

## P R E F A C E

# New perspectives on ancient marine reptiles

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Amniotes first invaded saline lagoons and coastal seaways towards the end of the Palaeozoic (Early Permian, ~280 Ma: Piñeiro *et al.* 2012), but by the dawn of the Mesozoic (Early–Middle Triassic, ~250–235 Ma: Rieppel, 2002; McGowan & Motani, 2003) they had achieved a diversity of specialized body-forms requisite for an obligate oceanic lifestyle. Such an explosive ecomorphological radiation paved the way for amniote dominance of large-bodied aquatic carnivore/omnivore niches over the next 185 Ma, with some lineages (e.g. dyrosaurid crocodylomorphs and bothremydid turtles: Gaffney, Tong & Meylan, 2006; Barbosa, Kellner & Sales Viana, 2008) even persisting on into the Palaeogene (until ~50 Ma), and diversifying (i.e. chelonioid sea turtles: Hirayama, 1997) alongside emergent marine mammals through the Neogene (from ~23 Ma) and up until today.

The scientific concept of ancient marine amniotes, or ‘marine reptiles’ as the iconic Mesozoic clades are often popularly known, began with the birth of vertebrate palaeontology in the early nineteenth century. The famous British fossil collector Mary Anning (1799–1847) is widely credited with the first documented find in 1811: the articulated skull and skeleton of the gigantic ichthyosaurian *Temnodontosaurus platyodon* (Torrens, 1995; McGowan, 2001). These remains were eventually described by the eminent surgeon Sir Everard Home (1756–1832) in 1814 (Home, 1814), and contributed to the sensational debates on extinction and the geological age of the Earth, which were amongst the most controversial academic topics of the day.

With the nomenclatural establishment of Dinosauria by Sir Richard Owen (1804–1892) in 1842, and the subsequent capture of public imagination by this quintessential group of ‘prehistoric animals’, studies on many of the fossil marine reptile clades became less fashionable. Indeed, it was not until the 1990s and the publication of dedicated compendia such as the landmark book *Ancient Marine Reptiles* (Callaway & Nicholls, 1997), which appeared on the back of newly proliferating research, that marine reptile palaeontology once again experienced a resurgence. Since that time, a wealth of new material, innovative technologies

and fresh perspectives have continued to dynamically advance the field. In an effort to capture part of this developing knowledge, a special issue of *Geological Magazine* was commissioned in 2011 to commemorate Mary Anning’s first fossil marine reptile discovery and, through its scheduled release in 2014, 200 years of continuing work following Sir Everard Home’s seminal publication. Fourteen papers by 33 international contributing authors have been included in this synopsis, and cover a broad range of topics from Mary Anning’s historical specimens (Vincent *et al.* 2014; Massare & Lomax, 2013) to ichthyosaurian anatomy, phylogeny and ontogeny (Druckenmiller & Maxwell, 2013; Fernández & Talevi, 2013; Fischer *et al.* 2013; Kear & Zammit, 2013; Maxwell, Scheyer & Fowler, 2013; Zammit, Kear & Norris, 2014), early sauropterygian interrelationships (Li *et al.* 2013; Sato *et al.* 2013), dyrosaurid palaeobiology (Schwartz-Wings, 2013), dental histology in crocodylians and mosasaurs (Gren & Lindgren, 2013) and Jurassic–Cretaceous marine amniote palaeobiogeography and palaeoecology (Kear *et al.* 2013; Massare *et al.* 2013). These collective articles aim to carry on the spirit of Mary Anning’s legacy, and reflect rapidly evolving research foci that can only gain in profile over the years to come.

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