

# Benchmark Papers in Karst Science

Edited by

**William B. White**

Materials Research Institute and Department of Geosciences  
The Pennsylvania State University  
University Park, PA 16802

and

**David C. Culver**

Department of Biology  
American University  
4400 Massachusetts Avenue  
Washington, DC

Published by the Karst Waters Institute

PO Box 4142, Leesburg, VA 20177

2007

## Table of Contents

Preface

Introduction

The Decade 1951 – 1960	<b>3</b>
1. Vertical Shafts in Limestone Caves, <b>E.R. Pohl</b> .....	5
2. The Effect of Solvent Motion on Limestone Solution, <b>C.A. Kaye</b> .....	29
3. Stream Tracing, <b>J.R. Dunn</b> .....	45
4. Origin of Caves in Folded Limestone, <b>W.E. Davies</b> .....	49
5. A Synopsis of Cave Beetles of the Genus <i>Pseudanophthalmus</i> of the Mitchell Plain in Southern Indiana (Coleoptera, Carabidae), <b>T.C. Barr</b> .....	65
The Decade 1961 – 1970	<b>81</b>
6. Convergence and Parallelism in Cave Entomobryinae, <b>K.A. Christiansen</b> .....	83
7. Observations on the Ecology of Caves, <b>T.C. Barr</b> .....	99
8. Calcium Carbonate Saturation in Ground Water, from Routine Analyses, <b>W. Back</b> .....	119
9. The Cave Environment, <b>T.L. Poulson and W.B. White</b> .....	137
10. Conceptual Models of Carbonate Aquifers, <b>W.B. White</b> .....	151
11. Analysis of Simple Cave Communities. I. Caves as Islands, <b>D.C. Culver</b> .....	161
12. Behavior of Annual Floods in Limestone Basins in Pennsylvania, <b>E.L. White and B.M. Reich</b> .....	175
The Decade 1971 – 1980	<b>183</b>
13. The Geochemistry of Some Carbonate Ground Waters in Central Pennsylvania, <b>D. Langmuir</b> .....	185
14. Genetic Interpretation of Regressive Evolutionary Processes: Studies on Hybrid Eyes of Two <i>Astyanax</i> Cave Populations (Characidae, Pisces), <b>H. Wilkins</b> .....	211
15. Cavernicoles in Lava Tubes on the Island of Hawaii, <b>F.G. Howarth</b> .....	229
16. Evolutionary Genetics of Cave-Dwelling Fishes of the Genus <i>Astyanax</i> , <b>J.C. Avise and R.L. Selander</b> .....	233
17. Deducing Flow Velocity in Cave Conduits from Scallops, <b>R.L. Curl</b> .....	255
18. The Origin of Maze Caves, <b>A.N. Palmer</b> .....	263
19. Foraging by Cave Beetles: Spatial and Temporal Heterogeneity of Prey, <b>T.C. Kane and T.L. Poulson</b> .....	285
20. Considerations of the Karst Ecosystem, <b>R. Rouch</b> .....	295
21. Diffuse Flow and Conduit Flow in Limestone Terrain in the Mendip Hills, Somerset (Great Britain), <b>T.C. Atkinson</b> .....	301
22. The Development of Limestone Cave Systems in Dimensions of Length and Depth, <b>D.C. Ford and R.O. Ewers</b> .....	321

The Decade 1981 – 1990	<b>339</b>
23. Magnetostratigraphy of Sediments in Mammoth Cave, Kentucky, <b>V.A. Schmidt</b> .....	341
24. Uranium-Series Ages of Speleothem from Northwest England: Correlations with Quaternary Climate, <b>M. Gascoyne, D.C. Ford and H.P. Schwarcz</b> .....	347
25. Analysis and Interpretation of Data from Tracer Tests in Karst Areas, <b>W.K. Jones</b> .....	373
26. Evolution of Adult Morphology and Life-History Characters in Cavernicolous Ptomaphagus Beetles, <b>S.B. Peck</b> .....	383
27. Ecology of the Mixohaline Hypogean Fauna along the Yugoslav Coasts, <b>B. Sket</b> .....	395
28. Fractal Dimensions and Geometries of Caves, <b>R.L. Curl</b> .....	419
29. Regional Scale Transport in a Karst Aquifer. 1. Component Separation of Spring Flow Hydrographs, <b>S.J. Dreiss</b> .....	441
30. Morphological Evolution of the Amphipod <i>Gammarus minus</i> in Caves: ..... Quantitative Genetic Analysis, <b>D.W. Fong</b> .....	453
31. The Flank Margin Model for Dissolution Cave Development in Carbonate Platforms, <b>J.E. Mylroie and J.L. Carew</b> .....	473
32. Sulfuric Acid Speleogenesis of Carlsbad Cavern and Its Relationship to Hydrocarbons, Delaware Basin, New Mexico and Texas, <b>C.A. Hill</b> .....	487
 The Decade 1991 – 2000	 <b>499</b>
33. Origin and Morphology of Limestone Caves, <b>A.N. Palmer</b> .....	501
34. How Many Species of Troglobites Are There? <b>D.C. Culver and</b> <b>J.R. Holsinger</b> .....	525
35. Annual Growth Banding in a Cave Stalagmite, <b>A. Baker, P.L. Smart,</b> <b>R.L. Edwards and D.A. Richards</b> .....	529
36. Natural Environment Change in Karst: The Quaternary Record, <b>S.-E. Lauritzen</b> .....	535
37. Pattern and Process in the Biogeography of Subterranean Amphipods, <b>J.R. Holsinger</b> .....	557
38. A Chemoautotrophically Based Cave Ecosystem, <b>S.M. Sarbu, T.C. Kane</b> <b>and B.K. Kinkle</b> .....	575
39. Rhodopsin Evolution in the Dark, <b>K.A. Crandall and D.M. Hillis</b> .....	581
40. Climate and Vegetation History of the Midcontinent from 75 to 25 ka: A Speleothem Record from Crevice Cave, Missouri, USA, <b>J.A. Dorale,</b> <b>R.L. Edwards, E. Ito and L.A. González</b> .....	585