

## DINOSAUR ISLE MUSEUM REPORT 2022

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### Introduction

2022 saw the publication of Europe's biggest carnivorous dinosaur, the "White Rock Spinosaurid", the story appearing on national news and around the world. Dinosaur Isle Museum specimens featured in a number of other publications in 2022. The neotype of the Lower Cretaceous ammonite, *Roloboceras horridum* (IWCMS : 2014.216) was figured and briefly described (Delanoy *et al.*, 2022), with a short mention of the holotype turtle *Sandownia harrisi* (Hermanson *et al.*, 2022). Significantly, for the first time since its original interpretation, *Eotyrannus lengi* (a tyrannosauroid dinosaur) has been comprehensively described in a monograph (Naish & Cau, 2022). Furthermore, the discovery of "The White Rock Spinosaur" has demonstrated a greater diversity in large bodied theropods than previously realised (Barker *et al.*, 2022).

***Roloboceras horridum*** is an ammonite from the Lower Greensand group. A period of global sea level rise during the Aptian (approximately 120 million years ago) caused large swathes of low-lying lands to be submerged by shallow and eventually deep seas. As the Proto-Atlantic Ocean began to form, Gondwana and Eurasia pulled apart forming new seas, which resulted in the concurrent deposition of greensands in northern Europe, Russia, Madagascar and elsewhere.

The Lower Greensand Group of southern England was deposited in warm, shallow, but deepening seas during the Aptian and early Albian periods for approximately 10 million years. The sea floor and water column were host to a large range of molluscs and brachiopods, as well as annelids, arthropods, echinoderms, vertebrates, and other rarer fauna (Casey, 1961). Many units contain terrestrial flora washed out to sea through river systems, as well as exceptionally rare dinosaurian remains (Blows, 1995 and Barker *et al.*, 2021).

Ammonites are well represented within the Lower Greensand Group, with over 100 species, having been described by numerous workers, in particular by Raymond Casey (The Ammonoidea of The Lower Greensand I-IX, 1960-1980). Casey (1961) selected IWCMS : 2014.216 as the neotype for the species having been unable to locate the original specimen described by Spath (1930).

In a review of *Roloboceras* species found in the French Lower Greensand deposits, Delanoy *et al.* (2022) synonymise *R. horridum* with *R. hambrovi* as a more robust form.

### ***Sandownia harrisi***

The holotype of *Sandownia harrisi* (MIWG : 3480) is an exceptionally well preserved turtle skull and

mandible from the Lower Greensand Group at Atherfield (Fig. 1). The near completeness of the skull has led it to being used in numerous comparative studies. It has recently been re-described (Evers & Joyce, 2020).

Previous studies indicated *Sandownia* to be durophagous; eating hard shelled fauna such as molluscs and crabs, using powerful jaw muscles and a strong mandible to crush their prey. Hermanson *et al.* (2022) suggest *Sandownia* used suction-feeding, by rapidly opening its mouth to create a drop in pressure, thereby sucking in its prey.



**Fig. 1** : MIWG : 3480 The skull of *Sandownia harrisi*; vertebrate remains are uncommon in the Lower Greensand Group and rarely demonstrate such exquisite preservation.

### **"White Rock Spinosaurid"**

Spinosaurids are an unusual group of fish-eating dinosaurs with skulls and teeth more closely resembling those of crocodiles. In 2021, the diversity of Isle of Wight spinosaurids trebled, with the addition of *Ceratosuchops inferodios* and *Riparovenator milnerae* (Barker *et al.*, 2021). Last year, Barker *et al.* (2022) also published on the "White Rock Spinosaurid", which was possibly a spinosaurine and of similar size to *Spinosaurus aegyptiacus*, the longest terrestrial predator in the fossil record.

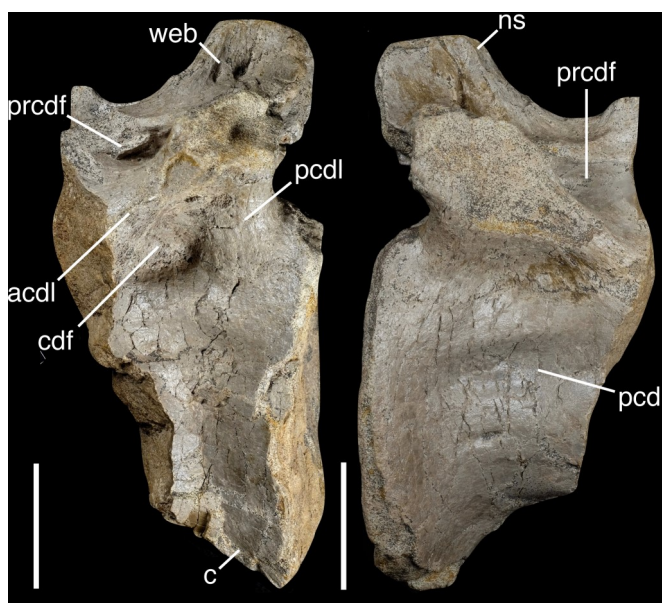
Initially discovered at Compton, by the late Nick Chase, matrix adhering to the specimen indicates it derived from the "white rock", an informal name given to a pale coloured, cross-laminated sandstone found at the base of the Vectis

Formation on the west coast of the Island. It is interpreted as being deposited in fluvial channels on the edge of a lagoonal mudflat; vertebrate remains are rare, but not unknown.

The “White Rock Spinosaurid” (IWCMS: 2018.30) consists of partial dorsal, sacral, and caudal vertebrae, a fragment of the right ilium, long bone fragments, and other indeterminate remains. Despite the incomplete nature of the remains, webbing on the transverse process of the caudal vertebrae (Fig. 2), alongside other features, indicate a spinosaurid, with possible spinosaurine affinity.

Comparisons to other spinosaurid remains indicate a length of over 10 metres for the White Rock Spinosaurid, demonstrating it is likely the largest theropod to have been discovered in Europe. The individual caudal vertebra is larger than any other spinosaurid caudal vertebra yet discovered, signifying the potential of an even greater body size (Barker *et al.*, 2022).

The possibility of a spinosaurine dinosaur (more closely related to the Late Cretaceous, North African *Spinosaurus* than to other contemporary spinosaurids discovered on the Island) is an exciting, but not unexpected result (Barker *et al.*, 2021). Changing habitats at the end of the Barremian may well have encouraged evolution, resulting in more highly derived, specialised dinosaurs.



**Fig. 2:** IWCMS : 2018.30 Caudal vertebra of the “White Rock Spinosaurid” in left and right lateral views demonstrating vertebral webbing. Image credits: Barker *et al.* (2022); scale bars : 50mm

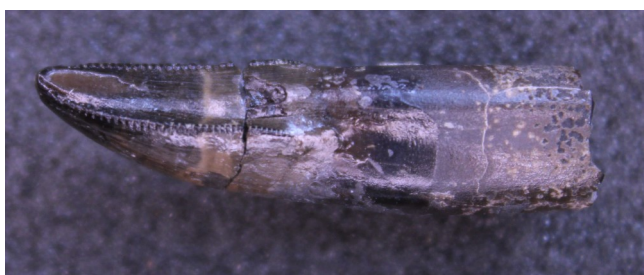
### ***Eotyrannus lengi***

Discovered in 1997 by Gavin Leng and initially described by Hutt *et al.* (2001), *Eotyrannus lengi* (IWCMS : 1997.550) is represented by the incomplete skeleton of one individual found at Grange Chine. The initial short description has been updated with a comprehensive monograph (Naish & Cau, 2022).

The initial determination of *Eotyrannus* as a non-

tyrannosaurid tyrannosauroid and as a distinct Wealden taxon has been maintained; however the specific diagnostic features have not (Figs. 3a & 3b). Initial traits thought to be characters of *Eotyrannus* or other tyrannosauroids are shown to be present in a range of other theropods (Naish & Cau, 2022).

Due to lack of fusion between the centrum and neural arch of the vertebrae, the holotype specimen has been recognised as skeletally immature (Naish & Cau, 2022). With the individual specimen estimated as 4.5 metres in length, *Eotyrannus* would have been a mid-sized theropod, possessing a relatively gracile build.



**Fig.3a and Fig. 3b:** IWCMS : 1997.550 Nasals and Premaxillary tooth of *Eotyrannus lengi*. Once thought to be autapomorphies of tyrannosaurs, fused nasals and ‘D’ or ‘U’ shaped tooth cross sections have been observed in other groups of theropods. Nasals are 22.5cm long; tooth is 3cm long. Image credits: Dinosaur Isle Museum

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### **References**

- Barker, C. T., Hone, D.W. E., Naish, D., Cau, A., Lockwood, J. A. F., Foster, B., Clarkin, C. E., Schneider, P. J., Gostling, N.J. 2021. New Spinosaurids from the Wessex Formation (Early Cretaceous, UK) and the European origins of Spinosauridae. *Nature. Scientific Reports*. **11**:19340.
- Barker, C. T., Naish, D., Clarkin, C. E., Farrell, P., Hullmann, G., Lockyer, J., Schneider, P., Ward, R., Gostling, N. J. 2020. A highly pneumatic middle Cretaceous theropod from the British Lower . *Carnets de Geologie*, **22** (2): 7-109.
- Evers, S.W. & Joyce, W.G. 2020. A re-description of *Sandownia harrisi* (Testudinata: Sandownidae) from the Aptian of the Isle of Wight based on computed tomography scans. *Royal Society Open Science* **7**: 191936.

- Hermanson, G., Benson, R., Farina, B., Ferreira, G., Langer, M., Evers, S. 2022. Cranial ecomorphology of turtles and neck retraction as a possible trigger of ecological diversification. *Evolution, Society for the study of Evolution*, **76** (11): 2566–2586.
- Hutt, S., Naish, D., Martill, D., Barker, M., Newbery, P. 2001. A preliminary account of a new tyrannosauroid theropod from the Wessex Formation (Early Cretaceous) of southern England. *Cretaceous Research*. **22**: 227-242.
- Naish, D., & Cau, A. 2022. The osteology and affinities of *Eotyrannus lengi*, a tyrannosauroid theropod from the Wealden Supergroup of southern England. *PeerJ* 10:e12727.
- Spath, L. 1930. On some Ammonoidea from the Lower Greensand. *The Annals and Magazine of Natural History*. **5** (29): 417-464.

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