Featured Article

Deep time diversity of metatherian mammals: implications for evolutionary history and fossil-record quality <i>C. Verity Bennett, Paul Upchurch, Francisco J. Goin, and Anjali Goswami</i>	171
Articles	
Estimating the number of pulses in a mass extinction Steve C. Wang and Ling Zhong	199
Diversity and tectonics: predictions from neutral theory Steven M. Holland	219
Land to sea transitions in vertebrates: the dynamics of colonization Geerat J. Vermeij and Ryosuke Motani	237
The modulating role of traits on the biogeographic dynamics of chondrichthyans from the Neogene to the present <i>Jaime A. Villafaña and Marcelo M. Rivadeneira</i>	251
Mosaic evolution in the middle Miocene planktonic foraminifera Fohsella lineage Weimin Si, William A. Berggren, and Marie-Pierre Aubry	263
An ecomorphospace for the Ammonoidea Sonny A. Walton and Dieter Korn	273
Spinosity, regeneration, and targeting among Paleozoic crinoids and their predators Valerie J. P. Syverson, Carlton E. Brett, Forest J. Gahn, and Tomasz K. Baumiller	290
Topological analysis of graphoglyptid trace fossils, a study of macrobenthic solitary and collective animal behaviors in the deep-sea environment Ruo-ying Fan, Yi-ming Gong, and Alfred Uchman	306
Breaking down the lithification bias: the effect of preferential sampling of larger specimens on the estimate of species richness, evenness, and average specimen size Andrew D. Hawkins, Michał Kowalewski, and Shuhai Xiao	326



PALEOBIOLOGY

EDITORS

Mark Patzkowsky, Senior Editor, *Pennsylvania State University, USA*Catherine Badgley, *University of Michigan, USA*Carlos A. Jaramillo, *Smithsonian Tropical Research Institute, Panama*Wolfgang Kiessling, *Friedrich-Alexander University of Erlangen-Nürnberg, Germany*Shuhai Xiao, *Virginia Polytechnic Institute, USA*

ASSOCIATE EDITORS

Martin Aberhan, Museum für Naturkunde Berlin, Germany
Paul Barrett, Natural History Museum, London, UK
Kevin Boyce, Stanford University, USA
Julia Clarke, University of Texas, USA
Laurel Collins, Florida International University, USA
James Crampton, GNS Science, New Zealand
Kristina Curry Rogers, Macalester College, USA
John Finarelli, University College Dublin, Ireland
David L. Fox, University of Minnesota, USA
Anjali Goswami, University College London, UK
Jason Head, University of Cambridge, UK
Melanie Hopkins, American Museum of Natural History, USA
Cynthia Looy, University of California Berkeley, USA
Jonathan Marcot, University of California, Los Angeles, USA

PEER REVIEW COORDINATOR:

Jessica Kastigar, Cincinnati, Ohio, USA, paleobiology@cambridge.org

FOUNDING EDITORS:

Thomas J. M. Schopf and Ralph G. Johnson



MEMBERSHIP INFORMATION

Members of the Paleontological Society automatically receive electronic subscriptions to *Paleobiology* and the *Journal of Paleontology* as a benefit of membership. To apply for individual membership, please go to the Paleontological Society's homepage at http://paleosoc.org/, where links to an electronic application, a printable paper application form, and a complete list of membership benefits are provided under the Membership heading.

The Patrons Fund was established to broaden the basis of financial support for *Paleobiology* and thus to encourage paleontological publication.

The Paleontological Society gratefully acknowledges the following Patrons of *Paleobiology*:

To become a Patron, send a check payable to *Paleobiology* to:

Paleobiology Patrons Fund The Paleontological Society P.O. Box 9044 Boulder, CO 80301-9044

PALEOBIOLOGY PATRONS

RICHARD P. ALVORD ROBERT L. ANEMONE GERALD S. BALES RICHARD K. BAMBACH ANNA K. BEHRENSMEYER STIG M. BERGSTRÖM DAVID S. BERMAN DAVID J. BOTTJER SANDRA J. CARLSON WILLIAM A. CLEMENS PAULO CUSTODI EDWARD B. DAVIS WILLIAM A. DIMICHELE RUSSELL ENGELMAN **ULF ERGANDER** DOUGLAS H. ERWIN DAVID E. FASTOVSKY KARL W. FLESSA MICHAEL J. FOOTE IN MEMORY OF STEPHEN J. GOULD JOHN C. HANDLEY CAROLE S. HICKMAN STEWART HOLLINGSWORTH JOHN R. HORNER FREDERICK H. C. HOTCHKISS **AUGUST ILG** JEREMY B. C. JACKSON SUSAN M. KIDWELL BRUCE S. LIEBERMAN DAVID R. LINDBERG ALAN R. LORD ERNEST L. LUNDELIUS BRUCE J. MacFADDEN HARUYOSHI MAEDA GEORGE R. McGHEE DAVID L. MEYER ARNOLD I. MILLER WILLIAM C. MILLER, III KEVIN PADIAN RANDY R. PATRICK MARK E. PATZKOWSKY DAVID L. RODLAND IN MEMORY OF TOM SCHOPF ELIZABETH C. SEASTRUM PETER M. SHEEHAN JAMES SPRINKLE GARY E. STRATHEARN JACEK K. SULANOWSKI SHERMAN SUTER ROGER D. K. THOMAS **BRUCE H. TIFFNEY** JAMES W. VALENTINE GEERAT J. VERMEIJ SALLY E. WALKER RON F. WASZCZAK SCOTT L. WING

SUBSCRIPTION INFORMATION

Paleobiology [ISSN 0094-8373] is published four times a year (February, May, August, and November) by Cambridge University Press for the Paleontological Society. Members of the Paleontological Society automatically receive electronic subscriptions to Paleobiology and the Journal of Paleontology as a benefit of membership. Institutional subscriptions can be purchased direct from Cambridge University Press or through any major subscription agent. Print-only, online-only, and bundled print and online prices are all available, and subscription prices are tiered according to institution type and size.

Please contact Cambridge University Press for further details:

For customers in North America

Email: subscriptions_newyork@cambridge.org

Phone: (800) 872-7423, option 4

For customers outside of North America

Email: journals@cambridge.org

Phone: +44 (0)1223-32-6070; Fax: +44 (0)1223-32-5150

Downloads of individual articles are available on https://www.cambridge.org/core/journals/paleobiology.

Reprints of individual articles may be ordered. For information on reprints, please contact Cambridge University Press.

Archives of previous issues are available on https://www.cambridge.org/core/journals/paleobiology.

Permissions All rights reserved. Permissions and reproduction policies, request forms, and contacts are available at: http://www.cambridge.org/about-us/rights-permissions/

ADVERTISING

To advertise in the journal please contact M. J. Mrvica Associates, 2 West Taunton Avenue, Berlin, NJ 08009; Phone: 856-768-9360; Fax: 856-753-0064; Email: mjmrvica@mrvica.com

ABSTRACTING AND INDEXING

Abstracting and indexing information for *Paleobiology* is available at: https://www.cambridge.org/core/journals/paleobiology/information/abstracting-and-indexing

POSTAL INFORMATION

Periodicals postage rate paid at New York, NY, and at additional mailing offices. POSTMASTER: Send address changes in the USA, Canada, and Mexico to: *Paleobiology*, Cambridge University Press, Journals Fulfillment Department, One Liberty Plaza, 20th floor, New York, NY 10006. Send address changes elsewhere to *Paleobiology*, Cambridge University Press, Journals Fulfillment Department, UPH, Shaftesbury Road, Cambridge CB2 8BS, England.

Copyright © 2018 The Paleontological Society. All rights reserved.

Printed in the United States of America