

Contents

Dedication	vii
BRASIER, A. T., McILROY, D. & McLoughlin, N. Contributions of Professor Martin Brasier to the study of early life, stratigraphy and biogeochemistry	1
Deciphering the earliest evidence for life	
ANTCLIFFE, J. B., LIU, A. G., MENON, L. R., McILROY, D., McLoughlin, N. & WACEY, D. Understanding ancient life: how Martin Brasier changed the way we think about the fossil record	19
HICKMAN-LEWIS, K., GARWOOD, R. J., WITHERS, P. J. & WACEY, D. X-ray microtomography as a tool for investigating the petrological context of Precambrian cellular remains	33
GROSCHE, E. G., MUÑOZ, M., MATHON, O. & McLoughlin, N. Earliest microbial trace fossils in Archaean pillow lavas under scrutiny: new micro-X-ray absorption near-edge spectroscopy, metamorphic and morphological constraints	57
The preservation, origins and interactions of early multicellular organisms – the Torridonian Supergroup, NW Scotland	
MUIRHEAD, D. K., PARNELL, J., SPINKS, S. & BOWDEN, S. A. Characterization of organic matter in the Torridonian using Raman spectroscopy	71
WACEY, D., BATTISON, L., GARWOOD, R. J., HICKMAN-LEWIS, K. & BRASIER, M. D. Advanced analytical techniques for studying the morphology and chemistry of Proterozoic microfossils	81
WACEY, D., BRASIER, M., PARNELL, J., CULWICK, T., BOWDEN, S., SPINKS, S., BOYCE, A. J., DAVIDHEISER-KROLL, B., JEON, H., SAUNDERS, M. & KILBURN, M. R. Contrasting microfossil preservation and lake chemistries within the 1200–1000 Ma Torridonian Supergroup of NW Scotland	105
BRASIER, A. T., CULWICK, T., BATTISON, L., CALLOW, R. H. T. & BRASIER, M. D. Evaluating evidence from the Torridonian Supergroup (Scotland, UK) for eukaryotic life on land in the Proterozoic	121
Progress on understanding the evolution of animal life and the biosphere during the Precambrian–Cambrian transition	
HE, T., ZHOU, Y., VERMEESCH, P., RITTNER, M., MIAO, L., ZHU, M., CARTER, A., POGGE VON STRANDMANN, P. A. E. & SHIELDS, G. A. Measuring the ‘Great Unconformity’ on the North China Craton using new detrital zircon age data	145
SHIELDS, G. A. Earth system transition during the Tonian–Cambrian interval of biological innovation: nutrients, climate, oxygen and the marine organic carbon capacitor	161
LIU, A. G., MENON, L. R., SHIELDS, G. A., CALLOW, R. H. T. & McILROY, D. Martin Brasier’s contribution to the palaeobiology of the Ediacaran–Cambrian transition	179
WOOD, R. Palaeoecology of Ediacaran metazoan reefs	195

DUFOUR, S. C. & McILROY, D. Ediacaran pre-placozoa diploblasts in the Avalonian biota: the role of chemosynthesis in the evolution of early animal life	211
KENCHINGTON, C. G. & WILBY, P. R. Rangeomorph classification schemes and intra-specific variation: are all characters created equal?	221
MATTHEWS, J. J., LIU, A. G. & McILROY, D. Post-fossilization processes and their implications for understanding Ediacaran macrofossil assemblages	251
MENON, L. R., McILROY, D. & BRASIER, M. D. ‘ <i>Intrites</i> ’ from the Ediacaran Longmyndian Supergroup, UK: a new form of microbially-induced sedimentary structure (MISS)	271
McMAHON, S., VAN SMEERDIJK HOOD, A. & McILROY, D. The origin and occurrence of subaqueous sedimentary cracks	285
GEYER, G. & LANDING, E. The Precambrian–Phanerozoic and Ediacaran–Cambrian boundaries: a historical approach to a dilemma	311
McILROY, D. & BRASIER, M. D. Ichnological evidence for the Cambrian explosion in the Ediacaran to Cambrian succession of Tanafjord, Finnmark, northern Norway	351
HERRINGSHAW, L. G., CALLOW, R. H. T. & McILROY, D. Engineering the Cambrian explosion: the earliest bioturbators as ecosystem engineers	369
Studies of exceptional preservation	
BRASIER, M. D., NORMAN, D. B., LIU, A. G., COTTON, L. J., HISCOCKS, J. E. H., GARWOOD, R. J., ANTCLIFFE, J. B. & WACEY, D. Remarkable preservation of brain tissues in an Early Cretaceous iguanodontian dinosaur	383
BRASIER, A. T., COTTON, L. J., GARWOOD, R. J., BAKER-BRIAN, J., HOWLETT, E. & BRASIER, M. D. Earliest Cretaceous cocoons or plant seed structures from the Wealden Group, Hastings, UK	399
COTTON, L. J., VOLLRATH, F., BRASIER, M. D. & DICKO, C. Chemical relationships of ambers using attenuated total reflectance Fourier transform infrared spectroscopy	413
Index	425