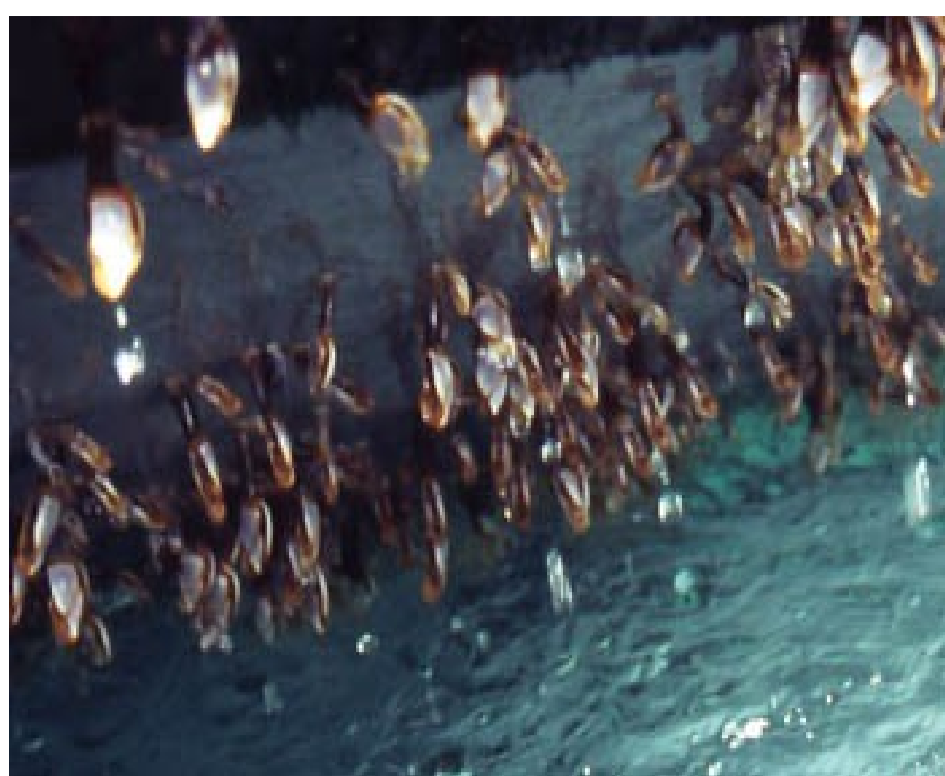


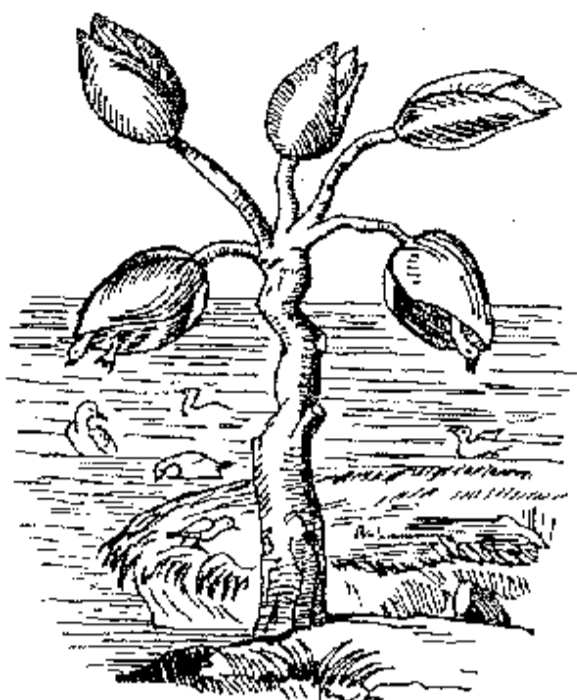
Beating the Barnacles



Goose barnacles attached to a my own boat after crossing the Pacific from Panama to the Marqueses.

We attack them with scrapers, high pressure water jets and grinders; spend countless hundreds of pounds on the latest poisons and yet, each year, they come back for more. Of all the marine organisms that like to grow on boat hulls, barnacles are maybe the most tenacious and from the earliest times the least understood.

In 1597 Gerard's "Herball" published an account of how, in parts of Scotland and the Orkneys are found "certaine trees whereon doe growe certaine shell fishes; wherein are containede little living creatures; and out of them growe those little living foules whom we call barnacles, in the north of England Brant Geese and in Lankashire Tree Geese" A curious idea but strangely, one that caught on and several writers of the time described how barnacles turned into birds.



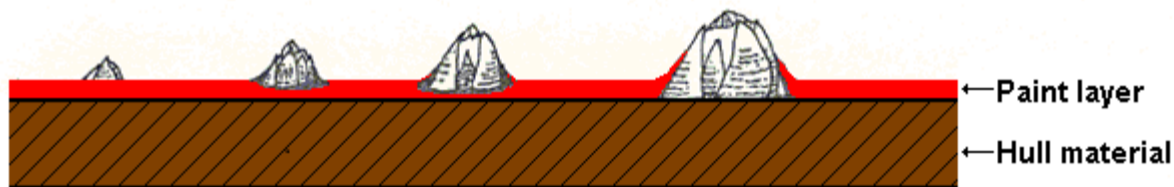
The Barnacle Tree (from Gerard's "Herball")

The stalked barnacles, today known as goose barnacles, are seldom a serious problem on boat hulls. Often they appear after a longish ocean passage, frequently close to the stern around the waterline. Their long stalk attachment makes them easy to scrape off but, when the boat stops moving through the water their food supply is reduced and they, tend to die off and shrivel away.

The more familiar acorn barnacles live inside a conical shell and have no visible stalk. They occur in virtually all parts of the world, attached to rocks, boat hulls, or pilings. The animal inside is, in effect, lying on its back and has fern like cirri attached to its legs which it waves through an opening in the top of its shell. Watch them from underwater and you can see them feeding, using their cirri to rake in passing food particles.

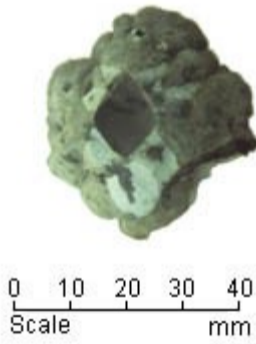
Young barnacles in larval form (naupilus) are scarcely visible, free swimming animals. When they find a suitable rock or boat hull to make home, they attach themselves head first and begin securing a stronger hold by secreting calcareous shell material. At this stage they are fairly vulnerable and easily dislodged. Even strong water currents can be sufficient to dislodge youngsters, though in more moderate currents, up to 1.5 knots, their rate of growth actually increases as more food is brought within reach.

As they grow, shell material is laid down, particularly around the base, so making them taller and larger. Unlike the marine glues we use in boat building that are inactive once set, barnacles continue improving their hold by adding more cement and shaping themselves to exactly fit the contours of the underlying surface. If hard objects, or other barnacles stand in their way, they simply adjust their own shape to fit. If the surface they are sitting on is a little soft, they tend to bury into it, looking for harder material and an ever more secure bond. If barnacles have been allowed to grow unchecked on glassfibre boats, it is not unusual to find a few that have worked their way down through the old layers of paint and firmly attached themselves to the gel coat. Even when all traces are removed, a circular impression may still remain as evidence of their powerful grip. My own boat is made of steel, protected by a good layer of epoxy pitch and yet on occasions, I have picked off barnacles with nothing separating them from bare steel.



How do barnacles grow? By depositing shell material around the base which makes them wider and taller and can cause them to bury themselves beneath soft paint

Given the right conditions, barnacles can grow extremely quickly. When hauling out my boat, I usually try to do the best job I can, cleaning the hull fastidiously and repairing any suspect areas of epoxy pitch. Last year's haul out was in Trinidad where the climate was perfect for this type of work, and the job was finished by applying a suitable thickness of a locally manufactured co-polymer antifoul that the manufacturers claimed could remain effective for up to 5 years. Three weeks after launching, I scraped a full bucket of barnacles from around the rudder, stern gear and keel. Many had grown to diameters of around 10mm, and appeared to be thriving on the so called "toxic" paint. Larger ones had attached themselves to the epoxy having pushed their way beneath the grey antifoul that now coated their shells.



Acorn Barnacle from a repair yard in Panama

That at least was my theory, though the manufacturers had other ideas. When I showed them samples of the barnacles, with paint adhering to their shells, their conclusion was that obviously they were there before hauling out and I had simply painted over the top. That somehow they had managed to survive angle grinding, grit blasting, two weeks dehydration in tropical heat ashore plus a coating of toxic paint. Truly, barnacles must be super-beasts indeed, or could this be the modern equivalent of the myth about the geese?

ANTIFOUL MECHANISMS

In hard type conventional antifouls of the type I was using, high levels of biocide are released initially and then progressively less as the as the paint ages, though this is only part of the story. One component in its co-polymer make up reacts with water, degrading the surface and leaving a layer from which biocides (mainly copper oxide) are easily leached out. As the boat moves through the water, this fragile layer tends to wash off, so exposing fresh material from which more biocide can be released. Should the boat remain at anchor, the depleted layer is not removed, available biocide runs out and marine growths have an opportunity to take hold. In practice, on a long period at anchor, an

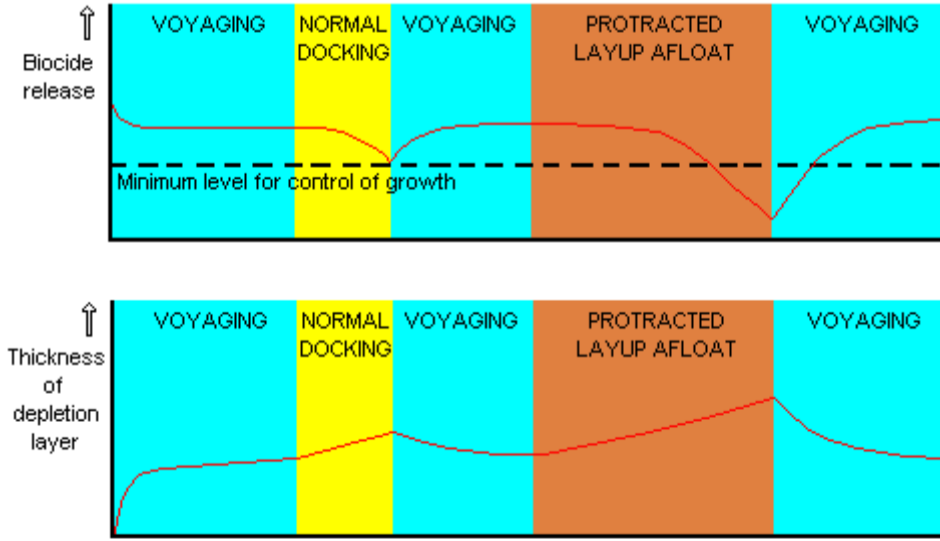


Fig 3 Biocide release from copolymer type antifoulings

occasional light brush over with a soft broom from a dinghy can be sufficient to freshen up the surface enough to discourage growth.

Biocide release from co-polymer antifoul.

Exactly why my antifoul performed so badly after such a short time in Trinidad remains a mystery. One possibility is that it had become contaminated with a material that prevented breakdown of the co-polymer. This would have reduced the release of biocide, though it it seems more likely that the paint was simply not up to the serious fouling problem of Caribbean waters. Certainly the Caribbean, and Gulf of Paria in particular, are parts of the world that presents a tough challenge for antifouls. Even though many countries do not apply the same legal restrictions on antifoul formulations as the Europeans or North Americans, the trend towards including ever less biocide is well set. In future it seems likely will have to rely more on clever mechanisms for dissuading growths, rather than killing them off. Unfortunately for the moment the perfect antifoul system remain illusive so for the time being at least the choice is between more frequent hauling out and scrubbing or the acceptance of a less clean hull and slower boat.

JUST RETRIBUTION FOR BARNACLES.

If you also have and your boat has lots of high big barnacles, you could always try eating them. In Chile, Balinus Psittacus is supposed to be very good, and since it can be 200mm high and 75mm in diameter, it's more the size of a small lobster. If you feel squeamish about getting to grips with the hard, crusty shell, why not try stalked barnacles? When steamed for 5 minutes, the red flesh of the stalked barnacle, Mitella Polymerus, is reputed to taste like lobster. Closer to home, Pollicipes is reputed to be regularly on the menu at some homes on the Britany and Spanish coasts. Before getting too enthusiastic about this whole new source of food - a few words of warning. Barnacles can accumulate large amounts of toxic, heavy metal compounds. Those growing close to or actually on antifoulings should clearly be avoided. Better to use only those growing on rocks in clear, unpolluted waters.

After my disappointing and rather expensive experience in Trinidad, I was beginning to think that antifouls might not be such a good idea. At least in the tropics, the water is usually warm enough to swim down now and again with a pan scourer to dislodge any growths before they establish a good hold. At the same time, why not treat the hull as a kind of agricultural area? One could simply rub off, or weed out unwanted organisms, cultivating the best, most tasty varieties to mature unmolested.

The crop of goose barnacles we collected on our wind vane rudder after crossing the Pacific seemed just the job for some preliminary culinary experimental work. Harvesting them by clipping their heads off with a pair of scissors and catching them in a net was simple enough. After lightly "steaming in the Indian style" (as suggested in a biology text book) they looked almost appetising, not unlike a pot of cockles. As for their taste - well, suffice it to say they were not the most popular dish at the beach barbecue. Maybe at our next haul out, I'll just put on the old antifoul as usual.

Acknowledgements

My thanks for help with this article go to Gayle Davis-Merlen at the Darwin Scientific Station on the Gal pagos, and to Peter Sinclair of International Paints for showing me how properly formulated antifouls should perform.

