



PALEONTOLOGY TECHNICAL DIVISION TALK

in conjunction with the Alberta Palaeontological Society

Adapting to life in the soup: The fauna of the Cretaceous Upper Chalk

Presenter: Jon Noad, SediMental Services

February 19, 2021, 7:30-8:30 pm Mountain Time

Webinar, there will not be a meeting at Mount Royal University, Room B108 in December

1 CPD (Continuing Professional Development) credit will be awarded for this event

ABSTRACT

Chalk seas covered much of the Late Cretaceous world and outcrop from the White Cliffs of Dover in the UK, one of the Earth's most famous geological landmarks, to as far as western Australia. Fossils are often perfectly preserved in the very fine-grained sediment, providing an excellent opportunity to study their morphology. Little consideration has been given to the morphology of the living organisms and the various styles of preservation, and this talk will address these issues.

The stratigraphy of the Chalk has been refined in recent years, and this talk will focus on the Upper Chalk or White Chalk. Chalk is composed primarily of coccolithophores, tiny circular discs formed as plankton disintegrate after death. These were deposited as thick, fluidized oozes in shallow warm seas, with little sediment input. Evidence of cyclicity in the sedimentation is demonstrated by the interbedded layers of flints, often representing casts of shrimp burrows. Common cemented hardgrounds were formed during pauses in sedimentation that may relate to relative sea level highs.

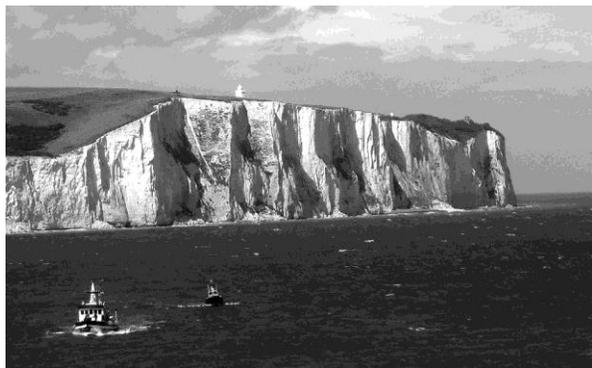


Figure 1. The White Cliffs of Dover, UK (photograph from Wikipedia).

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So, what types of organisms colonized the soupy, thixotropic seabed? Many of the inhabitants appear to show adaptations to the soft conditions, with giant flattened bivalves acting like snowshoes. Other bivalves were covered with long spines that may have stopped them sinking into the substrate. The most abundant macrofauna were echinoids (sea urchins), including the heart shaped *Micraster*, which rapidly evolved as it perfected a lifestyle half buried in the sediment. Other echinoderms, such as the domed *Echinocorys*, also seem to have adapted to life within the soup. Their tests are commonly colonized after death, suggesting periodical scouring of the seabed. There was also a rich pelagic fauna living in the water column. Ammonites and squid-like belemnites squirted water as a form of jet propulsion, while some sea lilies abandoned the seafloor to live a nomadic life in the water column. Vertebrates include fossil fish, a variety of sharks (mostly known only from their dentition due to their cartilaginous skeletons), and most notably marine reptiles that include the fearsome mosasaurs. One gigantic specimen from Maastricht was so famous that it even had a beer named after it. A wealth of often contrasting evidence will be presented to suggest that many of the benthic organisms evolved odd morphological features specifically to cope with the unusually fluidized seabed, and the audience will be left to make up their own minds as to whether this was the case.

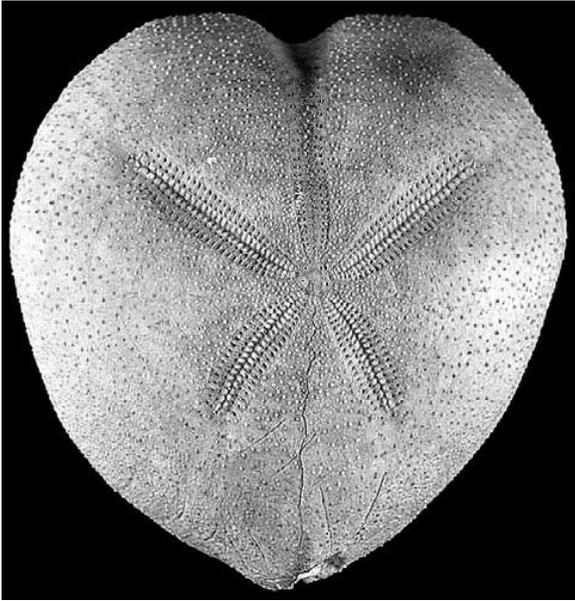


Figure 2. The sea urchin *Micraster* (photograph from the Natural History Museum, London).

BIOGRAPHY

Jon Noad graduated from Imperial College, London in 1985 and moved to South Africa to work on gold and platinum mines. He re- turned to the UK in 1990 becoming a marine geologist laying submarine cables. A Masters in Sedimentology at evening classes was followed by a Ph.D. based in Borneo, leading to a job exploring for oil in the Middle East with Shell. In 2006 Jon moved to Canada and roles as Frontier Team Lead (Shell Canada), Exploration Manager (Murphy Oil) and Senior Geologist (Husky Energy) followed. In 2016 he set up Sedimental Services to teach industry classes in field geology, core and classroom courses, and taught students at the U of A and MRU. He joined Gran Tierra in 2018. In his spare time Jon likes running, wildlife photography, travel and hot curries.