

The Invisibility of the Sea

A Brigstow Institute Working Paper

In 2017, Margherita Pieraccini (Law) and Laurence Publicover (English) brought together, with the support of the Cabot Institute, a group of Bristol academics from different disciplines and faculties to talk about their research on and concerns for the sea. Following a successful application to the Brigstow Institute, they then commissioned the artist Rod Harris to interview these academics, as well as an expert on cartography, before creating a series of artworks inspired by these conversations. Two of Rod's works were sited on the MV *Balmoral* while it undertook its summer cruises in 2017; the full exhibition, *The Invisibility of the Sea*, was launched at the Earth Gallery, Wills Memorial Building, in October 2017. It will remain there until the middle of April 2018.

What follows are images of Rod's artworks and some reflections composed by those involved in the project.



Rod Harris, *Antarctic Ocean*

Laurence Publicover, Department of English

(This piece is adapted from a talk given at the launch of 'The Invisibility of the Sea' in the Earth Gallery in October 2018, an event generously sponsored by the School of Earth Sciences.)

We live in a culture of sea-blindness. Principally due to containerisation and the mechanisation of ports, fewer people are involved in the business of seafaring; in Bristol

and London, rivers and harbours are now sites of leisure rather than routes towards ocean highways; the ports themselves have moved to sites like Avonmouth and Felixstowe. The



Rod Harris, *Brent Knoll*

development of affordable air travel has also, of course, had a profound effect on our relationship with the sea: very few of us now go on long sea-journeys as passengers, but instead hop across oceans as though they weren't there. The sea is no longer a significant barrier to travel, an alien element we need to overcome. We glance out of aircraft windows and might as well be looking at prairie, or desert.

For these reasons, and others, the sea has lost a lot of the cultural meanings it once had. And yet, more world trade than ever is taking place on the seas. Most of the clothes I wear and the electronic devices I use are, in some respects, maritime objects, as most of them have been carried across oceans. But to think of them in this way seems odd. In eighteenth-century England or France, a piece of Chinese porcelain would have had a maritime aura; the same could be said for an amphora of wine or olive oil in the ancient Mediterranean. These were objects whose value—whose cultural meanings—derived partly from having been transported, at some expense and effort, across deep water. You would struggle to say that you felt like that about your laptop or your cardigan.

This sense of the 'invisibility' of the sea was at the heart of our Brigstow project. But when Margherita and I gathered together scholars

working on the sea from subject areas as diverse as Chemistry, Archaeology, Earth Sciences, Law, and Literature, our interest was not only in the wider cultural phenomenon of sea-blindness, but also in how those who *worked* on the sea could be 'blind' to one another's research: how our views of the sea were independent of one another.

In this brief talk, I want to offer some sense of what the project set out to achieve, and what, thanks to Rod, it *did* achieve; and then I'm going to turn to my own discipline, literary studies—and to one text in particular, Herman Melville's *Moby-Dick*—to think about some of the ways in which literature can contribute to broader conversations about the sea and its future.

Working on literature, I am often thinking about the sea as a symbol or metaphor; and so working on this project has meant thinking, to a greater extent, about the *thing itself*—about declining fish stocks, bleached coral, rising temperatures, increased acidity, pollution from plastic, and so forth. But it is important to stress that the former influences the latter: *our way of thinking about the sea influences the sea itself*. Something frequently pointed out by scholars working in what has been called the 'blue humanities' or 'oceanic studies' is that the sea is often portrayed in literature and

other art forms as a wild space that lies beyond human influence—and, more specifically, a site in which we can *cleanse* ourselves.¹ The theologian-cum-anthropologist Kimberley Patton has demonstrated, in a wonderful book, that the sea is, across several cultures, thought of as a place that can ‘wash away all evils’; and this way of thinking about the sea, she and others have argued, has diminished our capacity to understand the damage we are doing to it.² Whatever the evidence to the contrary, something in the cultural psyche—of the West, at least—suggests that we can, without consequence, throw into the sea things we don’t want and don’t even want to think about—nuclear waste, for example. In a pattern of thought perhaps most apparent in the work of the Romantic poets, we also think of the sea as an element beyond human influence: as unchanging, sublime, even timeless. In such thinking, the sea is not quite invisible, but we remain blind to its real presence and to the damage we can do to it. This project, and the opportunity to talk to scholars from other disciplines, has helped me to think about these problems.

On the science side, what I hope this project has done is to ask those who work on the sea itself to think even harder about *human relations with and perceptions of* the sea. This is, I think, what humanities and law scholars are good at helping us think about—the presence and influence of social constructions of the world around us.³ And this is also, it seems to me, what Rod’s work brings out so beautifully. Rod has been concerned not only with the sea itself, but also with *how we see it*—with our maritime superstitions and our attempts to predict or pacify the sea; with the ways we map it, demarcate it, delineate it, and attempt to claim ownership over it; with our attempts to understand its depths while measuring them in ‘fathoms’, a unit of measurement derived from the human body

(specifically, the amount we can get our arms around). The ‘Antarctic Ocean’ and the ‘Marine Environment’ pieces use elements of the real ocean in their materials, but they also beautifully suggest the very human, and in some respects anthropocentric, ways in which we experience the sea: by, for example, isolating one facet of it—its depth—to try to comprehend it.

Rod’s barometers, meanwhile, begin with an interest in our measurement of atmospheric pressure, a measurement it’s necessary to take while at sea; but they also help us think about different kinds of pressure in relation to the sea: the cultural pressures that arise when people travel across the oceans; the environmental pressures our activities place on the seas. What I especially like about the barometers is how they invite us to decode them—reminding us of our own tendency to ‘read’ the sea as a symbol: as something that requires human interpretation—and how they juxtapose ideas without imposing on them a clear narrative structure. In this latter respect, they seem to me to capture the problem of disciplinary atomisation I spoke of a moment ago; Rod has picked up the challenge we set him and thrown it back in our faces.

What characterises much of the best writing about the sea, in my view, is how it explores the relationship between the oceans and human understanding. Even in cultures far less sea-blind than our own, poets and novelists have been interested in how difficult it is to *think* about the sea—about how doing so makes us think about *how we know what we know*. Herman Melville’s *Moby-Dick*, first published in 1851, is sometimes called the ‘Great American Novel’; but it’s a very strange kind of novel. My students often expect to find in it a fast-paced adventure narrative, only to

¹ See, for example, Dan Brayton, *Shakespeare’s Ocean: An Eco-Critical Exploration* (Charlottesville: University of Virginia Press, 2012).

² Kimberley C. Patton, *The Sea Can Wash Away all Evils: Modern Marine Pollution and the Ancient Cathartic Ocean* (New York: Columbia UP, 2006).

³ For one of the best studies of this phenomenon, see Philip Steinberg, *The Social Construction of the Ocean* (Cambridge: Cambridge University Press, 2001). Daniel Heller-Roazen’s *The Enemy of All: Piracy and the Law of Nations* (New York: Zone Books, 2009) thinks in fascinating ways about legal definitions of the sea in relation to piracy.



Rod Harris, *The Barometer of the Invisability of the Sea*

discover that it has very little of what we might traditionally think of as 'plot'. As much as a literary narrative, it's an encyclopaedia of whaling and the whale, and it's also a philosophical treatise disguised as a novel. The maritime world appears to be the perfect setting for such a text.

The passage I'm about to quote and then discuss comes in a chapter called 'The Castaway'. All you need to know by way of context is this: Pip, the black cabin boy on Captain Ahab's ship, is not someone who would usually get into the boats lowered to pursue a whale, but circumstances on board mean he is forced to take an oar. The first time he does this, in the boat of the second mate, Stubb, he is terrified and jumps out, forcing the chase to end prematurely. Stubb says that the next time Pip jumps, he'll leave him behind on the ocean. Soon afterwards Pip does jump

again, and Stubb is as good as his word. He doesn't mean for Pip to be abandoned: he thinks that one of the other whaleboats will pick him up. I'll let Melville take over:

But it so happened, that those boats, without seeing Pip, suddenly spying whales close to them on one side, turned, and gave chase; and Stubb's boat was now so far away, and he and his crew so intent upon his fish, that Pip's ringed horizon began to expand around him miserably. By the merest chance the ship itself at last rescued him; but from that hour the little negro went about the deck an idiot; such, at least, they said he was. The sea had jeeringly kept his finite body up, but drowned the infinite of his soul. Not drowned entirely, though. Rather carried down alive to wondrous depths, where strange shapes of the unwarped primal world glided to and

fro before his passive eyes; and the miser-merman, Wisdom, revealed his hoarded heaps; and among the joyous, heartless, ever-juvenile eternities, Pip saw the multitudinous, God-omnipresent, coral insects, that out of the firmament of waters heaved the colossal orbs. He saw God's foot upon the treadle of the loom, and spoke it; and therefore his shipmates called him mad. So man's insanity is heaven's sense; and wandering from all mortal reason, man comes at last to that celestial thought, which, to reason, is absurd and frantic; and weal or woe, feels then uncompromised, indifferent as his God.⁴

What on earth has happened to Pip? I want to break his experience into horizontal and vertical axes, both of which connect the human experience of the sea to human knowledge. At first, we're told, Pip's 'ringed horizon began to expand around him miserably'. It's difficult to know precisely what Melville means by this. Presumably Pip's eyesight doesn't suddenly improve when he's left alone, bobbing on the ocean, so that his vision stretches further and further. Perhaps we are supposed to understand that the horizon of Pip's vision is constituted by the last man-made object he can see, the whale-boat; as this shard of human life on the alien ocean gets further and further away, so Pip's vision 'miserably' tracks it; watching the boat recede into the distance, he feels more and more alone. Once the boat gets beyond his vision entirely, perhaps, this process continues, so that we are thinking now not of distance, but of time, with Pip becoming more and more miserable—more and more alone—the longer he goes without a glimpse of the man-made world.

The notion of being alone on a wide, wide sea is a powerful one: it's bad enough if you're alone in a boat, as is Coleridge's Ancient

Mariner; it's even worse if, like Pip, you have no human object to remind you of who you are. The philosopher Charles Taylor, in his classic work *Sources of the Self*, describes the ways in which someone's sense of self is shaped by a 'spiritual view or background [that] provides the frame within which they can determine where they stand on questions of what is good, or worthwhile, or admirable, or of value'. Should someone lose their sense of 'framing', Taylor remarks, 'they wouldn't know anymore [...] what the significance of things was for them'. Intriguingly, when seeking a way to describe this condition, Taylor reaches for the language of the sea. Someone who had lost all sense of commitment to a spiritual view or background, he writes, 'would be at sea, as it were'.⁵ The beginning of the passage from Melville appears to me interested in such questions. Pip, devoid of human contact of any kind, loses a grip on who he is. The vast, empty sea strips him of self-knowledge. At the end of the passage we learn that the experience of being at sea has fundamentally changed Pip's social identity: after he has been rescued, he roams the deck of the *Pequod* 'an idiot', and 'his shipmates call him mad'.

But this is not the only way the passage thinks about the relationship between the sea and human knowledge. The expansion of Pip's ringed horizon is the prelude to the extraordinary underwater passage which suggests that Pip *gains* knowledge from the sea, but a knowledge that neither he nor the narrator, Ishmael, appear able fully to communicate. Melville speaks elsewhere of 'thought-diving': he likens the process of philosophical speculation—*deep* thought, if you like—to diving into the watery element: sounding the depths. Why does he use this metaphor? The deep sea is a powerful symbol for the unknown, for Melville and others, because of its suggestion of the hidden, the inaccessible, and in many cases—as in the passage involving Pip—the divine. Pip experiences a revelation; he is privy to a

⁴ Herman Melville, *Moy-Dick*, ed. by Tony Tanner (Oxford: Oxford University Press, 1988; repr. 2008), pp. 371-2.

⁵ Charles Taylor, *Sources of the Self: The Making of the Modern Identity* (Cambridge: Cambridge University Press, 1989), pp. 27-8.

previously-inaccessible truth, seeing 'God's foot on the treadle of the loom'.

What interests me most about this passage, however, is not what it says, but how it says it. Its language, elegant but perfunctory at the opening, morphs as the paragraph unfolds into something less transparent, less easily fathomable, as though the meaning Melville is communicating is disappearing down into the depths with Pip. Organised sentences fragment into fluid, gorgeous, but obscure phrases, with words cascading over one another: 'and among the joyous, heartless, ever-juvenile eternities, Pip saw the multitudinous, God-omnipresent, coral insects, that out of the firmament of waters heaved the colossal orbs'. Reading in a 'scholarly' fashion affords the luxury of looking back over such passages, focusing on individual words and asking what they're doing; but the real power of this episode in *Moby-Dick*, I think, comes from what it's like to experience it as, I presume, you've just read it: as an agglomeration of language that is excessive, that crashes over us before we

have time to process it. It's the passage's form, as much as its content, that expresses what Melville is getting at here: the obscurity of the sea and our difficulty in comprehending it.

This is how many authors write about the human experience of the sea. (William Shakespeare and Adrienne Rich would be two others.) In thinking about the sea, and in particular its depth, poets and novelists employ language whose syntax seems bent out of shape, rather as a Styrofoam cup is compressed by water pressure if you lower it far enough into the deep; they compose language which seems ill at ease with itself, conscious of its own obscurity. And it's with this thought that I want to finish. Literature can help us think about our relations with the sea precisely by pointing out our difficulties in establishing such relations; like Rod's artworks, which use elements of the sea to represent the sea, it can point up its own constructed-ness: its attempt, which will always remain only an attempt, at presenting the sea 'as it is'. It does not claim transparency.



Rod Harris, *The Barometer of the Sea*

I don't think such artistic approaches to the sea should be regarded simply as defeatist—as resigned acknowledgements that we can never truly know the sea. Instead, I would want to look at them rather more optimistically. In trying to capture the essence of the sea, these authors break out of their usual structures of syntax, even of grammar; they usefully show us, I think, how the sea escapes our usual structures of thought. And this brings me back to where I began. Culturally, we struggle to think about the sea, to think of it as part of our world and part of our sphere of influence; for all the prevalence of beach holidays and all the popularity of programmes like *Blue Planet*, we remain in many respects sea-blind. This makes it difficult for us to think, as a wider public, about the future of the sea—about the effects of deep sea mining, for example, which would appear to be the next frontier in human

Rod Harris, Artist

My fellow artist Emma Stibbon asked me if the large print “Ancient marine environment”, which illustrates 300 million years of rocks created beneath the sea, was a self-portrait, as it is my height in width and a print of where I was born and grew up. In a way it is a self-portrait, and implies that we all have an emotional connection to the place we are from. The connection often manifests itself through the colours of a particular home landscape or geology.

Clothing is also historically associated with place or ritual of place: the colour of football shirts, or specific ethnic clothing, links us to a specific club or belief often associated with place. These affiliations are almost always land-based; when “at sea”, we are in another place and are in this sense rootless, and this way of describing such a condition affirms our connection with a particular piece of land – a piece of land which forms our identity. This notion is further strengthened by the term “ashes to ashes”: when we die, this suggests, we return to the materials of which we are made. Though there is also a sense in which we are all from outer space, as we contain

exploitation of the sea. The passage from *Moby-Dick* also points us towards our need, as scholars working on the sea, to break out of the structures of thought provided by our disciplines—by talking to one another; by nudging one another into new areas of perception. We need to get better at thinking with the sea, and literature has a role to play in this because literature helps us to think about how we think about things; it doesn't provide answers, but it may help us formulate questions and recognise blind spots.

I am not sure where our conversations about the sea, as academics and as global citizens, will go. But Rod's exhibition has helped us further them. Like a camera rotating around an object to provide a three-dimensional image, it has begun to make the sea's invisibility more apparent, at least to me—and has in that way made the sea *more* visible.

minerals and materials brought to Earth, we probably contain far more minerals from the land of our heritage or where we grew up; in this sense, too, our identity is linked with place.

There is an intentional “truth to materials” aspect to the work. The materials or colours are not altered, but are shown just as they are, hand ground and mixed with a linseed oil-based transparent medium. I do not make any aesthetic decisions about which colour goes where; their position on the print is determined by their geological position. Truth to materials is a tenet of modern architecture (as opposed to postmodern architecture), which holds that any material should be used where it is most appropriate, and its nature should not be hidden. When using these geological materials in printmaking it's important that colour is presented as accurately as possible.

The project has changed my approach to my art—and to life more generally—in that I am more acutely aware of the environmental implications of my actions and behaviour. I

also have a deeper appreciation of the sea. I already loved being near the sea, but now I have greater respect for it.

Our reality is often governed by the stories we tell ourselves: about our history, our identity, and our relationship to the earth. For me, the project has challenged some of the assumptions behind those stories

Margherita Pieraccini, Law School

The international community recognises the need to conserve and sustainably use the oceans (SDG n. 14, Agenda 2030). There are a number of legally binding instruments with the concept of sustainability and sustainable development at their core. These range from the United Convention on the Law on the Sea 1982, to regional instruments such as the 1992 Oskar Convention, the EU Marine Strategy Framework Directive (2008/56/EC) and domestically, the Marine and Coastal Access Act 2009. The law does point to a protection of the marine environment that attempt to reconcile different uses of the sea. Employing the concept of sustainable development indeed can be read as a call for balancing and integrating economic, social, cultural and environmental considerations.

However, being able to accommodate and reconcile the various interests is problematic. As the “Barometer of the Sea” shows us the scale of justice is surrounded by multiple perceptions and understandings of the sea that cross both temporal and spatial boundaries. Recent legal attempts to reconcile the various interests and uses of the sea can be found in the recent development of marine spatial planning under the Maritime Spatial Planning Directive (2014/89/EU) and domestically under Part 3 of the Marine and Coastal Access Act 2009. Deciding which interests and perspectives count should ultimately be a collective effort to be carried out in deliberative fora to enhance maritime democracy and avoid marginalising certain voices.

Kate Hendry, School of Earth Sciences

As a marine scientist, I work on the flow of nutrients and food through ecosystems and around the oceans – today and in the past. It’s all too easy to become buried in the details of research, and it’s in working with Laurence, Margherita, Rodney, and the rest of the team, on the *Invisibility of the Sea* project, that I’ve been able to take a few breaths and reflect on what it means to be a marine scientist, the challenges that face us, and the role that communication of science - and social media - plays in marine conservation. Rodney’s art exhibition formed the central pivot around my collected thoughts. In particular, my favourite work of his, *Antarctic Ocean*, reminds me of

my beloved Antarctica, but also makes me think about its fragile future: by picking out the different nature of the natural deposits of sediments in the ocean around Antarctica, Rodney’s work makes me think about what we’re doing to change the balance, as there have been more and more reports coming out about the increasing human fingerprint on the Southern Ocean and Antarctica.

And yet, there is an important positive message to come out of our collaborative project as well: the need to tell our stories of the ocean, and to recapture our wonder of the deep. My thoughts are summarised so well in



Rod Harris, *North Atlantic Sea Bed*

a quote from a 2013 TEDx talk by marine science writer, Helen Scales:

“I’ve been lucky enough to spend a lot of time diving and researching in oceans around the world. I’ve seen beautiful bizarre things and I’ve also witnessed many of the problems that the oceans face. I’ve felt the squeeze of a seahorse’s tail and I’ve seen hundreds of dead seahorses on sale... And there came a point when I decided doing research for myself wasn’t enough and I wanted to share these stories... essentially I’ve become one in a long line of ocean story-tellers. For

millennia people have pondered this alien realm filled with strange, scary creatures, and have told stories to try and understand that. The only difference now is that there’s never been a more vital time for people to hear these stories, because human actions are ruining the oceans like never before. And the only way we’re going to change that - I think - it is if people know about this and if they care about some of the things that live there. And what better place to start than to have your mind spin with stories of real sea monsters.”

Tamsin Badcoe, Department of English

To speak of seeing the sea still sounds to me like a statement of pleasures anticipated: the homophones revive childhood memories that recall the first glimpse of a promised horizon. For the purposes of this project, however, as its title ‘The Invisibility of Sea’ suggests, we tried to recalibrate our visual, tactile, and aural horizons somewhat differently: by reading across disciplines we attempted to attend to the parts of the sea that

remain unseen or often ignored, whether through impassibility, negligence, or owing to the limits of our ways of knowing and imagining. To begin with an anecdote, I will always remember the first time I saw the horns of narwhals: detached from their long-lost bodies and displayed in Whitby museum, together with such items as a ‘sea bishop’, and a Hand of Glory found concealed within a wall, I felt their spiralling length test the limits of



Rod Harris, The Barometer of the Superstition of the Sea

what I believed to be possible in the underwater world. At this most gothic of coastal locations – still more a cabinet of curiosities than a public gallery – the portability of marine objects resulted in a confrontation that can only be described as *uncanny*. I know narwhals to be real enough though I have never encountered one in life; yet, framed thus, they seemed creatures of myth and superstition, and their horns relics of a place unseen.

In my work on the representation of experiencing the sea in medieval and early modern literature and culture, including the ways in which poets, satirists and preachers engage with the sea as both a physical site of testing and an allegorical figuring of existence, I have been drawn to confrontations between devotional and geometrical approaches to the arts of navigation. The Hereford Mappa Mundi, for example, which is centred on Jerusalem and envisions a tripartite world wrapped around the Mediterranean Sea, is full of textual and visual detail that is rendered on the cusp between wonder and legibility. Some of the

inhabitants of the map's margins, such as the Sciapods and Blemmyes, have found their way on to Rod's 'The Barometer of the Sea', as relics of an ancient encyclopaedic tradition that includes the monstrous: a way of understanding the world that recovers the etymological origins of monstrosity and its capacity both to demonstrate and admonish. It seems fitting that they sit, as part of this work, beside a greenhouse and pair of scales, registering different kinds of measurement, limit and im/balance, and recalling the barometer's function as an instrument for gauging variations in pressure. In its inclusion of a sand-timer, 'The Barometer of Superstition of the Sea' participates in a similar visual language of warning; yet, what I find most interesting about Rod's pieces is the interpretive work they require of the viewer. The inert needles of the instruments are only capable of motion in the mind's eye, creating charged correspondences as the eye flickers from one icon, or emblem, to another.

By contrast, the tranquil luminescence of 'Antarctic' and the striations of the geological cross section, 'Marine Environment' seem to play a complementary visual game; in

‘Antarctic’ the ocular quality of the polar seas is arresting, appearing iris-like around a blank centre, and in ‘Marine Environment’ subterranean layers resemble seams of subcutaneous muscle. Historically, cartographical *terrae incognitae* are sites of epistemological testing, anxiety, and speculative projection, but for the purposes of ‘Antarctic’, in particular, the centrality of the landmass as a negative space redirects the gaze outwards: seabed meets lapis lazuli in a

fusion of surface shimmer, material depth, and sacred colour. Like the Hereford Mappa Mundi, the image is arresting, reviving the meditative practices that are intrinsic to early cartography; yet, unlike the busy fullness of a centred world, imagined by the medieval mapmakers in response to a weight of tradition, here the centring of negative space seems to speak of a new, if fragile, kind of resonant potential.

Diana Manson, Cartographer, Land Use (Bristol)

What I found really thought provoking, in the discussions I’ve had during the project, was the idea that we look to space as the future and the ocean depths as the past. I really enjoyed speaking to Rod about mapping, in particular. His use of words like ‘pigments’ contrast with my use of words like ‘symbology’ and ‘RGB values’ to describe what is essentially the same thing.

The symbols on the barometers were a good reminder of the effort that went into historic mapping – specifically, the use of icons and art to bring out the character of a place. This gave me lots to think about in terms of how I use my white space!

Daniela Schmidt, School of Earth Sciences

We rely on our oceans for oxygen, food, transport, recreation, coastal protection and regulating climate for habitability. The uncomfortable truth is that the health of our oceans is under threat due to man-made changes. Increasing noise and plastic pollution, sea level rise, over-fishing, coral bleaching and ocean acidification are all threatening to ocean ecosystems and to us, who benefit from the ocean.

We often forget that blue environments contribute significantly to our wellbeing and mental health, as we are more active in these environments and often in a more positive mood. The economic impacts of climate change are largely variable in their impact across the globe and across industries

(http://ec.europa.eu/research/sam/pdf/topics/food_ocean_sapea_report.pdf). Some countries will face the double jeopardy of negative impacts on both agriculture and fisheries. We need to ensure that we support countries with low adaptive capacity but increasing food demands while at the same time “conserving and sustainably using our ocean, seas and marine resources”.

Action is imperative for us in times of increasing mental health issues and low-income food-deficient societies around the world. For further thoughts on the ocean’s role in feeding the world, and thus the importance of keeping the marine ecosystem healthy and diverse, see the following article, published in *The Conversation*:

<https://policybristol.blogs.bris.ac.uk/2018/01/05/putting-algae-and-seaweed-on-the-menu-could-help-save-our-seafood>.

Rich Pancost, School of Chemistry

I find Rod's artwork to be profoundly moving, perhaps arising from my own complicated journey from the landlocked US state of Ohio to living on an island and devoting my life to understanding the nature and history of our mysterious oceans. I grew up on a dairy farm, about as far from the sea as you can get, physically and culturally. In particular, the daily and inflexible demands of dairy farming meant that vacations were rare, and I only saw the sea once or twice growing up. In those early days, Lake Erie was my analogue for the Invisibility of the Sea. I grew up with its history, from famous Revolutionary War battles to battles with pollution; I fished on Lake Erie with my Aunt and Uncle, even though we were cautioned not to eat too much of the perch and walleye that we caught; to pay my way through University, I studied invasive zebra mussels; and my family and friends went to 'North Coast' beaches for picnics and parties. But it was not the Sea. There was no vastness; there was no depth.

Ironically, my first profound relationship with the Sea came from going further inland, during my geology degree and PhD training and research. It was not the Sea of our modern world. It was the sea explored and imagined via the sedimentary rocks deposited in ancient oceans tens of millions of years ago. I studied and still study times of mass extinction, dramatic climate change or periods of profound chemical transformation, all manifested through the fossils – especially molecular fossils – produced in those ancient seas, buried in sediments and preserved in magnificent sequences of sedimentary rocks. Sometimes it seems that my work borders on the mythical as I study these ancient, secret seas that no longer exist. I study ammonites, belemnites and plesiosaurs, cyanobacteria and thaumarchaeota, in ancient oceans such

as the Western Interior Seaway, the Permian Basin, the Tethyan and Panthalassa Oceans, at locations such as Tarfaya, Zumaia and Lomonosov Ridge, at Kheu River and Waipara and Meishan.

This sense of mystery arises from time and space – the vastness of the ocean, its mercurial nature and its inscrutable depths, but also the billions of years of Earth history it records. It is why it is home to so many myths. Rod's work captures the mystery and superstition with which ancient seafarers regarded the ocean – a place of ritual and norms, of sea serpents, mermaids and mythical beasts, of Odysseys. All of his 'Balmoral Barometers', especially but not only the *Barometer of the Superstition of the Sea*, capture our fraught relationships with this vast and seemingly unknowable body. And the vastness of the oceans and their invisible depths allow such myths to persist. We no longer believe that dinosaurs will be found in an isolated corner of the Amazon, but some still cling to beliefs that we will discover a buried Atlantis or prehistoric mega-sharks, 20-m long Miocene Megaladons still preying on giant squid or baleen whales in the great dark deep of the ocean.

This is the Invisibility that has always fascinated me. I have now been on research expeditions across our Seas and dived via submersible to the bottom of the Mediterranean. I am fascinated by both the surface and deep ocean and the different relationships we have with each. When we think of the 'Sea', I think we emotionally connect differently to its volatile surface and its infinite, mysterious depths. The surface is what we experience in trade, slavery, migration, travel, holiday snorkelling and exploration; this is what provides escape from

persecution, threatens us with sea level rise, is the source of most of our fish, where sailors lose their lives; it is the network of ocean roads that support our global economy and sustained a global slave trade. In contrast, the deep ocean is vast, mysterious and constant – a home to krakens, hidden prehistoric sharks and lost cities but also limitless resources and room for waste.

More recently, however, it has become clear to me that for most of us *all of the ocean* remains invisible. We do not see the plastic or toxins in the ocean – plastics that now form islands of trash and can be found in every part of the ocean. We do not see the incremental but biologically devastating increases in temperature and decrease in pH due to increasing carbon dioxide in our atmosphere. We can measure those. But as a society we do not see *them*. *The sea is invisible*. Perhaps even more invisible now, despite our many scientific advances, than in the past when it was so intimately connected to our daily lives. This is where mystery meets apathy. Our assumptions, our view of the sea, are informed from earliest history, when only tens of millions of humans lived on the planet and our impact was small and could be absorbed, when a deep ocean could be a home to sea serpents and krakens and be a repository for our rubbish. On my first research expedition we

discovered, half-buried in 2-km deep mud just north of Crete, a magnificent 2-m tall amphora but also plastic bottles: similar waste from separate millennia. Ingrained in us is the belief that the ocean is a great constant, impervious to human action.

It is not. Those sedimentary records tell us otherwise. Its circulation can change; its chemistry can change; its biology can change. It is evident in Rod's *Brent Knoll*, each colour made from a different bit of the sea's sedimentary history and each representing a profound change in those ancient oceans. Although the oceans have been a constant during humanity's brief domination of the planet, they can change. And now they are changing at a pace perhaps unprecedented in the history of our planet. Because of us.

We have allowed that to happen not because the sea is 'invisible' but because we have chosen not to see. But we are no longer allowed the privilege of blindness. Ocean warming is devastating our coral reefs, plummeting fish stocks are causing us to raid the ocean depths to feed our growing population, toxic blooms of algae kill fish and blight our beaches, and plastic... is everywhere. Much of the sea was invisible to our ancestors. We do not have that excuse.

The Invisible and Inconstant Deep Sea

Today, the deep sea is a dark and empty world. It is a world of animals and Bacteria and Archaea – and relatively few of those. Unlike almost every other ecosystem on our planet, it is bereft of light and therefore bereft of plants. The animals of the deep sea are still almost entirely dependent on photosynthetic energy, but it is energy generated kilometres above in the thin photic zone. Beneath this, both animals and bacteria largely live off the scraps of organic matter energy that somehow escape the vibrant recycling of the surface world and sink to the twilight realm below. In this energy-starved world, the animals live solitary lives in emptiness, darkness and mystery. Exploring the deep sea via submersible is a humbling and quiet experience. The seafloor rolls on and on and on, with only the occasional shell or amphipod or small fish providing any evidence for life.

And yet life is there. Vast communities of krill thrive on the slowly sinking marine snow. Sperm whales dive deep into the ocean and emerge with the scars of fierce battles with giant squid on which they feed. And when one of those great creatures dies and its carcass plummets to the seafloor, within hours it is set upon by sharks and fish, ravenous and emerging from the darkness for the unexpected

feast. Within days the carcass is stripped to the bones but even then new colonizing animals arrive and thrive. Relying on bacteria that slowly tap the more recalcitrant organic matter that is locked away in the whale's bones, massive colonies of worms spring to life, spawn and eventually die.

But all of these animals, the fish, whales, worms and amphipods, depend on oxygen. And the oceans have been like this for almost all of Earth history, since the advent of multicellular life nearly a billion years ago. This oxygen-replete ocean is an incredible contrast to a handful of events in Earth history when the deep oceans became anoxic. Then, plesiosaurs, ichthyosaurs and mosasaurs, feeding on magnificent ammonites, would have been confined to the sunlit realm, their maximum depth of descent marked by a layer of bright pink and then green water, pigmented by sulfide consuming bacteria. And below it, not a realm of animals but a realm only of Bacteria and Archaea, single-celled organisms that can live in the absence of oxygen, a transient revival of the primeval marine ecosystems that existed for billions of years before complex life evolved.