

## A NEW SPECIES OF GONIASTERID STARFISH FROM CHERT IN THE UPPER GREENSAND FORMATION (LOWER CRETACEOUS: ALBIAN) OF LYME REGIS, DORSET, UK



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A new species of goniasterid starfish, *Nymphaster lymensis*, is recorded in a chert nodule from the Albian Upper Greensand Formation, found loose east of Lyme Regis, Dorset, UK. It preserves much of the largely articulated marginal frame, and clearly shows a stellate outline. The new species is characterized by the presence of at least five broad interradial superomarginal ossicles and extends the known stratigraphic range of *Nymphaster* back to the Albian. The preservation is remarkable as the Upper Greensand is typically a high-energy, cross-bedded sandy formation. Trace fossils imply that sedimentation continued for some time after the initial burial event, thus ensuring the specimen was not subsequently disturbed.

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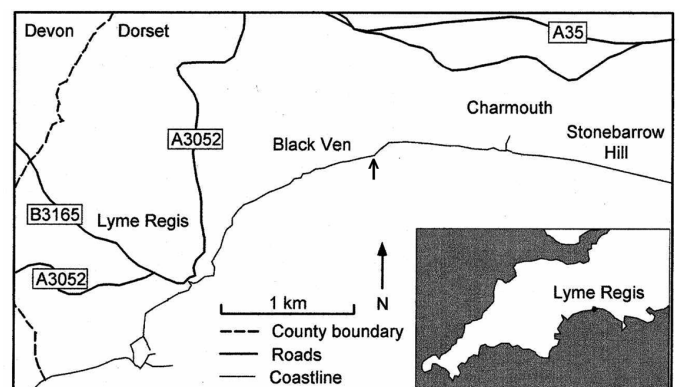
### INTRODUCTION

Starfish generally have loosely associated plates that fall apart soon after death. Preservation of articulated starfish requires very rapid burial and no subsequent disturbance. This is so well known that 'starfish beds' are specifically identified at various levels of the geological column, such as the starfish bed in the Downcliff Sand Member of the Dyrham Formation (Upper Pliensbachian) of west Dorset (see Goldring and Stephenson, 1972 for an analysis of this particular starfish bed). Indeed, the term 'starfish bed' is sometimes loosely applied to describe fossil lagerstätten with exceptional preservation due to rapid burial. Starfish beds tend to be formed by an exceptional, sudden influx of sediment into a generally quiet environment. It was, therefore, surprising to discover an articulated goniasterid starfish in a loose chert nodule from the Upper Greensand east of Lyme Regis, because the Upper Greensand is largely a high-energy, cross-bedded sandy unit, especially at the levels where the chert beds are developed (Gallois, 2004) that shows much evidence of sediment reworking. Most other articulated goniasterid starfish from the British Cretaceous are preserved in the Chalk (Gale, 1986, 1987). The specimen is now in the Lyme Regis Museum, registration number LYMPH 2015/6.

Goniasterid starfish are characterized by two sets of large marginal ossicles that are often highly distinctive and can be specifically identified even when preserved as isolated ossicles (see, for example, Gale, 1988; Breton, 1992; Jagt, 2000; Villier, 2001). Thus, the stratigraphic distribution of Cretaceous goniasterid starfish is generally better known than that of most other types of starfish (Gale, 1986, 1987). The marginal ossicles form a strong marginal frame, within which smaller abactinal and actinal plus adambulacral ossicles complete the skeleton on their respective surfaces (see Gale, 1986, 1987 for a more complete review of goniasterid starfish morphology). This marginal frame also makes it easy to recognize fossil goniasterids.

### METHODS

The chert nodule was found on the beach loose beneath Black Ven, east of Lyme Regis, Dorset (arrow in Figure 1). It reached the beach via the Black Ven landslip, thus it is impossible to deduce its original stratigraphic position. The nodule was subsequently lightly prepared using an airpen to expose some additional marginal ossicles. A 'silastic' cast was made in a vacuum chamber to study the specimen in positive relief. Photographs of the original chert nodule were taken using tungsten light with a Nikon D300 camera at varying object to camera distances and the proprietary software, Zerene Stacker, was used to produce the final photographs of the nodule.



**Figure 1.** Location of the sites mentioned in the text. The arrow indicates the position where the starfish described herein was found.