.A., Owen, A.W., Owens, R.M. & Prigmore, J.K. (eds.), British Cambrian to Ordovician stratigraphy. Geological Conservation Review Series, 18: 181-223. Chapman & Hall, London. # ichnofossils, Ordovician, Great Britain

Ozanne, C.R. & Harries, P.J. 2002. Role of predation and parasitism in the extinction of the inoceramid bivalves: an evaluation. Lethaia, 35(1): 1-19. # Upper Cretaceous, lower Maastrichtian, Wyoming, USA

Paczena, J. 2001. Zastosowanie skamieniaoci ladowych w analizie facjalnej i wysokorozdzielczej stratygrafii sekwencji – przykad z kambru polskiej cz ci kratonu wschodnioeuropejskiego (An application of trace fossils in the facies analysis and high-resolution sequence stratigraphy – an example from the Cambrian of the Polish part of the East European Craton). Przegld Geologiczny, 49(12): 1137-1146. [In Polish, English summary]. # *Bergaueria major, Monocraterion, Planolites beverleyensis, P. montanus, Skolithos linearis, Teichichnus rectus, Treptichnus,* escape structures, *Glossifungites* ichnofacies, general, Poland

Paddock, J.J., Havholm, K.G. & Mahoney, J.B. 1997. Cycles within the Upper Cambrian Lone Rock Formation: sedimentologic response to fine scale sea-level changes? Geological Society of America, Abstracts with Programs, 29(4): 64. # bioturbation, Wisconsin, USA

Padrón, V. 2001. Margarita, Stop No. 2, *Thalassinoides-Teichichnus* trace fossils in Neogene sequence. *In* VI International Ichnofabric Workshop, Venezuela 2001, Isla Margarita & Puerto La Cruz, July 14-20, 2001, Field Excursions [9 pp., no pagination]. Sociedad Venezolana de Geólogos & PDVSA. # Venezuela

Padrón, V., Zapata, E., Estevez, J.A. & Machado, A. 1998. Ichnocenosis of the Neogene-Quaternary sediments in northeastern Venezuela. *In* Canaveras, J.C., Garcia, d.C.M.A., Soria, J., Melendez, H.A. & Soria, A.R. (eds.), 15th International Sedimentological Congress, Abstracts. Alicante, Spain, p. 595.

Paik, I.S., Kim, H.J. & Lee, Y.I. 2001. Dinosaur track-bearing deposits in the Cretaceous Jindong Formation, Korea: occurrence, palaeoenvironments and preservation. Cretaceous Research, 22(1): 79-92. # footprints, reptiles, vertebrates

Papa, C.E. del. 2001. Stop 6: The Eocene fluvio-lacustrine delta succession of Faja Verde (Lumbrera Formation) at Alemanía section. *In* Buatois, L.A. & Mángano, M.G. (eds.), Ichnology, Sedimentology and Sequence Stratigraphy of Selected Lower Paleozoic, Mesozoic and Cenozoic Units of Northwest Argentina, Fourth Argentinean Ichnologic Meeting and Second Ichnologic Meeting of Mercosur, September 29th - October 1st, Field Guide, p. 65-67. Tucumán. # lacustrine, deltaic, paleosols, nonmarine, Argentina

Papa, C.E. del, Sabino, I. & Marquillas, R. 2001. Stratigraphy and Depositional Setting of the Salta Group (Cretaceous-Paleogene). *In* Buatois, L.A. & Mángano, M.G. (eds.), Ichnology, Sedimentology and Sequence Stratigraphy of Selected Lower Paleozoic, Mesozoic and Cenozoic Units of Northwest Argentina, Fourth Argentinean Ichnologic Meeting and Second Ichnologic Meeting of Mercosur, September 29th - October 1st, Field Guide, p. 26-33. Tucumán. # *Paleophycus, Taenidium,* nonmarine, bird footprints, Argentina

Parrish, J.T., Droser, M.L. & Bottjer, D.J. 2001. A Triassic upwelling zone: the Shublik Formation, Arctic Alaska, U.S.A. Journal of Sedimentary Research, 71(2): 272-285. # USA

Parsons Hubbard, K.M., Callender, W.R., Powell, E.N., Brett, C.E., Walker, S.E., Raymond, A. L. & Staff, G.M. 1999. Rates of burial and disturbance of experimentally-deployed molluscs: Implications for preservation potential. Palaios, 14(4): 337-351. # bioturbation, USA

Pate, K.A. 1998. Trace fossils and their geological significance in the Upper Cretaceous, (Gulfian), Wolfe City Sand, central Texas. Bachelor's Thesis, Baylor University. Waco, Texas, 73 pp. # USA

Paulsen, S.C., List, E.J. & Santschi, P.H. 1999. Modeling variability in ^{210}Pb and sediment fluxes near the Whites Point outfalls, Palos Verdes Shelf, California. Environmental Science and Technology, 33(18): 3077-3085. # bioturbation, USA

Pazos, P.J. 2001. Icnología de las sucesiones glaciales-postglaciales en las cuencas Paganzo-Calingasta/Uspallata (S. América) y Karoo-Kalahari (S. Africa). 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 63. # Carboniferous, Permian, Argentina, South Africa

Pazos, P.J., Garcia, d.C.M.A. & Soria, J. 1998. Trace fossils distribution in the late Paleozoic succession from the central section of the Paganzo Basin, Argentina. *In* Canaveras, J.C., Garcia, d.C.M.A., Soria, J., Melendez, H.A. & Soria, A.R. (eds.), 15th International Sedimentological Congress, Abstracts. Alicante, Spain, p. 608.

Pazos, P.J., Rodríguez, M.F., Etcheverría, M. & Folguera, A. 2001. Arthropod trackways from the Villavicencio Formation (Silurian-Devonian), Precordillera of Mendoza, Argentina. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 64.

Peacock, E. & Fant, D.W. 2002. Biomantle formation and artifact translocation in upland sandy soils: an example from the Holly Springs National Forest, north-central Mississippi, U.S.A. Geoarchaeology, 17(1): 91-114. # Quaternary, Holocene, bioturbation

Pemberton, S.G., MacEachern, J.A., Gingras, M.K. & Zhang, J. 2000. Significance of ichnofossils to genetic stratigraphy: examples from the Cretaceous of Alberta, Canada. Science in China, Series D, Earth Sciences, 43(5): 541-560. # *Glossifungites*, Cretaceous, Canada

Pemberton, S.G., Zhou, Z. & MacEachern, J. 2001. Modern ecological interpretation of opportunistic (r-selected) and equilibrium (K-selected) trace fossils. Acta Palaeontologica Sinica, 40(1): 134-142. [In Chinese, English abstract]. # general, *Anconichnus, Arenicolites, Asterosoma, Chondrites, Cosmorhaphe, Desmograpton, Diplocraterion, Granularia, Helminthopsis, Nereites, Ophiomorpha, Paleophycus, Paleodictyon, Phycosiphon, Rosselia, Scolicia, Skolithos, Spirorhaphe, Terebellina, Thalassinoides*

Pennisi, E. 2000. Chewed leaves reveal ancient relationships. Science, 289: 229.

Perg, L.A., Anderson, R.S. & Finkel, R.C. 2001. Use of a new ^{10}Be and ^{26}Al inventory method to date marine terraces, Santa Cruz, California, USA. Geology, 29(10): 879-882. # bioturbation, Quaternary, Pleistocene

Perkins, S. 2001. Beyond bones. Trace fossil yield important clues to ancient life. Science News, 159(23): 362-364. # [*Oichnus*], *Zoophycos*, *Trirachodon* burrows, reptiles, borings, parasites, predation, popular

Pérez-López, A. 2001. Significance of pot and gutter casts in a Middle Triassic carbonate platform, Betic Cordillera, southern Spain. Sedimentology, 48(6): 1371-1388. # *Chondrites, Planolites, Rhizocorallium, Thalassinoides*

Perkins, S. 2001. Beyond bones. Trace fossil yield important clues to ancient life. Science News, 159(23): 362-364. # [*Oichnus*], *Zoophycos, Trirachodon* burrows, reptiles, borings, parasites, predation, popular

Perry, C.T. 1988. Macroborers within coral framework at Discovery Bay, north Jamaica: species distribution and abundance, and effects on coral preservation. Coral Reefs, 17: 277-287. # *Cliona, Aka, Eunice, Phascolosma, Ceratoconchia, Upogebia, Paraspidosiphon, Lithacrosiphon, Lithophaga, Gastrochaena, Petricola,* borings, bioerosion, recent

Perry, C.T. & Bertling, M. 2000. Spatial and temporal patterns of macroboring within Mesozoic and Cenozoic coral reef systems. *In* Insalaco, E., Skeleton, P.W. & Palmer, T.J. (eds.), Carbonate platform systems: components and interactions. Geological Society, London, Special Publication, 178: 33-50. # *Caulostrepsis, Conchotrema, Cunctichnus, Dendrina, Dictyoporus, Entobia, Gastrochaenolites, Iramena, Lapispecus, Maeandropolydora, Phrixichnus, Rhopalonaria, Rogerella, Spathipora, Spirichnus, Talpina, Terebripora, Trypanites, Uniglobites,* borings, bioerosion, general, Triassic, Jurassic, Cretaceous, Paleocene, Eocene, Oligocene, Miocene, Pleistocene

Pešek, J., Holub V., Jaroš J., Malý, L, Martínek, K., Prouza, V., Spudil, J. & Tásler, R. (eds.), with contributions by Bek, J., Drábková, J., Koutný, J., Kobr, M., Krásný. J., Mikuláš, R., Opluštil, S., Skoek, V., Sýkorová, I., Šimnek, Z., Valterová, P., Zajíc, J. & áková, B. 2001. Geologie a loiska svrchnopaleozoických limnických pánví eské republiky (Geology and coal deposits of the upper Palaeozoic lacustrine basins of the Czech Republic). Czech Geological Survey, 244 pp. # *Cruziana problematica, Didymaulichnus, Diplichnites, Glockerichnus, Gracilichnium, Lunichnium, Palaeophycus, Permichnium, Planolites, Saurichnites, Tarichnus, Teichichnus, Undichna, Unisulcus,* Carboniferous

Petit-Maire, N. 1992. L'Europe dans les changements climatiques globaux du Quaternaire. Géochronique, 4: 24-25. # nests of Hymenoptera, insects, paleosols, Quaternary, Canary Islands

Peterhänsel, A. & Pratt, B.R. 2001. Nutrient-triggered bioerosion on a giant carbonate platform masking the postextinction Famennian benthic community. Geology 29(12): 1079-1082. # microbioerosion, bioerosion, bioturbation, Upper Devonian, Alberta, Canada

Peyrot, C.M., Chabanet, P., Conand, C., Fontaine, M.F., Letourneur, Y. & Harmelin, V.M. 2000. Sea urchin and fish bioerosion on La Réunion and Moorea reefs. Bulletin of Marine Science, 66(2): 477-485. # recent

Pflüger, F. 1998. Oxygenation facies as indicated by characteristic matground structures: the Akakus-Tanezzouft transition as an extraordinary window to inaccessible times and places. Geological Conference on Exploration in Murzuq Basin, Sabha, Abstracts, Sabha, Libya, 20-22 September 1998: 69-70. # Libya

Pflüger, F. & Seilacher, A. 1997. Precambrian-Cambrian crisis: The sediments turn over. Terra Nova, 9, Abstract Supplement(1): 279. Strasbourg. # matgrounds

Pharaoh, T. 1999. Precambrian intrusions in Leicestershire and Warwickshire. *In* Sutherland, D. (ed.), Volcanic eruption and igneous intrusion: Leicestershire's fiery past, and Warwickshire's part in it. Transactions of the Leicester Literary and Philosophical Society, 93: 45. # *Teichichnus,* Great Britain

Phelps, W.T. 2000. Biofabrics of the Early Carboniferous Joana Limestone: implications for ecologic change across the Late Devonian mass extinction. PaleoBios, 20(1, Suppl.): 8. # *Chondrites, Zoophycos,* USA

Phelps, W.T. & Droser, M.L. 2000. Biofabrics of the Late Devonian Guilmette Formation, Great Basin region of the western United States. Geological Society of America, Abstracts with Programs, 33(3): 83. # USA

Phillips, D.H., Foss, J.E., Buckner, E.R., Evans, R.M. & FitzPatrick, E.A. 2000. Response of surface horizons in an oak forest to prescribed burning. Soil Science Society of America Journal, 64(2): 754-760. # earthworms, bioturbation

Pickerill, R.K. & Blissett, D. 1999. A predatory *Rusophycus* burrow from the Cambrian of southern New Brunswick, eastern Canada. Atlantic Geology, 35(3): 179-183. # *Helminthopsis hieroglyphica*

Pickerill, R.K. & Donovan, S.K. 1997. Ichnology and biotic interactions on a Pleistocene gastropod from southeast Jamaica. Journal of the Geological Society of Jamaica, 32: 19-24. # *Gastrochaenolites,* borings

Pickerill, R.K. & Donovan, S.K. 1999. Ichnology of the late Cenozoic of southeast Jamaica: Additional ichnotaxa and synthesis. Caribbean Journal of Science, 35(1-2): 123-131. # *Entobia geometrica, E. ovula, Meandrina barretti, Trypanites weisei,* borings

Pickerill, R.K., Donovan, S.K. & Portell, R.W. 2001. The bioerosional ichnofossil *Petroxestes pera* Wilson and Palmer from the middle Miocene of Carriacou, Lesser Antilles. Caribbean Journal of Science, 37(1-2): 130-131. # Tertiary, Caribbean region, borings, *Caulostrepsis cretacea, Caulostrepsis* isp., *Entobia* isp., *Petroxestes pera,* boring Bivalvia in Bivalvia Ostreidae *Ostrea* sp.

Pickerill, R.K., Donovan, S.K. & Portell, R.W. 2001. Trace fossils are useful – an example from the Caribbean. Annual Meeting, Atlantic Geoscience Society, Moncton, New Brunswick, 8-9 February.

Pickering, K.T., Hodgson, D.M., Platzman, E., Clark, J.D. & Stephens, C. 2001. A new type of bedform produced by backfilling processes in a submarine channel, late Miocene, Tabernas-Sorbas Basin, SE Spain. Journal of Sedimentary Research, 71(5): 692-704. # bioturbation

Pike, J., Bernhard, J.M., Moreton, S.G. & Butler, I.B. 2001. Microbioirrigation of marine sediments in dysoxic environments; implications for early sediment fabric formation and diagenetic processes. Geology, 29(10): 923-926. # Nematoda, oxygenation, bioturbation, Antarctica, California Continental Borderland, USA

Plotnick, R.E. 2001. Simulations and theoretical morphology of trace fosssils. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 104. # methods, modelling

Poiré, D.G., 1998. Estructuras sedimentarias organicas en sedimentitas gruesas del Paleozoico de Chillar, Tandilia, Argentina. *In* Osterrieth, M., Lopez, d. A.A. & Tomas, M. (eds.), Actas de las V Jornadas Geológicas y Geofisicas Bonaerenses, 5(1): 9-18. # Argentina, Precambrian

Poiré, D.G., Carloni, A., Ferrer, O. & Canessa, N.D. 2001. Características icnológicas de la Formación Piedra Clavada (Cretácico), Tres Lagos, Cuenca Austral, Argentina. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 65. # *Arenicolites, Bergaueria, Chondrites, Cochlichnus, Curvolithus, Cylindrichnus, Diplocraterion, Gastrochaenolites, Gyrochorte, Monocraterion, Ophiomorpha, Palaeophycus, Phycodes, Planolites, Rhizocorallium, Skolithos, Teichichnus, Teredolites, Thalassinoides, Trypanites, Teredolites,* Cretaceous, Argentina

Poiré, D., Spalletti, L.A. & Valle, A. del 2000. The Cambrian-Ordovician siliciclastic sequence from the Tandilia System, Argentina. *In* Aceñolaza, G.F. & Peralta, S. (eds.), The Cambrian from the southern edge. Instituto Superior de Correlación Geológica (INSUGEO), Miscelánea, 6: 55-64. # *Ancorichnus ancorichnus, Arthrophycus alleghanensis, Bergaueria, Cochlichnus, Conostichus, Cruziana furcifera, Daedalus labechei, Didymaulichnus, Diplichnites, Diplocraterion, Helminthopsis, Herradurichnus scagliai, Monomorphichnus, Palaeophycus alternatus, Phycodes pedum, Plagiogmus, Planolites, Rusophycus, Scolicia, Teichichnus*

Poiré, D., Spalletti, L.A. & Valle, A. del 2000. The Cambrian-Ordovician in the Tandilia System, Argentina: sedimentary facies, trace fossils, paleonevironments and sequence stratigraphy. *In* Aceñolaza, G.F. & Peralta, S. (eds.), The Cambrian from the southern edge. Instituto Superior de Correlación Geológica (INSUGEO), Miscelánea, 6: 125-127. Tucumán. # *Ancorichnus ancorichnus, Arthrophycus alleghanensis, Bergaueria, Cochlichnus, Conostichus, Cruziana furcifera, Daedalus labechei, Didymaulichnus, Diplichnites, Diplocraterion, Herradurichnus scagliai, Monomorphichnus, Palaeophycus alternatus, Phycodes pedum, Plagiogmus, Planolites, Rusophycus, Scolicia, Teichichnus*

Pollard, J. 2001. *Atlas of Ichnofabrics – Recognition and Utility,* by R.G. Bromley, A.A. Ekdale, and J. Pollard: preliminary table of contents. Ichnology Newsletter, 23: 11. # book announcement'

Pomar, L., Obrador, A. & Westphal, H. 2002. Sub-wave cross bedded grainstones on a distally stepeneed carbonate ramp, upper Miocene, Menorca, Spain. Sedimentology, 49: 139-169. # *Ophiomorpha,* [*Dactyloidites funiculus*]

Pomar, L. & Tropeano, M. 2001. The Calcarenite di Gravina Formation in Matera (southern Italy): new insights for coarse-grained, large-scale, cross-bedded bodies

encased in offshore deposits. American Association of Petroleum Geologists, Bulletin, 85(4): 661-689. # bioturbation, Pleistocene, Pliocene

Porter, S. C. 2000. High-resolution paleoclimatic information from Chinese eolian sediments based on grayscale intensity profiles. Quaternary Research, 53(1): 70-77. Orlando. # bioturbation, paleosols

Posamentier, H.W., Suyenaga, W., Rufaida, D., Meyrick, R. & Pemberton, S.G. 1998. Stratigraphic analysis of the Main Member of the upper Cibulakan Formation at E Field, offshore northwest Java, Indonesia. Proceedings, Indonesian Petroleum Association, Twenty-Sixth Annual Convention, May 1998, p. 129-153. # *Anconichnus, Asterosoma, Chondrites, Helminthopsis, Planolites, Subphyllochorda, Teichichnus, Thalassinoides, Glossifungites* ichnofacies, Miocene

Powell, J. 2001. Dinosaurios: patrones de nidificación y comportamiento reproductivo. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 7. # reptiles, dinosaurs, tetrapods, nests

Pringle, H. 1998. The sickness of mummies. Discover, 19(13): 74-78, 80, 83. Chicago. # coprolites, archeology

Prokoph, A. & Thurow, J. 2001. Orbital forcing in a "Boreal" Cretaceous epeiric sea: high-resolution analysis of core and logging data (upper Albian of the Kirchrode I drill core – Lower Saxony Basin, NW Germany). Palaeogeography, Palaeoclimatology, Palaeoecology, 174: 67-96. # *Chondrites, Planolites, Sinusites, Teichichnus, Thalassinoides,* bioturbation intensity

Przewlocki, Z., Garcia, d.C.M.A. & Soria, J. 1998. Trace fossils in the Cambrian deposits of the Holy Cross Mountains. *In* Canaveras, J.C., Garcia, d.C.M.A., Soria, J., Melendez, H.A. & Soria, A.R. (eds.), 15th International Sedimentological Congress, Abstracts. Alicante, Spain, p. 637-638. # *Cruziana,* Poland

Ptaszyski, T. 2000. Lower Triassic vertebrate footprints from Wiory, Holy Cross Mountains, Poland. Acta Palaeontologia Polonica, 45(2): 151-194. # *Brachychirotherium hauboldi, Brachychirotherium wiorense* isp. n., *Capitosauroides fuglewiczi* isp. n., *Isochirotherium gierlinskii* isp. n., *Isochirotherium santacrucense, Prorotodactylus mirus* igen. n., isp. n., *Procolophonichnium polonicum, Rhynchosauroides brevidigitatus, Rhynchosauroides rdzaneki* isp. n., *Synaptichnium chirotherioides, Synaptichnium kotanskii* isp. n., footprints, reptiles, amphibians, vertebrates, Triassic

Pyenson, N.D. & Martin, A.J. 2001. Uses of amphibian trackways from the Union Chapel Mine (Lower Pennsylvanian, Westphalian A) of Alabama for estimating amphibian population compositions. Journal of Vertebrate Paleontology. 21(3, Suppl.): 91. # *Cincosaurus cobbi,* Carboniferous, USA

Qabazard, S., Al Temeemi A. & Abdulah, F. 2000. Petrographical, mineralogical and geochemical studies of the Al-Khiran Quaternary carbonates, southern coastal Kuwait and the middle part of the Lower Cretaceous Minagish Formation, South Kuwait. GeoArabia, 5(1): 166-167. Manama. # bioturbation

Qi, Yong-an & Hu, Bin. 2001. *Gyrolithes:* a characteristic trace fossil in marginal marine sediments. Acta Sedimentologica Sinica, 19(3): 440-442. [In Chinese, English abstract]. # brackish environment, firmground, Silurian, China

Radley, J.D. & Barker, M.J. 2000. Palaeoenvironmental significance of storm coquinas in a Lower Cretaceous coastal lagoonal succession (Vectis Formation, Isle of Wight, southern England). Geological Magazine, 137(2): 193-205. # *Diplocraterion, Planolites,* United Kingdom

Radley, J.D., Barker, M.J. & Harding, I.C. 1998. Palaeoenvironment and taphonomy of dinosaur tracks in the Vectis Formation (Lower Cretaceous) of the Wessex Sub-basin, southern England. Cretaceous Research, 19: 471-487. # *Diplocraterion, Iguanodon* tracks

Radley, J.D., Barker, M.J. & Munt, M.C. 1998. Bivalve trace fossils (*Lockeia*) from the Barnes High Sandstone (Wealden Group, Lower Cretaceous) of the Wessex Sub-basin, southern England. Cretaceous Research, 19: 505-509. # *Diplocraterion, Lockeia siliquaria, L. serialis, Ophiomorpha*

Radley, J.D. & Carpenter, S.C. 1999. The Late Triassic strata of Manor Farm, Aust, South Gloucestershire. Proceedings of the Bristol Naturalists' Society, 58: 57-67.

Radwaski, A. & Wysocka, A. 2001. Mass aggregation of middle Miocene spine-coated echinoids *Echinocardium* and their integrated eco-taphonomy. Acta Geologica Polonica, 51(4): 295-316. # *Scolicia,* [?*Bichordites*], Ukraine

Raffaelli, D. 2000. Interactions between macro-algal mats and invertebrates in the Ythan estuary, Aberdeenshire, Scotland. Helgoland Marine Research, 54(2-3): 71-79. # *Capitella* spp., *Corophium volutator, Hydrobia ulvae, Nereis diversicolor,* bioturbation

Ragueneau, O., Treguer, P., Leynaert, A., Anderson, R.F., Brzezinski, M.A., DeMaster, D.J., Dugdale, R.C., Dymond, J., Fischer, G., Francois, R., Heinze, C., Maier, R.E., Martin, J.V., Nelson, D.M. & Queguiner, B. 2000. A review of the Si cycle in the modern ocean: recent progress and missing gaps in the application of biogenic opal as a paleoproductivity proxy. Global and Planetary Change, 26(4): 317-365.

Rainforth, E.C. 2001. Late Triassic-Early Jurassic dinosaur ichnofaunas, eastern North American and southern Africa. Journal of Vertebrate Paleontology. 21(3, Suppl.): 9.# *Anchisauripus, Anomoepus, Eubrontes, Grallator, Kainomoyenisauropus, Kalasauropus, Moyenisauropus, Pseudotetrasauropus, Trisauropodiscus,* Lesotho

Ranger, M.J. & Pemberton, S.G. 1997. Elements of a stratigraphic framework for the McMurray Formation in South Athabasca area, Alberta. Canadian Society of Petroleum Geologists, Memoir, 18: 263-291. # *Asterosoma, Bergaueria, Chondrites, Conichnus, Cylindrichnus, Gyrolithes, Helminthoida, Palaeophycus, Planolites, Rhizocorallium, Skolithos, Teichichnus,* escape traces, *Cruziana* ichnofacies, *Skolithos* ichnofacies, roots, rootlets, sequence stratigraphy, nearshore, estuarine environments, Canada

Raucsik, B., Szabo, G. & Borbely, K.I. 1998. Geochemical study on a limestone/ marlstone alternation, Bajocian, Mecsek Mountains, southern Transdanubia, Hungary. Acta Mineralogica-Petrographica 39:107-138. Szeged.

Rajchel, J. & Uchman, A. 2001. Utwory transgresywnego miocenu na fliszu jednostki skolskiej w Dubiecku (Transgressive Miocene deposits upon the flysch of the Skole uniut at Dubiecko). Zeszyty Naukowe AGH, Geologia, 27(1): 71-87. Kraków [In Polish, English summary]. # *Entobia, Gastrochaenolites ampullatus, G. lapidicus, G. orbicularis, G. torpedo, Ophiomorpha, Thalassinoides, Trypanites,* borings, Poland

Rdzanek, K. 2001. J. Moratalla, J.L. Sanz, I. Melero & S. Jiménez - *Yacimentos Paleoicnólogicos de La Rioja (huellas de dinosaurios) Geobierno de La Rioja, Iberduero, 1988, 95 str.* Przegld Geologiczny, 49(6): 486-487. # book review

Rdzanek, K. 2001. The fate of an ichnological collection from the wilina River valley. Ichnology Newsletter, 23: 17-21. # Upper Permian to lower Middle Triassic, Buntsandstein, Holy Cross Mountains, Poland, history, museums

Reboulet, S., Proux, O., Giraud, F., Baudin, F., Olivero, D. & Aucour, A.M. 2000. Characterization and significance of ammonoid and nannoplankton assemblages during an 'anoxic' event: The Breistroffer level (upper Albian, SE France). 6th International Cretaceous Symposium, August 27th - September 4th 2000, Vienna, Austria, p. 111.

Remmes, K.C. & Diemer, J. 1999. Depositional setting of late Proterozoic ichnofacies, Floyd Church Formation, Carolina Slate Belt, Stanly County, North Carolina. Geological Society of America, Abstracts with Programs, 31(7): 284. # *Helminthoides, Oldhamia, Torrowangea,* Precambrian, USA

Retallack, G.J. 1999. Palaeosols. *In* Jones, T.P. & Rowe, N.P. (eds.), Fossil Plants and Spores: Modern Techniques. Geological Society, London, p. 214-219. # Miocene, Kenya

Retallack, G.J. 2000. Depth to pedogenic carbonate horizon as a paleoprecipitation indicator? comment. Geology, 28: 572-573.

Retallack, G.J. 2000. Ordovician life on land and Early Paleozoic global change. *In* Gastaldo, R.A. & Dimichele, W.A. (eds.), Phanerozoic terrestrial ecosystems. Paleontological Society, Papers, 6: 21-45.

Retallack, G.J. 2000. Pedotype approach to Quaternary paleosols and glacial-interglacial

climate and vegetation change. Geological Society of America, Abstracts with Programs, 32(7): 326.
Retallack, G.J. 2000. The Proserpina Principle: a role for soil communities in regulating atmospheric composition on time scales ranging from ecological to geological. Geological Society of America, Abstracts with Programs, 32(7): 486.
Retallack, G.J. 2001. Did grasslands spread with Cenozoic drying and cooling, or vice versa? Paleobios (Program and Abstracts, North American Paleontological Convention), 21(2, supplement): 108.
Retallack, G.J. 2001. Phanerozoic non-marine ichnofacies and atmospheric change. Geological Society of America, Abstracts with Programs, 33(6): A386.
Retallack, G.J. 2001. *Scoyenia* burrows from Ordovician palaeosols of the Juniata Formation in Pennsylvania. Palaeontology, 44(2): 229-235. # *Scoyenia beerboweri* isp. n., nonmarine, Ordovician, USA
Retallack, G.J., Bestland, E.A. & Fremd, T.J. (eds.). 2000. Eocene and Oligocene paleosols of central Oregon. Geological Society of America, Special Paper, 344: 196 pp. # Tertiary, USA
Retallack, G.J. & Wynn, J.G. 2001. Milankovitch-scale fluctuations in mammal communities in the upper John Day Formation (29-24 Ma), central Oregon. Journal of Vertebrate Paleontology. 21(3, Suppl.): 92.
Retraubun, A.S.W., Dawson, M. & Evans, S.M. 1996. Spatial and temporal factors affecting sediment turnover by the lugworm *Arenicola marina* (L.). Journal of Experimental Marine Biology and Ecology, 201(1-2): 23-35. # bioturbation rate, Polychaeta Arenicolidae *Arenicola marina*
Richter, G. & Baszio, S. 2001. First proof of planctivory/insectivory in a fossil fish: *Thaumaturus intermedius* from the Eocene Lake Messel (FRG). Palaeogeography, Palaeoclimatology, Palaeoecology, 173: 75-85. # gut contents, coprolites, Lower Tertiary, Germany
Richter, G. & Baszio, S. 2001. Traces of a limnic food web in the Eocene Lake Messel: a preliminary report based on fish coprolite analyses. Palaeogeography, Palaeoclimatology, Palaeoecology, 166(3-4): 345-368. # Germany, Lower Tertiary
Rindsberg, A.K. 2000. Star cobbles. *In* Osborne, E., Thomas, W.A. & Astini, R.A. (eds.), The Conasagua Formation and equivalent units in the Appalachian thrust belt in Alabama. Alabama Geological Society, 37th Annual Field Trip, Guidebook, p. 73-78. # *Brooksella alternata, B. confusa, Dactyloidites asteroides, Laotira cambria,* Cambrian, USA
Rindsberg, A.K. 2001. Birmingham Paleontological Society 'Track Meets', Tuscaloosa and Oneonta, Alabama (USA), August 19 and October 14, 2000. Ichnology Newsletter, 23: 47-49. # *Arborichnus, Attenosaurus subulensis, Cincosaurus cobbi, Diplocraterion, Kouphichnium, Planolites montanus, Quadropedia prima, Treptichnus bifurcus, Undichna britannica, U. simplicitas,* Pennsylvanian, Carboniferous, Alabama, USA, invertebrate traces, tracks, Vertebrata, Amphibia, Reptilia?, conference review, USA
Rindsberg, A.K. 2001. The most common invertebrate ichnogenera. Ichnology Newsletter, 23: 25-26. # ichnotaxonomy
Rindsberg, A.K. 2001. *Review of Point Last Seen,* by Hannah Nyala. Ichnology Newsletter, 23: 69. # book review of Nyala (1997), tracking
Rindsberg, A.K. 2001. Review of *Upper Jurassic trace fossils from the Boulonnais (northern France),* by Michael Schlirf. Ichnology Newsletter, 23: 66-68. # book review of Schlirf (2000), *Asterosoma ludwigae, Bolonia lata, Crossochorda Boursaulti, Equihenia rugosa, Gyrochorte comosa, Protovirgularia* cf. *dichotoma, Rhizocorallium jenense, Spongeliomorpha, Treptichnus patens,* Upper Jurassic, Bolonian, France
Rindsberg, A.K. 2001. Richard Bromley, visual thinker. Ichnology Newsletter, 23: 12-16. # biography, interview, R.G. Bromley
Rindsberg, A.K. 2001. Track shirts. Ichnology Newsletter, 23: 30-31. # humor
Rindsberg, A.K. & Martin, A.J. 2001. *Arthrophycus* and the problem of compound trace fossils. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 108. # Silurian, USA, Alabama, Virginia

Rindsberg, A.K., Martin, A.J. & Pyenson, N.D. 2001. Ichnofossil-Lagerstätte in Alabama: a world class Carboniferous (Westphalian) tracksite. North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 108. # *Cincosaurus, Kouphichnium, Diplocraterion, Planolites, Treptichnus*

Rindsberg, A.K. & Uchman, A. 2001. Friends of ichnology: addresses. Ichnology Newsletter, 23: 143-156. # addresses

Rindsberg, A.K. & Uchman, A. 2001. Ichnology Newsletter, 23. Kraków, Poland, 160 pp. # ichnology, general

Rindsberg, A.K. & Uchman, A. 2001. Introduction. Ichnology Newsletter, 23:7-8. # biography, S. Walker, A.K. Rindsberg, 2001 news

Roba, R.D., Varban, B.L. & Anastasiu, N. 2001. Trace fossil assemblages from turbidite sequences in Tarcau Sandstone – the Eastern Carpathian Flysch (Romania). *In* Wortmann, U.G. & Funk, H. (eds.), International Association of Sedimentologists, 21st Meeting, 3-5 September 2001, Davos, Switzerland, Abstract & Programme, p. 114. # circulation, *Granularia, Nereites, Ophiomorpha, Planolites, Palaeophycus, Paleodictyon, Scolicia, Spirophycus, Spirorhaphe, Zoophycos,* flysch, Eocene

Roberts, D. & Moore, H.M. 1997. Tentacular diversity in deep-sea deposit-feeding holothurians: implications for biodiversity in the deep sea. Biodiversity and Conservation, 6(11): 1487-1505.

Rodriguez, A.J.P., Calvo, J.P. & Soria, J. 1998. Influence of bioturbation on early diagenesis in continental evaporitic environments. *In* Canaveras, J.C., Garcia, d.C.M.A., Soria, J., Melendez, H.A. & Soria, A.R. (eds.), 15th International Sedimentological Congress, Abstracts. Alicante, p. 667. # Tertiary, Spain

Rodriguez, d.l.R.R.A. 2001. Pterosaur and bird tracks from the late Campanian Cerro del Pueblo Formation of southeastern Coahuila, Mexico. Journal of Vertebrate Paleontology. 21(3, Suppl.): 94. # Cretaceous

Rodriguez, d.l.R.R.A. & Davila, R J.R. 1998. Una icnita de Quelonio del Cretacico Superior de Coahuila, México. *In* Perrilliat, M.M.d.C. (ed.), Memoria del VI Congreso Nacional de Paleontología. Sociedad Mexicana de Paleontología, México, Resúmenes, 6:62-63. # tetrapods, footprints, tracks, Cretaceous

Rodríguez, S. 2001. Life strategies of solitary undissepimented rugose corals from the upper member of the Picos de Europa Formation (Moscovian, Carboniferous, Cantabrian Mountains, NW Spain). Lethaia, 39(3): 203-214. # life position, borings in Anthozoa Rugosa, *Trypanites*

Rodríguez-Tovar, F.J. 2001. Preliminary ichnofabric analysis of the Cretaceous-Tertiary boundary transition at Agost (SE Spain). VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001, Abstracts. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # *Chondrites, Planolites, Thalassinoides, Zoophycos*

Rodríguez-Tovar, F.J. & Delgado, J. 2001. Torvane test: quantification of substrate firmness in ichnological research. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001, Abstracts. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # methods

Rodríguez, M.F. & Panza, J.L. 2001. La icnofacies de *Glossifungites* en la Formación Salamanca, Paraje Campamento Villegas, Chubut, Argentina. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 66. # Paleocene

Röhl, H.J., Schmid-Röhl, A., Oschmann, W., Frimmel, A. & Schwark, L. 2001. The Posidonia Shale (lower Toarcian) of SW-Germany: an oxygen-depleted ecosystem controlled by sea level and palaeoclimate. Palaeogeography, Palaeoclimatology, Palaeoecology, 165(1-2): 27-52. # bioturbation, Lower Jurassic, bioturbation, coprolites

Rogers, R.R., Arcucci, A.B., Abdala, F., Sereno, P.C., Forster, C. & May, C.L. 2001. Paleoenvironment and taphonomy of the Chañares Formation tetrapod assemblage

(Middle Triassic), northwestern Argentina: spectacular preservation in volcanogenic concretions. Palaios, 16(5): 461-481. # coprolites

Roman, K. & Rdzanek, K. 2001. Geology and stratigraphy of the Early Triassic vertebrate footprint site 'Wióry' using γ-ray log correlation: NE margin of the Holy Cross Mountains, Poland. Schriftenreihe der Deutschen Geologischen Gesellschaft, 13: 83. # *Brachychirotherium, Capotosauroides, Isochirotherium, Procolophonichnium, Prorotodactylus, Rhynchosauroides, Synaptichnium,* footprints, tetrapods, dinosaurs, fluvial

Roopnarine, P. & Beussink, A. 1999. Extinction and naticid predation of the bivalve *Chione* Von Muhlfeld in the Late Neogene of Florida. Palaeontologia Electronica, 2(art. 1): 24 pp., 719 kB. # Tertiary, USA

Roper, T.J., Bennett, N.C., Conradt, L. & Molteno, A.J. 2001.Environmental conditions in burrows of two species of African mole-rat, *Georhynchus capensis* and *Cryptomys damarensis*. Journal of Zoology, 254: 101-107. London. # mole-rat, burrows, environmental conditions

Rosenberg, R., Nilsson, H.C., Hellman, B. & Agrenius, S. 2000. Depth correlated benthic faunal quantity and infaunal burrow structures on the slopes of a marine depression. Estuarine Coastal and Shelf Science, 50(6): 843-853. # *Heteromastus filiformis, Calocaris macandreae, Maera loveni, Maldane sarsi, Abra alba,* recent, Sweden

Rossetti, D.d.F. 2000. Influence of low amplitude/high frequency relative sea-level changes in a wave-dominated estuary (Miocene), Sao Luis Basin, northern Brazil. Sedimentary Geology, 133(3-4): 295-324. # ichnofossils

Rossi, V.L., Osterrieth, M.L., Martínez, G.A. 2001. Icnología de la secuencia estratigráfica Mar Chiquita (Cuaternario Tardío), Buenos Aires. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 68. # *Edaphichnium, Skolithos, Taenidium,* Quaternary, Argentina

Rossi, V.L., Osterrieth, M.L. & Laborde, B.V. 2001. Bioturbaciones en sedimentos del Pleistoceno tardío – Holoceno de Punta Hermengo (Partido de General Alvarado, Buenos Aires). 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 67. # Plaistocene, Holocene, Argentina

Rowden, A.A., Jago, C.F. & Jones, S.E. 1998. Influence of benthic macrofauna on the geotechnical and geophysical properties of surficial sediment, North Sea. *In* Morris, A.W., Jago, C.F., Howarth, M.J. & Bale, A.J. (eds.), The North Sea Sediment Resuspension Experiment (SERE). Continental Shelf Research, 18: 1347-1363. # bioturbation, recent

Rowden, A.A., Jones, M.B. & Morris, A.W. 1998. The role of *Callianassa subterranea* (Montagu) (Thalassinidea) in sediment resuspension in the North Sea. *In* Morris, A.W., Jago, C. F., Howarth, M.J. & Bale, A.J. (eds.), The North Sea Sediment Resuspension Experiment (SERE). Continental Shelf Research, 18: 1365-1380. # recent, bioturbation

Russell, A.D. & Morford, J.L. 2001. The behavior of redox-sensitive metals across a laminated- massive-laminated transition in Saanich Inlet, British Columbia. Marine Geology, 174(1-4): 341-354. # bioturbation, geochemistry, Holocene

Rysgaard, S., Christensen, P.-B., Sorensen, M. V., Funch, P. & Berg, P. 2000. Marine meiofauna, carbon and nitrogen mineralization in sandy and soft sediments of Disko Bay, West Greenland. Aquatic Microbial Ecology, 21(1): 59-71.

Sabino, I. 2001. Floodplain deposits of the Los Blanquitos Formation (Pirgua Subgroup) in the Cabra Corral Dam. *In* Buatois, L.A. & Mángano, M.G. (eds.), Ichnology, Sedimentology and Sequence Stratigraphy of Selected Lower Paleozoic, Mesozoic and Cenozoic Units of Northwest Argentina, Fourth Argentinean Ichnologic Meeting and Second Ichnologic Meeting of Mercosur, September 29th - October 1st, Field Guide, p. 63-64. Tucumán. # fluvial, paleosols, nonmarine, Campanian, Maastrichtian, Argentina

Sabino, I. 2001. Carbonate paleosols in alluvial-fan deposits of the La Yesera Formation (Pirgua Subgroup) at Las Conchas River. *In* Buatois, L.A. & Mángano, M.G. (eds.), Ichnology, Sedimentology and Sequence Stratigraphy of Selected Lower Paleozoic, Mesozoic and Cenozoic Units of Northwest Argentina, Fourth Argentinean Ichnologic Meeting and Second Ichnologic Meeting of Mercosur, September 29th - October 1st, Field Guide, p. 68-70. Tucumán. # nonmarine, Cretaceous, Argentina

Sager, E.P.S., Whillans, T.H. & Fox, M.G. 1998. Factors influencing the recovery of submersed macrophytes in four coastal marshes of Lake Ontario. Wetlands, 18(2): 256-265. # Lake Ontario, Ontario, Canada, lacustrine environment, freshwater environment, bioturbation

Sales, V.M.S. & Richter, M. 1999. Coprolites of the Santana Formation (Lower Cretaceous, NE-Brazil): Who produced them? Ameghiniana, 36:107-108. # Brazil

Sanders, D. 2001. Burrow-mediated carbonate dissolution in rudist biostromes (Aurisina, Italy): implications for taphonomy in tropical, shallow subtidal carbonate environments. Palaeogeography, Palaeoclimatology, Palaeoecology, 168(1-2): 39-74. # Upper Cretaceous, Turonian to Maastrichtian

Sanders, D. 2001. A fan delta succession rich in water escape structures (upper Turonian, Brandenberg, Austria): possible record of paleoseismicity. Facies, 44: 163-182.

Sanders, R.C. & Picard, M.D. 1999. Sedimentology and ichnology of a bioturbated interval in the Nugget Sandstone, a Jurassic eolianite, near Peoa, northeastern Utah. Utah Geological Association Publication, 27: 123-140. # *Brasilichnium,* USA

Santos, A., Mayoral, E., Muiz, F., Boski, T. & Cacho, M. 2001. Nueva estructura bioerosiva relacionada con *Maeandropolydora sulcans* Voigt, 1965 en el Mioceno Superior de Cacela (SE de Portugal). 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 69. # borings, Miocene

Sanz, E., Pascual, C. & Barez, S. 1999. Dinosaur tracks in the Weald facies at 'El Royo' (Soria, Spain). Boletín de la Real Sociedad Española de Historia Natural, Seccion Geológica, 95(1-4): 101-115. # footprints, tetrapods

Sanz, L.J., Melgarejo, J.C. & Crimes, T.P. 2000. Stratigraphy of Lower Cambrian and unconformable Lower Carboniferous beds from the Valls Unit (Catalonian Coastal Ranges). Comptes Rendus de l'Académie des Sciences, Série II. Sciences de la Terre et des Planetes, 330(2): 147-153.

Sarjeant, W.A.S. 1996. *Dinosaur tracks and other fossil footprints of the western United States* by Martin Lockley and Adrian P. Hunt, 1995. Journal of Vertebrate Paleontology, 16(3): 597-598. # review of Lockley & Hunt (1995)

Sarjeant, W.A.S. 1996. *Earth's first steps: tracking life before the dinosaurs* by Jerry MacDonald, 1994. Earth Sciences History, 15(1): 84-85. # tracks, review of MacDonald (1994), Vertebrata

Sarjeant, W.A.S. 2000. Can the decline of Latin names be halted? Journal of Geoscience Education, 48: 121-26. # nomenclature, taxonomy

Sarjeant, W.A.S. & Langston, W., Jr. 1996. Vertebrate and invertebrate traces from the Chadronian (late Eocene) of trans-Pecos Texas. Texas Memorial Museum Bulletin, 36: 86 pp., 25 pl. # Tertiary, USA

Sarjeant, W.A.S. & Reynolds, R.E. 2001. Bird footprints from the Miocene of California. *In* Reynolds, R.E. (ed.), The Changing Face of the East Mojave Desert and Abstracts from the 2001 Desert Symposium. California State University, Fullerton, and Western Center for Archeology & Paleontology, Riverside, p. 21-40. # *Avipeda trinax, Avipeda gryponyx, Aviadactyla panini, Aviadactyla vialovi, Ornithotarnocia lambrechti, Gruipeda becassi, Alaripeda lofgreni* igen.n., isp.n., *Charadriipeda recurvirostrioidea, Anatipeda californica* isp.n., *Anatipeda alfi* isp. n., Culcitapedidae ifam.n., *Culcitapeda ascia* igen., isp. n., *Culcitapeda tridens* isp. n., *Culcitapeda eccentrica* isp. n., USA

Sarkar, S., Banerjee, S. & Bose, P.K. 1996. Trace fossils in the Mesoproterozoic Koldaha Shale, central India, and their implications. Neues Jahrbuch für Geologie und Paläontologie. Monatshefte, 1996(7): 425-438. # Precambrian

Saunders, T.D., MacEachern, J.A. & Pemberton, S.G. 1994. Cadotte Member Sandstone: progradation in a boreal basin prone to winter storms. *In* Pemberton, S.G., James, D.P. & Wightman, D.M. (eds.), Canadian Society of Petroleum Geologists Manville Core Conference, p. 331-349. # *Conichnus, Macaronichnus segregatis, Ophiomorpha, Palaeophycus tubularis, Rosselia socialis, Terebellina,* Cretaceous, Canada

Saunders, T.D., Pemberton, S.G. & Ranger, M.J. 1990. Trace Fossils and Sedimentology of the Appaloosa Sandstone: Bearpaw-Horseshoe Canyon Formations Transition, Dorothy, Alberta. E.G.S. Guidebook, 50 + x pp. # *Macaronichnus segregatis, M. spiralis, Planolites, Skolithos linearis,* Canada

Savrda, C.E. 1998. Ichnology of the Bridge Creek Limestone Member: evidence for temporal and spatial variations in paleo-oxygenation in the Western Interior Seaway. In Dean, W.E. & Arthur, M.A. (eds.), Stratigraphy and Paleoenvironments of the Western Interior Seaway, USA. SEPM Concepts in Sedimentology and Paleontology, 6: 127-136. # USA, oxygen

Savrda, C.E., Blanton-Hooks, A.D., Collier, J.W., Drake, R.A., Graves, R.L., Hall, A.G., Nelson, A.I., Slone, J.C., Williams, D.D. & Wood, H.A. 2000. *Taenidium* and associated ichnofossils in fluvial deposits, Cretaceous Tuscaloosa Formation, eastern Alabama, southeastern U.S.A. Ichnos, 7(3): 227-242. # Upper Cretaceous, fluvial environment, *Scoyenia* ichnofacies, reworked burrows, *Taenidium serpentinum,* Vertebrata

Savrda, C.E., Browning, J.V., Krawinkel, H. & Hesselbo, S.P. 2001. Firmground ichnofabrics in deep-water sequence stratigraphy, Tertiary clinoform-toe deposits, New Jersey slope. Palaios, 16: 294-305. # Eocene, Oligocene, Miocene, Pliocene, ODP Site 1073, New Jersey, USA, continental slope environment, bathyal environment, firmgrounds, cores, ichnofabric, sequence stratigraphy, Glossifungites ichnofacies, *Chondrites, Palaeophycus?, Phycosiphon, Planolites, Taenidium, Teichichnus, Thalassinoides, Zoophycos*

Savrda, C.E. & Krawinkel, H. 2001. Data report: Decimeter-scale sedimentologic and ichnologic observations on 520-m-thick Pleistocene sequence Site 1073 (Leg 174A), New Jersey continental slope. In Christie-Blick, N., Austin, J.A., Jr. & Malone, M.J. (eds.), Proceedings of the Ocean Drilling Program, Scientific Results. 174A: 9 p. # USA, continental slope environment, bathyal environment

Savrda, C.E., Krawinkel, H., McCarthy, F.M.G., McHugh, C.M.G., Olson, H.C. & Mountain, G. 2001. Ichnofabrics of a Pleistocene slope succession, New Jersey in relation to climate and sea-level dynamics. Palaeogeography, Palaeoclimatology, Palaeoecology, 171(1-2): 41-61. # *Phycosiphon, Schaubcylindrichnus, Thalassinoides,* bioturbation, *Cruziana* ichnofacies, *Glossifungites* ichnofacies, USA

Scasso, R.A. & Castro, L.N. 2001. Trazas fósiles y fosfogénesis en la Formación Lefipan, Cretácico Superior del Chubut. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 70. # *Arenicolites, Gyrolithes, Lockeia, Ophiomorpha, Palaeophycus, Phycodes, Rhizocorallium, Skolithos, Tasselia, Thalassinoides,* Cretaceous, Argentina

Schieper, C. & Ruckstuhl, T. 1997. Pa Sporet af Dyrene (Spuren, Fährten, Zeichen. Ein Schau- und Wunderbuch). Kinderbuchverlag KBV, Luzern, 32 pp. [In Danish, translated from German.] # popular, invertebrate and vertebrate nonmarine lebensspuren

Schairere, G., Seyed-Emami, K., Fürsich, F., Senowbari-Daryan, B., Ali Aghanabati, S. & Reza Majidifarad, M. 2000. Stratigraphy, facies analysis and ammonite fauna of the Qal'eh Dokhtar Formation (Middle-Upper Jurassic) at the type locality west of Boshrouyeh (east-central Iran). Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, 216(1): 35-66. # *Teichichnus, Thalassinoides, Zoophycos*

Schlirf, M., Uchman, A. & Kümmel, M. 2001. Upper Triassic (Keuper) non-marine trace fossils from the Haßberge area (Franconia, south-eastern Germany). Paläontologische Zeitschrift, 75(1): 71-96. Stuttgart. # *Cruziana pascens* isp. n., *C.*

problematica, Helminthoidichnites tenuis, Lockeia cunctator isp. n., *L. siliquaria, Multina, Planolites beverleyensis, P. montanus, Polykladichnus, Rusophycus carbonarius, R. eutendorfensis, Rusophycus verans* isp. n., *Scoyenia gracilis, Skolithos, Taenidium barretti,* deltaic, fluvial environment

Schmidt, S., de Stiger, H.C. & van Weering, T.C.E. 2001. Enhanced short-term sediment deposition within the Nazare Canyon, North-East Atlantic. Marine Geology, 173(1-4): 55-67. # bioturbation rates, Portugal

Schneider, C.L. 1999. Fossils of the Decorah Shale (Ordovician): evidence for shallow ocean stratification. Geological Society of America, Abstracts with Programs, 31(7): 103-104. # *Chondrites,* USA

Schulz-Pittman, R.J., Lockley, M.G. & Gaston, R. 1996. First reports of synapsid tracks from the Wingate and Moenave Formations, Colorado Plateau Region. Museum of Northern Arizona Bulletin, 60: 271-273. Flagstaff. # footprints, Jurassic, Colorado, Arizona, USA

Schwarz, E. & Poiré, D.G. 2001. Trazas fósiles y ambientes deposicionales de la Formación Mulichinco (Valanginiano), Cuenca Neuquina, Argentina. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 71. # *Arenicolites, Bergaueria, Chondrites, Gyrochorte, Helminthopsis, Mammilichnis, Neonereites, Ophiomorpha, Palaeophycus, Phycodes, Planolites, Scolicia, Skolithos, Subphyllochorda, Teichichnus, Thalassinoides,* Cretaceous, Argentina

Schweigert, G. 2001. Ein Schwimmspur aus dem Nusplinger Plattenkalk (Oberjura, SW-Deutschland (A swimming trail from the Nusplinger Lithographic Limestone [Late Jurassic, SW Germany]). Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, 2001(2): 77-84. # *Undichna westerbergensis* isp. n., Jurassic, Germany

Schweigert, G. 2001. Über *Medusites* Germar (Koprolith) und echte Algen aus oberjurassischen Platten-kalken Süddeutschlands (On *Medusites* Germar [coprolith] and true algae from Upper Jurassic lithographic limestones of S Germany). Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, 2001(4): 237-249. # Lumbricariidae ifam. n., *Lumbricaria filaria, L. intestinum, Halymenites varius, Medusites arcuatus, M. capillaris,* Jurassic, Germany

Schweigert, G. 2001. Miscellanea aus dem Nusplinger Plattenkalk (Ober-Kimmeridgium, Schwäbische Alb) 3. Ein Speiballen mit Flugaurierresten. Jahresberichte und Mitteilungen des Oberrheinishen Geologischen Vereins, Neue Folge, 83: 357-364. Stuttgart. # gastric pellets, tetrapods, dinosaurs, Jurassic, Germany

Schweigert, G., Seegis, D., Fels, A. & Leinfelder, R.R. 1997. Internally structured decapod microcoprolites from Germany (Late Triassic/early Miocene), southern Spain (Early/Middle Jurassic) and Portugal (Late Jurassic): taxonomy, palaeoecology and evolutionary implications. Paläontologische Zeitschrift, 71: 51-69.

Schweitzer, C.E. & Feldmann, R.M. 2000. *Callichirus*? *symmetricus* (Decapoda, Thalassinoidea) and associated burrows, Eocene, Antarctica. *In* Stilwell, J.D. & Feldmann, R.M. (eds.), Paleobiology and paleoenvironments of Eocene rocks, McMurdo Sound, East Antarctica. Antarctic Research Series, 76: 335-347.

Scott, A.C. & Titchener, F.R. 1999. Techniques in the study of plant-arthropod interactions. *In* Jones, T.P. & Rowe, N.P. (eds.), Fossil Plants and Spores: Modern Techniques. Geological Society, London, p. 310-315.

Scott, J.J., McCrea, R.T., Plint, A.G., Lumsdon, M.P. & Lockley, M.G. 2001. Vertebrate ichnofauna of the Upper Cretaceous (Cenomanian) Dunvegan Formation of Western Canada. Journal of Vertebrate Paleontology. 21(3, Suppl.): 99-100. # *Amblydactylus, Gypsichnites, Tetrapodosaurus borealis,* Alberta, British Columbia

Seilacher, A. 1996. Evolution of burrowing behaviour in Silurian trilobites: ichnosubspecies of *Cruziana acacensis*. *In* Salem, M.J., Mouzughi, A.J. & Hammuda, A.J. (eds.). The Geology of Sirt Basin, 1. Elsevier, Amsterdam, p. 523-530. # *C. acacensis laevigata* isubsp. n., *Cruziana acacensis plana* isubsp. n., *C. acacensis retroversa* isubsp. n., *C. acacensis sandalina* isubsp. n., *C. dispar, C. jenningsi, C. leiferiksoni, C. pedroana, C. quadrata,* Libya

Seilacher, A. 2000. Ordovician and Silurian arthrophycid ichnostratigraphy. *In* Sola, M.AS. & Worsley, D. (eds.), Geological Exploration in Murzuq Basin. Elsevier, Amsterdam, p. 237-258. # *Arthrophycus alleghanensis, Arthrophycus lateralis* isp. n., *Arthrophycus linearis* isp. n., *Arthrophycus linearis protrusiva* isubsp. n., *Arthrophycus linearis retrusiva* isubsp. n., *Daedalus archimedes, D. halli, D. labechei, Daedalus multiplex* isp. n., *Daedelus verticalis* isp. n., *Phycodes circinatum, Phycodes fusiforme* isp. n., *Phycodes parallelum* isp. n., Ordovician, Silurian, Algeria, Antarctica, Argentina, Australia, Benin, Ontario, Canada, Chad, France, Iraq, Jordan, Libya, Oman, Portugal, Saudi Arabia, Spain, Turkey, New York, Ohio, USA

Seilacher, A. 2001. Concretions morphologies reflecting diagenetic and epigenetic pathways. Sedimentary Geology, 143: 41-57. # *Chondrites, Guilielmites, Palaeotrochis,* pseudo-trace fossils

Shang, Q. & Cao, C. 1999. Trace fossils of the Permian-Triassic boundary beds in southeastern China. *In* Yin, H. & Tong, J. (eds.), Proceedings of the International Conference on Pangea and the Paleozoic-Mesozoic Transition. China University of Geosciences Press, Wuhan, p. 147. # Permian, Triassic, China

Shanmugam, G., Poffenberger, M. & Alava, J. T. 2000. Tide-dominated estuarine facies in the Hollin and Napo ('T' and 'U') formations (Cretaceous), Sacha Field, Oriente Basin, Ecuador. American Association of Petroleum Geologists, Bulletin, 84(5): 652-682. # bioturbation

Shea, J.J. 1999. Artifact abrasion, fluvial processes, and living floors from the early Paleolithic site of Ubeidiya (Jordan Valley, Israel). Geoarchaeology, 2: 191-207. # archaeology, bioturbation, Quaternary, Holocene

Sheldon, N.D. & Retallack, G.J. 2001. Equation for compaction of paleosols due to burial. Geology, 29: 247-250.

Sheldon, N.D., Retallack, G.J. & Reed, M.H. 2001. Siderite-iron-silicate equilibria in paleosols as an atmospheric CO_2 paleobarometer or paleoproductivity index? Abstracts of the Geological Society of America and Geological Society of London Global Meeting – Earth System Processes, Edinburgh, p. 42.

Shirai, M. & Tada, R. 2000. Sedimentary successions formed by fifth-order glacio-eustatic cycles in the Middle to Upper Quaternary formations of the Oga Peninsula, northeast Japan. Journal of Sedimentary Research, 70(4): 839-849. # bioturbation

Shormann, D.E. & Cotner, J.B. 1997. The effects of benthivorous smallmouth buffalo (*Ictiobus bubalus*) on water quality and nutrient cycling in a shallow floodplain lake. Lake and Reservoir Management, 13(3): 270-278. # bioturbation, biogeochemistry, nitrogen, phosphorus

Short, A.D. & Hesp, P.A. 1999. Beach ecology. *In* Short, A. D. (ed.), Handbook of Beach and Shoreface Morphodynamics. John Wiley & Sons, Chichester, p. 272-278. # bioturbation

Shull, D.H. 2001. Transition-matrix model of bioturbation and radionuclide diagenesis. Limnology and Oceanography, 46(4): 905-916. # Oligochaeta, Polychaeta *Mediomastus ambiseta, Polycirrus eximius, Polydora, Sabaco elongatus,* Bivalvia *Nucula annulata, Yoldia limatula,* modern, Rhode Island, USA

Simons, D.-J.H. & Kenig, F. 2001. Molecular fossil constraints on the water column structure of the Cenomanian-Turonian Western Interior Seaway, USA. Palaeogeography, Palaeoclimatology, Palaeoecology, 169(1-2): 129-152. # bioturbation, Cretaceous

Slavickova, J. 1999. Remarks to the palaeobiology and taphonomy of illaenid trilobites (Ordovician, Barrandian area, Czech Republic). Journal of the Czech Geological Society, 44(1-2): 93-96. # ichnofossils

Slavíkova, J. & Mikuláš, R. 2000. Association of *Placoparia cambriensis* (Trilobita) and minute ovoid pellets in the fill of an ichnofossil (Ordovician, Czech Republic). Študencká Vedecká Konferencia, 11.-12. Apríl 2000, Zborník Abstraktov Prác Diplomantov a Doktorandov, p. 162. Bratislava.

Smail, S.E. & Miller, M.F. 1997. Record of freshwater benthic fauna from Permian and Triassic trace fossils of the central Transantarctic Mountains. Geological Society of America, Abstracts with Programs, 29(4): 72. # *Cochlichnus*

Smith, C.R., Levin, L.A., Hoover, D.J., McMurtry, G. & Gage, J.D. 2000. Variations in bioturbation across the oxygen minimum zone in the northwest Arabian Sea. In Gage, J. D., Levin, L.A. & Wolff, G A. (eds.), Benthic processes in the deep Arabian Sea: biogeochemistry, biodiversity and ecology. Deep-Sea Research, part II: Topical Studies in Oceanography, 47(1-2): 227-257.

Smith, G.J. & Jacobi, R.D. 2001. Tectonic and eustatic signals in the sequence stratigraphy of the Upper Devonian Canadaway Group, New York State. American Association of Petroleum Geologists Bulletin, 85(2): 325-357. # *Arenicolites, Macaronichnus, Ophiomorpha, Palaeophycus, Planolites, Rhizocorallium, Schaubcylindrichnus, Skolithos, Teichichnus, Thalassinoides, Zoophycos,* USA

Sohlenius, G., Emeis, K.-C., Andren, E., Andren, T. & Kohly, A. 2001. Development of anoxia during the Holocene fresh–brackish water transition in the Baltic Sea. Marine Geology, 177(3-4): 221-242. # bioturbation, geochemistry

Soler-Gijón, R. & Moratalla, J.J. 2001. Fish and tetrapod trace fossils from the Upper Carboniferous of Puertollano, Spain. Palaeogeography, Palaeoclimatology, Palaeoecology, 171(1-2): 1-28. # new taxa, *Puertollanopus microdactylus* n.igen. n.isp., *Undichna britannica, U. unisulca,* resting traces, Vertebrata Chondrichthyes *Orthacanthus,* Amphibia or Reptilia, Stephanian C

Sommerfield, C.K., Aller, R.C. & Nittrouer, C.A. 2001. Sedimentary carbon, sulfur, and iron relationships in modern and ancient diagenetic environments of the Eel River Basin (U.S.A.). Journal of Sedimentary Research, 71(3): 335-345. # *Palaeophycus, Teichichnus,* bioturbation, geochemistry, Pleistocene, modern, California

Souto, P.R.F. 2001. New occurrences of coprolites from the Ariripe Basin (Upper Jurassic and Lower Cretaceous, Brazil). *In* Paleontology in the New Millenium, North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 119.

Stamhuis, E.J., Schreurs, C.E. & Videler, J.J. 1997. Burrow architecture and turbative activity of the thalassinid shrimp *Callianassa subterranea* from the central North Sea. Marine Ecology Progress Series, 151: 155-163. # modern, Thalassinidea, Callianassidae

St-Onge, G. & Hillaire-Marcel, C. 2001. Isotopic constraints of sedimentary inputs and organic carbon burial rates in the Saguenay Fjord, Quebec. Marine Geology, 176(1-4): 1-22. # bioturbation, Canada, Quaternary, Holocene

Sullivan, M.D., Jennette, D.C., Foster, M.E., Stuart, R.M., Lovell, R.W. & Pemberton, S.G. 1997. High resolution sequence stratigraphy and architecture of the Shannon Sandstone, Hartzog Draw Field, Wyoming: implications for reservoir management. GCSSEOM Foundation 18th Annual Research Conference Shallow marine and Nonmarine Reservoirs, December 7-10, 1997, p. 331-344. # *Conichnus, Helminthopsis, Macaronichnus, Ophiomorpha, Palaeophycus, Planolites, Skolithos, Teichichnus, Terebellina, Thalassinoides*

Spencer, L.A. 2001. Potentially false interpretations of dinosaur nests and nesting, with an example from the Allen Formation, Patagonia, Argentina. *In* Paleontology in the New Millenium, North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 119. # tetrapods

Spencer, P.S. & Lee, M.S.Y. 2000. A juvenile *Elginia* and early growth in pareiasaurs. Journal of Paleontology, 74(6): 1191-1195. # ichnofossils, Permian, Great Britain

Sprechmann, P., Gaucher, C. & Montaa, J. 2001. Icnofosiles de la Formación Cerro Victoria (Nemakitiano–Daladyniano) del Grupo Arroyo del Soldado, Uruguay: bioestratigrafía y paleoecología [Ichnofossils of the Cerro Victoria Formation (Nemakitian-Daladynian) of the Arroyo del Soldado Group, Uruguay: biostratigraphy and paleoecology]. 4th Reunión Argentina de Icnología y Segunda Reunión de

Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 72. # *Thalassinoides,* Precambrian, Cambrian

Sprechmann, P., Gaucher, C., Montaa, J. & Herrera, Z. 2001. Icnofosiles en concreciones de la Formación San Gregorio del Uruguay (Carbonifero Superior? - Permico Inferior?): implicancias paleoecologias y paleoclimaticas [Ichnofossils and concretions of the San Gregorio Formation of Uruguay (Upper Carboniferous? - Lower Permian?)]. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 73. # *Arachnostega,* Carboniferous, Permian

Sprinkle, J., Guensburg, T.E. & Rozhnov, S.V. 1999. Correlation anomaly shown by Ordovician shelly and trace fossils in Baltic Russia: redating the Ordovician radiation. Acta Universitatis Carolinae – Geologica, 43: 471-474.

Steen, P.P. 1999. Biogenic sedimentary structures in Estero Morua, a macrotidal flat in the northern Gulf of California, Sonora, Mexico. Unpublished M.S. Thesis, University of Utah, Salt Lake City, Utah, United States, 143 p. # modern, Sonora, Mexico, intertidal environment

Stelck, C.R., MacEachern, J.A. & Pemberton, S.G. 2000. A calcareous foraminiferal faunule from the upper Albian Viking Formation of the Giroux Lake and Kaybob North Fields, northwestern Alberta: implications for regional biostratigraphic correlation. Canadian Journal of Earth Sciences, 37(10): 1389-1410. # *Ancorichnus, Arenicolites, Asterosoma, Chondrites, Conichnus, Cylindrichnus, Diplocraterion, Gastrochaenolites, Helminthopsis, Lockeia, Ophiomorpha, Planolites, Palaeophycus, Rhizocorallium, Rosselia, Schaubcylindrichnus, Siphonichnus, Skolithos, Subphyllochorda, Thalassinoides, Zoophycos,* root traces, *Glossifungites* ichnofacies, *Skolithos* ichnofacies, *Cruziana* ichnofacies, sequence stratigraphy, Cretaceous, Canada

Stephens, S. 2001. Bornholm Field Excursion. Geologist's Association Circular, 944: 12-13. # *Diplocraterion, Gyrophyllites, Ophiomorpha, Planolites, Skolithos,* Cambrian, Jurassic, Denmark

Stevens, L.R., Ito, E. & Olson, D.E.L. 2000. Relationship of Mn-carbonates in varved lake-sediments to catchment vegetation in Big Watab Lake, MN, USA. Journal of Paleolimnology, 24(2): 199-211. # Minnesota

Stewart, J.D. & Carpenter, K. 1999. Examples of vertebrate predation on cephalopods in the Late Cretaceous of the Western Interior. Bulletin of the Southern California Paleontological Society, 31(9-10): 66-73. # USA

Stinnesbeck, W., Keller, G., Adatte, T., Grajales-Nishimura, J.M., Cedillo-Pardo, E., Rosales-Dominguez, C., Moran-Zenteno, D., Alvarez, W., Claeys, P., Ruiz-Morales, J., Garcia-Hernandez, J., Padilla-Avila, P. & Sanchez-Rios, A. 2001. Chicxulub impact: the origin of reservoir and seal facies in the southeastern Mexico oil fields: discussion and reply. Geology, 29(1): 94-96. # *Chondrites, Ophiomorpha, Planolites, Rhizocorallium, Zoophycos,* Cretaceous, Paleocene, K/T boundary

Stoessel, I. 2000. Frühe Tetrapoden: kontroverse Spurenfossilien. Vierteljahresschrift der Naturforschenden Gesellschaft in Zürich, 145(1): 31-40. # Devonian, Greenland

Stoops, G., Van Ranst, E. & Verbeek, K. 2001. Pedology of soils within the spray zone of the Victoria Falls (Zimbabwe). Catena, 46(1): 63-83. Giessen.

Stott, L.D., Berelson, W., Douglas, R. & Gorsline, D. 2000. Increased dissolved oxygen in Pacific intermediate waters due to lower rates of carbon oxidation in sediments. Nature, 407(6802): 367-370. # bioturbation

Stromberg, C.A.E. & Stidham, T.A. 2001. Dung beetle brood balls and notoungulate diet. Journal of Vertebrate Paleontology. 21(3, Suppl.): 105. # coprolites, insects, Argentina, Eocene, Oligocene

Struve, W. 1995. Die Riesen-Phacopiden aus dem Mader, SE-marokanische Prä-Sahara. Senckenbergiana Lethea, 75(1/2): 77-129. # *Chondrites praetargionii* isp. n., Devonian, Morocco

Stuart, C. & Stuart, T. 1998. A Field Guide to the Tracks and Signs of Southern and East African Wildlife. Southern Book Publishers, Cape Town, 310 pp. # tracking, Africa.

Sudan, C.S., Sharma, U.K., Sahni, A.K. & Shah, S.K. 2000. Trace fossils from the Pin section of Spiti Valley, Himachal Pradesh and their stratigraphic significance. Journal of the Geological Society of India, 55(6): 649-654. # Cambrian, India

Sun, Y. & Torgersen, T. 2001. Adsorption-desorption reactions and bioturbation transport of ^{224}Ra in marine sediments: a one-dimensional model with applications. Marine Chemistry, 74(4): 227-243. # Long Island Sound, Connecticut, USA

Sutcliffe, O.E., Suedkamp, W.H. & Jefferies, R.P.S. 2000. Ichnological evidence on the behaviour of mitrates: two trails associated with the Devonian mitrate *Rhenocystis*. Lethaia, 33(1): 1-12. # locomotion trails, Germany

Swaney, D.P. 1999. Analytical solution of Boudreau's equation for a tracer subject to food-feedback bioturbation. Limnology and Oceanography, 44(3): 697-698. # methods

Tateo, F., Cortecci, G., Minguzzi, V. & Morandi, N. 2001. Mineralogy and geochemistry of early-formed deep marine dolomite in the Castagnola Formation (Oligocene-Miocene, northern Italy). European Journal of Mineralogy, 13(4): 727-741. # bioturbation

Taylor, M.A. 1999. The greatest fossilist the world ever knew: Mary Anning (1799-1847). Endeavour, 23(3): 93-94. # Cretaceous, Jurassic, coprolites

Taylor, P.D., Wilson, M.A. & Bromley, R.G. 1999. A new ichnogenus for etching made by cheilostom bryozoans into calcareous substrates. Palaeontology, 42(4): 595-604. # *Leptichnus* igen. n., *Leptichnus dromeus* isp. n., *Leptichnus peristoma* isp. n., borings, Cretaceous, Oligocene, Miocene, Pliocene, Pleistocene, Great Britain, UK, England, New Zealand

Tchoumatchenco, P. & Uchman, A. The oldest deep-sea *Ophiomorpha* and *Scolicia* and associated trace fossils from the Upper Jurassic - Lower Cretaceous deep-water turbidite deposits of SW Bulgaria. Palaeogeography, Palaeoclimatology, Palaeoecology, 169(1-2): 85-99. # *Arabesca, Bergaueria, Chondrites targionii, Halopoa imbricata, Helminthopsis abeli, Hormosiroidea annulata, Ophiomorpha annulata, Ophiomorpha isp., Palaeophycus tubularis, P. heberti, Paleodictyon latum, P. strozzii, P. majus, Phycodes palmatum, Protopaleodictyon incompositum, Scolicia strozzii, Spongeliomorpha oraviense, Thalassinoides, Zoophycos brianteus,* flysch

Thomas, D.S.G., P.W, O. C., Bateman, M.D., Shaw, P.A., Stokes, S. & Nash, D.J. 2000. Dune activity as a record of Late Quaternary aridity in the northern Kalahari: new evidence from northern Namibia interpreted in the context of regional arid and humid chronologies. Palaeogeography, Palaeoclimatology, Palaeoecology, 156(3-4): 243-259.

Thomsen, E., Bromley, R.G. & Hanken, N.-M. 2001. The bivalve *Panopea faujasi* and its trace fossil. *In* Salvini-Plawen, L., Voltzow, J., Sattmann, H. & Steiner, G. (eds.), Unitas Malacologica, 2001: World Congress of Malacology, Vienna, Abstracts, p. 353.

Tian, J., Gong, Y., Liang, B. & Huang, J. 1999. Permian-Triassic trace fossils in the eastern Kunlun orogenic belt, China. Acta Sedimentologica Sinica, 17(3): 361-366.

Tita, G., Desrosiers, G., Vincx, M. & Nozais, C. 2000. Predation and sediment disturbance effects of the intertidal polychaete *Nereis virens* (Sars) on associated meiofaunal assemblages. Journal of Experimental Marine Biology and Ecology, 243(2): 261-282. # bioturbation, effects on meiofauna, tiering

Toner, M. 2000. Saving mankind's first footprints. Atlanta Journal-Constitution, (23 April): B2. # Quaternary, Pleistocene, South Africa, Tanzania, tracks, Vertebrata Mammalia Primates Hominidae *Homo sapiens*

Treptau, K.L., MacEachern, J.A. & Mustard, P.S. 2000. An integrated sedimentological-ichnological analysis of a distal submarine fan succession: Upper Cretaceous Cedar District Formation, Nanaimo Group, southwest British Columbia, Canada. Geological Society of America, Abstracts with Programs, 33(3): 68. # Canada

Treptau, K.L., MacEachern, J.A. & Mustard, P.S. 2001. An integrated sedimentological-ichnological analysis of a distal submarine fan succession: Upper Cretaceous Cedar District Formation, Nanaimo Group, southwest British Columbia, Canada. American Association of Petroleum Geologists. Bulletin, 85(6): 1146-1147. # *Zoophycos*

Tresise, G. & Radley, J.D. 2000. Triassic footprints: the first English finds. Geological Curator, 7(4): 135-140.

Tresise, G. & Sarjeant, W.A.S. 1997. The Tracks of Triassic Vertebrates: Fossil Evidence from North-west England. The Stationery Office, London, xii + 204 pp. # United Kingdom

Trewin, N.H. 2000. The ichnogenus *Undichna,* with examples from the Permian of the Falkland Islands. Palaeontology, 43(6): 979-997. # *Undichna bina, U. britannica, U. consulca, U. insolentia, Undichna quina* isp. n., *U. radnicensis, U. simplicitas, U. tricosa, U. uniscula*

Tríbulo, E. & Mángano, M.G. 2001. Aplicaciones de la neoicnología experimental en el estudio de huellas de artrópodos [Applications of experimental neoichnology to the study of arthropod traces]. Cuarta Reunión Argentina de Icnologia y Segunda Reunión de Icnología del Mercosur, Resúmenes, San Miguel de Tucumán: 75. # modern, Argentina

Tuominen, L., Heinänen, A., Kuparinen, J. & Nielsen, L. P. 1998. Spatial and temporal variability of denitrification in the sediments of the northern Baltic proper. Marine Ecology Progress Series, 172: 13-24. # Finland, bioturbation, biogeochemistry, nitrogen

Turley, C. 2000. Bacteria in the cold deep-sea benthic boundary layer and sediment-water interface of the NE Atlantic. FEMS Microbiology. Ecology, 33(2): 89-99. # bioerosion

Tyler, A.N., Carter, S., Davidson, D.A., Long, D.J. & Tipping, R. 2001. The extent and significance of bioturbation on ^{137}Cs distributions in upland soils. Catena, 43(2): 81-99. # geochemistry, isotopes

Uchman, A. 2001. Graphoglyptid trace fossils: their ethology, ecology and evolution. *In* Paleontology in the New Millenium, North American Paleontological Convention 2001, Program & Abstracts. Museum of Paleontology, University of California, Berkeley, p. 128. # general, *Paleodictyon*

Uchman, A. 2001. Ichnofabrics from Lower Cretaceous dark flysch deposits of the Carpathians, Poland. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July, 4-20, 2001. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # *Chondrites intricatus, Helminthopsis, Planolites, Phycosiphon, Protovirgularia obliterata, P. pennata,* oxygenation

Uchman, A. 2001. Deep-sea trace fossils: on the edge of *terra incognita*. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 13. # general

Uchman, A. 2001. Ichnological record of oxygenation changes in the Lower Cretaceous flysch deposits of the Silesian Unit, Polish Carpathians. *In* Zuchiewicz, W. (ed.), Carpathians Palaeogeography and Geodynamics: a Multidisciplinary Approach, 12th Meeting of the Association of European Geological Societies, MAEGS 2001, Kraków, 8-15 September, 2001, Abstracts. Biuletyn Pastwowego Instytutu Geologicznego, 396: 159-160. Warszawa. # *Arthrophycus tenuis, Belorhaphe, Chondrites intricatus, C. targionii, Glockerichnus, Helminthopsis, Lorenzinia, Paleodictyon, Phycosiphon incertum, Protovirgularia obliterata, P. pennata, Taenidium, Thalassinoides, Urohelminthoida,* anoxia

Uchman, A. 2001. Eocene flysch trace fossils from the Hecho Group of the Pyrenees, northern Spain. Beringeria, 28: 3-41. Würzburg. # *Alcyonidiopsis, Asterichnus, Belocosmorhaphe aculeata, Belorhaphe zickzack, Chondrites intricatus, C. patulus, Chondrorhaphe bifida, Cladichnus aragonensis* isp. n., *Cosmorhaphe lobata, Desmograpton alternum, D. dertonensis, Diplocraterion, Estrellichnus jacaensis, Gordia marina, Gyrophyllites multiradiatus, Halopoa annulata, H. imbricata, Halopoa storeana* isp. n., *Heimdallia,.Helicolithus ramosus, Helminthopsis abeli, H. tenuis, Helminthorhaphe flexuosa, Lockeia, Lophoctenium, Lorenzinia nowaki, Megagrapton irregulare, M. submontanum, Multina minima* isp. n., *Nereites biserialis, N. irregularis, Ophiomorpha annulata, O. rudis, Paleodictyon arvense, P. delicatulum, P. goetzingeri, P. majus, P. minimum, P. strozzii, Parahaentzschelinia, Phycosiphon incertum, Planolites beverleyensis, P. terraenovae, Protopaleodictyon incompositum, 'Rotundusichnium' zumayensis, Scolicia plana, S. strozzii, Spirorhaphe involuta, Strobilorhaphe, Taenidium cameroensis, T. dieslingi, Tasselia,*

Thalassinoides suevicus, Trichichnus linearis, Urohelminthoida appendiculata, U. dertonensis, Zoophycos, flysch, slope

Uchman, A. & Bromley, R. 2001. Shelf and deep-sea *Ophiomorpha* ichnofabrics from Rhodes, Greece. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # *Ophiomorpha nodosa, O. rudis, Macaronichnus, Phymatoderma, Rosselia, Teichichnus,* Miocene, Oligocene

Uchman, A., Bubniak, I. & Bubniak, A. 2000. *Glossifungites* ichnofacies in the area of its nomenclatural archetype, Lviv, Ukraine. Ichnos, 7(3): 183-193. # Ukraine, *Glossifungites* ichnofacies, *Glossifungites saxicava = Rhizocorallium jenense*

Uchman, A., Demírcan, H., Toker, V., Derman, S., Sevim, S. & Szulc, J. 2001. Borings from a Miocene rocky shore in the Mut Basin, southern Turkey. *In* Fourth International Turkish Geology Symposium, Working Progress in the Geology of Turkey and Its Surroundings, 24-28 September, Abstracts. Adana, Çukurova University, p. 265. # *Caulostrepsis taeniola, Entobia, Gastrochaenolites lapidicus, G. torpedo*

Uchman, A. & Przybyowicz, . 2001. Spiralne lady ycia z dolnego trzeciorz du w otoczeniu Gorczaskiego Parku Narodowego, Parki Narodowe, 2001(1): 18. [In Polish] # popular, *Spirorhaphe,* Eocene, flysch, Poland

Uchman, A. & Rindsberg, A.K. 2001. Bibliographia ichnologica 2000, with complementary data for 1996 to 1999. Ichnology Newsletter, 23: 76-115. # bibliography

Uchman, A. & Rindsberg, A.K. 2001. Repositories of type and other specimens of trace fossils. Ichnology Newsletter, 23: 70-75. # museum collections

Uchman, A. & Wetzel, A. 2001. Ichnofabric and sequentional colonization of muddy turbidites from the Eocene Belovea Formation, Carpathians, Poland. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # *Chondrites, Halopoa, Nereites, Ophiomorpha, Phycosiphon, Scolicia,* tiering, flysch

Uchman, A. & Wetzel, A. 2001. *Estrellichnus jacaensis* nov. igen., nov. isp. – a large radial trace fossil from Eocene flysch (Hecho Group, northern Spain). Geobios, 34(3): 357-361. # *Capodistria vettersi, Estrellichnus jacaensis* igen. n., isp. n., *Helminthorhaphe flexuosa, Megagrapton submontanum, Paleodictyon strozzii, Scolicia, Thalassinoides*

Uliny, D. 2001. Depositional systems and sequence stratigraphy of coarse-grained deltas in a shallow-marine, strike-slip setting: the Bohemian Cretaceous Basin, Czech Republic. Sedimentology, 48: 599-628. # *Ophiomorpha, Planolites, Teredolites, Thalassinoides,* sequence stratigraphy

Uroza, C.A., Arostegui, G. & Machillanda, C. 2001. The *Glossifungites* ichnofacies as indicator of transgressive surfaces in a wave-dominated setting, Oligocene basal section of the Furial Field, Montagas stage. *In* VI International Ichnofabric Workshop, Venezuela 2001, Isla Margarita & Puerto La Cruz, July 14-20, 2001, Core Workshop. [2 pp., no pagination, also Spanish version]. Sociedad Venezolana de Geólogos & PDVSA. # *Thalassinoides, Glossifungites* ichnofacies, Venezuela

Uroza, C.A., Arostegui, G. & Machillanda, C. 2001. The *Glossifungites* ichnofacies as indicator of transgressive surfaces in a wave-dominated setting, Oligocene basal section of the Furial Field, Montagas stage. VI International Ichnofabric Workshop, Venezuela 2001, Isla Margarita & Puerto La Cruz, July 14-20, 2001, Abstracts [1 p., no pagination]. Sociedad Venezolana de Geólogos & PDVSA. # *Thalassinoides, Glossifungites* ichnofacies, Venezuela

Usio, N. & Townsend, C. R. 2000. Distribution of the New Zealand crayfish *Paranephrops zealandicus* in relation to stream physico-chemistry, predatory fish, and invertebrate prey. New Zealand Journal of Marine and Freshwater Research, 34(3): 557-567.

Valais, S. de & Melchor, R. 2001. Huellas de artrópodos de la Formación la Matilde (Jurásico Medio), Santa Cruz, Argentina. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001,

Tucumán, p. 76. # *Ameghinichnus patagonicus, Hexapodichnus, Sermientichnus scagliai, Wildeichnus navesi,* arthropods, Jurassic

Valentine, J.W., Erwin, D.H. & Jablonski, D. 1996. Developmental evolution of metazoan body plans: the fossil evidence. Developmental Biology, 173: 373-381.

Van Rees, K.C.J., Reddy, K.R. & Rao, P.S.C. 1996. Influence of benthic organisms on solute transport in lake sediments. Hydrobiologia, 317(1): 31-40. # Lake Okeechobee, Florida, USA, bioturbation

VanNest, J. 2002. The good earthworm: How natural processes preserve upland Archaic archaeological sites of western Illinois, U.S.A. Geoarchaeology, 17(1): 53-90. # bioturbation

Varricchio, D.J. 2001. Gut contents from a Cretaceous tyrannosaurid: implications for theropod dinosaur digestive tracts. Journal of Paleontology, 75(2): 401-406. # Upper Cretaceous, Campanian, Montana, USA, cololites, Vertebrata Dinosauria Theropoda Tyrannosauridae *Daspletosaurus* sp.

Vaughan, R.D., Leret, V.G. & Villalobos, V.L. 1998. The reservoir character of the c4 zone (Lower Devonian, f6 formation), Illizi Basin, southern Algeria: a transgressive shoreface deposit. *In* Canaveras, J.C., Garcia, d.C.M.A., Soria, J., Melendez, H.A. & Soria, A.R. (eds.), 15th International Sedimentological Congress; Abstracts. Alicante, Spain, p. 791.

Vendetti, J. 2001. Fossils on the fairway. Geotimes, 46(10): 10. # Upper Cretaceous, Colorado, USA, M.G. Lockley, tracks, parks, Vertebrata Dinosauria Ceratopsia Triceratops

Verde, M. 2001. Sedimentological significance of a densely bored surface at the top of the Camacho Formation (late Miocene) of Uruguay. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 77. # *Gastrochaenolites lapidicus, G. ornatus, G. torpedo, G. turbinatus, Ophiomorpha, Thalassinoides,* borings

Verde, M. 2001. New ichnospecies of *Gastrochaenolites* and *Rosselia* from the Late Miocene Camacho Formation of Uruguay. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 78. # *Rosselia, Gastrochaenolites lapidicus, G. ornatus, G. torpedo, G. turbinatus, Lingulichnus, Ophiomorpha nodosa, Thalassinoides,* borings

Verde, M. & Martínez, S. 2001. A new crustacean trace fossil from the Late Miocene Camacho Formation of Uruguay. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 79. # *Ophiomorpha, Thalassinoides*

Vidal, E., Medail, F., Tatoni, T., Roche, P. & Vidal, P. 1998. Impact of gull colonies on the flora of the Riou Archipelego (Mediterranean islands of south-east France). Biological Conservation, 84(3): 235-243. # bioturbation, nests, Vertebrata Aves *Larus cachinnans*

Vilela, C., Carvalho, I.d.S. & Henriques, M.H.P. 1999. Acão bioerosiva de algas e fungos em foraminiferos do leque do Amazonas. Estudos Tecnologicos, 23(49): 93-101. # bioerosion, Pleistocene, Quaternary, Brazil

Villarreal Chavez, G. & Carmona Cedillo, C. M. 1999. Benthic community structure (infauna) in the Colorado River delta, Mexico. Revista de Biologia Tropical, 47(4): 809-812. # *Uca princeps*

Vincent, A.J. & Tyson, R.V. 1999. Organic facies of the Middle Jurassic of the Inner Hebrides, Scotland. Petroleum Geoscience, 5(1): 83-92.

Vincent, S.J. 2001. The Sis palaeovalley: a record of proximal fluvial sedimentationn and drainage basin development in response to Pyrenean mountain building. Sedimentology, 48(6): 1235-1276. # *Skolithos,* bioturbation, palaeosols, terrestrial, fluvial, nonmarine environments, Eocene, Oligocene, Spain

Vízcaino, S.F., Zárate, M., Bargo, M.S. & Dondas, A. 2001. Pleistocene burrows in the Mar del Plata area (Argentina) and their probable builders. Acta Palaeontologica Polonica, 46(2): 289-301. # *Glossotherium, Scelidotherium,* mylodontid ground sloths, mammals

Walker, S.E. 2001. Below the sediment-water interface: a new frontier in taphonomic research. Palaios, 16(2): 113-114. # modern, bioturbation

Walker, S.E. 2001. Paleoecology of gastropods preserved in turbiditic slope deposits from the upper Pliocene of Ecuador. Palaeogeography, Palaeoclimatology, Palaeoecology, 166(1-2): 141-163 # deepsea, littoral, lithic borings, drillholes, shell repair, taphonomy, *Entobia, Helicotaphrichnus commensalis, Zaphella* [*Zapfella*], boring Fungi or algae, boring Polychaeta Spionidae, drilling Gastropoda Muricidae, Naticidae, Cephalopoda Octopodidae, Upper Tertiary, modern

Wang, Y. & Wang, X. 1996. Trace fossils near Devonian-Carboniferous boundary section in Dushan, Guizhou. Dicengxue Zazhi = Journal of Stratigraphy, 20(4): 285-290. # *Skolithos,* China

Waters, M.R. & Kuehn, D.D. 1996. The geoarchaeology of place: the effect of geological processes on the preservation and interpretation of the archaeological record. American Antiquity, 61(3): 483-497. # Quaternary, Holocene, archaeology, bioturbation

Wehausen, R. & Brumsack, H.J. 2000. Chemical cycles in Pliocene sapropel-bearing and sapropel-barren eastern Mediterranean sediments. Palaeogeography, Palaeoclimatology, Palaeoecology, 158(3-4): 325-352. # bioturbation

Wetzel, A. 2001. Modern *Nereites* as a key to better understand their fossil counterparts. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001, Abstracts. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # *Nereites missouriensis,* recent, South China Sea

Wetzel, A. 2001. Ichnology of a low-relief flooding interval and effects of bioturbation on diagenesis – an example from the lower Liassic in northern Switzerland. Wetzel, A. 2001. Modern *Nereites* as a key to better understand their fossil counterparts. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001, Abstracts. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # *Chondrites, Diplocraterion, Palaeophycus, Phycosiphon, Planolites, Rhizocorallium, Skolithos,* Jurassic

Wetzel, A. & Uchman, A., 2001. Sequential colonization of muddy turbidites: examples from Eocene Beloveza Formation, Carpathians, Poland. Palaeogeography, Palaeoclimatology, Palaeoecology, 168(1-2): 171-186. # flysch

Weyhenmeyer, G.A. 1998. Resuspension in lakes and its ecological impact: a review. Ergebnisse der Limnologie, 51:185-200. # bioturbation, lacustrine environment

White, D., Lockley, M.G., Wright, J., Feng, L., Li, H. & Li, J. 2001. Bird tracks and running theropods from the Lower Cretaceous of Inner Mongolia. Journal of Vertebrate Paleontology. 21(3, Suppl.): 113.

White, M.E. & Wilson, E.A. 1996. Predators, pests, and competitors. In Kennedy, V.S., Newell, R.I.E. & Erle, A.F. (eds.), The Eastern Oyster. Maryland Sea Grant Book, College Park, Maryland, 559-579. # modern, predation by Gastropoda on Bivalvia Ostreidae *Crassostrea virginica*

Wightman, D.M. & Pemberton, S.G. 1997. The Lower Cretaceous (Aptian) McMurray Formation: an overview of the Fort McMurray area, northeastern Alberta. Canadian Society of Petroleum Geologists, Memoir, 18: 312-344. # *Arenicolites variabilis, Asterosoma, Bergaueria perata, Chondrites, Conichnus conicus, Cylindrichnus concentricus, Diplocraterion parallelum, Gyrolithes marylandicus, Monocraterion, Palaeophycus tubularis, Planolites beverleyensis, Rhizocorallium, Rosselia socialis, Skolithos linearis, Teichichnus,* escape traces, *Cruziana* ichnofacies, *Skolithos* ichnofacies, roots, sequence stratigraphy, nearshore, estuarine environments, Canada

Whitmore, J. H. & Peters, R. A. 1999. Reconnaissance study of the contact between the Hermit Formation and the Coconino Sandstone, Grand Canyon, Arizona. Geological Society of America, Abstracts with Programs, 31(7): 235. # Permian, USA

Whyte, M. A. & Romano, M. 2001. Probable stegosaurian dinosaur tracks from the Saltwick Formation (Middle Jurassic) of Yorkshire, England. Proceedings of the Geologists' Association, 112(1): 45-54. # *Deltapodus brodricki, Ravarichnus kotshnevi*

Widdicombe, S. & Austen, M.C. 1999. Mesocosm investigation into the effects of bioturbation on the diversity and structure of a subtidal macrobenthic community. Marine Ecology Progress Series, 189: 181-193.
Wilf, P. & Labandeira, C.C. 1999. Response of plant-insect associations to Paleocene-Eocene warming. Science, 284: 2153-2156.
Wilf, P. & Labandeira, C.C. 2000. Effects of Paleocene-Eocene warming on insect herbivory. Geologiska Foreningens Forhandlingar, 122(1): 178-179.
Wilf, P., Labandeira, C.C., Johnson, K.R., Coley, P.D. & Cutter, A.D. 2001. Insect herbivory, plant defense, and early Cenozoic climate change. Proceedings of the National Academy of Sciences of the United States, 98: 6221-6226.
Wilf, P., Labandeira, C.C., Kress, J.W., Staines, C.L., Windsor, D.M., Allen, A.L. & Johnson, K.R. 2000. Timing the radiations of leaf-beetles: hispines on gingers from latest Cretaceous to Recent. Science, 289: 291-294.
Williamson, R.B., Wilcock, R.J., Wise, B.E. & Pickmere, S.E. 1999. Effect of burrowing by the crab *Helice crassa* on chemistry of intertidal muddy sediments. Environmental Toxicology and Chemistry, 18(9): 2078-2086.
Wills, B. & Gabel, S. 2001. Sharp-based, tide-dominated deltas of the Sego Sandstone, Book Cliffs, Utah, USA. Sedimentology, 48: 479-506. # *Asterosoma, Ophiomorpha, Palaeophycus, Planolites, Skolithos, Thalassinoides,* root casts, Cretaceous
Wilmsen, M. 2000. Evolution and demise of a mid-Cretaceous carbonate shelf: the Altamira Limestones (Cenomanian) of northern Cantabria (Spain). Sedimentary Geology, 133(3-4): 195-226. # bioturbation
Wilson, J.A. & Carrano, M.T. 1999. Titanosaurs and the origin of 'wide-gauge' trackways: a biomechanical and systematic perspective on sauropod locomotion. Paleobiology, 25(2): 252-267. # footprints, vertebrates, Cretaceous, Jurassic, Portugal, Texas, USA
Wilson, M.A. & Lazzuri, J.E. 2000. Paleoecology of borings and pseudoborings in the Cincinnatian (Late Ordovician) of the North American Midcontinent. Geological Society of America, Abstracts with Programs, 32(4): 68. # *Palaeosabella, Petroxestes, Rhopalonaria, Trypanites*, USA
Wilson, M.A. & Palmer, T.J. 2001. Domiciles, not predatory borings: a simpler explanation of the holes in Ordovician shells analyzed by Kaplan and Baumiller, 2000. Palaios, 16(5): 524-525. # Indiana, USA, borings in hardgrounds, false drillholes in Brachiopoda, reply to Kaplan & Baumiller (2000)
Wilson, M.A. & Taylor, P.D. 2001. Palaeoecology and hard substrate faunas from the Cretaceous Qanlah Formation of the Oman Mountains. Palaeontology, 44(1): 21-41. # *Entobia, Gastrochaenolites, Gnathichnus, Rogerella, Teredolites,* borings
Witte, U. 2000. Vertical distribution of metazoan macrofauna within the sediment at four sites with contrasting food supply in the deep Arabian Sea. Deep-Sea Research, part II, Tropical Studies in Oceanography, 47(14): 2979-2997. # modern, bioturbation, tiering
Wohnrath Tognoli, F.M. & Netto, R.G. 2001. The utilization of ichnofabric analysis to recognize potential source rocks: an example from Palermo Formation (Lower Permian), eastern of Paraná Basin, Brazil. VI International Ichnofabric Workshop, Isla Margarita & Puerto La Cruz, Venezuela, July 14-20, 2001, Abstracts. Sociedad Venezolana de Geólogos, PDVSA, [1 p., no pagination]. # *Chondrites, Helminthopsis, Palaeophycus, Planolites, Thalassinoides*
Wohnrath Tognoli, F., Netto, R.G. 2001. Ichnofabric patterns of wave-dominated estuarine deposits from the Permian of Paraná Basin, Brazil. 4th Reunión Argentina de Icnología y Segunda Reunión de Icnología del Mercosur, Resúmenes, 24 al 28 Septiembre 2001, Tucumán, p. 74. # *Asterosoma, Bergaueria, Chondrites, Cylindrichnus, Diplocraterion, Gyrolithes, Monocraterion, Palaeophycus, Phycosiphon, Planolites, Rhizocorallium, Siphonichnus, Skolithos, Teichichnus, Thalassinoides*
Wood, D.A. 1999. Vertebrate and invertebrate surficial trace fossils from the Horton Bluff Formation (Lower Carboniferous) near Avonport, Nova Scotia. Bachelor's Thesis, Acadia University, Wolfville, Nova Scotia, Canada, 114 pp.

Wood, J., Poiré, D.G. & Soria, J. 1998. Late Miocene ichnofauna in the Vera and Sorbas basins, SE Spain: uses in the determination of onshore-offshore palaeoenvironment relationships on a temperate water carbonate ramp. *In* Canaveras, J.C., Garcia, d.C.M.A., Soria, J., Melendez, H.A. & Soria, A.R. (eds.), 15th International Sedimentological Congress, Abstracts. Alicante, Spain, p. 823.

Wood, L.J. & Willis, B. 2000. Characterizing tidally influenced reservoirs through integrated sequence stratigraphic study of subsurface and outcrop: Sego Sandstone, Book Cliffs, Utah, U.S.A. American Association of Petroleum Geologists, Bulletin, 84(9): 1515. # bioturbation, Cretaceous, USA

Wright, I.C. 2001. In situ modification of modem submarine hyaloclastic/pyroclastic deposits by oceanic currents: an example from the southern Kermadec arc (SW Pacific). Marine Geology, 172(3-4): 287-307. # bioturbation

Wright, J.L. 1997. Trackways of juvenile dinosaurs. Palaeontology Newsletter, 36: 34.

Wright, J., Lockley, M.G., White, D., Feng, L. & Li, J. 2001. The first sauropod trackways from Inner Mongolia, China. Journal of Vertebrate Paleontology. 21(3, Suppl.): 116.

Wynn, J.G. & Retallack, G.J. 2001. Paleoenvironmental reconstruction of middle Miocene paleosols bearing *Kenyapithecus* and *Victoriapithecus*, Nyakach Formation, southwestern Kenya. Journal of Human Evolution 40: 263-288.

Yang, S., Deng, X., Zheng, X. & Liu, X. 2001. Trace fossils in flysch facies in the Miners Bluff Formation (Late Triassic), Livingston Island, Antarctica. Acta Palaeontologica Sinica, 40(1): 101-115. [In Chinese, English abstract]. # *Belorhaphe, Cochlichnus, Fucusopsis angulata, Glockerichnus, Halymenidium sublumbricoides, Lophoctenium comosum, Neonereites uniserialis, Pelaeichnus antarcticus* igen. n., isp. n., *Planolites montanus, Rhabdoglyphus grossheimi, Spirophycus bicornis, Strobilorhaphe, Sublorenzinia plana, Tuberculichnus bulbosus, T. meandrinus*

Yokokawa, M.E. et al. 2001. Sedimentary structures of contourites and turbidites observed by X-radiographic prints; samples from Blake-Bahama Outer Ridge and Sohm abyssal plain. Proceedings of the Ocean Drilling Program, Scientific Results. Proceedings of the Ocean Drilling Program, Scientific Results (CD-ROM). 172, 37 pp. # bioturbation

Yoshida, S. 2000. Sequence and facies architecture of the upper Blackhawk Formation and the lower Castlegate Sandstone (Upper Cretaceous), Book Cliffs, Utah, USA. Sedimentary Geology, 136(3-4): 239-276. # bioturbation

Zeilstra, M.D. & Lohrengel, C.F., II. 2001. Reptile tracks in the Timpoweap Member, Moenkopi Formation (Triassic), Washington County, Utah. Geological Society of America, Abstracts with Programs, 33(5): 55. # USA

Zhuravlev, A.Yu. 2001. Biotic diversity and structure during the Neoproterozoic-Ordovician transition. *In* Zhuravlev, A.Yu. & Riding, R. (eds.), The Ecology of the Cambrian Radiation. Columbia University Press, New York, p. 173-199. # Cambrian, Precambrian

Zonneveld, J.-P. 2001. Middle Triassic biostromes from the Liard Formation, British Columbia, Canada: oldest examples from the Mesozoic of NW Pangea. Sedimentary Geology, 145: 317-241. # *Arenicolites, Asterosoma, Bergaueria, Chondrites, Cylindrichnus, Diplocraterion, Palaeophycus, Phycosiphon, Planolites, Rosselia, Scalarituba, Skolithos, Teichichnus, Thalassinoides,* bioturbation

Zonneveld, J.-P., Gingras, M.K. & Pemberton, S.G. 2001. Trace fossil assemblages in a Middle Triassic mixed siliciclastic-carbonate marginal marine depositional system, British Columbia. Palaeogeography, Palaeoclimatology, Palaeoecology, 166(3-4): 249-276. # *Arenicolites, Conichnus, Cylindrichnus concentricus, Diplocraterion parallelum, Gyrochorte, Gyrolithes, Laevicyclus, Lingulichnus verticalis, Lockeia siliquaria, Monocraterion, Ophiomorpha, Palaeophycus beverleyensis, P. tubularis, Planolites beverleyensis, Siphonites, Skolithos linearis, Trichichnus, Rhizocorallium jenense, Taenidium serpentinum, Teichichnus, Thalassinoides suevicus, Glossifungites* ichnofacies, escape, traces, bivalve dwelling traces, root traces, bivalve resting traces, intertidal, sabkha, lagoonal environments, Canada

Zonneveld, J.-P., Moslov, T.F. & Henderson, C.M. 1997. Lithofacies association and depositional environments in a mixed silicclastic-carbonate coastal depositional

system, upper Liard Formation, Triassic, northeastern British Columbia. Bulletin of Canadian Petroleum Geology, 45(4): 553-575. # *Cylindrichnus, Diplocraterion parallelum, Isopodichnus, Laevicyclus, Lingulichnus, Lockeia, Palaeophycus striatus, P. tubularis, Planolites montanus, Podichnus, Rhizocorallium, Rosselia, Scolicia, Siphonites, Spongeliomorpha, Teichichnus, Thalassinoides suevicus, Psilonichnus* ichnofacies, Canada

Zonneveld, J-P. & Orchard, M.J. 2002. Stratal relartionships of the Upper Triassic Baldonnel Formation, Williston Lake, northeastern British Columbia. Geological Survey of Canada, Current Research, 2002-A8: 1-11. # *Diplocraterion, Rosselia, Skolithos, Thalassinoides, Glossifungites* assemblage, Canada

Zonneveld, J.-P., Saunders, T.D.A., Pemberton, S.G., Gingras, M.K. & Brett, K.D. 1998. Sediment-organism zonation and the recolonization of Triassic shorelines, Williston Lake, northeastern British Columbia. *In* Canaveras, J.C., Garcia, d.C.M.A., Soria, J., Melendez, H.A. & Soria, A.R. (eds.), 15th International Sedimentological Congress, Abstracts. Alicante, Spain, p. 846.

Zoumis, T., Schmidt, A., Grigorova, L. & Calmano, W. 2001. Contaminants in sediments: remobilisation and demobilisation. Science of the Total Environment, 266(1-3): 195-202.

Papers in press

Bromley, R.G., Gregory, M., Martin. A.J. & Uchman, A. *Hillichnus lobosensis* igen. et isp. nov., a complex trace fossil produced by tellinacean bivalves, Paleocene, Monterey, California, U.S.A. Palaeogeography, Palaeoclimatology, Palaeoecology. Amsterdam.

Buatois, L.A., Mangano, M.G., Alissa, A. & Carr, T.R. Sequence stratigraphic and sedimentologic significance of biogenic structures from a late Paleozoic reservoir, Morrow Sandstone, subsurface of southwest Kansas, USA. Sedimentary Geology.

Curran, H.A. & White, B. Ichnology of Holocene carbonate eolianites of the Bahamas. *In* Abegg, R., Loope, D. & Harris, P.M. (eds.), Modern and ancient eolianites. SEPM, Special Publication, 71: 44-55.

Ekdale, A.A., Benner, J.S., Bromley, R.G. & Gibert, J.M. de. Bioerosion of Lower Ordovician hardgrounds in southern Scandinavia and western North America. Acta Geologica Hispanica.

Fornós, J.J., Bromley, R.G., Clemmensen, L. B. & Rodríguez-Perea, A. Tracks and trackways of *Myotragus balearicus* Bate (Artiodactyla, Caprinae) in Pleistocene aeolianites from Mallorca (western Mediterranean). Palaeogeography, Palaeoclimatology, Palaeoecology.

Genise, J.F., Sciutto, J.C., Laza, J.H., González, M.G. & Bellosi, E.S. Fossil bee nests, coleopteran pupal chambers and tuffaceous paleosols from the Late Cretaceous Laguna Palacios Formation, central Patagonia (Argentina). Palaeogeography, Palaeoclimatology, Palaeoecology.

Glaub, I., Vogel, K. & Gektidis, M. The role of modern and fossil Cyanobacteria borings in bioerosion and bathymetry. Ichnos.

Hanken, N.-M., Bromley, R.G. & Thomsen, E. Trace fossils of the bivalve *Panopea faujasi*, Pliocene, Rhodes, Greece. Ichnos, 8: 117-130.

Labandeira, C.C. The history of associations between plants and animals. *In* Herrera, C. & Pellmyr, O. (eds.), Plant-Animal Interactions. Blackwell Science, Oxford.

Labandeira, C.C., Johnson, K.R. & Lang, P.A. Preliminary assessment of insect herbivory across the Cretaceous/Tertiary boundary: extinction and minimal rebound. *In* Hartman, J.H., Johnson, K.R. & Nichols, D.J. (eds.), The Hell Creek Formation and the Cretaceous-Tertiary Boundary in the northern Great Plains: an Integrated Continental Record at the End of the Cretaceous. Geological Society of America Special Paper.

Labandeira, C.C., LePage, B.A., Wood, S.L. & Johnson, A.H. A *Dendroctonus*-like bark-engraving (Coleoptera: Scolytidae) from a middle Eocene *Larix* (Coniferales: Pinaceae): Early or delayed colonization? American Journal of Botany.

Labandeira, C.C. & Phillips, T.L. Trunk borings and rhachis galls of tree ferns from the Late Pennsylvanian (Kasimovian) of Illinois: implications for the origin of the galling functional feeding group and holometabolous insects. Palaeontographica, Abt. A, 188.

Mángano, M.G., Labandeira, C.C., Kvale, E., & Buatois, L.A. The insect trace fossil *Tonganoxichnus* from the Middle Pennsylvanian of Indiana: paleobiologic and paleoenvironmental implications. Ichnos.

Melchor, R.N., Genise, J.F. & Miquel, S. Ichnology, sedimentology and paleontology of Eocene calcareous paleosols from a palustrine sequence, southwest La Pampa, central Argentina. Palaios.
Melchor, R.N., Genise, J.F. & Poiré, D. Icnología de los depósitos continentales Triásicos. *In* Artabe, A. & Morel, E. (eds.). El Sistema Triásico de la Argentina. Fundación Museo de La Plata.
Mikuláš, R. Modern and fossil traces in terrestrial lithic substrates. Ichnos, 8.
Mikuláš, R. Ichnological aspect of fossiliferous nodules of the Šárka Formation (Ordovician, Llanvirnian, Czech Republic). Bulletin of the Czech Geological Survey.
Mikuláš, R., Nmeková, M., Adamovi, J. Bioerosion and bioturbation on a weathered (and subsequently re-compacted) metavolcanic rock (Cretaceous, Czech Republic). Acta Geologica Hispanica.
Mikuláš, R., Mach, K. & Dvoák, Z. Bioturbation of claystones of the Most Basin in the Bílina Quarry (Miocene, Czech Republic). Acta Universitatis Carolinae – Geologica.
Mikuláš, R. & Slavíková, J. Association of trilobites and minute ovoid pellets in the fill of an ichnofossil (Ordovician, Llanvirnian, Czech Republic). Ichnos, 8.
Mikuláš, R., Valíek, J. & Szabad, M. New finds of ichnofossils from the Middle Cambrian of the Barrandian area (Czech Republic). Bulletin of the Czech Geological Survey.
Retallack, G.J. Carbon dioxide and climate over the past 300 million years. Philosophical Transactions of the Royal Society of London.
Retallack, G.J. End-Cretaceous acid rain as a selective extinction mechanism between birds and dinosaurs. In Wright, J. (ed.). Florida Symposium on Dinosaur-Bird Evolution.
Retallack, G.J. Early Triassic fossil plants from the Transantarctic Mountains. U.S. Antarctic Journal.
Retallack, G.J. Alluvial architecture of the Feather Conglomerate, southern Victoria Land. U.S. Antarctic Journal.
Retallack, G.J., Krull, E.S. & Bockheim, J.G. New grounds for reassessing palaeoclimate of the Sirius Group, Antarctica. Journal of the Geological Society of London.
Retallack G.J. & Tanaka, S. Late Miocene advent of tall grassland paleosols in central Oregon. Palaeogeography, Palaeoclimatology, Palaeoecology.
Sheldon, N.D. & Retallack, G.J. Chemical climofunctions from North American soils. Eos Transactions American Geophysical Union Fall Supplement, p. 82.

Index to new ichnotaxa

Ichnotaxa ascribed to invertebrates

Furnasichnus langei Borghi & Fernandes, 2001
Gastrochaenolites oleandicus Ekdale & Bromley, 2001
Gyrolithes chosiensis Omori, Ishida & Adachi, 1992
Halopoa storeana Uchman, 2001
Leptichnus Taylor, Wilson & Bromley, 1999
Leptichnus peristoma Taylor, Wilson & Bromley, 1999
Leptichnus dromeus Taylor, Wilson & Bromley, 1999
Lockeia cunctator Schlirf, Uchman & Kümmel, 2001
Lumbricariidae Schweigert, 2001
Macanopsis plataniformis Muiz & Mayoral, 2001
Multina minima Uchman, 2001
Oichnus asperus Nielsen & Nielsen, 2001.
Oichnus coronatus Nielsen & Nielsen, 2001
Oichnus gradates Nielsen & Nielsen, 2001
Parataenidium Buckman, 2001
Parataenidium mullaghmorensis Buckman, 2001
Parowanichnus Bown, Hasiotis, Genise, Maldonado & Brouwers, 1997
Parowanichnus formicoides Bown, Hasiotis, Genise, Maldonado & Brouwers, 1997
Pelaeichnus Yang, Deng, Zheng & Liu, 2001
Pelaeichnus antarcticus Yang, Deng, Zheng & Liu, 2001
Phycodes fusiforme Seilacher, 2000
Phycodes parallelum Seilacher, 2000
Psilonichnus quietis Myint, 2001
Rusophycus verans Schlirf, Uchman & Kümmel, 2001
Scalichnus phiale Hanken, Bromley & Thomsen, 2001
Scoyenia beerboweri Retallack, 2001
Spongeliomorpha chevronensis Muiz & Mayoral, 2001
Spongeliomorpha sinuostriata Muiz & Mayoral, 2001
Stellatichnus Nielsen & Nielsen, 2001
Stellatichnus radiatus Nielsen & Nielsen, 2001

Ichnotaxa ascribed to vertebrates

Accordiichnus Manni, Nicosia & Nobili, 1999
Accordiichnus natans Manni, Nicosia & Nobili, 1999
Alaripeda Sarjeant & Reynolds, 2001
Alaripeda lofgreni Sarjeant & Reynolds, 2001
Anatipeda alfi Sarjeant & Reynolds, 2001
Anatipeda californica Sarjeant & Reynolds, 2001
Apulosauripus Nicosia, Mariano, Mariotti, Muraro, Pianigutti, Petti & Sacchi, 1999.
Apulosauripus federicianus Nicosia, Mariano, Mariotti, Muraro, Pianigutti, Petti & Sacchi, 1999.
Brachychirotherium wiorense Ptaszyski, 2000
Capitosauroides fuglewiczi Ptaszyski, 2000
Coelurausaurichnus grancieri Courel & Demathieu, 2000
Culcitapeda Sarjeant & Reynolds, 2001
Culcitapeda ascia Sarjeant & Reynolds, 2001
Culcitapeda eccentrica Sarjeant & Reynolds, 2001
Culcitapeda tridens Sarjeant & Reynolds, 2001
Culcitapedidae Sarjeant & Reynolds, 2001
Isochirotherium gierlinskii Ptaszyski, 2000
Prorotodactylus Ptaszyski, 2000
Prorotodactylus mirus Ptaszyski, 2000
Puertollanopus Soler-Gijón & Moratalla, 2001
Puertollanopus microdactylus Soler-Gijón & Moratalla, 2001
Rhyncosauroides rdzaneki Ptaszyski, 2000
Synaptichnium kotanskii Ptaszyski, 2000
Undichna gosiutensis Gibert, 2001
Undichna quina Trewin, 2000
Undichna westerbergensis Schweigert, 2001

* * * * *

Current activities of ichnologists

39 authors:
Nasrollah Abbassi, Silvia Aramayo, Christopher Baldwin, Eduardo S. Bellosi, Richard G. Bromley, Luis A. Buatois, Noelia Carmona, Dávid Árpád, William Doleman, Stephen K. Donovan, Jorge F. Genise, Michael A. Gibson, Ingrid Glaub, Stjepko Golubic, Yuri M. Gubin, Stephen T. Hasiotis, Ludvig Löwemark, Maria I. López C., Robert B. MacNaughton, Jacqui Malpas, M. Gabriela Mángano, Ronald McDowell, Ricardo Néstor Melchor, Radek Mikulas, William Miller III, Masakazu Nara, Eduardo B. Olivero, Jonathan D. Radley, Gudrun Radtke, Emma C. Rainforth, Greg Retallack, Andrew K. Rindsberg, Michael Schlirf, Christine Schoenberg, Günter Schweigert, Ray Stanford, Alfred Uchman, John-Paul Zonneveld

Nasrollah Abbassi nasrabbassi@yahoo.com
University of Zanjan, Iran

My next ichnological research focuses on the study of diverse ichnofossils of the Angahran Unit (late Oligocene to early Miocene), which were sampled north of Kahurakan village, Nikshahr area, Makran Range, SE Iran. These trace fossils are a deep marine assemblage and include *Paleodictyon* ispp., *Gordia marina, Lorenzinia* isp., *Helminthopsis* isp. and so on.

In addition is a study on the avian and mammalian footprints that have been discovered in the Karaj Formation (Eocene), Tarom Mountains, north Iran, with the cooperation and joint effort of Prof. **Martin Lockley**. This was first reported in the 5th Symposium of the Geological Society of Iran on 28-29th August 2001 in Tehran University. The expanded report and paper are in hand and will be published as soon as possible.

Silvia Aramayo saramayo@criba.edu.ar
Universidad Nacional del Sur, Bahia Blanca, Argentina

Last July, I attended the 6th International Congress of Vertebrate Morphology, held at Jena, Germany. In that event, I presented: a poster titled: 'Palaeoichnology of Ground Sloths'. Abstract in: ICVM-6: 202. I also attended the Symposium titled: 'Morphological studies in fossil & extant Xenarthra', which was a very interesting meeting.

Last week in Tucuman, Argentina (September 24 to 28), the IV Reunión Argentina de Icnología y 2º Reunión de Icnología del Mercosur took place. There I presented:

- Aramayo, S. & Bocanegra, L. Icnofacies de *Scoyenia* en el Miembro Candeleros, Formacion Rio Limay (Grupo Neuquen, Cretacico tardio) Provincia de Neuquen, Argentina. Resumenes: 23.
- Aramayo, S., Manera de Bianco, T. & Bocanegra, L. Presencia de *Taenidium* Heer, 1877 en el yacimiento paleoicnológico de Pehuen-Co (Pleistoceno tardio) Provincia de Buenos Aires, Argentina. Resumenes: 24.

Both titles will be published as extended papers in a special publication of the Asociación Paleontológica Argentina.

Chris Baldwin baldwin@shsu.edu
Sam Houston State University, Huntsville, Texas, USA

I have recently returned to teaching and research after a sojourn as Associate Dean at Boston University, and more recently as Dean of Arts and Sciences here at Sam Houston State University. I have a couple of projects that involve trace fossils.

Arthrophycus *Project*
I am working with students to unravel the kinematics of trace production. We are slicing and x-raying specimens collected from the Tuscarora of Pennsylvania – a sequence that **Paul Strother** and I worked on with graduate students at Boston University (fig. 1). With the help of people from our Art Department we are going to reconstruct these traces using a graphics movie program called Carrara™.

FIGURE 1. *Arthrophycus* from the Silurian of Pennsylvania.
Note the 'stitched' or *en-echelon* form similar to *Phycodes*.

Bright Angel Shale, Grand Canyon Project
I am working with **Paul Strother** (Boston College), **Eben Rose** (University of Northern Arizona) and **John Beck** (Boston College) on the paleoenvironmental context of micro fossils that appear to have a rather distinctive terrestrial – (certainly not 'normal marine' signature). The Bright Angel Shale is in some sections surprisingly rich in these problematic remains and we are trying to refine the facies context using, among many other things, trace fossils. What makes our interpretations difficult are rich *Skolithos* and *Cruziana* facies traces on the casting sandstone but seemingly paralic or terrestrial 'food' in the muds. **John Beck** and I are just beginning to go to school on some of **Don Rhodes'** work on the distribution of organics and we have some interesting sets of well-preserved *Phycodes*-like traces to work on from the perspective of depth controls on burrowing and furrowing.

Eduardo S. BELLOSI ebellosi@sei.com.ar
División Icnología, Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina

After my friend **Jorge Genise** moved to Patagonia, I took direction of the Ichnology Division of the MACN, working together with **José Laza** (fossil insect nests and curator), **Mirta González** (micromorphology of paleosols and trace fossils) and **Marcela Cosarinsky** (termite nests).
The activities of the Division are focused in four projects:

- *Insect ichnology and paleosols of the loessite Sarmiento Formation (Eocene-Miocene, central Patagonia).* This project is funded by NSF (directed by Prof. **R. Kay** and **R. Madden**, Duke University). These mammal-bearing tuffs (including five South America Land Mammal Ages) are excellent examples to study bee, coleopteran, termite and probable ant nests in loess-paleosol sequences.
- *Ichnology of siliciclastic shallow-marine early Miocene sequences from Patagonia*, together with **L. Buatois**, **M.G. Mángano**, **N. Carmona** (INSUGEO, Tucumán) and **R. Bromley** (University of Copenhagen). .
- *Ichnology of the continental Triassic Ischigualasto Basin, Argentina*. The associates on the project include **Jorge Genise** (MEF, Trelew) and **Ricardo Melchor** (La Pampa University).
- *Ichnology of Late Miocene-Pleistocene loess deposits of the Pampean region, Argentina*. In collaboration with **J. Laza** and **M. González**.

Richard G. Bromley rullard@geo.geol.ku.dk & richard@bromley.dk
University of Copenhagen, Denmark

My research projects were dominated by two main groups in 2001: the finishing of the SEPM *Atlas of Ichnofabrics,* co-edited with **John Pollard**, **Al Curran** and **Tony Ekdale**, and the book that is emerging from the symposium on Complex Trace Fossils organized by **William Miller III** at the NAPC-2001 meeting. Under preparation for this NAPC book are three projects. With **Tony Ekdale**, the complex *Thalassinoides* from the Swedish Lower Ordovician Limestones; with **Murray Gregory**, **Alfred Uchman** and **Tony Martin**, a highly complex trace fossil in Paleocene canyon-fill sediments of southern California; and with **Nils-Martin Hanken**, the Pliocene *Zoophycos* of Rhodes, Greece.

Alfred Uchman and I are finishing off a paper on the ichnology of Jurassic sands on the Baltic island Bornholm and have several other on-going projects on Bornholm and Rhodes. I am enjoying fieldwork with **Luis Buatois** and **Gabriela Mángano** on beautiful Miocene ichnofabrics of Patagonia, Argentina.

For 2002 I am intending to make progress on the *Treatise*. My main tasks are the lithic bioerosion ichnotaxa plus the glossary. I am pretty well up-to-date with the literature and it will be fun to get the microborings and macroborings under one roof.

I am now publishing projects faster that I am initiating new ones. If this continues, then older but no less important projects will ultimately be exhumed!

Luis A. Buatois ichnolog@infovia.com.ar
CONICET-INSUGEO, Tucumán, Argentina

During 2001 I was involved in a series of ichnologic projects with several colleagues.

- First, our ichnology textbook, *Trazas fósiles: Señales de comportamiento en el registro estratigráfico* (together with **Gabriela Mángano** and **Florencio Aceñolaza**), is finally ready and it was published by the Paleontologic Museum Egidio Feruglio, Trelew in 2002.
- I also keep on working on the ichnology of late Paleozoic continental to marginal marine deposits of northwest and west Argentina. Focus is on the ichnofaunas associated with the Namurian-Westphalian postglacial transgression.
- A paper dealing with ichnofacies in Carboniferous floodplain deposits from western Argentina, including additional comments on the *Scoyenia* and *Mermia* ichnofacies, is in press in *Palaeo-3*.
- With **Richard Bromley**, **Gabriela Mángano**, **Noelia Carmona** and **Eduardo Bellosi**, we are studying Miocene shallow marine ichnofaunas from Patagonia. At present we are in the process of finishing a couple of manuscripts on this topic. Tiering structure of these lower shoreface ichnofaunas is particularly complex.
- Progress is being made on the study of Precambrian-Cambrian trace fossils from the Puncoviscana Formation of northwest Argentina together with **Gabriela Mángano** and **Florencio Aceñolaza**. This ichnofauna is one of the most diverse for that time and we are reinterpreting its paleoecological and paleoenvironmental significance in the light of recent ideas on microbial mat ecosystems.
- Finally, I have been involved in the organization of the Fourth Argentinean Ichnologic Meeting and Second of Mercosur that was held in Tucumán last September and keep on working on the organization of Ichnia 2004 with other South American colleagues.

For recent publications, see Bibliographia Ichnologica under BUATOIS and also under BYRNES; CARMONA; MÁNGANO; NETTO.

Noelia CARMONA ichnolog@infovia.com.ar
CONICET-INSUGEO, Tucumán, Argentina

I am starting with my Ph.D thesis on Miocene trace fossils of Patagonia (Argentina). Now, I am preparing a paper with **Luis Buatois** where we discuss with more detail some aspects of the crustacean burrows of Patagonia, including some evolutionary points comparing behavioral characteristics of modern decapods with the Miocene ones. I am also involved in a project with **Gabriela Mángano** and **Luis Buatois** that deals with Precambrian-Cambrian trace fossils of North Argentina.

For recent publications, see Bibliographia Ichnologica under CARMONA and also under BUATOIS.

DÁVID Árpád davida@ektf.hu ; coralga@yahoo.com
Karoly Esterhazy Teacher's Training College, Eger, Hungary

- Bioerosion on/in the shells of Tertiary Molluscs collected at selected localities of Hungary
- Bioerosion in the tests of Tertiary solitary corals in Hungary
- Bioerosion in the shells of Tertiary oysters of Hungary
- Ichnological examination of Hungarian fossil rocky shores
- Bioerosion of Clionidae in the Hungarian Tertiary
- Activity of Naticidae on corbulid bivalves collected at different Tertiary localities of Hungary

For recent publications, see Bibliographia Ichnologica under ÁRPÁD and also under FODOR.

William DOLEMAN wdoleman@unm.edu
Office of Contract Archeology, University of New Mexico, Albuquerque, New Mexico, USA

I'm looking at bioturbated (by cicadas, rodents & ?) sheet-sand deposits in central New Mexico and am in search of other bioturbation references, particularly in desert and eolian contexts.

Stephen K. DONOVAN donovan@naturalis.nnm.nl
New address: Department of Palaeontology
Nationaal Natuurhistorisch Museum, Naturalis
Postbus 9517
2300 RA Leiden
THE NETHERLANDS
Telephone (+31)-71-56-87-642
Fax (+31)-71-56-87-666

Current research continues to be based in the Caribbean. **Ron Pickerill** (University of New Brunswick) and I are two of five investigators working on my National Geographic Society grant "Miocene environments and tectonic history of Grenadines, Lesser Antilles'. The middle Miocene Grand Bay Formation has yielded a diverse ichnofauna that has supported a deeper water island shelf origin of this unit, associated with bored valves of benthic molluscs derived from shallower water. Fieldwork in Jamaica in May/June 2001 yielded a late Pleistocene shell of the gastropod *Strombus gigas* bored by *Gastrochaenolites* showing lateral spreite, suggesting sideways movement.

For recent publications, see Bibliographia Ichnologica under DONOVAN and also under PICKERILL.

Jorge F. GENISE jgenise@mef.org.ar
Museo Paleontologico Egidio Feruglio, Trelew, Chubut, Argentina

Having finally settled in Trelew at the Museo Paleontológico Egidio Feruglio (MEF), where I am in charge of the Scientific Department, I have begun to build up a regional collection of trace fossils and to teach ichnology as a regular course at the University of Patagonia. Together with

other Argentinean and South American colleagues, we are organizing the First International Congress on Ichnology (Ichnia 2004) at Trelew.

Eduardo Bellosi is now in charge of the Laboratorio de Icnología at the Museo Argentino de Ciencias Naturales in Buenos Aires. There, **Jose Laza** (curator of the collection) is preparing a revision of ichnogenus *Coprinisphaera;* **Mirta Gonzalez** continues with her work on micromorphology of trace fossils and paleosols, and **Marcela Cosarinsky** with her termite nests. We are developing two funded projects, one by the National Research Council: 'Trazas Fósiles del Grupo Chubut: Icnotaxonomía y Paleoecología', to study continental trace fossils of different Cretaceous formations of Patagonia. The main results of this project are now in press in *Palaeo-3*. The other grant, 'Ichnology of the Triassic Ischigualasto-Villa Union Basin', in which **Ricardo Melchor** also participates, supports our research on invertebrate neo- and paleoichnology from continental bodies of water. In addition, for this project, a graduate student, **Silvina de Valais**, is working on vertebrate footprints here at the MEF. Beside these two projects, we continue with our research on different aspects of insect neo- and paleoichnology from different formations, localities and ages in Argentina.

Michael A. Gibson mgibson@utm.edu
University of Tennessee at Martin, Tennessee, USA
Web http://www.utm.edu/~mgibson/home.htm

My work on Lower Devonian trace fossils from West Tennessee continues as part of an overall study of the paleoecology of these rock units. I have returned to the Cretaceous to pick up work on trace fossils from the type locality and surrounding exposures of the Coon Creek Formation. This work is being conducted with **Stan Dunagan** at Austin Peay State University and **students from UT Martin**. We have enlisted the help of **Karen Chin** to look at the coprolites that 'litter' the area. Plans are being finalized for a two-day field trip to this site in conjunction with the 2003 Southeastern Regional Section of GSA. We plan on a volume of papers to coincide with the field trip.

Ingrid Glaub I.Glaub@em.uni-frankfurt.de
Geologisch-Paläontologisches Institut, Frankfurt am Main, Germany

Current work in ichnology (together with **Marcos Gektidis** and **Klaus Vogel**):

Studies on microendoliths in selected North Atlantic shelf areas –
Variability of the euphotic zone extension and consequences for paleo-depth reconstructions
Our field of research are modern and fossil microborings in marine environments. Microborings are omnipresent in calcareous substrates. They are known from the supratidal to the deep sea. Earliest microborings are recorded from the Precambrian. As it is well known for modern environments, many microborings are produced by obligate photoautotrophic organisms. Boring systems similar to those are identified in the fossil record, too. As a consequence, we use a photic zonation standard, distinguishing a euphotic zone, a dysphotic zone and an aphotic zone. The euphotic zone can be subdivided by microboring associations into four subzones. Further studies demonstrated that this scheme is applicable to sedimentary basins from the Silurian onwards (e.g., Vogel et al. 1999). The composition of assemblages as well as their vertical sequence show astonishing constancy through Earth history.

Thus, microborings turned out to be important for relative paleobathymetric reconstructions. In a second step we are approaching an estimation for the absolute depth of the individual zone boundaries in the ancient basin in question. For this approach it is necessary to find a modern analog of the fossil environment investigated. This is one of the reasons, why we have been studying microboring communities in different modern environments (Bahamas, Mauritania, Scotland, Norway and Spitsbergen). The lower limit of the euphotic zone is according to the definition we follow characterized by the level where the photosynthesis rate equals the respiration rate of photoautotrophic organisms. This is at the same time almost identical with the depth, in which the surface light (between 350 and 700 nm) is reduced to 1%. The lower limit of the euphotic zone was identified off Mauritania (19°N, upwelling area) in about 40 m water depth, off the Bahamas (25°N) in about 120 m, off Scotland (56°N) in about 20 m, and off Norway (70°N) in about 16 m.

For recent publications, see Bibliographia Ichnologica under Glaub and also under Vogel.

Stjepko GOLUBIC golubic@bu.edu
Boston University, Boston, Massachusetts, USA

- Morphometry of microboring traces
- Ichnological nomenclature
- Fossil and Recent microbial endoliths in ooids and marine bioclasts

Yuri M. GUBIN vg@paleo.ru
Paleontological Institute of Russian Academy of Sciences, Moscow, Russia

The team under Y.M. Gubin spent field season 2000 in the North of Russia (North Dvina and Suchona River basins). At the end of the trip, a huge field of footprints and trackways of big Late Permian tetrapods was discovered on the bench of a lower part of the Suchona River. The length of the field is about 500 m and the width in some places up to 2 m. There were excavated two trackways (12 steps each) and more than 200 separate imprints with a length of 10 to 30 cm. The most unusual feature of the imprints is their direction – forelimbs (hands) in perpendicular position and hindlimbs (feet) parallel to the midline of the trackway. Preliminarily we refer them to pareiasaurs or dicynodonts. Next year the excavation of this locality will be continued.

The year 2001 was at least on the same level of interest or even more interesting than 2000. The lower part of Suchona River has a lot of small tributaries and one of them gave us beautiful results. The Strelna River is a tributary on the right hand of the Suchona, about 60 km upriver from the town of Veliki Ustyug. The bottom of this short, shallow river in many places is covered by a thick horizontal layer of chemogenic limestones with a lot of trackways. The water made us unable to excavate footprints out of the water, but we pictured them, measured, painted, etc. Footprints were met with in three places with the distance between them 200 to 300 m or more. The biggest trackway, which crosses the river from one side to the other, is about 100 feet long with beautiful imprints of fingers and other soft parts of feet.

Stratigraphically, the footprint-bearing limestones belong to the late Tatarian age of the Late Permian, and differ by some meters from the Suchona footprint limestones. New trackways were made by the same kind of animals as the footprints from the Suchona River, and to our mind belong to pareiasaurs of the family Bradysauridae. They were of about the same size as pareiasaurs from the Late Permian locality at Kotelnich and differ from classic pareisaur *Scutosaurus* in having smaller size and length of limbs, and very likely more terrestrial kind of life. It's interesting that this footprints differ from the famous pareiasaur(?) footprints from Italy (*Pachypes dolomiticus*) in the form of manus, position of imprints in the trackway, length of fingers and distribution of pressure on the substrate. One of the new footprints found on the bank of Suchona River, with long, separated fingers, may belong to another kind of animals. The description of the new findings will be published later.

Stephen T. HASIOTIS hasiotis@ku.edu
New address: University of Kansas
Department of Geology
1475 Jayhawk Blvd.
120 Lindley Hall
Lawrence, KS 66045-7613 USA
Telephone (785) 864-4941
Fax (785) 864-5276

Ludvig LÖWEMARK ludvig@earth.sinica.edu.tw
New address: Institute of Earth Sciences, Academia Sinica
P.O. Box 1-55, Nankang, Taipei 115, Taiwan R.O.C.
Tel. +886-(0)2-2783 9910 ext. 606
Fax. +886-(0)2-2783 9871

On May 15th, 2001, I finally defended my Ph.D. thesis, *Biogenic Traces as Palaeoceanographic Indicators in Late Quaternary Sediments from the SW Iberian Margin*. The thesis consists of three parts:

1. Ichnological changes as response to variations in the Mediterranean Outflow Water (MOW) and North Atlantic Deep Water (NADW) formation from the last glacial maximum to the present,

2. An attempt to automatically quantify a part of the ichnofabric in X-ray radiographs using the digital image analysis program DIAna,
3. A detailed study of the ethology of the modern *Zoophycos* and of its impact on AMS ^{14}C-dating of marine sediments.

On August 1st, I started a postdoc position at the Institute of Earth Sciences, Academia Sinica in Taiwan. Here I will work on Late Quaternary climate changes in close contact with the Taiwanese IMAGES-team. I also hope to be able to continue on trace fossils although probably to a smaller extent.

María I. López C. eolivero@satlink.com
Centro Austral de Investigaciones Científicas (CADIC)-CONICET
Ushuaia, Tierra del Fuego, Argentina
Web http://www.tierradelfuego.org.ar/cadic/

I am working with **E.B. Olivero** on trace fossils collected from Cretaceous and Tertiary rocks in Tierra del Fuego and Antarctica. In Antarctica we are studying a *Neonereites*- dominated ichnocenosis recorded in tidal deposits. After two years of summer field works I made my first 'ichnocontribution' on estuarine, shelfal, and slope ichnocenosis from the Eocene of Tierra del Fuego. The study is based on superbly preserved material assigned to the *Curvolithus* ichnocenosis, estuarine settings; *Cruziana* Ichnofacies, shelfal settings; and *Zoophycos* Ichnofacies, slope settings. We are looking forward to initiate in 2002 a study of flysch ichnofossils from Paleocene-Eocene rocks of Tierra del Fuego.

Robert B. MacNaughton romacnau@NRCan.gc.ca
Geological Survey of Canada, Calgary, Alberta, Canada

My work with the Geological Survey of Canada continues to provide opportunities to indulge my ichnological propensities. In addition to ongoing work with **Simon Braddy** on arthropod trackways in the Cambro-Ordovician Potsdam Group of eastern Canada, I have recently undertaken two other projects.

The first of these is a serendipitous outcome of my involvement in the Central Foreland NATMAP Project, a major regional mapping initiative in northwestern Canada. Part of my time on this project has been spent in measuring stratigraphic sections in the Triassic succession of the southeastern Yukon Territory. These siliciclastic strata are of mid- to shallow-shelf origin and yield very well-preserved trace fossil assemblages of relatively high diversity, including abundant arthropod-produced traces. I'm still in the early phases of getting to grips with this material.

The second project is a study of *Oldhamia* and associated ichnotaxa from a deep-water Cambrian succession in the British Mountains in the northern part of the Yukon Territory. This work is based on collections made by my colleague **Larry Lane** during regional mapping in the early 1990s. (Earlier collections from further north in the British Mountains were included in a 1995 paper by **H.J. Hofmann**, **M.P. Cecile**, and **L.S. Lane**, in *Canadian Journal of Earth Sciences*, v. 31, p. 767-782.) Having worked on Lower Cambrian shallow-marine trace fossils, I am enjoying the opportunity to study deep-marine assemblages from roughly the same time period. Larry and I presented a paper on this material at this year's Canadian Paleontology Conference in London, Ontario.

Jacqui Malpas jmalpas@fs1.ge.man.ac.uk
Basin Studies Research Group, Dept. of Earth Sciences, Manchester University, Manchester, UK

I am a mature student who came to geology through the Open University in the UK. I am now in my final year of my PhD and ichnology is a significant part of my research. The title of my project is: *Palaeontological, sedimentolologial and diagenetic analysis of marine flooding surfaces: A case study of the Miocene, Suez Rift, Egypt.*

M. Gabriela Mángano ichnolog@infovia.com.ar
Instituto Superior de Correlación Geológica (INSUGEO), Tucumán, Argentina

Many things happened during the last year. Perhaps the most important is that we managed to accomplish a series of long and never-ending projects, the Waverly monograph and the Trace Fossil book. Personally, the Waverly monograph represents a lot to me. It summarizes one of our projects in Kansas: the detailed study of a Carboniferous tidal flat ichnofauna. It is being

published by the Kansas Geological Survey. We also enjoyed writing the book (an ichnology book in Spanish published by the Museo Paleontológico Egidio Feruglio) and appreciated the opportunity of leaving an imprint of our personal understanding of the study of trace fossils. We hope to reach the Ibero-American community and, why not? to offer other colleagues the challenge (hopefully for a good reason!) to read a book in Spanish.

In terms of research projects, my main interests were concentrated on Lower Paleozoic trace fossils, particularly Cambrian and Ordovician rocks of Northwest Argentina. I have also had the opportunity to work on some Laurentian *Cruziana* (thanks to the invitation of **Ricardo Astini**), and to explore paleoecologic and paleobiologic implications of marginal marine *Cruziana* ichnofacies. Right now, I am also working on some *Psammichnites* from the Carboniferous of western Argentina. We have started a long-term project revising the Vendian-Lower Cambrian Puncoviscana Formation. It is an ambitious project that emphasizes the environmental and paleobiologic implications of this important ichnofauna.

The Patagonia ichnologic group (**Richard Bromley**, **Luis Buatois**, **Noelia Carmona**, **Eduardo Bellosi** and myself) is very active and promises to produce some results in 2002. I have been more involved in IGCP 410 Project (The Ordovician Biodiversification Event). Last February, I joined a field trip to the Moroccan High Atlas and Antiatlas (led by **Naima Hamoumi**) that was really significant to my understanding of Ordovician Gondwanic successions. In June, I participated in the regional IGCP 410 meeting in Riverside (California), where I presented a draft (coauthored by **Mary Droser** and **Sören Jensen**) of ichnodiversity trends during the Ordovician. A manuscript on this topic is in progress and hopefully will be published as part of a book on the Ordovician Radiation that will be published by Columbia University Press.

Regarding the First International Paleontological Congress (July 2002, Australia), **Barry Webby** has kindly invited me to coordinate with him a Trace Fossil Symposium. I hope to be able to gather a representative sample of the international trace fossil community. Please, keep in mind that I count on your support!

For recent publications, see Bibliographia Ichnologica under MÁNGANO and also under BUATOIS; BYRNES; CARMONA; NETTO.

Ronald McDOWELL mcdowell@geosrv.wvnet.edu
West Virginia Geological and Economic Survey, Morgantown, West Virginia, USA

For the past three years, I've been a participant in a project sponsored by the United States Department of Energy involving reservoir characterization in an old oil field here in West Virginia. A major part of my duties was to acquire permeability data directly from outcrop and drill core using an inert-gas injection permeameter. Basically, this instrument injects nitrogen gas into the rock at a known rate, pressure, and temperature through a probe of known geometry held against the rock face. Using feedback on the rate that gas pressure builds up against the rock surface, the instrument computes the permeability of the rock. All of this sounds very esoteric, and it is, except for the fact that the drill cores from the reservoir (Upper Devonian siliciclastics) contain a number of highly bioturbated intervals with well-preserved (although mostly nondescript) ichnofossils.

Permeability and extent of cementation were found to be 'patchy' and difficult to predict for this reservoir – hence the reservoir characterization study. Towards the end of the project, I realized that our permeability equipment had the capability of measuring the permeabilities of very small features because it came with interchangeable probe tips with inside diameters of 0.125" (3.2mm) and 0.0625" (1.6 mm). I decided to measure permeability at selected positions in the drill core to allow a comparison of the permeability characteristics of burrow fillings to the enclosing sedimentary rock. The results of this study were summarized in a poster session presented at the American Association of Petroleum Geology Annual Meeting in Denver, Colorado in June, 2001. The reference for this study is: McDowell, R., Matchen, D. & Avary, K., 2001, *Bioturbation and reservoir flow characteristics: Where did the permeability go?* AAPG 2001 Annual Convention Program, 10: 131.

Briefly, I found that sand-filled vertical and oblique ichnofossils (e.g., *Skolithos*, *Diplocraterion,* or *Arenicolites*) retained no permeability whatsoever. Horizontal ichnofossils (e.g., *Planolites* or *Chondrites*) still had existing permeability even when enclosed in impermeable shale or siltstone. More importantly, the permeability encountered in some of the horizontal traces was nearly 100 millidarcies, which is as high as that found in much of the productive portion of the reservoir. Figure 3 shows a permeability map of a segment of core from the field.

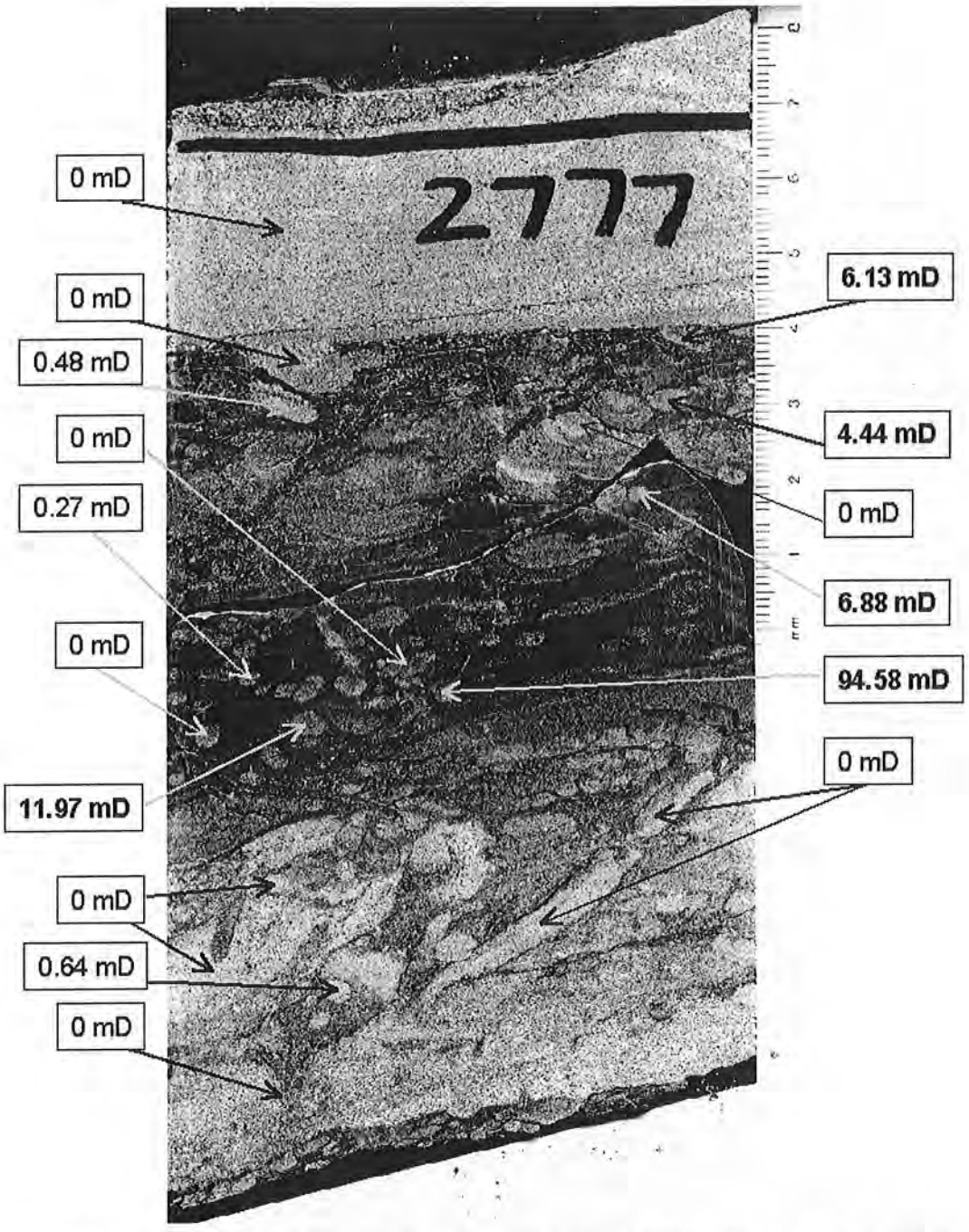


FIGURE 3. Permeability map for core from Thompson Heirs #8 (095-1124) – from a depth of 2777.0'. Fillings in vertical and 'oblique' trace fossils show no permeability; enclosing sandstones and siltstones show no permeability. Horizontal burrow fillings exhibit permeabilities ranging from < 0.5 mDarcies to > 90 mDarcies.

It appears that following shallow burial, vertical and oblique ichnofossils provided a conduit between sedimentary layers allowing fluids to pass from layer to layer. Petrographic examination showed that the reservoir rock contains a good deal of calcite cement formed during early diagenesis. Since this cement is very concentrated in bioturbated intervals and appears to be the 'destroyer of permeability' in vertical burrow fillings, I suggest that the susceptibility of vertical traces to fluid migration may have actually enhanced and localized early

calcite cementation in bioturbated intervals. Furthermore, the intensity of calcite cementation is greatest where the density of vertical traces is greatest.

So why do the horizontal traces still retain relatively high permeabilities? My 'guess' is that the answer lies in the chemical conditions within the burrow fillings during diagenesis. Shallowly buried vertical traces were filled with fluids from different stratigraphic levels with variable chemical composition, pH, and oxygen content. On the other hand, shallowly buried horizontal traces were filled with fluids from the same stratigraphic level with a 'uniform' or at least not highly variable chemical composition, pH, and oxygen content. During diagenesis, there's nothing like a gradient or abrupt change in the chemical microenvironment to cause precipitation of cement. I believe that the sediment-filled vertical traces allowed just such a situation. On the other hand, the horizontal traces experienced a more stable chemical microenvironment and their fillings retained permeability into the late stages of diagenesis and beyond. The net result was to produce an ichnological component of reservoir heterogeneity.

Currently, I am investigating the possibility of using a trace fossil as an index fossil or at the very least a stratigraphic 'indicator' to help in the recognition of the Upper Devonian Brallier Formation during reconnaissance mapping. As geologic workers in the Appalachian region know, exposures here are frequently few and far between. Two units, the Brallier and overlying Foreknobs formations, have been problematic because they both contain thick intervals (200 to 300 meters or more) of olive-green, quartz siltstone, generally devoid of marker horizons or identifiable fossils. After several field seasons trying to differentiate between these two formations in isolated outcrop, my colleagues and I are coming to the conclusion that the ichnofossil *Pteridichnites biseriatus* Clarke and Swartz, 1913 (fig. 4) is restricted to the lower Brallier. We are currently (when the opportunity presents) examining correlative strata in other states to determine the geographic and stratigraphic range of this ichnofossil. A short paper is in preparation proposing the stratigraphic utility of *P. biseriatus* and reinterpreting its original designation as the 'probable tracks of crustaceans or possibly of annelids' to the locomotory impressions of the tube feet of an echinoderm, either an asteroid or ophiuroid.

FIGURE 4. Examples of *P. biseriatus* from the Brallier Formation north of Elkins, West Virginia. Arrows point to impressions that appear to be of the oral surface of an asteroid or orphiuroid; these organisms are suggested as the tracemaker.

Ricardo Néstor MELCHOR melchor_r@cpsarg.com
Universidad Nacional de La Pampa, Santa Rosa, La Pampa, Argentina

During the last year we continued the study of Triassic continental ichnocoenoses from Argentina, mainly from the Ischigualasto - Villa Unión basin. This is a joint project with **Jorge Genise**, **Eduardo Bellosi**, **Miguel Archangelsky**, and **Silvina de Valais**, who recently joined the group. Fieldwork was conducted in a number of localities of the lacustrine Los Rastros Formation at Ischigualasto and Talampaya Parks and also on the floodplain facies of the overlying Ischigualasto Formation. We also started to work in the northern area of the Triassic Cuyo basin (northern Mendoza Province, central-west Argentina), mainly at renowned localities (Sierra de Las Peñas y de Las Higueras) for twentieth-century findings of tetrapod footprints (mostly unpublished). From these localities, a relatively diverse assemblage of vertebrate and invertebrate trace fossils was recorded from sheetflood - playa lake facies, and is in the process of study. We also started to revise the ichnologic knowledge of the Jurassic La Matilde Formation from Patagonia and described distinctive arthropod trackways (mostly the work of **Silvina**). This ichnofauna has become famous by the excellent preservation of tiny mammal-like footprints (ichnogenus *Ameghinichnus*) and small dinosaurs. The work on Triassic invertebrate and vertebrate ichnofaunas from Argentina will (hopefully) continue for at least two more years.

For recent publications, see Bibliographia Ichnologica under MELCHOR and also under VALAIS.

Radek MIKULÁŠ mikulas@gli.cas.cz
Institute of Geology, Academy of Sciences, Praha, Czech Republic

Surprises of the field season 2001 have been:

- The ichnogenus *Helicodromites* and adjacent ichnoassemblage from the Badenian claystones at Brno, Czech Republic (locality visited by **Alfred Uchman** with **Miroslav Bubik** and me);
- A *Circolites* – dominated ichnoassemblage on the Neogene rockgrounds at Brno, Czech Republic (locality visited with **Alfred Uchman** and **Miroslav Bubik**);
- Ichnologically controlled grooves and ridges on thin carapaces of the Cambrian to Silurian eurypterids (joint project with **Ivo Chlupac**); plug-shaped trace fossils from cherts and calc-flints of the Pridoli Formation (Silurian) of the Barrandian area (with **Radvan Horny** and **Pavel Cap**);
- *'Megaplanolites'* from the Cretaceous thick-bedded sandstones (Czech Republic);
- Extremely large *?Gastrochaenolites* cf. *G. ornatus* Kelly & Bromley with the tracemakers (*?Pholadonia* sp. – a non-pholadid bivalve!) *in situ* (Cretaceous, Czech Republic; with **Jiri Zitt**);
- Numerous *Teredolites* from the Bohemian Cretaceous basin (with **Jiri Kriz**);
- Ichnological aspect of fossiliferous nodules of the Ordovician in the Barrandian area;
- Ichnofabric of the Culm facies of the Lower Carboniferous (Moravia and Silesia, Czech Republic; with **Ondra Babek**).

Beside these new items, I continue (or I hope to continue) with some ichnological topics announced already in *IN* 22 and 23, namely:

- The Ordovician ichnofabrics of the Barrandian area (Czech Republic);
- Hymenopterous and mammal burrows in the Bohemian Oligocene;
- Early bioerosion in Devonian bioclasts of the Prague Basin;
- Bioturbation in submarine karst cavities at Štramberk (Jurassic to Cretaceous; with **Alfred Uchman**);
- Lateral holes (predators, parasitoids, cleptoparasites) in insect brood chambers (with **Jorge Genise**).

William MILLER III wm1@axe.humboldt.edu
Humboldt State University, Arcata, California, USA

This has been a productive twelve months or so. I continue to work on deep-marine trace fossil assemblages in northeastern Italy, started to see some of this work published, and convened the symposium 'New Interpretations of Complex Trace Fossils' at the North American Paleontological Convention. The work in Italy is moving from description and interpretation of assemblages in Late Cretaceous-Early Paleogene pelagic limestones to new work on the Eocene Belluno Flysch (with **Paolo Grandesso** and **Cristina Stefani** of Universita di Padova). The symposium at NAPC was a tremendous success; the room was packed most of the time and I have heard only favorable reactions from those who saw the presentations. *Palaeo-3* will publish the contributions, together with a few additional papers solicited to complete coverage of the topic, as a special volume probably in late 2002 (if we keep to schedules). I am growing more interested in the biologic properties of complex trace fossils, such as *Zoophycos*, compounds, and independent traces that occur in repeated, intimate associations, and will spend some time in the coming year trying to relate 'extended organism' concepts to the interpretation of these complicated patterns.

For recent publications, see Bibliographia Ichnologica under MILLER.

Masakazu NARA nara@sci.ehime-u.ac.jp
Center for Marine Environmental Studies, Ehime University, Matsuyama, Japan

I am working on sedimentology and ichnology of Cenozoic shallow-marine to marginal-marine deposits of Japan. My main field of interest is to reveal impact of Pleistocene short-term sea-level changes on shallow-marine ecosystems.

In Japan, there are lots of splendid exposures of Cenozoic strata formed in various depositional environments. I also enjoy studying them. In addition, together with **Alfred Uchman** and **Michael Schlirf**, I have started reevaluation of ichnotaxonomy of rosselian traces.

Eduardo B. Olivero eolivero@satlink.com
Centro Austral de Investigaciones Científicas (CADIC) – Conicet, Ushuaia, Tierra del Fuego, Argentina
Web http://www.tierradelfuego.org.ar/cadic/

Present research is focused on the sedimentology and ichnology of estuarine and tidal deposits from the James Ross Basin in Antarctica and the Austral-Malvinas basins in Tierra del Fuego. The ichnologic study is carried out together with **María I. López C.** We have a fine collection of *Nereites* from the Upper Cretaceous of Antarctica, consisting mostly of the so-called *N. biserialis-N. uniserialis* preservational variants and we are trying to clarify the problem through the study of thin and polished sections. We have produced a short abstract with preliminary results to be presented in the IX Reunión Argentina de Sedimentología (Córdoba, Argentina, May 2002) and full results are expected to be submitted at the end of 2002. In Tierra del Fuego we are studying an estuarine ichnocoenosis dominated by *Macaronichnus*, *Curvolithus*, *Gyrochorte*, and trace fossils similar to those frequently assigned to the activity of gastropods. Preliminary results were published in the Fourth Argentinian Ichnologic Meeting and Second Ichnologic Meeting of the Mercosur (S.M. de Tucumán, September 2001).

In 2002 we plan to begin ichnologic studies on the Paleogene turbidite systems of the Austral-Malvinas basins in Tierra del Fuego.

Jonathan D. Radley
Warwickshire Museum, Warwick & University of Portsmouth, UK

Ichnological research: Non-marine Lower Cretaceous of the Wessex-Weald Basin (southern England) and the marine Upper Triassic-Middle Jurassic of the East Midlands Shelf (central England).

The non-marine Lower Cretaceous (Purbeck-Wealden) succession of southern England yields well-preserved, low-diversity, vertebrate (chiefly dinosaur) and invertebrate ichnofaunas, principally in meanderplain and marginal lacustrine-lagoonal environments. Many of these are poorly documented. Current investigations are addressing their taphonomy and sedimentological significance. The marine Upper Triassic to Middle Jurassic succession on the Central English East Midlands Shelf is rich in pebble beds and skeletal concentrations, many previously unrecognised. The lithoclasts and bioclasts frequently display shallow-tier bioerosive traces which appear to be bathymetrically controlled. Ongoing research is revealing the importance of hard substrate grazing as a bioerosive agent, in siliciclastic and carbonate facies as old as Rhaetian.

Gudrun Radtke gudrun.radtke@arcormail.de
Hessisches Landesamt für Umwelt und Geologie, Wiesbaden, Germany

- Morphometry of microboring traces
- Ichnological nomenclature
- Microbial traces in shells in Safaga, Red Sea (Egypt)
- Tertiary fossil microborings of Germany

Emma C. Rainforth emmar@mesalands.edu
New address: Curator, Mesalands Dinosaur Museum
Mesalands Community College
911 South 10th Street
Tucumcari, NM 88401, USA
Telephone (505) 461-4413 x192
Telefax (505) 461-1901

Greg RETALLACK gregr@darkwing.uoregon.edu
University of Oregon, Eugene, Oregon, USA

Greg Retallack is getting more and more into trace fossils, with recently published studies identifying supposed Ordovician millipede burrows as *Scoyenia*. He is also fascinated by the alternation of *Edaphichnium* and *Taenidium* trace fossil assemblages in the Eocene-Miocene John Day Formation of Oregon and Renova Formation of Montana. As in comparable trace fossil assemblages of the Pleistocene Palouse loess of Washington described by Toby O'Geen and Alan Busacca, these assemblages may represent alternation of grassland and sagebrush communities on Milankovitch frequences (40 ka). This alternation of carbon-sequestering grassland soils stuffed with earthworm pellets and carbon-oxidizing sagebrush riddled with cicada burrows, has got him thinking that soil ichofacies on longer time scales may play a role in greenhouse-icehouse alternation. Ordovician *Scoyenia* ichnofacies are supplemented by Carboniferous *Coprulus* ichnofacies, then Triassic *Termitichnus* and Cenozoic *Coprinisphaera* ichnofacies. What is the connection, if any, between trace fossils of soil organisms and global change?

Andrew K. RINDSBERG arindsberg@gsa.state.al.us
Geological Survey of Alabama, Tuscaloosa, Alabama, USA

Family illnesses cut deeply into my research time during the past two years, but I am catching up now. I was delighted to receive visitors including **Richard Bromley**, **Mary Droser**, **Jerry MacDonald**, **Tony Martin**, and **Alfred Uchman** in 2001 and early 2002. Several large projects are underway:

- Coordinating the revision of the trace-fossil part of the *Treatise* (with several contributing authors)
- Continuing work on the Bibliographia Ichnologica, a general bibliography on traces (with **Alfred Uchman**)
- Contributing to, and helping to edit, a book being prepared by amateurs and professionals of the Birmingham Paleontological Society on the Union Chapel tracksite (Pennsylvanian, Alabama) (with **Ron Buta**, an astronomer at the University of Alabama; and **David Kopaska-Merkel**, Geological Survey of Alabama)

Alfred Uchman and I completed a bibliography of the 'lost years' between the two *Ichnology Newsletter* series, 1990 to 1995; we are tackling the years before 1900 next.

Also, **Tony Martin** and I recently completed a manuscript on *Arthrophycus*, which turns out to have some surprising interrelationships with other ichnogenera in the Silurian of Alabama. We appreciate the help we received from the ichno-community through the SKOLITHOS listserver.

For recent publications, see Bibliographia Ichnologica under RINDSBERG and also under MÁNGANO; UCHMAN.

Michael SCHLIRF michael.schlirf@mail.uni-wuerzburg.de
Institut für Paläontologie der Universität, Pleicherwall 1, 97070 Würzburg, Germany

Besides continuous efforts in improving my knowledge on ichnotaxonomy and finding ways of uniform methods in how to handle trace fossils, I am currently working on Upper Triassic trace fossils from the Germanic Basin and their palaeoecological significance. Together with **Mario Werner** I am still working on the Permian trace fossils from Namibia – which hopefully will soon result in a publication on a very interesting new ichnogenus (see IN23). Together with **Alfred Uchman** I will work on the type material of *Rosselia* Dahmer. Some new material of *Steigerwaldichnium* Kuhn, 1937 has been discovered and is waiting for being described. A revision of *Minichnium* Pfeiffer is in progress. Last but not least I will keep on opening ichnological Pandora boxes on SKOLITHOS and elsewhere to entertain the ichno-community.

For recent publications, see Bibliographia Ichnologica under SCHLIRF.

Christine SCHOENBERG cschoenb@mpi-bremen.de
New address: Max Planck Institute of Marine Microbiology
Dept. Microsensor Techniques
Celsiusstr. 1
28359 Bremen, Germany

Telephone 2028-804 (extension 818)
Fax 2028-690

Günter SCHWEIGERT schweigert.smns@naturkundemuseum-bw.de
Staatliches Museum für Naturkunde, Stuttgart, Germany

Working for several years on lithographic limestones of the Upper Jurassic in southwestern Germany, I have been astonished by the poorness of knowledge concerning trace fossils in these laminated sediments, which are, in comparison with other fossils, equally or even more important for understanding the palaeoecology and genesis of such kinds of famous fossil-lagerstätten. In the past they were often overlooked and hence missing in older collections because they have little economic value for fossil traders. Starting with the Nusplingen Lithographic Limestone, I am continuing to work on trace fossils (and 'pseudo'-trace fossils as well!) from several lithographic limestone deposits in Bavaria, together with **Martin Röper** from Solnhofen, one of the best local specialists on the Bavarian lithographic limestones. At the least, I am also interested in decapod microcoprolites found in thin sections of rocks from the Mesozoic and Cenozoic.

For recent publications, see Bibliographia Ichnologica under SCHWEIGERT.

Ray STANFORD dinotracker@earthlink.net
Mesozoic Track Project, College Park, Maryland, USA

I am an amateur paleoichnologist (age 64 in June 2002) who, after retirement from unrelated work, began almost literally stumbling upon dislodged ('float') pieces of track-bearing Early Cretaceous substrate in Maryland while walking stream beds with my three children in the summer 1993. After learning that Early Cretaceous tracks had been unknown in this state before my finds, I began the Mesozoic Track Project, with advice from professionals, to collect, conserve, and catalog such float finds as well as to locate parent substrates and record appropriate data. The substrates containing tracks are of the Potomac Group, evidently from its Patuxent Formation, and seem to be of late Barremian to early Aptian age, based on pollen and stratigraphic studies (with help from Robert Weems, USGS, Reston, Virginia).

Maryland finds include:

- Diagnostic hypsilophodontid manus/pes imprint sets
- Slabs with multiple trackways, including two with three distinct ichnospecies represented, one of which includes four trackways comprising 22.5 tridactyl footprints, avian footprints and trackways of various foot sizes, and the smallest foot-size dinosaurian trackways ever reported
- Ten tracks (including two successive tracks on one slab) realistically attributable to dromeosaurids progressing in soft substrates (Teeth of dromeosaurids have been found locally in the Arundel Clay.)
- At least a dozen distinct ichnospecies of tridactyl footprints, including ornithopod tracks of various sizes attributable to iguanadontids
- Four examples of coprolites with tridactyl footprints impressed into them;
- Over a dozen sauropod manus imprints, ranging from tiny (two are 3.8 cm across) to large but probably sub-adult examples; four sauropod pes ichnites, the largest 67 cm across
- Several sizes of 'croc' type footprints
- Perhaps five varieties of mammal imprints
- A diagnostic nodosaur hatchling fossil, the first found in this hemisphere
- Perhaps the finest nodosaur(?) pes imprint ever found

- Two excellent nodosaur manus prints
- Pes and manus imprints attributable to a basal neoceratopsian.

On April 4, 2002, I recovered a tridactyl dinosaur footprint, the first ever found from Maryland's Late Cretaceous Magothy Formation. It is of Santonian age (roughly 84 Ma).

My Texas finds include detailed sauropod footprints, the smallest ever reported, world-wide, and found in Edwards Limestone 'member # 3' (middle Albian, about 100 Ma) of Travis County, Texas. They comprise a single trackway and consist of left and right pes imprints only 58 mm long by 50 mm wide, a left manus imprint 23 mm long by 30 mm wide, and a right manus print partly overprinted by the right pes. The diminutive imprints are attributable a hatchling and suggest the possible presence of a nesting site in the surroundings. Although shallow, the outlines of the three complete footprints are clear, displaying rather typical *Brontopodus birdi* morphology.

Abstracts of the three papers I presented at Dinofest '98 in Philadelphia, may be seen in the event's book of abstracts. (The Dinofest '98 conference proceedings were, alas, never published by the promoter.)

Should researchers wish to visit and see things, first hand, please contact me.

Alfred Uchman fred@ing.uj.edu.pl
Jagiellonian University, Kraków, Poland

Apart from work on *Ichnology Newsletter* and *Bibliographia Ichnologica* (with **Andy Rindsberg**), I visited Wiesbaden Museum and the field (Germany) to examine type material of *Rosselia socialis* and other ichnospecies named by Dahmer (1937) (with **Michael Schlirf** and **Masakazu Nara**). **Richard Bromley**, **Murray Gregory**, **Tony Martin**, and I examined Point Lobos, California (USA), for a Paleocene trace fossil described by Gary Hill (1981). With **Radek Mikuláš**, we examined a Miocene clay pit with *Helicodromites* and other trace fossils, near Brno in the Czech Republic. With **Richard Bromley**, I examined flysch and non-flysch trace fossils in Rhodes, Greece. There are also several unfinished projects from former years, with many coauthors from different countries, and never-ending researches in the Carpathian Flysch.

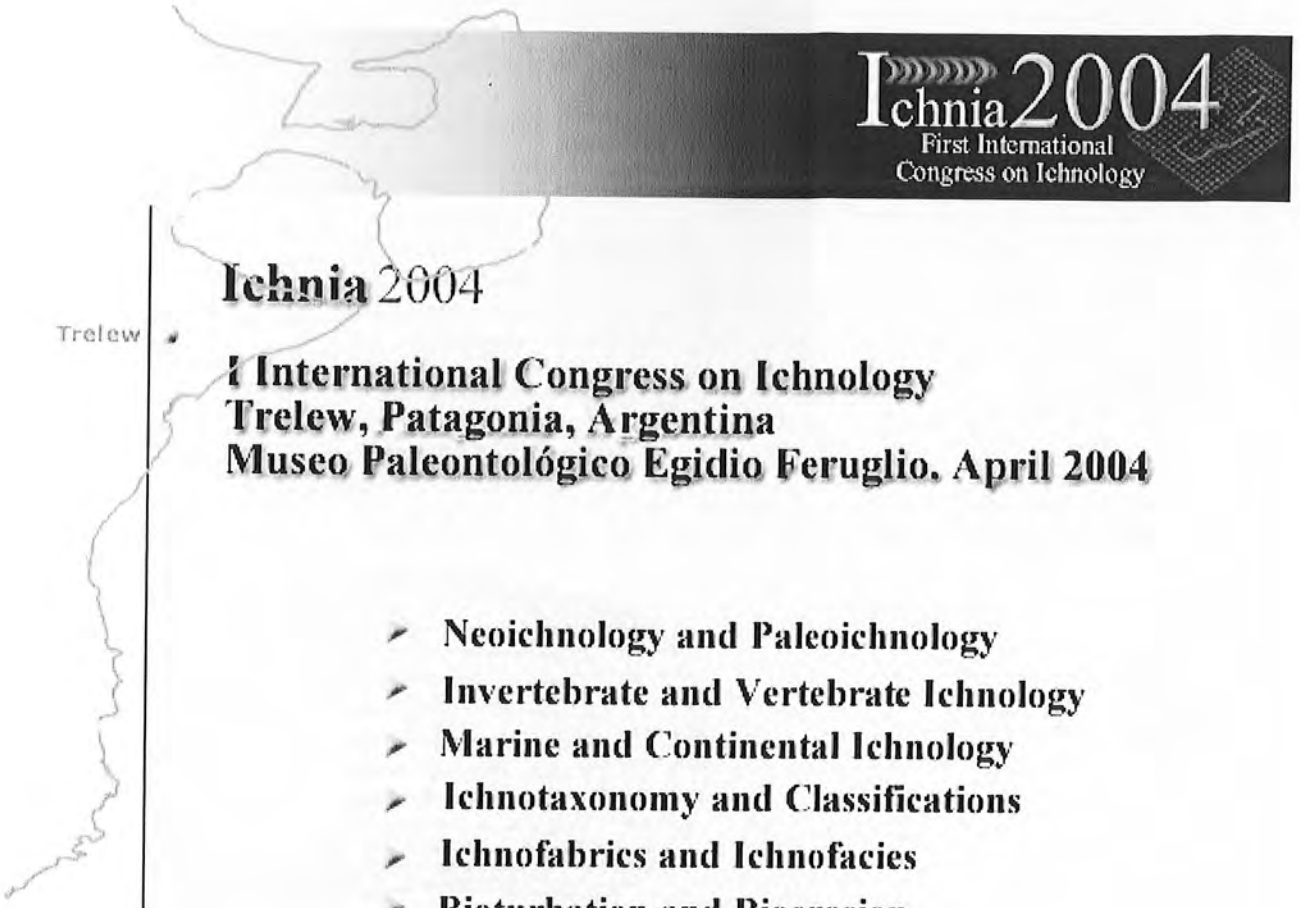
John-Paul Zonneveld jzonneve@nrcan.gc.ca
New address: Geological Survey of Canada (Calgary)
3303-33rd Street NW
Calgary, Alberta, Canada T2L 2A7
Phone (403) 292-7018
Fax (403) 229-4961

* * * * *

If he for whom I have waited
Should even now end by coming,
What should I do?
He will be wanting to tread
The (fresh) snow of the garden.

Matsu hito no
Ima mo ki-taraba,
Ikaga semu?
Fuma-maku-hoshiki
Niwa no yuki kana.

Izumi no Shikibu, Shikwa 156
Translated by Arthur Waley (1919)



Ichnia2004
First International
Congress on Ichnology

Ichnia 2004

I International Congress on Ichnology
Trelew, Patagonia, Argentina
Museo Paleontológico Egidio Feruglio. April 2004

- Neoichnology and Paleoichnology
- Invertebrate and Vertebrate Ichnology
- Marine and Continental Ichnology
- Ichnotaxonomy and Classifications
- Ichnofabrics and Ichnofacies
- Bioturbation and Bioerosion
- Theoretical and Applied Ichnology

Web Page www.ichnia2004.com

Organizing Committee: Jorge F. Genise (Trelew, Argentina)
Luis A. Buatois (Tucumán , Argentina)
Eduardo Bellosi (Buenos Aires, Argentina)
M. Gabriela Mángano (Tucumán, Argentina)
Ricardo N. Melchor (Santa Rosa, Argentina)
Nicolás Muñoz (Caracas, Venezuela)
Renata G. Netto (Sao Leopoldo, Brasil)
Daniel G. Poiré (La Plata, Argentina)
Mariano Verde (Montevideo, Uruguay)

Present Contacts: Jorge F. Genise (jgenise@mef.org.ar)
Luis A. Buatois (ichnolog@infovia.com.ar)