Brachiopods

Terebratulina retusa & Neocrania anomala

GORDON MACSKIMMING

Brachiopods have always intrigued Gordon MacSkimming since he discovered what they were. Here he tells us more about these fascinating local creatures ...

A LONG TIME ago two diving clubs from a distant land (Northumberland actually) regularly organised an annual Easter pilgrimage to the far north-west (Oban). During one such event we shore dived the Easdale wall where (as usual) my attempts to get a photographic record of every living thing stopped abruptly as I went for the 37th exposure. For those who have never used a 35mm film camera, 36 exposures is the point at which the film runs out (for some underwater photographers this ranked alongside diving emergencies in the scale of justifiable reasons to terminate a dive).

A few days later back in Northumberland I picked up my slides from the local processors and commenced the cull of underexposed, out of focus and generally rubbish images. What appeared to be a bivalve mollusc emerged amongst the survivors but I couldn't identify it, time to consult an expert. Answers came after a quick drive up the coast to see an appropriately qualified friend who worked at Newcastle University, someone who knew lots of good stuff about marine life. I said: "Look at the mollusc on this slide, I can't put a name to it". He said: "That's because it isn't a mollusc." I had just encountered my first brachiopod.

Members of the *phylum Brachiopoda* are sometimes called lamp shells because many species have a lower (ventral) shell that is larger than the upper (dorsal) shell giving a side on profile similar to that of an ancient oil lamp.

A Geological Connection

When introducing the concept of evolution Charles Darwin required that the organisation of species into groups should be supported by fossilised evidence of earlier forms. In this respect the brachiopods have provided a trail that stretches back to the Precambrian era, in geological terms a very long time ago. As a result the vast majority of known brachiopod species are extinct, having been described from fossils. For geologists the accurate identification of a brachiopod fossil specimen can indicate the age and type of rock in which it was found. Existing brachiopod species number in the low 100's, fossil species number in excess of 30,000.

Appearance

As you can see from the supporting images, the convex shells of *Terebratulina retusa* make it look very much like a bivalve mollusc. The key distinguishing feature are the two filter arrays called lophophores that can be seen within the shell cavity, in bivalve molluscs this area would contain a siphon arrangement.

On living specimens ribs on the outer side of the hard shell are often only just visible under an overall sponge-like coating. *Terebratulina* can grow to a maximum size of 30mm and has a cream colouration.

Neocrania anomala looks very like the fairly widespread and common saddle oyster, a mollusc which shares the same habitat and low profile appearance. Once again Neocrania can be distinguished from the saddle oyster by its lophophores but in this species they may be difficult to observe. A quicker and easier method is to look down onto the top of Neocrania which should appear 'squared off' whereas the same view of a saddle oyster would tend to be round.

The lower shell of Neocrania is not normally visible. The surface of the top shell is coloured brown and only projects a short distance above the surrounding rock face. It can grow to around 15mm in diameter.

Note that the name *Neocrania anomala* has only recently been changed from *Crania anomala*. Most published information about this species pre-dates the change and uses the older name.

Distribution

Terebratulina retusa is most often seen off Scotland's west coast and around the Northern Isles, beyond this its range extends from the Mediterranean to Norway and the east coast of Greenland.

In Scotland *Neocrania anomala* has a similar range to Terebratulina. Further afield it has a greater range than Terebratulina with records coming from the Canary Islands all the way north to Spitzbergen.

Habitat

Terebratulina retusa is a deep water species which can be found on vertical rock walls or steep boulder slopes from about 25 metres down to well beyond normal diving depths. *Neocrania anomala* can be found in a similar habitat from 15 metres down to beyond diving depth.

Biology

Scientists have divided the brachiopods into two major groups, class Inarticulata which includes *Neocrania anomala* and class Articulata which includes *Terebratulina retusa*. At the most basic level the Articulata have a hinge mechanism linking the upper and lower shells whereas the Inarticulata do not. Terebratulina attaches to hard substrate using a stalk which extends out from the rear of the animal adjacent to the hinge mechanism. The lower shell of Neocrania adheres directly to hard substrate.

Most brachiopod species have separate sexes and shed either eggs or sperm into open water where external fertilisation takes place. The resulting planktonic larvae use small hairs (cilia) to propel themselves through the water as they are distributed by tidal movement. After anything from a few hours to a few days some of the larvae will settle on a hard surface and eventually develop into adults.

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Top: Terebratulina retusa, St Catherines, Loch Fyne.
Centre left: Terebratulina retusa showing lophophores, St Catherines, Loch Fyne.
Centre right: Terebratulina retusa closed, St Catherines, Loch Fyne.
Bottom Left: Neocrania anomala as normally viewed by divers (a peripheral to higher impact species), Creagan Dubh, Loch Fyne.
Bottom Right: Neocrania anomala showing lophophores, Creagan Dubh, Loch Fyne.

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The lophophores mentioned earlier are made up of two grooved tubes each carrying a row of cilia. The lophophores extend out from the mouth of the brachiopod. Movement of the cilia generate localised currents which transport water through the shell cavity where particulate matter can be intercepted. Food items such as diatoms are transferred from the cilia into the groove and driven towards the mouth. Inedible particulate matter is ejected.

If threatened brachiopods will fairly quickly close up using adductor muscles similar to those employed by bivalve molluscs.

Where to See

Terebratulina can be found on the wall at Stallion Rock and on a boulder slope at St Catherines, both in Loch Fyne. The Easdale wall on Seil Island is an excellent dive site with a population of Terebratulina amongst many other sessile invertebrates. Neocrania can be found in significant numbers close to the base of the wall at Creagan Dubh (Anchor point) in Loch Fyne.

How to Photograph

Unfortunately brachiopods fall into that category of marine animals which have minimal visual impact and are unlikely to establish a prominent place in any underwater photography hit list. I have chosen to include them in this series of articles mainly in the interests of being comprehensive. Despite their lack of colour and small size the brachiopods along with numerous other inconspicuous marine animals have a role to play within a correctly balanced marine environment and deserve at least a little exposure.

To be effective, images of brachiopods or similar species need to show some element of behaviour or act as an illustration of how the animal works. For the examples described here that means trying to capture the lophophores arrayed within the fully gaping shells. With Terebratulina this is not too difficult, individuals normally project out in a way that will allow you to focus a macro lens and direct flash light into the opening between the shells. Even a careful approach however may instigate closure long before you have a chance to frame up the shot. If this happens look around for another individual, my experience suggests that you will eventually find one tolerant enough to allow a few shots before it closes up.

With Neocrania there is bit more of a challenge, they are quite skittish and often close up when you are still a metre or so away. Add to this their low surface adhering profile and you have the problem of getting a camera angle that will allow your lens to see between the shells. To overcame this issue I searched around until I found an individual adhering to the lower surface of a rock fissure. This allowed me to shoot straight into the lophophores from open water avoiding any obstructions to the position of camera or lens.