FIFTH NORTH AMERICAN PALEONTOLOGICAL CONVENTION

- ABSTRACTS AND PROGRAM -

FIELD MUSEUM OF NATURAL HISTORY
JUNE 28 - JULY 1, 1992

Edited By

S. Lidgard & P. R. Crane

THE PALEONTOLOGICAL SOCIETY
SPECIAL PUBLICATION NO. 6
1992

Randall S. Spencer
Series Editor

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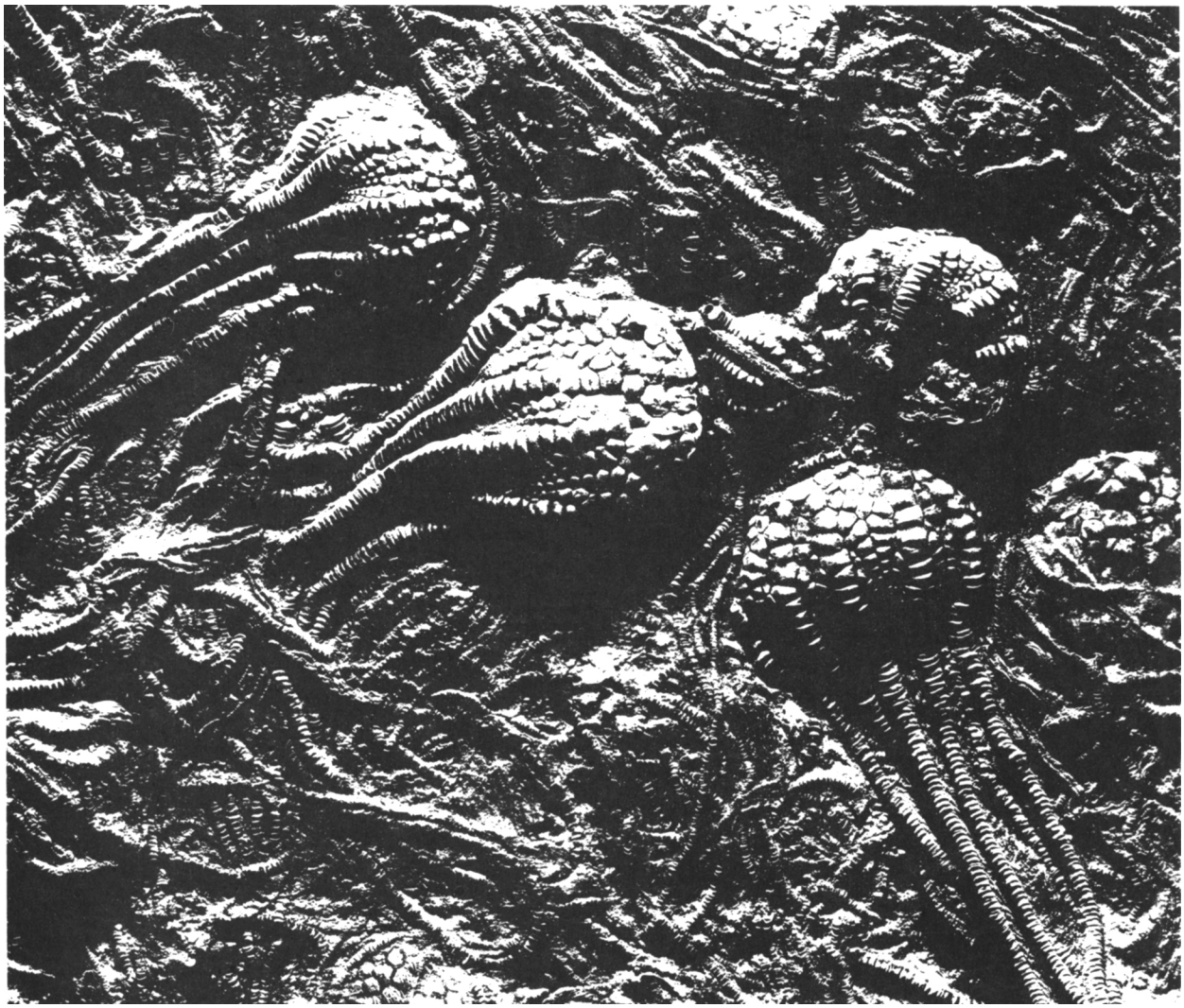

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PREFACE

The First North American Paleontological Convention was held at the Field Museum of Natural History, Chicago, in September 1969 to provide a forum for the exchange of ideas and information among the diverse subdisciplines of paleontology (E.L. Yochelson, Ed., 1970, *Proceedings of the North American Paleontological Convention*, Allen Press, Lawrence, Kansas). Between 700 and 750 paleontologists from all over the world attended this highly successful meeting. Since 1969, three other North American Paleontological Conventions have been organized (Kansas 1977; Montreal 1982; Boulder 1986) and have continued to play an important international role in enhancing communication and encouraging interdisciplinary progress within the broad field of paleontology.

In 1992-1994 the University of Chicago and the Field Museum of Natural History both celebrate their centenaries and as part of these celebrations it seemed appropriate that NAPC should return to Chicago. The paleontologists at the Field Museum, the University of Chicago and the University of Illinois at Chicago are therefore pleased to welcome you to the Fifth North American Paleontological Convention (NAPC.V). The program will begin on the evening of Sunday June 28th and over the next three days (Monday June 29th - Wednesday July 1st) the 329 presentations summarized in this volume will be given as either lectures or posters.

The Chicago meeting is the first North American Paleontological Convention to be held under the formal auspices of the Association of North American Paleontological Societies (ANAPS), which includes representatives from the American Association of Stratigraphic Palynologists, Canadian Association of Palynologists, Cushman Foundation for Foraminiferal Research, North American Micropaleontological Society, Paleobotanical Section of the Botanical Society of America, Paleontological Division of the Geological Society of Canada, Paleontological Research Institution, Society of Vertebrate Paleontology, and the Paleontological Society. The program for NAPC.V has been developed by the Organizing Committee in consultation with ANAPS, with the aims of encouraging interactions between different subdisciplines in paleontology; providing opportunities for the participation of students; and stimulating the integration of paleontological expertise into research within biology and geology in the broad sense.

We are grateful to the other members of the Organizing Committee for all their assistance with many aspects of NAPC.V. In addition, we especially thank all staff of the Department of Geology, Field Museum, and Barbara Ballard, Michael Croon, Mary Dybas, Kathryn Hill, Carol Konieczny and Elaine Zeiger for their invaluable contributions to planning the details of the schedule. We are also indebted to all the symposium organizers for helping us to develop an interdisciplinary program, and the Council of the Paleontological Society, particularly Thomas W. Broadhead, University of Tennessee, and Randall S. Spencer, Old Dominion University, for their cooperation in publishing this abstract volume.

Scott Lidgard
Department of Geology
Field Museum

Peter R. Crane
Department of Geology
Field Museum

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Sponsors of NAPC.V:

FIELD MUSEUM OF NATURAL HISTORY

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The National Science Foundation
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Fifth North American Paleontological Convention (NAPC.V)

Field Museum of Natural History, Chicago

Summary of Program

Monday, June 29th, 1991	Tuesday, June 30th, 1991	Wednesday, July 1st, 1991	Location
1. *The Meaning of Higher Taxa in Macroevolutionary Studies*[1] D. E. Fastovsky & J. M. Clark	6. *Early Metazoan Evolution* S. Conway Morris	16. *Paleobiogeography: Global Change and Evolution* R. E. Crick, A. Raymond & C. Scotese	James Simpson Theater
2. *Phylogenetics and Rates of Evolution: Morphologic, Genomic and Taxic Rates* R. Cloutier & D. K. Elliott	7. *Early Metazoan Evolution* continued with contributed papers	17. *Paleobiogeography: Global Change and Evolution* continued with contributed papers	James Simpson Theater
3. *Paleontology Applied to Geologic Problem Solving (Part 1)* L. E. Edwards & S. R. Jacobson	8. *Implications of Sequence Stratigraphy for Evolutionary and Biostratigraphic Patterns* R.W. Scott and A.R. Ormiston	18. *Environmental and Biological Change in Neogene and Quaternary Tropical America* J. B. C. Jackson, A. G. Coates & A. F. Budd	Montgomery Ward Lecture Hall
3. *Paleontology Applied to Geologic Problem Solving (Part 2)*	9. *Long Records of Land Biotas: A Comparison of Wyoming-Montana Paleogene and Siwalik Miocene Sequences* A. K. Behrensmeyer & C. E. Badgley, with contributions from T. M. Bown	19. *Origination and Extinction* contributed papers	Montgomery Ward Lecture Hall
4. *Environmental Patterns in the Origins and Fates of Major Groups (Part 1)* D. J. Bottjer & D. Jablonski	10. *Origin of Modern Terrestrial Ecosystems: Late Mesozoic and Cenozoic* G. R. Upchurch & R. K. Stucky	20. *Paleozoic and Post-Paleozoic Benthos: Comparative Ecology and Physiology*[1] M. C. Rhodes & G. J. Vermeij	Founders' Room
4. *Environmental Patterns in the Origins and Fates of Major Groups (Part 2)*	11. *Origin of Modern Terrestrial Ecosystems: Late Mesozoic and Cenozoic* continued with contributed papers	21. *Evolution and Functional Morphology* contributed papers	Founders' Room
5. *Advances in Deep Sea Paleoecology (Part 1)* W. C. Miller	12. *Conquering Shape and Form: Quantitative Morphometrics*[2] B. T. Huber & D. Erwin	22. *Molecular Paleontology and Exceptional Preservation* D. E. G. Briggs	Dining Room E
5. *Advances in Deep Sea Paleoecology (Part 2)*	13. *Morphological Evolution* contributed papers	23. *Taphonomy* contributed papers	Dining Room E
	14. *Biomolecular and Isotopic Paleontology: An Integrated Approach*[4] J. D. Hudson, J. M. Hayes & D. M. Martill	24. *Late Paleozoic and Early Mesozoic Circum-Pacific Events and their Global Correlation: A Comparison of the Permian and Triassic of the North American and East Asian Pacific Regions*[3] M. Dickins, D. W. Boyd & G. D. Stanley	Lecture Hall II
	15. *Paleoecology* contributed papers	25. *Lagerstätten* H. R. Feldman	Lecture Hall II

[1]Sponsored by the Paleontological Society
[2]Sponsored by the Cushman Foundation for Foraminiferal Research
[3]Sponsored by International Geological Correlation Project 272
[4]Sponsored by Organic Geochemistry Division of the Geochemical Society of America

NAPC.V Program - Monday, June 29th, 1992

- names indicated are those of the presenter -

	James Simpson Theater	Montgomery Ward Lecture Hall	Founders' Room	Dining Room E
8.00	Welcome			
8.15	Raup	L		
8.45	Berggren	P E		
9.15	Knoll	L C		
9.45	Patterson	E T		
10.15	Break	N U		
		A R		
		R E		
		Y S		
10.30	1 Intro - Higher Taxa in Macroevolution	3 Intro - Applied Paleontology	4 Intro - Environmental Patterns	5 Intro - Deep Sea Paleoecology
10.35	1 Rieppel	3 Jacobson	4 Jablonski	5 Miller
10.55	1 Damuth	3 Soja	4 Hunt	5 Smith
11.15	1 Stein	3 Finney	4 Fortey	5 Crimes
11.35	1 Fastovsky	3 Palmer	4 Miller	5 Pfluger
11.55	1 Bambach	3 Baird	4 Patzkowsky	5 Ekdale
12.15	1 Janis	3 Kontrovitz	4 Westrop	5 Fu
12.35	1 D'Hondt			
12.55	1 Carlson			
1.15	LUNCH	LUNCH	LUNCH	LUNCH
1.55	2 Intro - Rates of Evolution	3 Applied Paleontology - contd.	4 Environmental Patterns - contd.	5 Deep Sea Paleoecology - contd.
2.00	2 Cracraft	3 Dorning	4 Droser	5 Gooday
2.20	2 Cloutier	3 Gyllenhaal	4 Hickey	5 Levin
2.40	2 Smith	3 Sageman	4 Benton	5 Lutz
3.00	2 Huelsenbeck	3 Khan	4 Lidgard	5 Voight
3.20	2 Flynn	3 Verteuil	4 Parsons	5 Callender
3.40	2 Hauser	3 Edwards	4 Sepkoski	
4.00	2 Wilkinson	3 Lane		
4.20				Poster Session - Hall 38
5.00				Roundtable Discussion - Paleontology on Public Lands
6.00				
7.00				

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NAPC.V Program - Tuesday June 30th, 1992

- names indicated are those of the presenter -

	James Simpson Theater	Montgomery Ward Lecture Hall	Founders' Room	Dining Room E	Lecture Hall II
8.15	6 Intro - Early Metazoan Evolution	8 Intro - Implications of Sequence Stratigraphy	10 Intro - Modern Terrestrial Ecosystems	12 Intro - Shape and Form: Morphometrics	14 Intro - Biomolecular & Isotopic Paleontology
8.20	6 Fisher	8 Armentrout	10 Upchurch	12 Arnold	14 Hudson
8.40	6 Kauffman	8 Scott	10 Crepet	12 Huber	14 Anderson
9.00	6 Butterfield	8 Kidwell	10 Crane	12 Wei	14 Popp
9.20	6 Runnegar	8 Holland	10 Weishampel	12 Lohmann	14 Kenig
9.40	6 Narbonne	8 McGhee	10 Labandeira	12 Lazarus	14 Belin
10.00	6 Conway Morris	8 Ormiston	10 Greenwood	12 Budd	14 Martill
10.20	6 Bengtson	8 Brett	10 Stucky	12 Key	14 Westbroek
10.40	6 Wood	8 Holterhoff	10 Prothero	12 Hageman	14 Van Bergen
11.00	6 Foote	8 Bergen	10 Jacobs	12 Erwin	14 Taylor
11.20	6 Peel	8 Leckie	10 Graham	12 Crampton	14 Showers
11.40	6 Budd	8 Kauffman	10 Crowley	12 Macleod	14 Barrick
12.00	6 Collins	8 Shaffer	10 Olson	12 Stevens	14 Kolodny
12.20	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
1.30	7 Early Metazoan Evolution - contd.	9 Intro - Long Records of Land Biotas	11 - Modern Terrestrial Ecosystems - contd.	13 Morph. Evolution contributed papers	15 Paleoecology contributed papers
1.45	7 Nedin	9 Cerling	11 Taggart	13 Thomas	15 Anderson
2.00	7 Valentine	9 Koch	11 Lucas	13 Landman	15 Hubbard
2.15	7 Jacobs	9 Wing	11 Sereno	13 Boyajian	15 Burke
2.30	7 Signor	9 Willis	11 Forster	13 Zaslavskaya	15 Skelton
2.45	7 Rudkin	9 Bown	11 Holtz	13 Carter	15 Villamil
3.00	7 Yochelson	9 Behrensmeyer	11 Pike	13 Mitchell	15 Harper
3.15	7 Hart	9 Bartels	11 Romero	13 Heaney	15 Rindsberg
3.30	7 Li	9 Maas	11 Herendeen	13 Schneider	15 Zell
3.45	7 Van Iten	9 Barry	11 Masterson	13 Nehm	15 Johns
4.00	7 Sumrall	9 Gingerich	11 Melchior	13 Rice	15 Meyer
4.15	7 Rowland	9 Flynn	11 Wyss	13 Staley	15 Miller
4.30		9 Gunnell	11 Nakaya	13 MacKinnon	15 Fields
4.45		9 Morgan	11 Watabe	13 Sumida	15 Beerbower
5.00		9 Badgley		13 Gaudin	15 Bocherens
5.15					
6.00	Horner Plenary - Public Lecture				
7.00	STANLEY FIELD HALL		COCKTAIL RECEPTION & DINNER		STANLEY FIELD HALL
10.00					

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Program - Wednesday July 1st, 1992

- names indicated are those of the presenter -

	James Simpson Theater	Montgomery Ward Lecture Hall	Founders' Room	Dining Room E	Lecture Hall II
8.15	16 Intro - Paleobio-geography	18 Intro - Tropical America	20 Intro - Paleozoic & Post-Paleozoic Benthos	22 Intro - Molecular Paleontology	24 Intro - Circum-Pacific Events
8.20	16 Hughes	18 Coates	20 Thayer	22 Marshall	24 Dickins
8.40	16 Jin	18 Dowsett	20 Baumiller	22 Polson	24 Renner
9.00	16 Crick	18 Cronin	20 Fordyce	22 Walton	24 Hanger
9.20	16 Crame	18 Geary	20 Rhodes	22 Clegg	24 McRoberts
9.40	16 Klapper	18 Collins	20 Alexander	22 Stathopolos	24 Campbell
10.00	16 Young	18 Johnson	20 Morris	22 Johnson	24 Kamada
10.20	16 House	18 Cheetham	20 Miller	22 Briggs	24 Stanley
10.40	16 Kelley	18 Jackson	20 McKinney	22 Yang	
11.00	16 Raymond	18 Allmon	20 Aronson	22 Logan	
11.20	16 Belasky	18 Collins	20 Vermeij	22 CoBabe	
11.40	16 Ziegler	18 Webb		22 Hemsley	
12.00	16 Rowley	18 Colinvaux		22 Wilby	
12.20	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
12.45	Gould Plenary Lecture				
1.15	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
1.55	Paleobiogeography - contd.	19 Originat.-Extinction contributed papers	21 Ev.-Funct. Morph. contributed papers	23 Taphonomy contributed papers	25 Intro - Lagerstätten
2.00	17 Maples	19 Guensberg	21 Cohen	23 Brandt	25 Feldman
2.15	17 Yao	19 Elias	21 Brower	23 Terry	25 Kluessendorf
2.30	17 Bhalla	19 Lenz	21 Donovan	23 Oji	25 Lo Duca
2.45	17 Russell	19 Hirsch	21 Zhang	23 Nebelsick	25 Schultze
3.00	17 Johnson	19 Hunt	21 Titus	23 Mapes	
3.15	17 Young	19 Schubert	21 Goldman	23 Davies	
3.30	17 Markwick	19 Roy	21 Johnston	23 Miller	
3.45	17 Keller	19 Norris	21 Young	23 Parsons	
4.00	17 Fredericksen	19 Harries	21 Purnell	23 Powell	
4.15	17 Flessa	19 Clemens	21 Kenawy	23 Walker	
4.30		19 Aubry	21 Mapes	23 Shroba	
4.45		19 Alroy	21 Abler	23 Martin	
5.00		19 Moss	21 Nicholls	23 Davis	
5.15		19 Lieberman	21 Whittle	23 Rogers	
5.30					

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** PROGRAM **

SUNDAY JUNE 28

12:00p REGISTRATION BEGINS
West Lobby

12:00p PALEONTOLOGY EXHIBIT
-5:00p *Courtesy of the Mid-America Paleontological Society*
North Lounge

5:30p OPENING RECEPTION and
-8:00p REGISTRATION
Stanley Field Hall

MONDAY JUNE 29

8:00a WELCOME
Willard L. Boyd
President, Field Museum
Simpson Theater

OPENING PLENARY LECTURES
Simpson Theater
S. Lidgard and P.R. Crane, Presiding

8:15a Raup, D.M., Large body impact: the least unlikely cause of pulsed extinction 240
8:45a Berggren, W.A., Time and time again: getting it right 27
9:15a Knoll, A.H., The advent of the Phanerozoic world: Vendian stratigraphy, environmental change, and evolution 169
9:45a Patterson, C., The meaning of fossils, 1992 231

1. THE MEANING OF HIGHER TAXA IN MACROEVOLUTIONARY STUDIES
Simpson Theater
D.E. Fastovsky and J.M. Clark, Presiding

10:30a Introduction
10:35a Rieppel, O., What is the significance of the supraspecific taxa in macroevolutionary studies? 246
10:55a Damuth, J., The uses and irrelevance of higher taxa 80
11:15a Stein, W.E., Evolution and development in the origin of major groups of vascular plants 280
11:35a Fastovsky*, D.E. & Sheehan, P.M., Higher taxa in the fossil record and the recognition of evolutionary events: patterns vs. processes 94
11:55a Bambach*, R.K. & Sepkoski, J.J., Historical evolutionary information in the traditional Linnean hierarchy . 16
12:15p Janis, C., The importance of paraphyletic groups in mammalian paleobiology 148
12:35p D'Hondt, S., The definition and macroevolutionary study of planktic foraminiferal higher taxa 133
12:55p Carlson, S.J., Inarticulata, Brachiopoda, Lophophorata: what do they signify? 51

2. PHYLOGENETICS AND RATES OF EVOLUTION: MORPHOLOGIC, GENOMIC, AND TAXIC RATES
Simpson Theater
R. Cloutier and D.K. Elliott, Presiding

1:55p Introduction
2:00p Cracraft, J., Problems with measuring taxic, morphological, and molecular rates of evolution: a methodological overview 70
2:20p Cloutier*, R. & Rowe, T., Cladistics and rates of morphological evolution: computation and comparison 61
2:40p Smith*, A.B. & Christen, R., Morphological and molecular rates of evolution in post-Paleozoic echinoids 273
3:00p Huelsenbeck*, J.P., & Hillis, D.M., Rates of evolution and fossils in phylogenetic analysis: a computer simulation approach 140

3. PALEONTOLOGY APPLIED TO GEOLOGIC PROBLEM SOLVING
Montgomery Ward Lecture Hall
L.E. Edwards and S.R. Jacobson, Presiding

4. ENVIRONMENTAL PATTERNS IN THE ORIGINS AND FATES OF MAJOR GROUPS
Founders' Room
D.J. Bottjer and D. Jablonski, Presiding

5. ADVANCES IN DEEP SEA PALEOECOLOGY
Dining Room E
W.C. Miller, Presiding

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4:00p POSTER SESSION
-6:00p Hall 38

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5:00p ROUND TABLE DISCUSSION:
-7:00p PALEONTOLOGY ON PUBLIC LANDS
Montgomery Ward Lecture Hall
V.L. Santucci, Presiding

TUESDAY JUNE 30

6. EARLY METAZOAN EVOLUTION
Simpson Theater
S. Conway Morris, Presiding

7. EARLY METAZOAN EVOLUTION, continued with contributed papers
Simpson Theater
S.M. Rowland and P.W. Signor, Presiding

8. IMPLICATIONS OF SEQUENCE STRATIGRAPHY FOR EVOLUTIONARY AND BIOSTRATIGRAPHIC PATTERNS
Montgomery Ward Lecture Hall
R.W. Scott and A.R. Ormiston, Presiding

9. LONG RECORDS OF LAND BIOTAS: A COMPARISON OF WYOMING-MONTANA PALEOGENE AND SIWALIK MIOCENE SEQUENCES
Montgomery Ward Lecture Hall
A.K. Behrensmeyer and C.E. Badgley, Presiding

10. ORIGIN OF MODERN TERRESTRIAL ECOSYSTEMS: LATE MESOZOIC AND CENOZOIC

Founders' Room

G.R. Upchurch and R.K. Stucky, Presiding

11. ORIGINS OF MODERN TERRESTRIAL ECOSYSTEMS: LATE MESOZOIC AND CENOZOIC,
continued with contributed papers
Founders' Room
G.R. Upchurch and R.E. Taggart, Presiding

12. CONQUERING SHAPE AND FORM: QUANTITATIVE MORPHOMETRICS
Dining Room E
B.T. Huber and D. Erwin, Presiding

13. MORPHOLOGICAL EVOLUTION
Dining Room E
G.E. Boyajian and R.D.K. Thomas, Presiding

14. BIOMOLECULAR AND ISOTOPIC PALEONTOLOGY: AN INTEGRATED APPROACH
Lecture Hall II
J.D. Hudson and J.M. Hayes, Presiding

15. PALEOECOLOGY

Lecture Hall 2

L.C. Anderson and P.W. Skelton, Presiding

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UNIVERSITY OF CHICAGO CENTENARY PLENARY-PUBLIC LECTURE
Simpson Theater

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COCKTAILS and CONVENTION DINNER
Stanley Field Hall
7:00p
-10:00p

WEDNESDAY JULY 1

16. PALEOBIOGEOGRAPHY: GLOBAL CHANGE AND EVOLUTION
Simpson Theater
R.E. Crick and A. Raymond, Presiding

****

PLENARY LECTURE
Simpson Theater

12:45p Gould, S.J.
-1:15p

****

17. PALEOBIOGEOGRAPHY: GLOBAL CHANGE AND EVOLUTION, continued with contributed papers
Simpson Theater
K.W. Flessa and C.C. Johnson, Presiding

18. ENVIRONMENTAL AND BIOLOGICAL CHANGE IN NEOGENE AND QUATERNARY TROPICAL AMERICA
Montgomery Ward Lecture Hall
J.B.C. Jackson and A.G. Coates, Presiding

19. ORIGINATION AND EXTINCTION
Montgomery Ward Lecture Hall
W.A. Clemens and R.D. Norris, Presiding

20. PALEOZOIC AND POST-PALEOZOIC BENTHOS: COMPARATIVE ECOLOGY AND PHYSIOLOGY
Founders' Room
M.C. Rhodes and G.J. Vermeij, Presiding

21. EVOLUTION AND FUNCTIONAL MORPHOLOGY
Founders' Room
S.K. Donovan and G.A. Young, Presiding

22. MOLECULAR PALEONTOLOGY AND EXCEPTIONAL PRESERVATION

Dining Room E

D.E.G. Briggs, Presiding

23. TAPHONOMY
Dining Room E
E.N. Powell and S.E. Walker, Presiding

24. LATE PALEOZOIC AND EARLY MESOZOIC CIRCUM-PACIFIC EVENTS AND THEIR GLOBAL CORRELATION: A COMPARISON OF THE PERMIAN AND TRIASSIC OF THE NORTH AMERICAN AND EAST ASIAN PACIFIC REGIONS
Lecture Hall II
M. Dickins and G.D. Stanley, Presiding

25. LAGERSTÄTTEN
Lecture Hall II
H.R. Feldman, Presiding

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