The Ammonites

The phylum Mollusca is divided into several main groups. They include the chitons, slugs and snails, tusk shells, bivalves, ammonites, nautili, octopus and squids and belemnites. Of these, ammonites and belemnites are all extinct.

Until recently it was thought that the extinct ammonites were most closely related to the extant nautiloids, which have a similar shell. In both groups there are divisions, the septa, which close off chambers within the shell. In nautilus these septa are a simple curve but in ammonites they are pleated into complex curves where they join the outer shell. Particularly well-preserved ammonite fossils, containing some of the soft parts, show that they had a radula, a rasping tongue, and upper jaw that was more like those of octopus and squid. None the less it is to the nautilus we must look to understand the probable mode of life of ammonites.

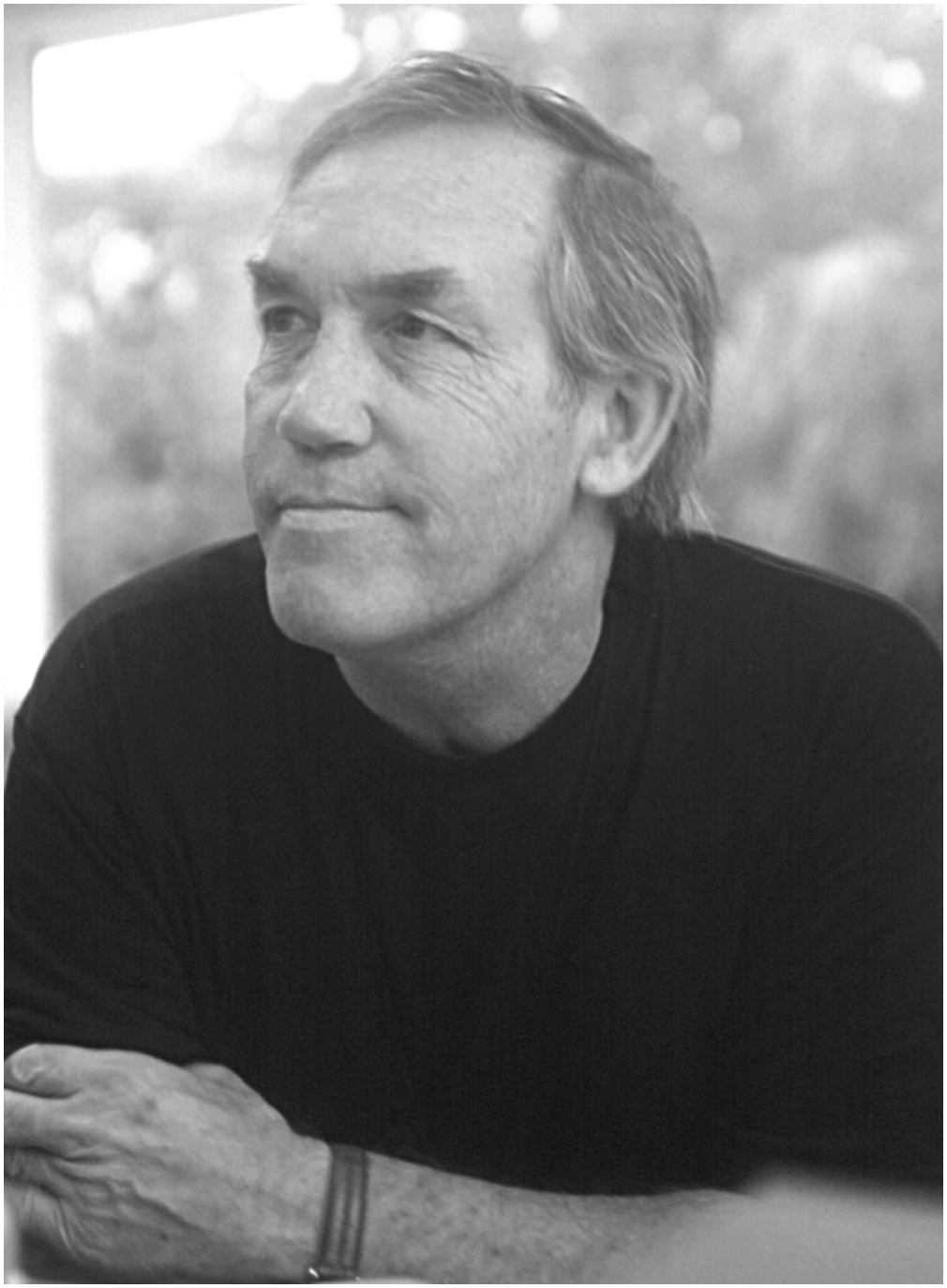
Ammonites and nautili both start life as a small protoconch, those of the nautilus being much larger. This is a small planktonic larva whose shell grew in a spiral. In the vast majority of ammonites there is a line of symmetry that divides the shell into identical left and right halves. Running just under the outer surface of the shell is a tube, the siphuncle. As it passes through each septum there is a strengthening ring, on the inside of the septum in nautili and outside in ammonites. The siphuncle is responsible for controlling the buoyancy of the animal, which lives in front of the last septum, in the body chamber. As it grows, it moves forward and secretes a new septum behind it. This creates a chamber full of sea water which is slowly removed by the siphuncle and replaced by air derived from the animal's blood system, thus compensating for the extra weight produced by the growing shell. Surprisingly, the air pressure recorded in nautili is well below atmospheric pressure. Calculations of the pressure needed to collapse the air-filled chambers shows that ammonites probably lived in the upper 150m of the ocean. When they died, the shell would remain buoyant until the siphuncle decayed and water could enter.

Ammonites were probably scavengers or active hunters. Movement would be in the same way as squid by pumping a jet of water at high-pressure through a movable nozzle. To prevent the animal spinning like a Catherine wheel, the line of the jet would be almost directly in line with the centre of gravity, which was just below the centre of buoyancy. Species with a slim, streamlined body are considered to be more rapid moving than the wider, spinose species.

To palaeontologists the ammonites are supremely valuable for correlating strata in different parts of the world. They evolved rapidly into a huge variety of shapes and ornament, each species having a range of a few million years at most. As ocean drifters, they covered a wide area, so a particular species can be found wherever in the world sediments of that age were being formed. Species characteristic of the Gault Clay of South-East England are also found in many other countries, indicating that the rocks there are of the same age as in England.

It is not known why ammonites were continually changing. One possible answer is sex. We know that ammonites, during the Jurassic period at least, had male and female forms and that modern cephalopods mate. In birds, we assume that the variety of plumage, song and display, is for sexual and specific discrimination prior to

mating. As ammonites probably could not sing, it is reasonable to assume that visual cues were used to attract a mate of the right species; hence the variety of ornament. There is often a gradation of form between one species and another through time, which could be interpreted as resulting from mate selection pressure.



Mick Cuddeford - gone before2003.
From all at the MLMS - goodbye Chuck, we will all miss you.