

## DEDICATION TO WILLIAM BUCKLAND

“The author concludes that he has established generally the curious fact that, in formations of all ages, from the carboniferous limestone to the diluvium, the faeces of terrestrial and aquatic carnivorous animals have been preserved; and proposes to include them all under the generic name of Coprolite.” (Buckland 1829b, p. 143)

It seems entirely fitting that the first ever volume devoted entirely to coprolite research should be dedicated to the memory of William Buckland (1784-1856). It was he, after all, who coined the name “coprolite” (Greek, copros = dung, lithos = stone) for fossilized feces in 1829 (Buckland 1829b, p. 143). What began in 1829 as a short note regarding rounded black phosphatic structures found in the Late Triassic Rhaetic Bone Bed exposed in the banks of the River Severn in the West of England, fairly blossomed into a research area that took on something of a life of its’ own. In a sense, the work completed by Buckland on coprolites typified the intellectual acumen of the man, and embodied many of his personal characteristics.

Buckland came to coprolites by way of Pleistocene cave deposits discovered in rural Yorkshire in the autumn of 1821. By that time, Buckland had enjoyed 8 years of academic life at the University of Oxford, first as Reader in Mineralogy (1813) and then as Reader in Geology (1818). He had already published on the regional metamorphic and sedimentary geology of Britain, Madagascar and the Alps, and introduced the world to the infamous Paramoudras (potstones of nodular flint after large Chalk trace fossils).

During December 1821, Buckland visited the Kirkdale cavern deposits in Yorkshire at the request of Georges Cuvier (1769-1832), some 6 months after the site had been discovered. Buckland approached the investigation of the Pleistocene fauna preserved in the cave floor holistically, and in so doing was the first to consider in any detail many research themes which are now established as paleontological disciplines in their own right – paleoecology, taphonomy and ichnology, for example. Anxious to bring the story of the Kirkdale cave deposits to life, he envisaged that they represented the accumulated debris of an ancient hyena den. One of the crucial elements in this reconstruction was the balls of whitish material scattered amongst the bones and teeth of a wide range of Pleistocene mammals. Typically multidisciplinary in his approach, he considered their morphology, distribution and chemistry in an attempt to elucidate their origins, concluding that they were the fossilised feces of hyenas. Not content to leave it there, he tested his hypothesis by observing the feeding and scatological behaviour of extant hyenas, in so far as he was able (he was limited to travelling menageries), collecting their feces and making careful comparisons with the supposed fossil specimens (Buckland 1822, 1824).

From this base, he was able to use his conclusions to interpret problematic structures with varying morphologies from the Lower Jurassic of Lyme Regis and the Late Triassic of the Severn Estuary. He built up a representative sample through personal collection, and purchases from Mary Anning (1799-1847) and fossil dealers (see Duffin, this volume). Again, by examining the morphology, chemistry and contents of these structures (using polished sections), he was able to broaden the application of his concept of fossil feces, coin an appropriate and enduring name for them, and extend their record to the larger vertebrates of the early Mesozoic (Buckland 1829a, 1829b, 1835). Spiral forms represented a particular challenge of interpretation which he approached in typically innovative fashion by filling the intestines of extant chondrichthyans with Roman cement in order to replicate the spiral structure (see Duffin, this volume). From this point, having captured the imagination of the geological fraternity, he extended his study using loaned and donated specimens from a wide network of colleagues, establishing a geological range for coprolites from the Lower Carboniferous onwards, and popularized his conclusions (Buckland 1835, 1836).

It is obvious from the discussion above that William Buckland brought a range of novel approaches to the fledgling science of Geology at a crucial time in its early development. Amongst his accomplishments was the vivid bringing to life of past communities of organisms in such a way as to challenge the orthodox prevailing framework of diluvial geology. He was a true scientist in the sense that he utilized the evidence which he had gathered to construct, test, modify and restate hypotheses. He used these to reach and embrace logical conclusions which flew in the face of his intrinsic belief system. His thinking was versatile, his approach honest and his opinions adaptable. His methodology



FIGURE 1. Portrait of William Buckland in 1833, at the point in his career when he was actively studying and publishing on coprolites. Mezzotint by S. Cousins. Image courtesy of the Wellcome Trust.

was typically meticulous, innovative and comprehensive. For those who have read his original work, his descriptions are lucid and his logic compelling. Buckland brought the widest possible range of intellectual talents to his research in general and his study of coprolites in particular. He was able to draw upon the good will of friends and colleagues in a well established network of correspondents dispersed through Britain, Europe and even the USA, for the provision of specimens, observations and expertise.

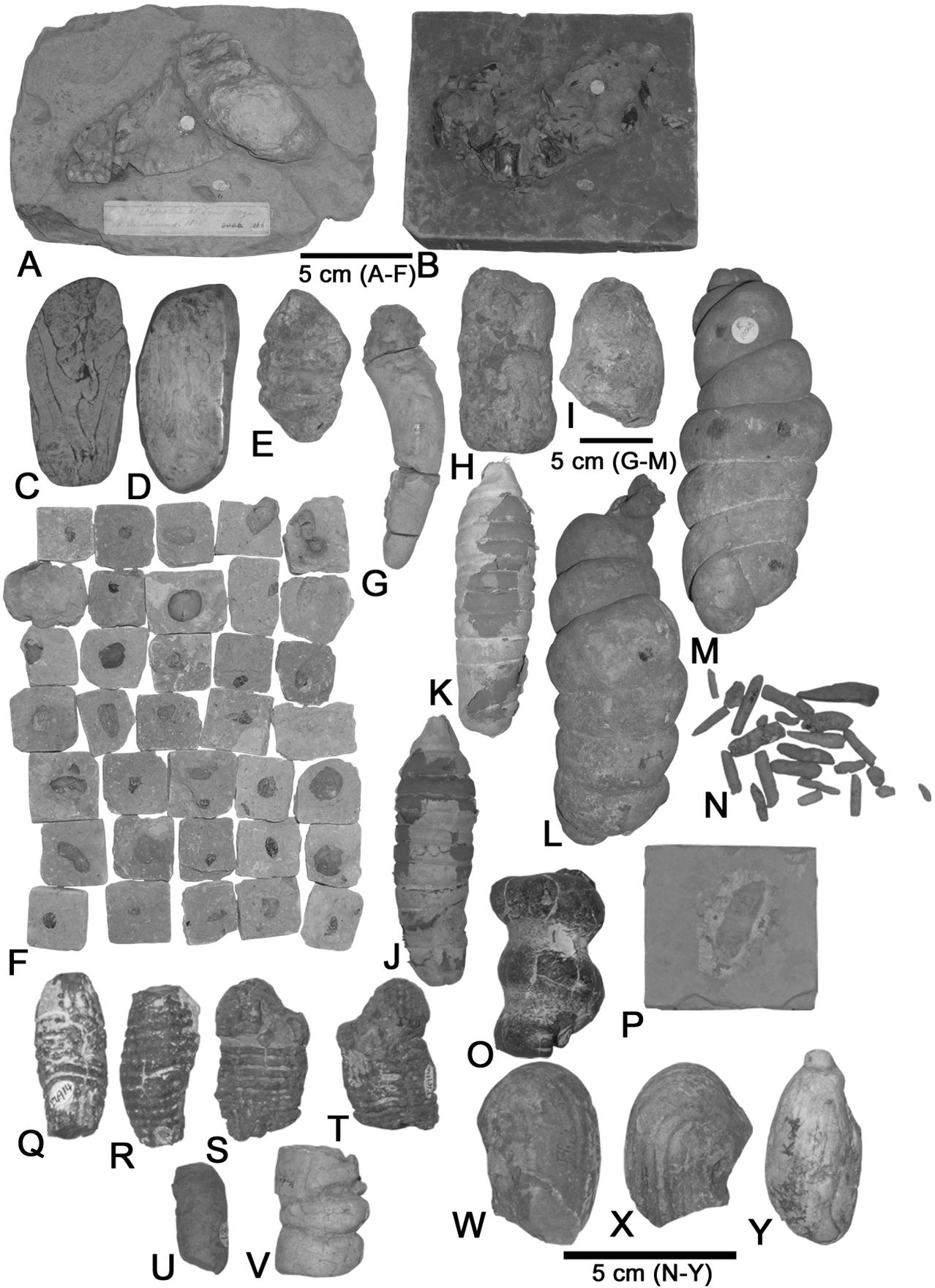
I think that William Buckland would approve of the current volume. He would welcome the spirit of co-operation that exists between colleagues forming a scattered community. He would appreciate the range of coverage and the breadth of description. He would laud the attempt to bring the study of coprolites up to date, especially after an intervening period of over 180 years, and praise the utilization of new techniques in the description and interpretation of these “records of warfare . . . embalmed in the everlasting hills” (Buckland 1835, p. 235). He would commiserate with scientists who admit in public to cultivating and sustaining an abiding interest in such lowly fossils, and thereby attracting all sorts of ribald comments from less enlightened souls. Perhaps he would share a wry smile with this peculiar band of researchers, united as we are by a singular and uncommon interest, and for whom Philip Bury Duncan’s doggerel approaches the status of a declaration of faith :

Approach, approach ingenuous Youth  
And learn this fundamental truth.  
The noble science of Geology  
Is bottomed firmly on Coprology.

— CHRISTOPHER J. DUFFIN

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Selected coprolites from the collection of the Natural History Museum, London.