SUPPLEMENTARY INFORMATION APPENDIX S1

Characters modified from, or added to the matrix of Benson *et al.* (2011*b*; modified from Ketchum and Benson [2010]) to determine the phylogenetic position of *Marmornectes candrewi*.

Institutional abbreviations. BRSMG, Bristol City Museum and Art Gallery, Bristol, UK; KUVP, University of Kansas Natural History Museum, Lawrence, Kansas, USA; LEICT, New Walk Museum and Art Gallery, Leicester, UK; MCZ, Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA; NHMUK, Natural History Museum, London, UK; OXFUM, Oxford University Museum of Natural History, Oxford, UK; QM, Queensland Museum, Brisbane, Australia; USNM, National Museum of Natural History, Washington D. C., USA; YPM, Peabody Museum of Natural History, New Haven, Connecticut, USA.

Modified characters. Citation lists for previous uses of modified characters are given by Ketchum and Benson (2010, appendix S3).

14. Premaxilla, posterior termination: tapering (0); deeply interdigitating suture with the frontal or parietal (1); shallowly interdigitating suture with the frontal or parietal (2) (modified following Benson *et al.* 2011*a*, character 1).

This character is modified from that used by Druckenmiller and Russell (2008 *a*, character 5) and Ketchum and Benson (2010, character 14) to distinguish the broad, interdigitating premaxilla-parietal contact of pliosaurids from the paired, tapering, prong-like posterior processes of the premaxillae of polycotylids. However, although it does not contact the parietal, the posterior termination of the premaxilla in cryptoclidids (Andrews 1910; Brown and Cruickshank 1994), *Hauffiosaurus* (Benson *et al.* 2011*b*) and *Thalassiodracon* (Benson *et al.* 2011*a*) is broad and interdigitating, similar to that in pliosaurids. In contrast, most other plesiosaurians have paired, prong-like posterior processes similar to those of polycotylids. Thus, unlike in previous characterisations, the morphology of the posterior termination of the premaxilla is regarded as independent of the presence or absence of a premaxilla-parietal contact. In elasmosaurids the posterior termination of the premaxilla is shallowly interdigiating (e.g. Welles and Bump 1949).

68. Parasphenoid, ventral surface within posterior interpterygoid vacuity: transversely narrow longitudinal keel (0); convex, lacking keel (1: new state); flat (2); weakly concave (3: new state); inapplicable (?: taxa with a short parasphenoid that does not extend far posteriorly within the posterior interpterygoid vacuity, see character 69, below).

Ketchum and Benson (2010, character 68) noted difficulty in scoring the parasphenoid morphology as high levels of variation are present in plesiosaurians. Here, we attempt to summarise the most common morphologies among taxa that have a parasphenoid that extends to the posterior end of the posterior interpterygoid vacuity. This differs from the previous conceptions of this character as it includes a transversely convex morphology that is present in *Brachauchenius* (Williston 1903) and *Pliosaurus brachyspondylus* (Taylor and Cruickshank 1993), and a weakly concave morphology seen in some Jurassic pliosauromorph taxa such as *Macroplata* (Ketchum and Smith 2010), '*Rhomaleosaurus*' *megacephalus* (LEICT G221.1851) and a braincase referred to *Archaeonectrus* by Owen (1865–1881; as '*Plesiosaurus*' *rostratus*).

69. Parasphenoid, posterior extent: extends close to basioccipital contact or more posteriorly (0); terminates in anterior half of anterior interpterygoid vacuity (1) (modified from Druckenmiller and Russell 2008*a*, character 54; Benson *et al.* 2011*a*, character 4).

In OXFUM J.28585, *Hauffiosaurus* and *Thalassiodracon*, the parasphenoid is very short, and does not even extend posteriorly to midlength of the posterior interpterygoid vacuity (Cruickshank 1994*a*; Benson *et al*. 2011*a*, *b*). In other plesiosaurians it extends more posteriorly (e.g. Andrews 1910; Carpenter 1997; O'Keefe 2004*a*; Ketchum and Benson 2011).

134. Anterior process of cervical ribs: present forming a prominent elongate projection (0); present but dorsoventrally thick, anteroposteriorly low, and rounded (1: new state); absent in most cervical ribs, small processes may be present in anterior cervical ribs (2).

A new character state (state 1) describes the condition in *Marmornectes* (Text-fig. 10) and some other pliosaurids such as NHMUK R2439, *Brachauchenius* (Williston 1907), *Liopleurodon* (NHMUK R3536) and *Simolestes* (NHMUK R3319), which is intermediate between the prominent anterior process of many plesiosaurians and the absent or very reduced anterior process of some cryptoclidians (e.g. Williston 1903; Andrews 1910; Wegner 1914; Brown 1981). Note that a new character (191, see below) describes the morphology of the posterior process. These characters are independent of each other. For instance, the cervical ribs of *Marmornectes* have a long, tapering posterior process but a short, rounded anterior process (Text-fig. 10).

136. Dorsal transverse processes, distal articular facet: dorsoventrally tall oval, composed of two weakly divided rib facets (0); composed of only a single facet identified as the diapophysis (1).

Previous authors have described state 0 as 'oblong' (Druckenmiller and Russell 2008*a*, character 116; Smith and Dyke 2008, character 73). We clarify here that non-pistosaurian sauropterygians have a dorsoventrally tall dorsal rib articulations that appear to be weakly divided into two facets as is primitive for amniotes (e.g. Rieppel 2000). A new character (192, see below) describes variation in the morphology of the single dorsal rib facet among pistosaurians.

150. Coracoid, shape of anterior process: anteroposteriorly long and transversely broad, approximately rectangular (0); anteroposteriorly long and transversely narrow (1); anteroposteriorly short and subtriangular (2: new state).

A new state (2) is added here, describing the anteroposteriorly short, subtriangular anterior process of the coracoid in *Attenborosaurus* (Sollas 1881), most pliosaurids (Andrews 1913; Tarlo 1957; Albright *et al.* 2007*a*), and elasmosaurids (Welles 1943; Welles and Bump 1949). Very immature individuals of *Cryptoclidus* have state 2, which develops into state 1 during ontogeny (Andrews 1910, text-figs 88–89), and Brown (1981) suggested that the presence of state 2 in elasmosaurids might result study from immature specimens. However, all elasmosaurids and derived pliosaurids, even those based on adult specimens, have a short, triangular process, suggesting that its presence is genuine. Furthermore, even ontogenetically intermediate individuals of *Cryptoclidus* have clearly developed state 1 (Andrews 1910, text-fig. 89). Thus, ontogeny is not expected to confuse recognition of character states, except in very young, poorly ossified individuals. Note that a new character (197, see below) describes the dorsoventral height of the anterior process.

151. Coracoid, posterolateral cornu: does not extend as far laterally as glenoid (0); extends lateral to glenoid (1); extends to level of glenoid (2: new state).

A new state (2) describes the morphology in pliosaurids more derived than *Marmornectes* (Text-fig. 15I–J; state 0), *Brancasaurus* (Wegner 1914) and elasmosaurids (Welles 1943), in which the posterolateral cornu of the coracoid extends to approximately the level of the glenoid. The posterolateral cornu becomes increasingly prominent through the ontogeny of *Cryptoclidus* (Andrews 1910, text-figs 88–89; Brown 1981). However, even the youngest juveniles have state 1 of this character, so ontogeny is not expected to confuse recognition of character states.

Added characters.

181. Parietal, anterior extension: short or absent, parietal extends to the level of the temporal bar (0); long, parietal extends to orbital midlength or more anteriorly (1) (Benson *et al.* 2011*a*, character 2).

Previous authors have assumed that the anterior extent of the parietal is correlated with the presence or absence of a premaxilla-parietal contact. However, the parietal extends far anteriorly but does not contact the premaxilla in *Hauffiosaurus* and *Thalassiodracon* (Benson *et al.* 2011*a*, *b*). In *Edgarosaurus* (Druckenmiller 2002), *Plesiopleurodon* (Carpenter 1996) and *Thililua* (Bardet *et al.* 2003) the parietal contacts the premaxilla, but does not extend far anteriorly. Thus, the anterior extent of the parietal is independent of the presence of a parietal-premaxilla contact (character 10 herein) and is coded as a separate character here.

182. Parietal, sagittal crest height: low, transversely convex (0); high, transversely compressed sheet (1: new state); very high, forming convex dome in lateral view rising above the skull table (2) (O'Keefe 2008, character 32).

O'Keefe (2008, character 32) characterised the high, arched parietal crests of *Dolichorhynchops osborni* and *D. bonneri*. This is also present in derived pliosaurids (e.g. Gasparini 2009; Ketchum and Benson 2011), *Muraenosaurus* (NHMUK R2422) and elasmosaurids (e.g. Welles 1943; Carpenter 1999; Sato *et al.* 2003), including *Kaiwhekia* (Cruickshank and Fordyce 2002). Pistosauroids (von Meyer 1847–1855; Rieppel *et al.* 2002) and some leptoclidians (e.g. QM F18041; Wegner 1914; Druckenmiller and Russell 2008*b*) have a transversely compressed, sheet-like sagittal crest that does not rise above the level of the skull table (state 1).

183. Exoccipital, foramina in lateral surface: one (0); two or more (1) (Benson *et al.* 2011*a*, character 5).

In basal sauropterygians (Rieppel 1994) and pliosauroids (Andrews 1913; White 1935; Cruickshank 1994*b*; Ketchum and Benson 2011) all cranial nerve canals exit laterally through the jugal foramen. This is also present in *Aristonectes* (Chatterjee and Small 1989) and *Leptocleidus* (NHMUK R4828). In contrast, most plesiosauroids, including polycotylids and the possible leptoclidid *Brancasaurus*, have an additional foramen (e.g. Andrews 1910; Wegner 1914; Carpenter 1997), and *Kimmerosaurus* has three (Brown 1981).

184. Palate, foramina between maxilla and vomer anterior to internal naris: absent (0); present (1) (new character).

In the pliosaurids *Pliosaurus* (Taylor and Cruickshank 1993) and *Peloneustes* (Ketchum and Benson 2011) two or three foramina penetrate the maxilla-vomer contact anterior to the internal naris. These foramina are absent in other plesiosaurians including *Hauffiosaurus* (Benson *et al.* 2011*b*), and the condition in other pliosaurids cannot be determined.

185. Pterygoid, anterior termination: tapering (0); transversely broad (1); indeterminate (?; scored where a large anterior interpterygoid vacuity is present) (Benson *et al.* 2011*a*, character 3).

In basal sauropterygians (e.g. Rieppel 2000; Rieppel *et al.* 2002) and most plesiosaurians the pterygoids taper anteriorly to a point. In contrast, the pterygoids of Jurassic pliosauromorph taxa are broad anteriorly and form an interdigitating contact with the vomer (e.g. Williston 1903; Taylor 1992; O'Keefe 2001).

186. Dentary, posteromedially oriented grooves on dorsal surface: at same level (symmetrical) (0); offset (asymmetrical) (1) (new character).

Some longirostrine plesiosaurians have posteromedially oriented grooves on the dorsal surface of the dentary symphysis. This includes pliosaurids (Noè *et al.* 2004; Albright *et al.* 2007*a*; Ketchum and Benson 2011) and polycotylids (O'Keefe 2008). In most, the grooves are located at the same level on each side, but in *Peloneustes* (Ketchum and Benson 2011) and *Marmornectes* (Text-fig. 3) they are offset relative to each other, and thus asymmetrically positioned.

187. Axial intercentrum, size: small, restricted to ventral surface of atlas-axis complex (0); large, wedge-shaped element that extends dorsally (1); absent (2) (new character).

In many plesiosaurians, including *Thalassiodracon* (Barrett 1859), the unnamed pliosaurid NHMUK R2439 (Andrews 1913, text-fig. 16) and

Brancasaurus (Wegner 1914), the axial intercentrum is a small, ventrally convex disc of bone on the ventral surface of the atlas-axis complex. In contrast, *Macroplata* (Ketchum and Smith 2010), some pliosaurids (text-fig 6B–C; Andrews 1913) and some polycotylids (Williston 1903, pl. 22, fig. 5) have a dorsoventrally tall axial intercentrum that restricts the atlantal centrum (odontoid) to the dorsal part of the atlas-axis complex. This may be equivalent to the polycotylid morphology coded by O'Keefe (2001, character 110, state 2) as 'atlas and axis intercentra exclude atlas centrum ventrally'. In *Brachauchenius* (USNM 4989) and *Kronosaurus* (MCZ 1284) the ventral surface of the atlas-axis complex is evenly rounded and seems to comprise only an axial centrum and atlantal intercentrum. In taxa with a prominent hypophyseal ridge it is difficult to determine the morphology of the axial intercentrum. However, Andrews (1910, p. 168) described juvenile specimens with well-defined sutures that showed the absence of an axial intercentrum in *Cryptoclidus.*

188. Axial neural spine: transversely narrow (0); transversely broad and very low (1) (new character).

Benson *et al.* (2011*b*) described a low, transversely broad axial neural spine in *Hauffiosaurus*. This is also present in the *Liopleurodon* (NHMUK R3536), although the condition cannot be determined in most other pliosaurids. Other plesiosaurians have taller, transversely narrow axial neural spines (e.g. Barrett 1859; Wegner 1914).

189. Anterior cervical centra, anterior surface extends ventrally as a 'lip': no (0); yes (1) (Tarlo 1960; new character).

In many pliosaurids, including *Marmornectes* (Text-fig. 7A) a small, semioval 'lip' extends ventrally from the anterior articular surfaces of the anterior cervical centra (Tarlo 1960). This is independent of the presence of a ventral 'keel' or 'ridge' in *Peloneustes* and *Pliosaurus brachydeirus* (Tarlo 1960; Ketchum and Benson 2010, character 123.1).

190. Cervical ribs in taxa with two rib-heads: rib-heads close together (0); large foramen immediately lateral to rib-heads (1) (new character).

Benson *et al.* (2011*b*) described the presence of a large foramen between the cervical rib-heads as a synapomorphy of *Hauffiosaurus*. However, during this study this foramen was also noted in pliosaurids, including *Liopleurodon* (NHMUK R3536), '*Pliosaurus*' *andrewsi* (NHMUK R3891) and *Simolestes* (NHMUK R3319). Although there is a large space between the rib heads in basal sauropterygians (e.g. Sues 1987), this morphology is coded for herein in character 125, and the foramen between closely spaced rib heads as seen in pliosaurids is the only state coded as present in the current character.

191. Cervical ribs, distal end: prominent posterior process: present forming a prominent elongate projection (0); present but low and rounded (1); absent (2) (new character).

In most plesiosaurians, including *Marmornectes* (Text-fig. 10) the cervical ribs extend posteriorly as a long, tapering process. This posterior process is usually substantially longer than the anterior process. However, in *Kimmerosaurus* (NHMUK R10042), *Nichollsaura* (Druckenmiller and Russell 2008*b*), *Polycotylus* (YPM 1125) and many pliosaurids the posterior process is reduced so it is shorter or subequal to the anterior process. The posterior process is absent in *Pliosaurus brachyspondylus* (BRSMG Cc332).

192. Dorsal diapophysis, shape: approximately as tall and broad with a subcircular articular facet (0); dorsoventrally tall with an oval articular surface (1) (new character).

In many pistosaurians the dorsal transverse processes are subcylindrical, with subequal anteroposterior and dorsoventral diameters and subcircular rib facets (e.g. Andrews 1910; Welles 1943; Rieppel *et al.* 2002; Druckenmiller and Russell 2008*a*). This differs from the situation in more basal sauropterygians, in which the transverse process is dorsoventrally high, and comprises two rib facets, both of which are approximately as high as they are wide (see character 136, above). In pliosaurids, the dorsal transverse processes form a single rib facet, but it is dorsoventrally tall, and thus oval (e.g. *Peloneustes* Linder 1913; '*Pliosaurus*' *andrewsi* NHMUK R3891; *Pliosaurus brachyspondylus* BRSMG Cc332).

193. Caudal vertebrae, wedge-shaped vertebra in middle part of caudal series: absent (0); present (1) (Smith and Dyke 2008, character 74; Ketchum and Smith 2010).

Smith and Dyke (2008, character 74) described a 'conspicuous' vertebra in the caudal series of *Rhomaleosaurus megacephalus*, *R. zetlandicus* and *R. cramptoni*. This corresponds to the 'wedge'-shaped middle caudal vertebrae of *Macroplata* (Ketchum and Smith 2010) and is absent in other plesiosaurians.

194. Sacral ribs: tubular and slightly expanded towards distal end (0); transversely expanded, dorsoventrally thin and sheet-like (1) (new character).

The sacral ribs of most plesiosaurians are approximately as high dorsoventrally as they are wide anteroposteriorly (e.g. Williston 1903; Andrews 1910; Wegner 1914). In contrast, the sacral ribs of some pliosaurids are dorsoventrally low, anteroposteriorly broad, sheet-like structures (Text-fig. 11I; ‘*Pliosaurus*’ *andrewsi*, Andrews 1913, text-fig. 29; *Peloneustes*, Ketchum 2007, fig. 2.13).

195. Scapula blade, direction: posterodistally inflected (0); inflection weak or absent (1) (modified from O’Keefe 2008, character 37; Smith and Dyke 2008, character 81).

The scapular blade of *Pistosaurus* (Sues 1987), most pliosauroids, including *Marmornectes* (Text-fig. 12G), *Peloneustes* (Andrews 1913, text-fig. 21), and some polycotylids (Williston 1903; O’Keefe 2008) is inflected posterodorsally around midheight, forming a ‘kink’ in the anterior margin of the outline in lateral view. This inflection is absent or very weakly developed in most plesiosauroids (e.g. Andrews 1910, pl. 10, fig. 1b; Wegner 1914; Bardet *et al.* 1999; Kear and Barrett 2011) and some pliosaurids (‘*Liopleurodon*’ *rossicus*, Halstead 1971, text-fig. 4; *Pliosaurus*, BRSMG Cd6172: Tarlo 1960, pl. 21, fig. 5; *Simolestes*, NHMUK R3319, R3170: Tarlo 1960, pl. 27, fig. 5).

196. Scapular blade, anteroposterior width: broad, width at distal end subequal to or greater than that at midlength (0); narrow, tapering dorsally (1) (new character).

In most plesiosaurians the scapular blade is anteroposteriorly broad and does not taper dorsally. In contrast, cryptoclidids (*Cryptoclidus*, Andrews 1910, pl. 10, fig. 1b), leptoclidids (*Brancasaurus*, Wegner 1914; *Leptocleidus*, NHMUK R4828) and basal polycotylids (e.g. Albright *et al.* 2007*b*) have a scapular blade that tapers dorsally.

197. Coracoid, dorsoventral height of anterior process: dorsoventrally low and thus plate-like (0); taller dorsoventrally than mediolaterally (1) (new character).

The anterior process of the coracoid is dorsoventrally thin and plate-like in most plesiosaurians including polycotylids (KUVP 1300) and *Leptocleidus* (NHMUK R4828). In cryptoclidids (Andrews 1910, pl. 10, fig. 1c) this process is dorsoventrally thick.

198. Ilium, tubercle on posterior surface around midlength: absent (0); present (1) (new character).

In *Brancasaurus* (Wegner 1914), *Cryptoclidus* and *Muraenosaurus* (NHMUK R2422; Andrews 1910), and *Nichollsaura* (Druckenmiller and Russell 2008*b*) a prominent tubercle is present on the posterior surface of the ilium. This is absent in polycotylids (Albright *et al*. 2007*b*) and other plesiosaurians (Owen 1865–1881; Andrews 1913; Welles 1943; O'Keefe 2001).

199. Proportions of pubis: length equal to or shorter than width (0); length greater than width (1) (Smith and Dyke 2008, character 83).

Many basal plesiosaurians, cryptoclidids and leptoclidids have a short, broad pubis (e.g. Owen 1865–1881; Andrews 1910; Wegner 1914; Storrs 1997; O'Keefe 2001). In *Attenborosaurus* (Sollas 1881), *Macroplata* (Ketchum and Smith 2010), pliosaurids (Andrews 1913), elasmosaurids (Welles 1943) and polycotylids (Williston 1903; Albright *et al*. 2007*b*) the pubis is longer anteroposteriorly than it is broad transversely (the anterolateral cornu that is present in some plesiosauroids [character 172 herein] was excluded from measurements of transverse width).

200. Tibia, posterodistal facet for intermedium: absent (0); present (1) (new character: cf. Caldwell 1997).

In *Marmornectes* (Text-fig. 13Q, S), basal sauropterygians (Rieppel 2000; Rieppel *et al.* 2002; Cheng *et al.* 2006) and many Lower Jurassic plesiosaurians (e.g. Hawkins 1834; Owen 1865–1881; Caldwell 1997; Storrs 1997; Cheng *et al.* 2006), including *Hauffiosaurus* (O'Keefe 2001; Benson *et al.* 2011*b*), the tibia lacks a distinct posterodistal facet for the intermedium. However, in most other pliosaurids (Andrews 1913; Linder 1913; Tarlo 1960) and most plesiosauroids (Williston 1903; Andrews 1910; Welles 1943; Bardet *et al.* 1999) the posterodistal portion of the tibia is bevelled for articulation with the intermedium.

201. Ilium, distal expansion: less than twice the minimum anteroposterior width of shaft (0); approximately three times (1).

In *Marmornectes* (Text-fig. 15A–G) and many other plesiosaurians the distal end of the ilium is only slightly anteroposteriorly expanded relative to the minimum anteroposterior diameter of the shaft (e.g. Andrews 1910; Bardet *et al.* 1999; O'Keefe 2004*b*; Druckenmiller and Russell 2008*b*). In contrast, those of the pliosaurids *Peloneustes* (Andrews 1913, text-fig 25A), '*Pliosaurus*' *andrewsi* (NHMUK R3981) *Simolestes* (NHMUK R3319) and *Stretosaurus* (Tarlo 1957 and 1960, pl. 22, fig. 2) are expanded to approximately three times the shaft width. This character is independent from Ketchum and Benson's (2010, character 168, state 2) character that describes the distinctive shape of the distal ilium in pliosaurids, including *Marmornectes*.

REFERENCES

ALBRIGHT, L. B., GILLETTE, D. D. and TITUS, A. L. 2007*a*. Plesiosaurs from the Upper Cretaceous (Cenomanian-Turonian) Tropic Shale of southern Utah, Part 1: New records of the pliosaur *Brachauchenius lucasi*. *Journal of Vertebrate Paleontology*, **27**, 31–40.

—— —— —— 2007*b*. Plesiosaurs from the Upper Cretaceous (Cenomanian-Turonian) Tropic Shale of southern Utah, Part 2: Polycotylidae. *Journal of Vertebrate Paleontology*, **27**, 41–58.

ANDREWS, C. W. 1910. *A descriptive catalogue of the marine reptiles of the Oxford Clay, based on the Leeds Collection in the British Museum (Natural History), London, Part I*. British Museum (Natural History), London, xxiv + 205 pp., 10 pls.

—— 1913. *A descriptive catalogue of the marine reptiles of the Oxford Clay, based on the Leeds Collection in the British Museum (Natural History), London, Part II*. British Museum (Natural History), London, xxiv + 206 pp., 13 pls.

BARRETT, L. 1859. On the atlas and axis of the *Plesiosaurus*. *Annals and Magazine of Natural History*, **3**, 361–364.

BENSON, R. B. J., BATES, K. T., JOHNSON, M. R. and WITHERS, P. J. 2011*a*. Computed tomographic and other new data on the skull of *Thalassiodracon* (Reptilia, Plesiosauria) from the pre-*Planorbis* beds of the United Kingdom. *Journal of Vertebrate Paleontology*, **31**, 562–574.

—— KETCHUM, H. F., NOÈ, L. F. and GOMEZ-PEREZ, M. 2011*b.* New information on *Hauffiosaurus* (Reptilia, Plesiosauria) based on a new species from the Alum Shale Member (Lower Toarcian: Lower Jurassic) of Yorkshire, UK. *Palaeontology,* **54**, 547–571.

BARDET, N., GODEFROIT, P. and SCIAU, J. 1999. A new elasmosaurid plesiosaur from the Lower Jurassic of southern France. *Palaeontology*, **42**, 927–952.

—— SUBERBIOLA, X. P. and JALIL, N.-E. 2003. A new polycotylid plesiosaur from the Late Cretaceous (Turonian) of Morocco. *Comptes Rendus Palevol*, **2**, 307–315.

BROWN, D. S. 1981. The English Upper Jurassic Plesiosauroidea (Reptilia) and a review of the phylogeny and classification of the Plesiosauria. *Bulletin of the British Museum (Natural History), Geology Series*, **35**, 253–347.

—— and CRUICKSHANK, A. R. I. 1994. The skull of the Callovian plesiosaur *Cryptoclidus eurymerus* and the sauropterygian cheek. *Palaeontology*, **37**, 941–953.

CALDWELL, M. W. 1997. Limb osteology and ossification patterns in *Cryptoclidus* (Reptilia: Plesiosauroidea) with a review of sauropterygian limbs. *Journal of Vertebrate Paleontology*, **17**, 295–307.

CARPENTER, K. 1996. A review of short-necked plesiosaurs from the Cretaceous of the Western Interior, North America. *Neues Jahrbuch für Geologie und Palaontologie, Abhandlungen*, **201**, 259–287.

—— 1997. Comparative cranial anatomy of two North American Cretaceous plesiosaurs. 191–213. *In* CALLAWAY, J. M. and NICHOLLS, E. (eds). *Ancient marine reptiles.* Academic Press, San Diego, 501 pp.

—— 1999. Revision of North American elasmosaurids from the Cretaceous of the Western Interior. *Paludicola*, **2**, 148–173.

CHATTERJEE, S. and SMALL, B. J. 1989. New plesiosaurs from the Upper Cretaceous of Antarctica. 197–215. *In* Crame, J. A. (ed.). *Origins and evolution of the Antarctic biota. Geological Society of London, Special Publications*, **47**, 313 pp.

CHENG YEN-NIEN, SATO, T., WU XIAO-CHUN and LI CHUN. 2006. First complete pistosauroid from the Triassic of China. *Journal of Vertebrate*

Paleontology, **26**, 501–504.

CRUICKSHANK, A. R. I. 1994*a*. A juvenile plesiosaur (Plesiosauria: Reptilia) from the Lower Lias (Hettangian: Lower Jurassic) of Lyme Regis, England: a pliosauroid-plesiosauroid intermediate? *Zoological Journal of the Linnean Society*, **112**, 151–178.

—— 1994*b*. Cranial anatomy of the Lower Jurassic pliosaur *Rhomaleosaurus megacephalus* (Stutchbury) (Reptilia: Plesiosauria). *Philosophical Transactions of the Royal Society of London, Series B*, **343**, 247–260.

—— and FORDYCE, R. E. 2002. A new marine reptile (Sauropterygia) from New Zealand: Further evidence for a Late Cretaceous austral radiation of cryptoclidid plesiosaurs. *Palaeontology*, **45**, 557–575.

DRUCKENMILLER, P. S. 2002. Osteology of a new plesiosaur from the Lower Cretaceous (Albian) Thermopolis Shale of Montana. *Journal of Vertebrate Paleontology*, **22**, 29–42.

—— and RUSSELL, A. P. 2008*a*. A phylogeny of Plesiosauria (Sauropterygia) and its bearing on the systematic status of *Leptocleidus* Andrews, 1922. *Zootaxa*, **1863**, 1–120.

—— —— 2008*b*. Skeletal anatomy of an exceptionally complete specimen of a new genus of plesiosaur from the Early Cretaceous (Early Albian) of Northeastern Alberta, Canada. *Palaeontographica Abteilung A*, **283**, 1–33.

GASPARINI, Z. 2009. A new Oxfordian pliosaurid (Plesiosauria, Pliosauridae) in the Caribbean seaway. *Palaeontology*, **52**, 661–669.

HALSTEAD, L. B. 1971. *Liopleurodon rossicus* (Novozhilov); a pliosaur from the lower Volgian of the Moscow Basin. *Palaeontology*, **14**, 566–570.

HAWKINS, T. H. 1834. *Memoirs on Ichthyosauri and Plesiosauri*. Relfe and

Fletcher, London, 58 pp.

KEAR, B. P. and BARRETT, P. M. 2011. Reassessment of the Early Cretaceous (Barremian) pliosauroid *Leptocleidus superstes* Andrews, 1922 and other plesiosaur remains from the non-marine Wealden succession of southern England. *Zoological Journal of the Linnean Society*, **161**, 663–691.

KETCHUM, H. F. 2007. The anatomy, taxonomy and systematics of three British Middle Jurassic pliosaurs (Sauropterygia: Plesiosauria), and the phylogeny of Plesiosauria. Unpublished PhD thesis, University of Cambridge, Cambridge, xii + 244 pp.

—— and BENSON, R. B. J. 2010. Global interrelationships of Plesiosauria (Reptilia, Sauropterygia) and the pivotal role of taxon sampling in determining the outcome of phylogenetic analyses. *Biological Reviews*, **85**, 361–392.

—— —— 2011. The cranial anatomy and taxonomy of *Peloneustes philarchus* (Sauropterygia, Pliosauridae) from the Peterborough Member (Callovian, Middle Jurassic) of the UK. *Palaeontology*, **54**, 639–665.

—— and SMITH, A. S. 2010. The anatomy and taxonomy of *Macroplata tenuiceps* (Sauropterygia, Plesiosauria) from the Hettangian (Lower Jurassic) of Warwickshire, United Kingdom. *Journal of Vertebrate Paleontology*, **30**, 1069–1081.

LINDER, H. 1913. Beiträge zur Kenntnis der Plesiosauria-Gattungen *Peloneustes* und *Pliosaurus*. *Geologische und Palaeontologische Abhandlungen*, **11**, 339–409.

MEYER, H. VON. 1847–1855. *Zur Fauna der Vorwelt; die Saurier des Muschelkalkes mit Rücksicht auf die Saurier aus buntem Sandstein und Keuper*. Heinrich Keller, Frankfurt am Main, 167 pp.

NOÈ, L. F., SMITH, D. T. J. and WALTON, D. I. 2004. A new species of Kimmeridgian pliosaur (Reptilia; Sauropterygia) and its bearing on the nomenclature of *Liopleurodon macromerus*. *Proceedings of the Geologists' Association*, **115**, 13–24.

O'KEEFE, F. R. 2001. A cladistic analysis and taxonomic revision of the Plesiosauria (Reptilia: Sauropterygia). *Acta Zoologica Fennica*, **213**, 1–63.

—— 2004*a*. On the cranial anatomy of the polycotylid plesiosaurs, including new material of *Polycotylus latipinnis*, Cope, from Alabama. *Journal of Vertebrate Paleontology*, **24**, 326–340.

—— 2004*b*. Preliminary description and phylogenetic position of a new plesiosaur (Reptilia: Sauropterygia) from the Toarcian of Holzmaden, Germany. *Journal of Paleontology*, **78**, 973–988.

—— 2008. Cranial anatomy and taxonomy of *Dolichorhynchops bonneri* new combination, a polycotylid (Sauropterygia: Plesiosauria) from the Pierre Shale of Wyoming and South Dakota. *Journal of Vertebrate Paleontology*, **28**, 664–676.

OWEN, R. 1865–1881. A monograph on the fossil Reptilia of the Liassic formations. *Plesiosaurus*, *Dimorphodon* and *Ichthyosaurus*. *Palaeontographical Society Monographs*, Part 1 **18**(number 75), Part II **23**(number 104) and Part III **35**(166), 134 pp + 33 pls.

RIEPPEL, O. 1994. The braincases of *Simosaurus* and *Nothosaurus*: monophyly of the Nothosauridae (Reptilia: Sauropterygia). *Journal of Vertebrate Paleontology*, **14**, 9–23.

—— 2000. Sauropterygia I. *Encyclopedia of Paleoherpetology*, **12A**, 134 pp.

—— SANDER, P. M. and STORRS, G. W. 2002. The skull of the pistosaur

Augustasaurus from the Middle Triassic of Northwestern Nevada. *Journal of Vertebrate Paleontology*, **22**, 577–592.

SATO, T., LI CHUN and WU XIAO-CHUN. 2003. Restudy of *Bishanpliosaurus youngi* Dong 1980, a fresh-water plesiosaurian from the Jurassic of Chongqing. *Vertebrata PalAsiatica*, **41**, 17–33.

SMITH A. S. and DYKE, G. J. 2008. The skull of the giant predatory pliosaur *Rhomaleosaurus cramptoni*: implications for plesiosaur phylogenetics. *Naturwissenschaften*, **95**, 975–980.

SOLLAS, W. J. 1881. On a new species of *Plesiosaurus* (*P. Conybeari*) from the Lower Lias of Charmouth; with observations on *P. megacephalus*, Stutchbury, and *P. brachycephalus*, Owen. *Quarterly Journal of the Geological Society of London*, **37**, 440–480.

STORRS, G. W. 1997. Morphological and taxonomic clarification of the genus *Plesiosaurus*. 145-190. *In* CALLAWAY, J. M. and NICHOLLS, E. L. (eds). *Ancient marine reptiles*. Academic Press, San Diego, 501 pp.

SUES, H. -D. 1987. Postcranial skeleton of *Pistosaurus* and interrelationships of the Sauropterygia (Diapsida). *Zoological Journal of the Linnean Society*, **90**, 109–131.

TARLO, L. B. 1957. The scapula of *Pliosaurus macromerus* Phillips. *Palaeontology*, **1**, 193–199.

—— 1960. A review of the Upper Jurassic pliosaurs. *Bulletin of the British Museum (Natural History), Geology Series*, **14**, 145–189.

TAYLOR, M. A. 1992. Functional anatomy of the head of the large aquatic predator *Rhomaleosaurus zetlandicus* (Plesiosauria, Reptilia) from the Toarcian (Lower

Jurassic) of Yorkshire, England. *Philosophical Transactions of the Royal Society of London, Series B*, **335**, 247–280.

—— and CRUICKSHANK, A. R. I. 1993. Cranial anatomy and functional morphology of *Pliosaurus brachyspondylus* (Reptilia: Plesiosauria) from the Upper Jurassic of Westbury, Wiltshire. *Philosophical Transactions of the Royal Society of London, Series B*, **341**, 399–418.

WEGNER, T. 1914. *Brancasaurus brancai* n. g. n. sp., ein Elasmosauride aus dem Wealden Westfalens. 235–305. *In* SCHOENDORF, F. (ed.). *Branca-Festschrift*. Verlag von Gebrüder Borntrager, Leipzig, 494 pp.

WELLES, S. P. 1943. Elasmosaurid plesiosaurs, with description of new material from California and Colorado. *University of California Memoirs*, **13**, 125–254.

—— and BUMP, J. D. 1949. *Alzadasaurus pembertoni*, a new elasmosaur from the Upper Cretaceous of South Dakota. *Journal of Paleontology*, **23**, 521–535.

WHITE, T. E. 1935. On the skull of *Kronosaurus queenslandicus* Longman. *Occasional Papers of the Boston Society of Natural History*, **8**, 219–228.

WILLISTON, S. W. 1903. North American Plesiosaurs. *Field Columbian Museum, Geological Series*, **2**, 1–16.

—— 1907. The skull of *Brachauchenius*, with observations on the relationships of the plesiosaurs. *Proceedings of the United States National Museum*, **32**, 477–489.