Things Unseen

Previous page: Beach, Houghgarry, North Uist, 2009

Anne Bevan

Robert Alan Jamieson

Kate Darling

Alan Spence

Janice Galloway

Jen Hadfield

‘Strange and beautiful things were brought to us from time to time,
which seemed to give us a glimpse of the edge of some unfamiliar world.’

— Sir Charles Wyville Thomson, *The Challenger Expedition,* 1876

THE SENSE OF WONDER and possibility evoked by Charles Wyville Thomson's words intensifies as we learn about the important scientific work undertaken during the Challenger expedition when scientists first obtained proof that life exists in the depths of the oceans. Wyville Thomson's 'unfamiliar world' is one in which marine species hold information about the past and future, on earth and beyond. One such organism, the single-cell foraminifera, holds within it a record of the earth's development. This microscopic form is the focus of artist Anne Bevan's recent work, which has often been concerned with water, the sea, and the idea of 'making the invisible visible'. Using science and creative processes, including 3D imagery and microbiology techniques, Anne has altered the scale of this tiny organism, transforming it from microscopic to human scale, through processes of casting, modelling and printing. She brings the artist's sensibility to reveal connections and layers of meaning, drawing us again to the wonder of the object.

DNA techniques are now used to decode information that can locate the specific environments in which individual foraminifera have developed. These scientific voyages of discovery, whether in the research laboratory or on the oceans, share common ground with the artist's own journeys for the making of work – collecting and sampling from beaches in Shetland, Japan and the Hebridean island of North Uist, travelling coastal waters to locate material that both informs and becomes the work.

Things Unseen hosts a dialogue around the research process and the development of work, specifically in relation to the subject of marine sciences. The writers Robert Alan Jamieson, Alan Spence, Janice Galloway and Jen Hadfield have been invited to collaborate with the artist, and to reflect on the processes, history and experiences alongside scientist Kate Darling whose research into foraminifera is the starting point for this publication.

— Jane Warrilow

Ghost, 3D acrylic resin print, 2012

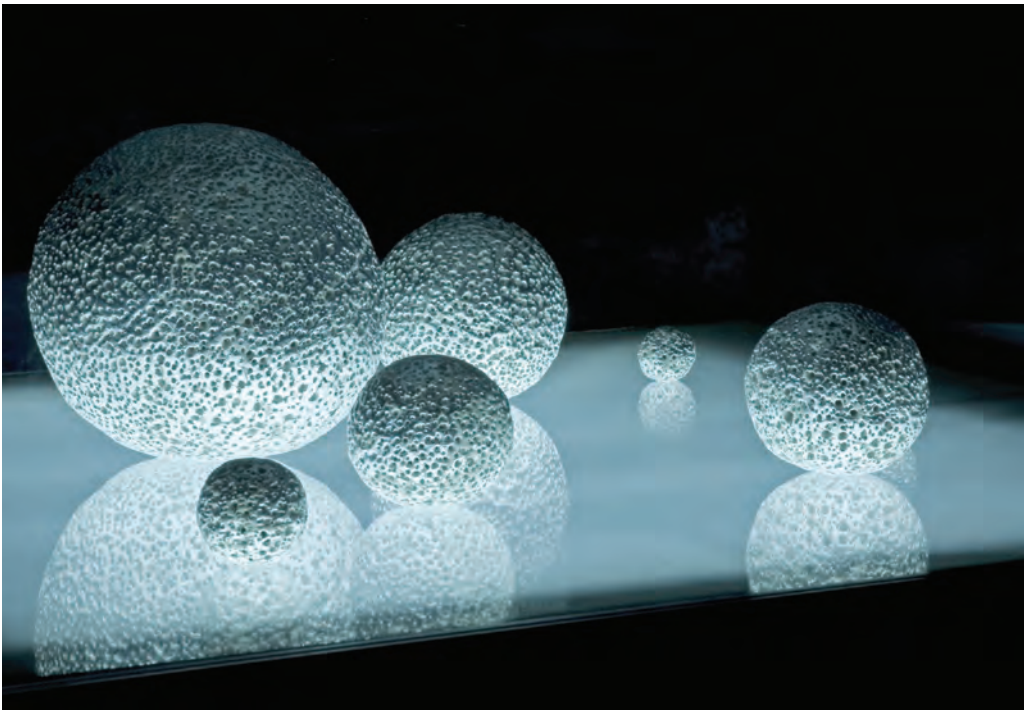
Yes, when we peer inside
there's infinitesimally more
than dappled whorls

there is this habit of
seeking pattern, of apophenic
reading fortunes

an imitation at the ear
a cosmic whistling through
the world of other world sense

a breezy reel of particle –
this life is only gravity
twisted through the mud
by the body suckling ocean

— Robert Alan Jamieson



Nova, clay with silver leaf, 2009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Forams
3 perspectives
Kate Darling

1

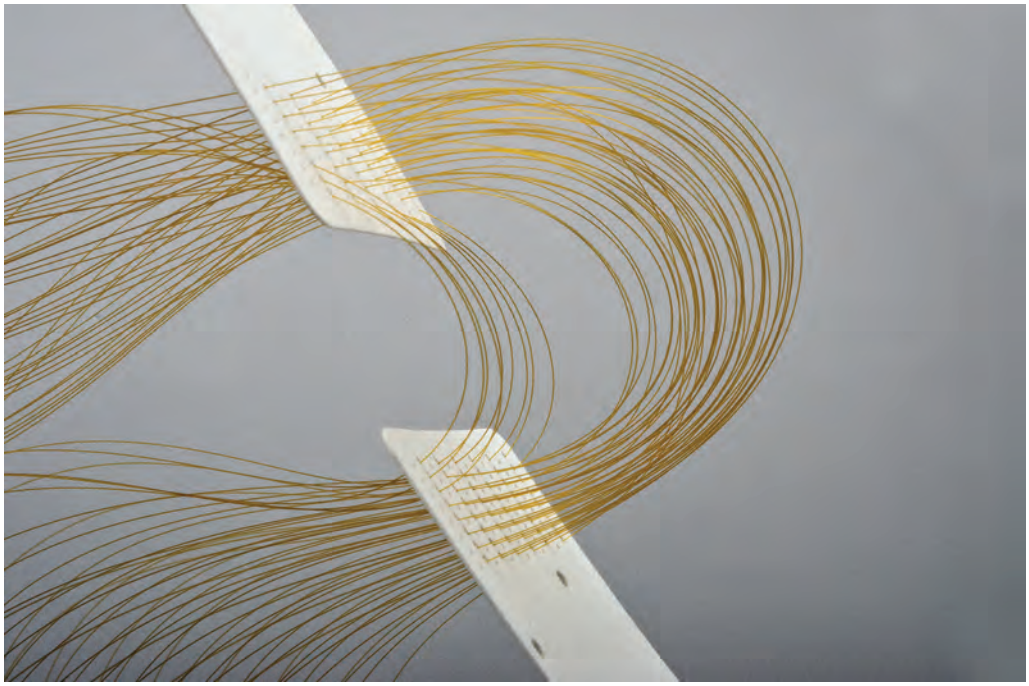
The foraminifera (forams) are an important group of single-celled organisms that live in the ocean. Their hard shells of calcium carbonate preserve as microfossils in the ocean sediments where they have accumulated to great depths over long periods of time. Here they not only become a very important component of the global carbon reservoir but form one of our most complete fossil records on earth. Since forams evolve through time, they can be used as markers to date sedimentary rocks and study evolutionary processes. They are also one of our most important archives of past climate. Considerable environmental information can be obtained from the sediment time slices using evidence from the foram species assemblages and the chemistry of their shells. We can understand foram diversity using modern DNA fingerprinting, their biogeographic distribution, their adaptations to the modern ecosystem and work out how they become imprinted with a chemical record of the environment in which they grew. We can then use this information to reconstruct events in the past such as the catastrophic extinction of the dinosaurs following the meteor impact, the more recent glacial cycles or our current escalating climate change.

Opposite page: Ocean Bottom Residue Collection, Natural History Museum, London

Following page: DNA sequencing machine (detail)

2

Forams are amazing. There are trillions and trillions of them in the ocean. Their beautiful tiny shells have fallen like rain to the bottom of the ocean since the time of the dinosaurs. They form lots of layers just like the pages in a book. The shells in each layer are different and every one tells a story about the changing history of our world. They can tell us how living things change as time goes by and even why they sometimes completely disappear. From the different chemicals in their shells we can work out what the weather was like where they lived. This is really important, as it helps us find out why the climate is changing and to see into our future.



3

Traditionally, all planktic foraminifera have been seen as monophyletic, descending from a single benthic group in the late Early Jurassic. Although limited in resolution, foraminiferal molecular phylogenies hint that this is unlikely to be true. In many ways it would be quite surprising if it were such a singular event since there is constant opportunity to bridge the benthic/planktic divide. The transition zone of the outer continental shelf and upper slope is an area of seasonally high biological productivity and shifting water masses where the thermocline, chlorophyll maximum zone and oxygen minimum zone (OMZ) interface with benthic habitats. This dynamic interface makes it a likely 'bridge' for benthic forms to invade the planktic realm.

Buoyancy is generally assumed to be one of the major constraining evolutionary traits on the passage from benthos to plankton. In the modern ocean, propagules of benthic forms are widely dispersed in suspension and a few benthic taxa produce reproductive float chambers containing gametes. Benthic taxa are also regularly observed in plankton tows over the shelf and off the shelf break in turbulent waters. Lacking buoyancy, they are thought to sink back to the benthos as high energy waters subside. But is this true for all of them? Today, microperforate biserial and triserial planktic forms appear off the continental shelf edge in large numbers, often associated with wind driven upwelling. We now know that the biserial forms lead a dual lifestyle as molecular evidence shows that the benthic morphospecies *Bolivina variabilis* and the planktic *Streptochilus globigerus* are the same biological species with the ability to occupy both planktic and benthic habitats. Geochemical data show that this ecologically flexible species can actively grow in both the seafloor sediments of a continental shelf or in surface waters of the open ocean far offshore. The existence of such a 'tychopelagic' mode of life in foraminifers provides a glimpse at a possible mechanism by which planktic lineages may have evolved multiple times from benthic ancestors since Jurassic time.

Opposite page: *Ebb*, sycamore, glass, sand, 2012 (detail)

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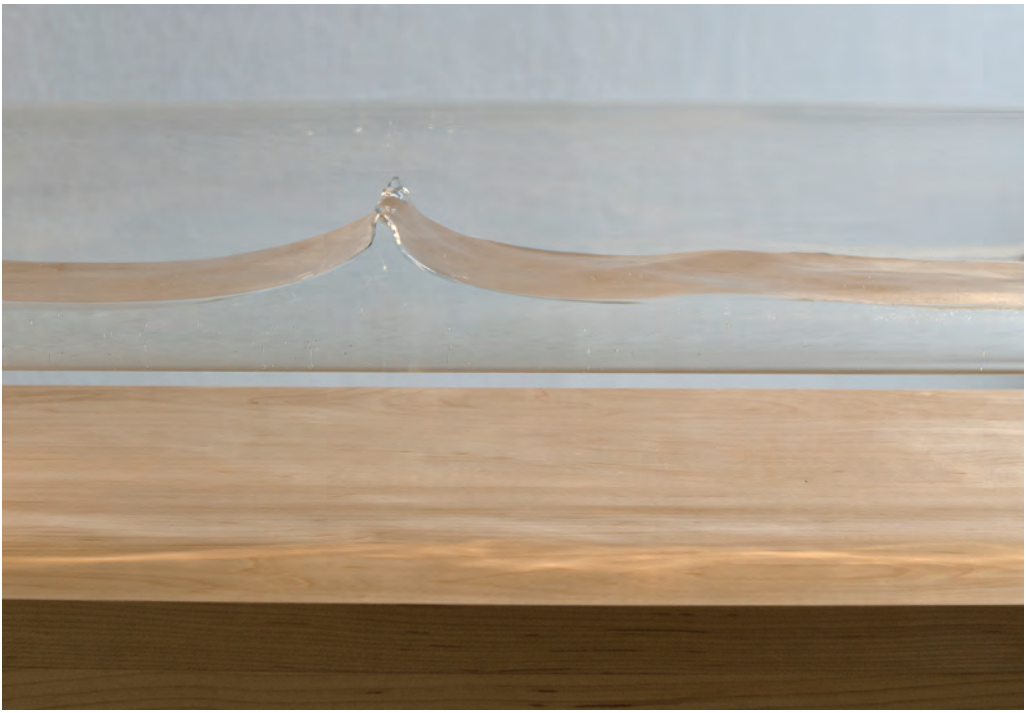
Above: *Flow*, maple, glass, water, foraminifera, 2012

Opposite page: *Ebb*, sycamore, glass, sand, 2012

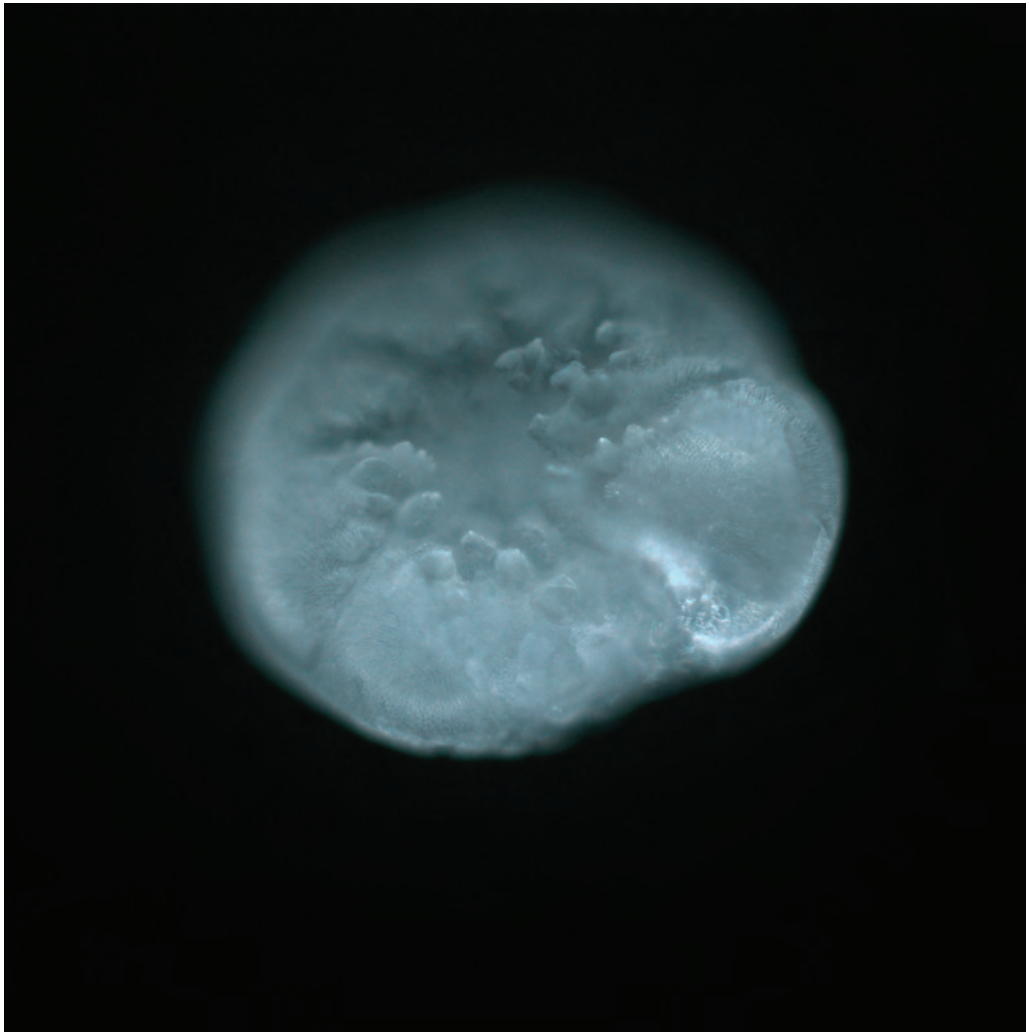


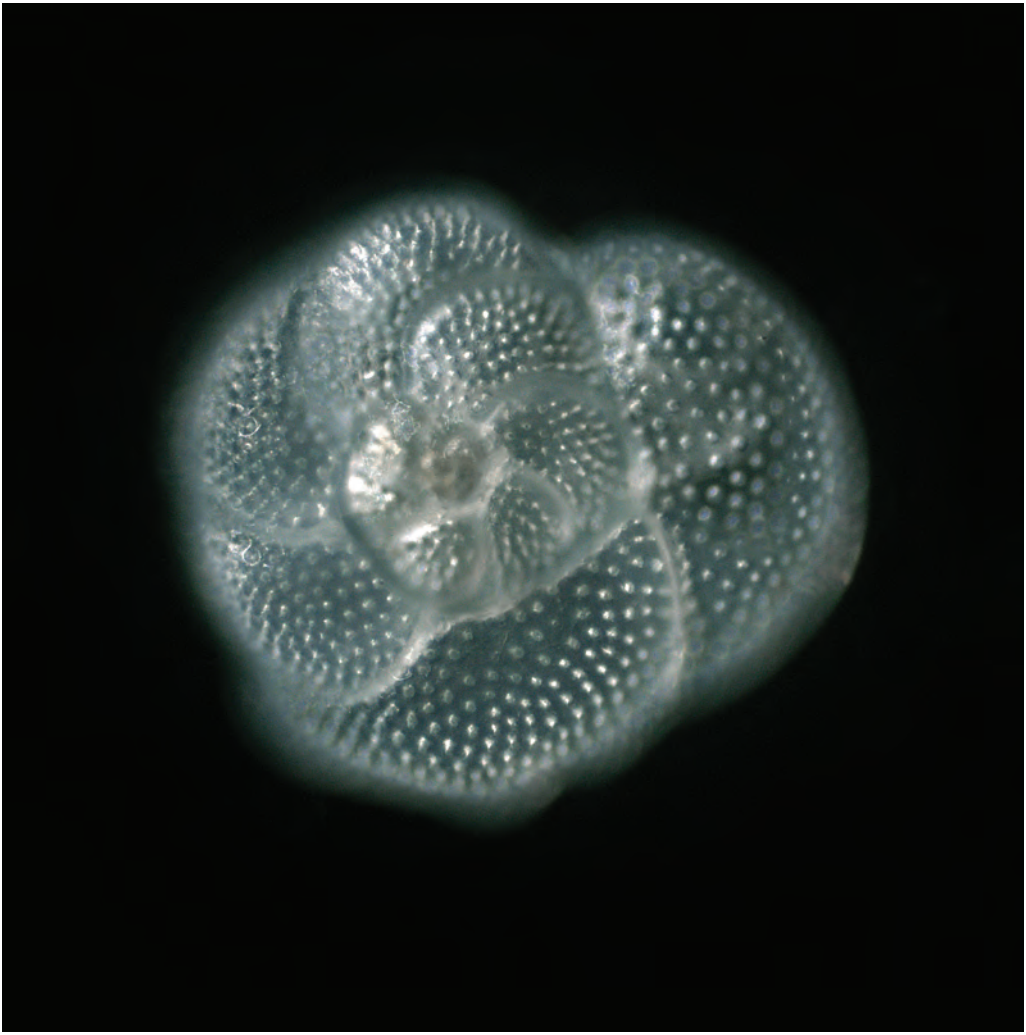
Flow, 2012 (detail)

at the heart of it is motion
and water always water in which
motion is perpetual

if there were such things as
apples of the moon, they would float in air,
as silver, sure, as this

Janice Galloway





Above: *Particle (Rosalina sp.)*, giclée print, 2009

Previous page, left: *Particle (Cibicides lobatulus)*, giclée print, 2009

Previous page, right: *Particle (Ammonia beccarii)*, giclée print, 2009

Janice Galloway

The heaven and the earth, the void, the darkness
the interminable, numberless deep.

After the dark, the waters: the essential element, the first. The land and the sea are yet optional: the swimmers, formed from invisible matter, free of all dependences but one, were first. Single cells and floating shells: *sans eyes, sans teeth, sans taste, sans everything.* Many-chambered and hollow, unencumbered by a vestige of a single thought, they form; they occupy and populate. They live.

They are soundless, bloodless, free of intent. Their charm is unconscious modesty, their shapes essential yet unfixed. So insignificant, so small, so many: they might pass unnoticed. They are the mass, οἱ πολλοί, rabble: the common herd from which we fall.

Their collective show makes an alphabet, a twist of cyphers; age-drawn records written yet unwritten in the sand we are learning now to read. They are many-leaved. Insubstantial. A heedless multiplication. Invaluable and somehow infinite, they care nothing at all for you. They care nothing for nothing, will never know how. All the rest is immaterial. They have lives to lead, patterns to form, a history to etch on their skin.

Everything that is made comes from that which was made and everything we are is fallible. Watch then. Do not classify. Learn your lately-come place. Little, many, blessed, meek.

And the Lord God brought them to the man to see what he would call them.

In the everyday is the truly sublime: in naming, the beginnings of understanding. For this is the kingdom. For ever and ever.
The open, waiting vault.

See here in embryo a

rupture clouds an autumn gourd tomatoes secondary infection bacterium leprae an opium poppy sac oyster cradle ravioli flying saucer space capsule a centrifuge tube they a pill box slipknot consistently, the number three a brand burned hard upon an acorn intestine (section) the eye of the nautilus the nautilus entire coracle must a hidden tunnel (with or without branches) treasure cave polyps tapeworm crocheted hat a mess of raffia dinner plate coaster buckle belt chameleon eye be dental pincers chopsticks claws an icing furrow snowdrops a chambered trunk a chambered tree plant shoots (inverted) pea shoot (inverted) rose (screen print) a culture flask a disc in representation of the sun distinguished tattoo sea cucumber zucchini razor razor clam with foot extruded the golden section crystal geode ammonite constellation astrolabe starfish cave painting broken rays from a heavenly cloud springbok (representation) sewer pipe because a sandworm cast an eyeless ball a poppy seed pod whip and parsnip tree in a dark wood tree (inverted) they open wound with gangrene filigree grape cluster caterpillar colony spilled barley fruiting hemorrhoids wheat husks acorn seahorses (conjoined) seed pearls trilobite horseshoe crab beechnut peanut casket test-tube crown of thorns can siamese leech pine cone spruce cone the holy spirit ice cream breathing tube s bend u bend plumber's fixtures blender be bullet lighter gall bladder onion shallot beetroot sea urchin pincushion a spike of quills japanese fan fish knife knife fish ribcage (section) a Fernbach flask mandolin lute casing slug byzantine egg zeppelin jellyfish a limbless octopus distinguished* snail fat millipede sunspot flare a swollen vein a scrotal sac the ripe pudendum labial folds a coil a caul a beating heart a heart

a heart
a heart
a heart

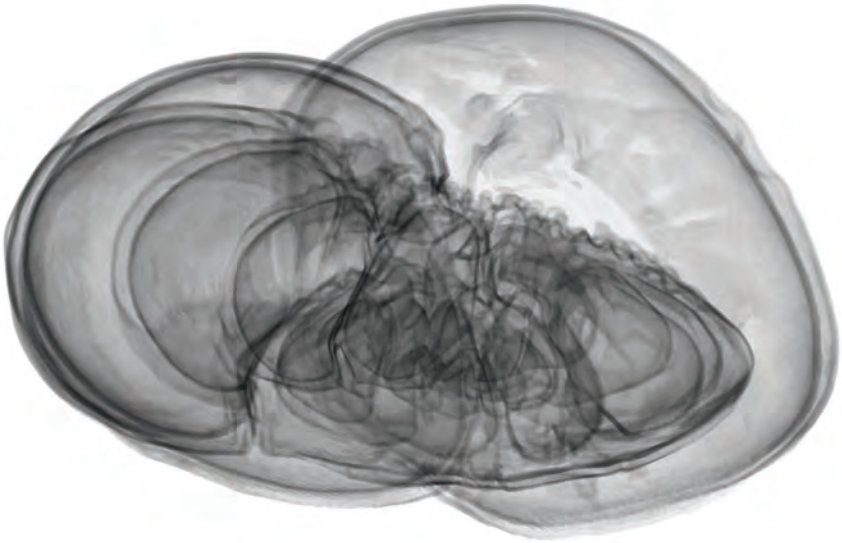
be still my

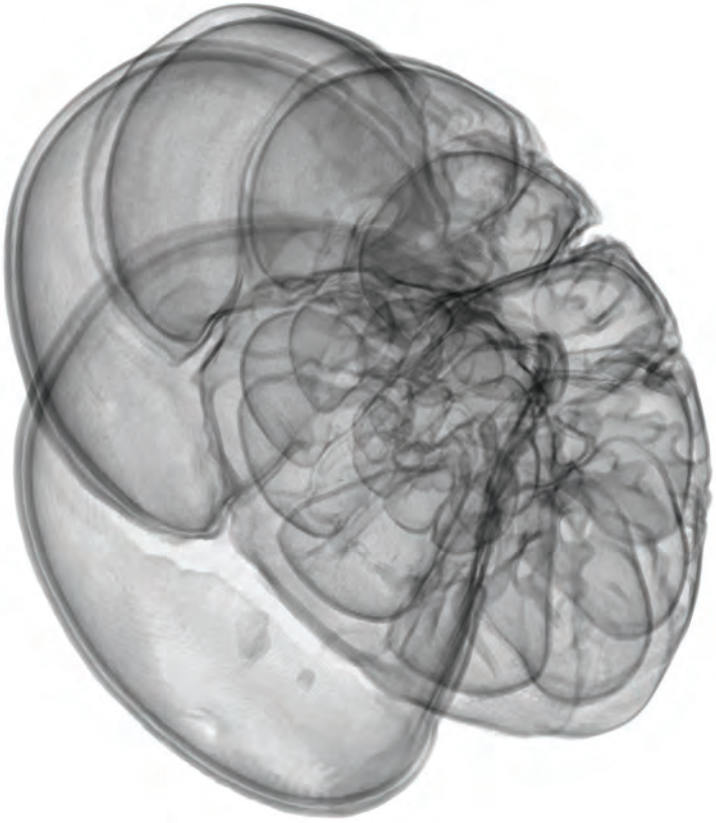
beating

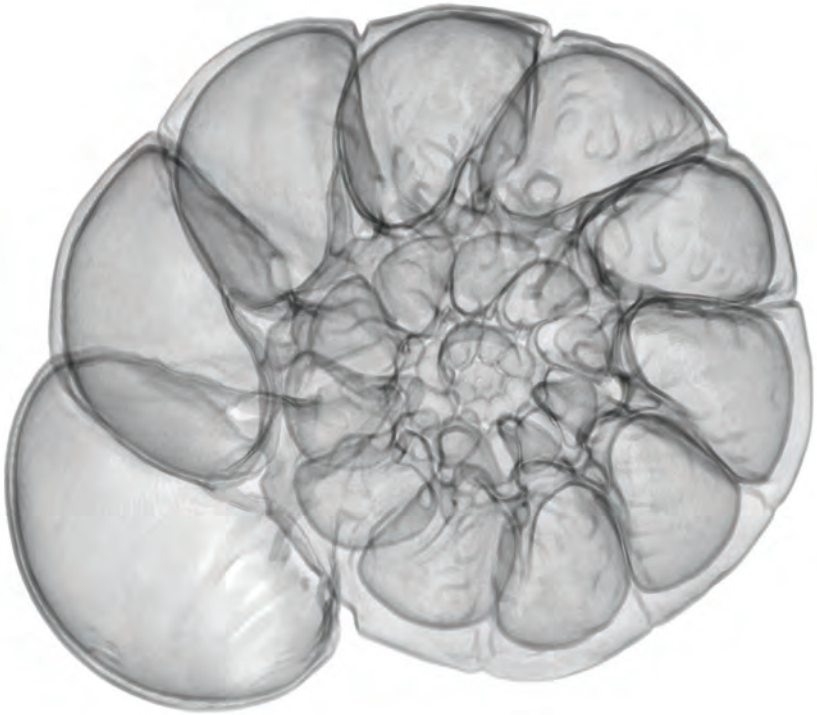
beating heart

*Henry Bowman Brady, from his 1884 report on the foraminifera dredged by the HMS Challenger during the years 1873 -1876.

Opposite page: *Ghost I (Ammonia beccarii)*, giclée print from CT scan, 2012 (with Ian Butler)
Following page, left: *Ghost III (Ammonia beccarii)*, giclée print from CT scan, 2012 (with Ian Butler)
Following page, right: *Ghost II (Ammonia beccarii)*, giclée print from CT scan, 2012 (with Ian Butler)







Jen Hadfield

FORAMS ARE A PHYLUM of **amoeboid protists**, and belong to the superkingdom or domain of **Eukaryotes**. This means 'good kernel' or 'good nut' and refers to their possession of a nucleus – that accounts for the line about the 'good egg' in 'To forams'. In 'To be a protist', there's a play on the adjective 'protean' which refers to the Greek marine god Proteus, and carries connotations of versatility. Something protean mutates easily.

Forams either live on the ocean floor ('benthic') or are carried in the current: 'planktic' (not 'planktonic'). Apparently 'planktonic' is incorrectly derived and was an aberration to at least one planktologist: 'Burckhardt was upset about the misuse of the fine word plankton', Wilhelm Rodhe, 1974. Plankton (derived from greek **planktos**, meaning 'errant' or 'wanderer') refers to organisms that can only swim weakly against the current, if at all.

The **test** is the foram's shell, which probably protects it, and helps it control its buoyancy. It may be built of calcium carbonate secreted by the foram, or composed of materials scavenged from the seafloor. A test can be a highly intricate thing, and is a response to the demands of its environment. I'm pretending in my poem that a protist can turn into anything, which isn't the case at all, but poems build their own tests according to their own natural laws.

Ernst Haeckel was a German biologist and artist of the mid-19th century, whose drawings of marine animals (collected as *Kunstformen Der Natur / Artforms in Nature*) are the stuff of science-fiction, and were influential in early 20th century art, design and architecture. He was the first to use the term **protista**, in 1866.

The Greek term 'foraminifera' means 'hole-bearers', hence the reference in 'To be a protist'.

To forams
after *Kunstformen der Natur*, Ernst Haeckel

The world pelts tenderly down around you.
You dress up as falling cherry blossom.

The world buffets you.
You dress up as a dandelion clock.

The world pelts you with shards of volcanic glass.
You doll yourself up in sequins and jet.

The world picks your pocket.
The world shakes your eyes.

The world passes you through its mincer.
Are you just going to just let it happen?

The world spreads and flutters its hood.
The world rubs up against your ankle.

The world riddles you with bullets.
The world pops you like a pill.

The world tows you into the fast lane and leaves you there.
You emulate the streamlined nautilus.

Or the streamlined nautilus emulates you:
the world steals your homework,

ties you to the traintracks,
calls you a good egg.

You dress up as a raviolo,
you dress up like a turd.

The world puts you under its spotlight
and looks at you directly.

The world abrades you imperceptibly.
You dress up like sand and you roll in it.

You make a paper hat, a cloaking device.
You velvet from its leftovers a fig-leaf, a flask.

D'Orbigny plaster models, Natural History Museum, London

To a human

You need to dismantle
this shell you've spun about yourself.

It's made of other people's language.
All you can see is faulty flesh –

the double-chin, the muffin-top,
the dewlap, the bingo-wings,

the red cape of a blush
fluttering round the bull-ring of your face –

but features dissolve in the onrush
of language our muscles are making;

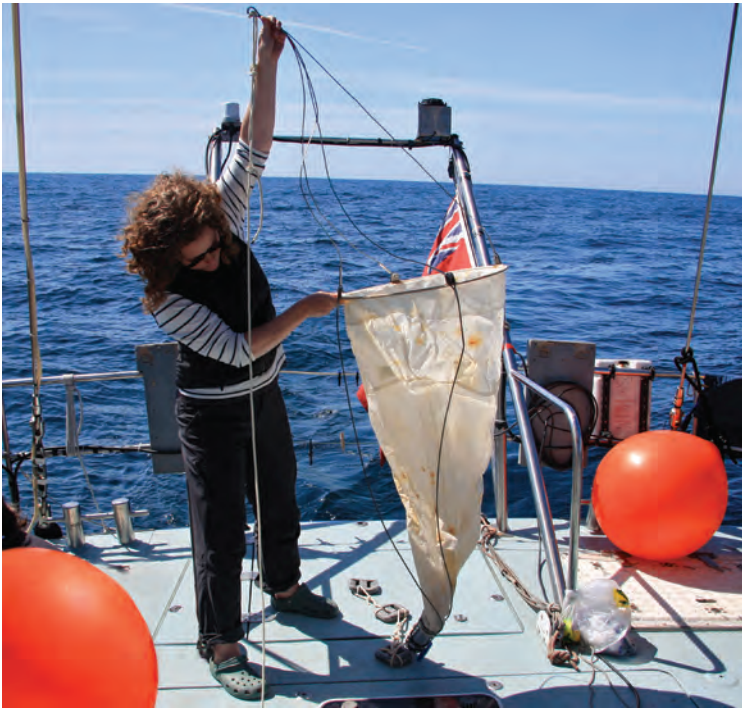
language we're perspiring out
language we're dressed up to dance in:

the jaw muscle twitching like a foxglove with a bee in it,
the muscular tidelines beneath the scalp,
the muscles pooled as the mare of the moon.

This mobile, protean test
is our electric, democratic beauty –

when gorgeous means transparent,
everyone is gorgeous in this one way –

what we allow our bodies to betray.



Anne Bevan on ‘Song of the Whale’, Cape Farewell, 2011

To be a protist

Think what would happen if we could concentrate long enough to create our inventions instantly off the tops of our heads, from the toolbox of a single cell, in streaming lassoos of ectoplasm. If we could shiver up out of thought a knife for example, or a fascinator or those studded balls you tenderise your laundry or your enemy with; your velcro, your flask, your bladder, your mesmeric forest of wind-boomerangs, sort-of Swiss army knives, that may or may not quadruple up as 'king-makers' (like we need more kings); harvesters of birds; wealers of the bog's Sistine ceiling of flowers with chancres of concrete and stretchmarks of tarmac; weather inverters.

Perhaps the same issues don't arise for forams, although there's the threat of what a hole may contain (or blade open), like Mary Poppins' carpet-bag.

To be benthic

like the foram
in the midnight zone

which does one
thing

which makes one
thing

its attention
coalesced

on a single opus
of calcium carbonate

the remote sun anglepoised
above the slow

sweating out
of his test.

Opposite page: *Sprinkle*, video projection on to glass, 2009

Anne Bevan, *Things Unspoken,* exhibition installation, 2012

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Annual Exhibition (Invited artist) Royal Scottish Academy, April – June 2011

Things Unspoken with Andrea Roe at the Royal British Society of Sculptors, London, May – July 2012. Curated by Jane Warrilow

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ANNE BEVAN is a visual artist who comes from Orkney. She works in a variety of media including sculpture, video, photography and installation and her research involves working with people from other disciplines such as science, industry and medicine. Previous collaborations with writers include works with Janice Galloway – the books *Pipelines* and *Rosengarten*, and an outdoor commission for Tyrebagger Forest – *Moon Pool*. Solo exhibitions include *Lifting Light* (Pier Arts Centre, Stromness, 1997), *Undercover* (Fruitmarket Gallery, Edinburgh, 2000) and *Rosengarten* (Hunterian Museum, Glasgow, 2004). She is a Lecturer in Sculpture at Edinburgh College of Art.

KATE DARLING is a multi-disciplinary scientist working with the genetics and biogeography of marine micro-organisms. Her popular articles include *Same Species, Polar Opposites: the Mystery of Identical Creatures Found in both Arctic and Antarctic Waters* (Scientific American, 2010) and *Tiny Marine Organism Lives Double Life to Survive Extinction* (NERC Planet Earth, 2009). She is a Senior Lecturer in Marine Micropaleontology & Phylogeography in the Department of GeoSciences at the University of Edinburgh, and an Honorary Professor at the University of St Andrews.

JANICE GALLOWAY is a writer of many forms including novels, short stories and prose-poetry. She has won a number of awards for books that include *The Trick is to Keep Breathing* (1989), *Foreign Parts* (1994), *Clara* (2002), and a volume of memoirs, *This is Not About Me* (2008). In 2012 her second volume of memoirs *All Made Up* was named Scottish Book of the Year. She works extensively with musicians and artists and has collaborated with Anne Bevan on a number of projects.

JEN HADFIELD is a poet and artist based in Shetland. In 2008 she won the T.S. Eliot Prize for poetry for her second collection, *Nigh-No-Place,* and was also named the winner of the Edwin Morgan International Poetry Prize 2012 for her poem *The Kids*. Her third poetry collection, *Byssus*, is due to be published in early 2014. Jen Hadfield also creates visual artworks, most recently with *Dominant Species*, an installation of porcelain limpets in the Shetland Museum and Archives' Pier Store.

ROBERT ALAN JAMIESON is a poet and novelist who grew up in the crofting community of Sandness in Shetland. He is now based in Edinburgh where he is a Senior Lecturer in Creative Writing at the University of Edinburgh. His work includes the novels *Soor Hearts* (1984)*, Thin Wealth* (1986) – both set in Shetland, *A Day at the Office* (1991) and two collections of poetry, *Shoormal* (1986) and *Nort Atlantik Drift* (2007). His novel *Da Happie Laand*, published in 2010, was shortlisted for a Saltire Award.

ALAN SPENCE is an award-winning poet, playwright and novelist. His works include *The Magic Flute* (1990), *Stone Garden* (1997), *Way to Go* (1999), *Seasons of the Heart* (2000), *Clear Light* (2005) and *The Pure Land* (2007). A new novel, *Night Boat*, is published in 2013. He has collaborated with a number of artists including Alison Watt, Calum Colvin and Elizabeth Blackadder. A deep interest in Eastern philosophy permeates his work, and with his wife he runs the Sri Chinmoy Meditation Centre in Edinburgh. He is Professor in Creative Writing at the University of Aberdeen, where he was Artistic Director of the Word Festival from 1999 till 2011.

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