

Popular Music & Depopulated Species: Probing life at the limits in song and science

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ABSTRACT

In the opening lyrics and refrain of The Beatles song *Strawberry Fields Forever*, John Lennon invites the listener to join a journey down to a place called Strawberry Fields. Each of these four invitations are to an otherworldly realm: reminiscence in a halcyon time of childhood wonder. This essay draws on the ethos and milieu of Lennon's song, to turn his invitation toward another otherworldly realm: the submarine. In turning our attention downward, this article extends his invitation over the half century between now and the song's release.

Taking up this invitation will lead us from the zeitgeist of nascent artistic and scientific ideas of underwater life when *Forever* was released, to two descendants of The Beatles – Radiohead and Beirut. Their music presents telling popular cultural engagement with two other otherworldly realms: that which is more-than-human and post-human. By probing the limits of life through song (selfhood, nostalgia, sensation, and wonder) and science (evolutionary biology, climatology, and Earth System Science) I explore what environmental sensitivity pop music of our time can attune us to. As marine species disappear en masse under the advent of The Sixth Extinction, this article speculates on what extinction and evolution may come to be, when future sea shores engulf cities founded in the littoral zones of the early modern period.

KEYWORDS

Popular music; cultural imaginary; evolution; extinction; biophysical limits

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1: LET ME TAKE YOU DOWN...

“Let me take you down, ‘cause I'm going to Strawberry Fields” (Lennon & McCartney, 1967). So begins The Beatles song *Strawberry Fields Forever* (henceforth referred to as *Forever*). Over the four times this refrain is sung, John Lennon invites the listener to reminisce in a halcyon time. The time of innocence is his childlike wonder at the world. The site of innocence is Strawberry Fields, described by the adult Lennon as “an old Victorian house converted for Salvation Army orphans” (Lennon in Elliott, 1999, p. 59). During his childhood this orphanage abutted a wooded garden around the corner of his home in Liverpool. “As a kid I used to go to their garden parties with my friends...we’d all go up there and hang out and sell lemonade bottles for a penny and we always had fun at Strawberry Fields” (ibid 59). Death, via the orphanage, and life, via the adjoining garden, are springboards for lyrics about becoming, being and memory:

Living is easy with eyes closed

Misunderstanding all you see

It's getting hard to be someone

But it all works out (Lennon & McCartney, 1967).

That it is “getting hard to be someone” and nostalgia for childhood wonder also frame scientific approaches to grappling with existential predicaments facing the more-than-human world today. Not only is it “getting hard to be someone”, for vast multitudes of species it is getting hard to be. Full stop. Marine scientist Carl Safina opens his *Song for the Blue Ocean: Encounters Along the World's Coasts* (henceforth referred to as *Song*) with how his adult becoming is founded on such tension:

When I was a boy, on warm spring evenings in the rich light before sunset my father would often take me down to the pebbly shore of Long Island Sound to hunt striped bass...The world seemed unspeakably beautiful and - I remember this vividly - so real. It seemed so real...When one is growing up with a sense of place, the world seems secure and filled with promise (Safina, 1999, p. xii).

This halcyon time is immediately followed with a lament for how this shore and its abutting aquatic ecosystem were soon after destroyed by coastal development. Here, Safina refers to extirpation: the local extinction of a species in an ecosystem. Speaking more globally, his *Song* is a requiem for the seismic disappearances of the life aquatic in the three decades following this childhood experience. Safina's reminiscence in *Song* to when “the world seemed unspeakably beautiful” is his adult self of 1999 writing to his 12-year-old self of 1967: coincidentally the same year *Forever* was released.

Forever and *Song* are premised on a formative childhood experience which is used as a recurring theme in their respective song and book. Lennon and Safina situate their childhood experiences as a baseline for reframing their adult selves' sensibility toward existential predicaments. For Lennon, the limits of life are about the difficulty of reconciling childhood innocence (“misunderstanding all you see” when playing carefree in an orphanage grounds) versus adult awareness of the ever-presence of mortality. Safina's *Song* shares Lennon's interest in the trials and tribulations of adult selfhood, though his probing of the limits of life extends to a scientific sensibility toward extinction of marine species.

In this spirit, this article draws on the subjects of Lennon's *Forever* and Safina's *Song*. It probes the limits of life through song (selfhood, nostalgia, sensation, and wonder) and science (evolutionary biology, climatology, and Earth System Science). The probe is conducted through the haunting proclamation to "let me take you down". Down because we are going toward the realm of the submarine. Down because we are going back in time, from the half century between now and the release of *Forever*. Down because we are turning our attention toward the palpable limits of life, wherein multitudes of species face imminent extinction due to the effects of human industrial activities. Down because cities founded in the littoral zones of the early modern period are already slated to be the future seafloor, due to the inevitable amount of sea level rise from existing greenhouse gas emissions. Down because we are going down.

To probe life at the limits in song and science, I will first reframe the *zeitgeist* of nascent environmentalism when *Forever* was released, then trace how two descendants of The Beatles – Radiohead and Beirut – extend this invitation toward a contemporary *zeitgeist*: evolution and extinction in the submarine. This act of reframing follows the same premise of *Forever* and *Song*: establish a youth baseline and then reappraise the baseline in light of ones' adult understanding. I will then bring this cultural imaginary of the life aquatic into the contemporary realm, via discussion of Radiohead and Beirut, and onward to speculate on the future of evolution and extinction as marine species disappear en masse under the advent of The Sixth Extinction. The closing discussion of Radiohead and Beirut offers a soundtrack to accompany the rapidity of biophysical change at the outset of the 21st century. In attuning ourselves to that soundtrack, the core question driving this probe is: what environmental sensitivity can pop music of our time offer?

Pop music is the bridge across these times and spaces, due to its ability to capture the *zeitgeist* of any moment in time and pervasive cultural impact across time. Dick Clark declared that "popular music is the soundtrack of our individual lives. Anything that ever happened to you, good or bad, was scored with the music you listened to" (Clark, in Arkush, 1994). Pop music starts us on this journey because the life-long curation of the soundtrack to our lives is also one of speculating on being marooned on a desert island:

We say pop is of its time, and can date the music by ear with surprising precision, to 1966 or 1969 or 1972 or 1978 or 1984. Well, is it? Is pop truly of its time, in the sense that it represents some aspect of exterior history apart from the path of its internal development? I know pop does something to me; everyone says the same. So what does it do?... Popular music is the most living art form today. Condemned to a desert island, contemporary people would grab their records first; we have the concept of desert island discs because we could do without most other art forms before we would give up songs (Greif, 2009, p.102).

In this excerpt from 'Radiohead, Or the Philosophy of Pop' Mark Greif outlines why Radiohead uniquely encapsulate the contemporary let-me-take-you-down *zeitgeist*. The closing discussion of their music will be the adult world of today reflecting back to the childhood wonder of *Forever*, when "the world seemed unspeakably beautiful" (Safina, 1999) to 12-year-old Safina. Before we can turn on the proverbial pop music our adults selves will take when "condemned to a desert island" (Greif, 2009, p. 102) we must first configure a baseline (Wodak, 2017, p. 9). Lennon's baseline was his childhood garden games and orphanage

encounters. For Safina it was his Long Island Sound explorations. For both, their childhood wonder formed the catalyst for their adult sensibility toward the limits of life.

2: LET ME TAKE YOU BACK...

Taking inspiration from Alice's Adventures in Wonderland, Lennon's invitation in *Forever* is not just to a memory or a place, but is to an otherworldly realm. In its immediate and subsequent reception *Forever* is considered a maverick hybrid of popular and avant-garde cultures (Daniels, 2006, pp. 43-44). The song achieves this rare feat as it uniquely "problematizes the link, or crisscrossing between our inner and outer worlds and in so doing reimagines the relations between selfhood, culture, and contemporary political life (Elliot, 1999, p. 59).

Forever appeared just as the terrestrial focus of nascent environmental awareness began to be spurred by, and toward, the undersea. *The Undersea World of Jacques Cousteau* was the first television broadcast on this subject, which took place on the 24th of March 1966 in the US, and shortly thereafter in the UK. This broadcast catalysed an emergent submarine sensibility as it "brought life under the seas to public attention for the very first time" (Haq and Paul, 2013, p. 83) and was widely received by US and UK audiences.

The outreach capitalised on Cousteau's unprecedented depiction of aquatic life in *World Without Sun*, his 1964 Oscar winning documentary. Cousteau's concerns mirror those of Safina: to plumb the depths in search for greater understanding of the life aquatic. Limits – of life, habitability and human dominion – are central to the film about aquanaut research in underwater habitats. These aquanauts were probing the physical tolerance thresholds of human endurance: for one week in Conshelf I in 1961, and for 30 days on Continental Shelf Station II in 1964. The aim in these experiments was to probe the limits of human inhabitation underwater. The risks endured by the aquanauts are palpable reminders of what happens when we literally and metaphorically get out of our depth.

The Beatles probed the life aquatic in their music and filmmaking, taking inspiration from Cousteau's work. *The Yellow Submarine* lyrics "And we lived beneath the waves/In our yellow submarine" (Lennon and McCartney, 1966) uncannily describe Cousteau's submarine vessels, which featured the same iridescent yellow colour scheme. *The Yellow Submarine* followed a series of recent encounters The Beatles had with aquatic ecosystems. Starting with standing on a coral reef in The Bahamas for their 1965 music video for *Another Girl*, staying on board a yacht during their 1966 Philippines tour, and Lennon writing *Forever* on location in the Spanish seaside city of Almeria in 1966 while acting in Richard Lester's film *How I Won the War*. Ringo Starr, who sang lead on *The Yellow Submarine*, would later write *Octopus's Garden*, inspired by a boating holiday in Sardinia in 1968. *Octopus's Garden* continued the same themes of existing in underwater habitats as *The Yellow Submarine*:

We would be warm below the storm

In our little hideaway beneath the waves (Lennon and McCartney, 1966).

The lyrics recall Cousteau's "little hideaway beneath the waves" of Continental Shelf Station II. Ostensibly for children, both songs in fact deal with proverbial refuges sought by adults. They conjure an invitation to come down to join an underwater refuge from a storm brewing in the atmosphere - an invitation to

return to a realm of innocence and childish wonder at the world. These ideas were further developed in the Beatles' feature length animated film *The Yellow Submarine*, from 1968.

Cousteau's underwater habitats presented aquatic 'spaceships' for humans set against the inhospitable ocean. Depictions of aquanaut and submarine life and its limits formed palpable exemplars of the spaceship-earth concept during the space race. Therein earthly life ekes out an existence in a vessel interior (i.e. the spaceship), as survival is not possible on the exterior (i.e. outside the earth or another planet). Similarly, underwater humans can only survive on the interior of aquanaut habitats. The spaceship-earth concept became widespread in 1966 through Kenneth Boulding's *The Economics of the Coming Spaceship Earth*, Barbara Ward's *Spaceship Earth*, and Buckminster Fuller's *Operating Manual for Spaceship Earth* in 1968. This was the same year the iconic *Earthrise* photograph was released, showing Earth from space for the first time. *Earthrise* highlighted Earth as a life-supporting yellow submarine/spaceship environment encased in otherwise inhospitable surrounds.

These spaceship-earth publications and *Earthrise* also highlighted how the planet is dominated by marine, rather than terrestrial, realms. Going down means not stopping at the bottom of the terrestrial realm, but rather going from terrestrial to marine realms: "we live submerged at the bottom of an ocean of air", revealed Renaissance mathematician Evangelista Torricelli (in Walker, 2010, p. 24). We live at the boundary between two oceans, at the bottom of the one above, and at the top of the one below. Lennon's invitation to "let me take you down" can be to dwell at the bottom of this gaseous ocean, or to take flight to "our little hideaway beneath the waves."

The metaphors in *Forever* are of life as a phenomenon of probing limits within a yellow submarine/spaceship environment that is encased in otherwise inhospitable surrounds. These metaphors arose from Lennon's inspiration, where he "took the name ['Strawberry Fields'] as an image" (Lennon, in Daniels, 2006, p. 59), in conjunction with The Beatles' innovations in then nascent artform of music videos. From 1965 onwards they were instrumental in developing the music video as a truly integrated audiovisual artform, with the video of *Strawberry Fields Forever* regarded by MOMA's Golden Oldies of Music Video 2003 exhibition as the first major audiovisual artwork in pop music (Glynn, 2005, p. 94; Austerlitz, 2008, p. 19). Our invitation into otherworldly visual realms was by way of avant-garde film techniques of distorted camera angles, jarring lighting, stop-motion, direction reversal, varied speed, jump cuts and colour filters. Veneration of life and death in nature feature heavily in the video, based around a dead oak tree in Knole Park in Sevenoaks, Kent. Prominence is given to the tree, to highlight the song lyrics

No one I think is in my tree

I mean it must be high or low (Lennon and McCartney, 1967).

Here we hark back to the subject of how it is "getting hard to be someone" – we are all alone, being above and/or below one another in our respective 'trees.' Just as Oscar Wilde intoned that "we are all in the gutter, but some of us are looking at the stars" (1892, p. 205). For Lennon and Wilde solace is sought through looking beyond our life support vessel into the inhospitable void beyond.

The *Forever* video begins and ends with protruding dead tree limbs in the mid-winter filming. Between long distance shots of the tree at the beginning and end,

the band cavorts around it and a piano strung with wires connected to the tree limbs. In the end the surrealistic relationship established between humans and the tree via the connecting threads of the piano (itself made from the wood of a tree) break down. The piano is destroyed and collapses, pulling on the wires that connect it to the tree. In the end, the forever-ness of the lifeless tree gives way to post-mortem manipulation at the hands of the band.

The video, like the song, takes as its inspiration life. Together they probe the limits of life (also known as death) and of the limits of human understanding of the difficulties of being and becoming. We are asked to see our selfhood in a dead tree, which stands as an emblem of mortality for both human and the more-than-human world alike. A fitting end for a song that deliberately eschews conventional closure, and instead relishes the inherently irresolvable nature of its subject matter:

Living is easy with eyes closed

Misunderstanding all you see (Lennon and McCartney, 1967).

3: THE ADVENT OF THE ANTHROPOCENE

If there can be any halcyon reminiscence for our collective childhood of post-war environmentalism, then we would need to re-invoke a childlike naivety about anthropogenic destruction of the more-than-human world. Or, to phrase this admonishment plainly: cavorting around a dead tree is so 1967. This naivety pervaded not only post-war popular culture, but also nascent scientific methodology for researching the life aquatic. Cousteau's first feature documentary film, *The Silent World* from 1954, included blowing up a coral reef with dynamite to survey the species. In the scene immediately following, Cousteau justifies that this "is an act of vandalism, but the only method enabling us to list all the living species" (1956). The list is given greater credence than life itself.

World Without Sun featured ground-breaking science in the then nascent field of paleoclimatology, by pioneering the use of coral reef core samples to reconstruct past climate records. Coral produce year-by-year accretions that collectively create the reef itself, which can be a living structure for thousands of years. As these accretions record coral sensitivity to ocean warming and acidification, reefs are used for paleoclimatological reconstruction. With one third of marine species dependent on coral reefs for their survival, even though reefs constitute 0.1% of ocean surface area (Bowen et. al., 2013, p. 362), coral indeed lie at the heart of the life and death aquatic.

Cousteau's documentation of proximal environmental destruction began at the advent of the Great Acceleration, when socio-economic and Earth System trends all began to significantly rise at increasing rates (Steffen et. al., 2015, p. 81). Over the intervening years *homo sapiens* have exerted such extensive influences on Earth Systems that the cumulative geomorphic force has shifted Earth out of the Holocene, the prior geological era, and into the Anthropocene, defined by *homo sapiens* being the dominant influence on Earth Systems. We are now, relative to the entire geological history of this planet, in a "no-analogue state" (Cruzen and Steffen, 2003, p. 253) which is begetting a "no-analogue future." (Williams et. al., 2013, p. 29). Biophysical modelling has no analogous past to guide it.

Sixty years after the release of *The Silent World*, French novelist and filmmaker Gérard Mordillat decried the irony of the title. He found it "fitting" with regard to

how “today the massive destruction of coral reefs, the extermination of marine animals, hunting, pollution, the cynicism of all governments in the name of science, research and profit goes on in silence” (Samuel, 2015). Since the origins of post-war environmentalism, sound and silence have permeated scientific and cultural imaginaries of environmental change. Mordillat is referring to how we generally remain silent about environmental destruction, through which animal noise, such as birdsong, is reduced to silence. The book jacket endorsement of *Song* makes this double meaning of silence explicit, declaring that “Safina’s Song is the Silent Spring of our time” (2010). The “our time” (Safina, 1999) is the 21st century: the Silent Spring analogy having been added to the 2010 edition of *Song*. Safina was born in 1955, the year after *The Silent World* was released. The coming-of-age as a scientist that he recounts in *Song* is broadly representative of the profound biophysical changes between “our time” and the 1967 of his 12-year-old self, when *Forever* was released, and he found that “the world seemed unspeakably beautiful” (Safina, 1999, p. xii).

Pop could be seen as the barometer of how far we have come, or fallen, since the halcyon days of naive post-war childhood environmentalism. In “our time” the uptake of Lennon’s vision is the CIA naming a secret prison within Guantanamo Bay Naval Base Strawberry Fields because “the detainees would be held there, as the lyric put it, ‘forever’” (Johnston and Mazetti, 2009). The irony becomes only more beguiling as sites of geopolitical atrocity, such as Guantanamo Bay, also manifest unintentional refugia for the life aquatic.

Guantanamo Bay was established not only as a naval station under the 1903 Cuban–American Treaty, but also as a coaling station for concentrated stockpiles of fossil fuels for the US. A century later, in 2002, it was re-purposed to indefinitely detain prisoners from conflicts principally between the fossil fuel endowed Middle East and US geopolitical demand for these fuels. Guantanamo Bay Naval Base waters are a major site for scientific research about aquatic ecosystems due to their relative health, owing to the US enforcing stringent local activity, such as fishing, and Cuban government policy restricting tourism and development across Cuba (Carpenter, 2017). Due to this relative health, the marine area abutting Strawberry Fields prison is used for baseline surveys of aquatic ecosystems for the entire Caribbean and Florida Keys region. The region beyond the Naval Base waters is representative of non-baseline marine ecosystems. These are the ongoing redefinitions of the ‘new normal’, subject to the progressively deleterious effects Cousteau began documenting in *The Silent World* in 1954: overfishing, rapid coastal population increase, and associated industrial effluent onto reefs.

Yet proximal causes of biophysical loss are the new halcyon, like the dead tree that The Beatles cavorted around in the video for *Forever*. If only human induced predicaments inflicted on the world-of-life today were as simple as at the time when 12-year-old Safina savoured Long Island Sound marine ecosystems just before they were destroyed by development. In contrast, breaching the biophysical limits of life is happening first and foremost due to distal causes. Proximal causes are linear and can be traced with the naked eye (the bulldozer, the sewerage pipe, the fishing dynamite and so on). In contrast, distal causes arise from the highly complex non-linear behaviour of the Earth System. For instance: the ocean is absorbing 92% of the extra heat accumulating on Earth via combusting fossil fuels (Roemmich et al. 2015, p. 240), which leads to underwater heatwaves that then cause coral bleaching. Additionally, there is a roughly five decade lag between the greenhouse gas emissions and discernible changes in the rate, frequency and

intensity of underwater heat waves (Steffen et. al., 2007, p. 614). A human-amplified heatwave that moves with wanton abandon across invisible national park boundaries is an entirely different phenomenon to the naïve and proximal environmentalism when *Forever* was released. If we want to sing that song, we not only need an entirely new vocabulary. We need an entirely new sensitivity. One that extends toward a world so radically different from the simplistic mindset that pervades the nostalgia at the heart of environmentalism. What then is pop as the zeitgeist of “our time” (Safina, 1999) before we become “condemned to a desert island” (Greif, 2009, p. 100) with our Desert Island Disks sustaining the soundtrack to our lives? What environmental sensitivity can pop music of our time then attune us to?

4: “OUR TIME”: OF SONG, SOUND, AND SILENT SPRING

In “our time” another British band has taken up the mantle of providing the soundtrack for vast swathes of a generation. Hailing from Oxford and formed in 1985, Radiohead are widely regarded as the most influential band of their generation, courting such critical, commercial and chart-topping favour that pop music magazines frequently use headlines like “How Radiohead Became The Beatles Of The 21st Century” (Haynes, 2014). Like The Beatles, Radiohead’s influence transcends popular and avant-garde cultures, and similarly extends to the politics of the military-industrial complex. Edward Snowden’s revelations of global government surveillance included that the Government Communications Headquarters in the UK named one of their surveillance programs ‘Karma Police’ after the eponymous 1997 Radiohead song, “suggesting the spies may have been fans” (Gallagher, 2015). The pervasive cultural impact of pop music knows no bounds: recall the CIA naming their secret prison Strawberry Fields after the eponymous Beatles song.

However, unlike The Beatles’ naivety about their contemporaneous environmental and political context, Radiohead pursue confronting subject matter without peer in the wider terrain of pop culture:

Radiohead have always been politically, socially and ecologically sensible, criticizing the alienation, dehumanization and the technological development of the modern world, which are the most common topics of their songs. And despite of all the success and popularity, they have still remained quite an ‘underground’, alternative image with no scandals, no excesses, no extravagant live shows, and not drawing attention to their private lives (Jukić, 2009, p. 75).

The principal focus over their 150+ songs have been connections between biodiversity loss and climate change, induced by capitalism, consumerism, and socio-political inequality. These connections are frequently explored with aquatic motifs of snow, ice, water, waterfalls, waves, lakes, rain, rivers, floods, the ocean, sea level rise, and encounters with marine life. The aquatic realm is also explored in relation to terrestrial human impacts, such as their song *Idioteque* (2000). Widely considered one of the first pop songs about climate change (Wodak, 2017, p. 8), *Idioteque* features lyrics about an “ice age coming”, fear of the gravity of the situation (“We’re not scaremongering/This is really happening”) and societal myopia, which instead concerns “Mobiles skwrking, mobiles chirping/Take the money and run.” (Radiohead, 2000). The song “create[s] an apocalyptic imagery which also functions as a critique of the modern society, climate change and

alienation in the age of digital technology and virtual communication” (Jukić, 2009, p. 75).

Two Radiohead songs offer particularly pertinent invitations for taking us down to sense the submarine realm in “our time”: *No Surprises* and *Bloom*. *No Surprises*, released in the same year Safina wrote *Song* in 1997, concerns the mundanity of suburban existence, the ‘great acceleration’ of suburban growth, and, presciently, greenhouse gasses emitted by such vehicle commuting between suburban “quiet life” (Radiohead, 1997) and the city (Sharp, 2015):

I’ll take a quiet life

A handshake of carbon monoxide

With no alarms and no surprises (Radiohead, 1997).

The video features only a close up of the face of Thom Yorke, lyricist, lead songwriter and band frontman, staring directly into the camera. His head is completely encased in a glass helmet, resembling the aquanaut helmets Cousteau pioneered in *World Without Sun*. Over the 3:50 song duration the helmet starts out empty then fills to capacity with water, causing Yorke to hold his breath for beyond the limits of human tolerance (through a cinematographic trick of high speed filming played back at regular speed), before being emptied. Yorke sings the song lyrics with each line projected onto the helmet as he sings it.

The aquanaut symbolism is augmented with astronaut connotations. During the video beginning and end choreographed electronic lights flash in the glass helmet reflection, using an aesthetic that resembles the ‘starman’ sequence in *2001: A Space Odyssey*. In Cousteau, Kubrick and Yorke’s domain, humans are attempting to probe the limits of underwater or outerspace habitats. The symbolism also recalls the planetary boundaries of spaceship earth being breached, causing its internal oxygen-based life support system to be replaced by a water-based system that is only life supporting for aquatic organisms. The 60 seconds where Yorke holds his breath because the water is above his nostrils are highly confronting. Picture a person, trapped inside a flooded helmet, staring unblinkingly into the camera. He extends an invitation to let me take you down into the depths of my predicament, where what is mine is yours...

Recalling Lennon and Safina’s childhood reminiscence in their respective work, a recurring motif in Radiohead’s work is problematic invocations of childlike innocence. Mark Greif argues that “beside the artificial world” (such as aquanaut and astronaut technoscience) “is an iconography in their lyrics that comes from dark children’s books: swamps, rivers, animals, arks, and rowboats riding ambiguous tracks of light to the moon” (2009, p. 93). The *No Surprises* lyrics combined with their “musical counterpoint of chimes, strings, lullaby” form “a desperate wish for small, safe spaces” (ibid). In so doing, the song “promises sanctuary, a bit of quiet in which to think” (ibid). Tellingly, Yorke sings a song about wanting “silent silence” (Radiohead, 1997). Their music no longer acts as a paean for the submarine realm in Safina’s *Song*, or a “Silent Spring of our time” (Safina, 1999): Yorke’s face continues to sing to the viewer even while holding his breath underwater, despite his want for “silent silence” (Radiohead, 1997).

Fourteen years after the release of *No Surprises* Radiohead released their eighth studio album *The King of Limbs*, in 2011. In the intervening years the band members increasingly focused on environmental concerns, with Yorke becoming politically active in climate change campaigns to the extent that he is arguably the

pop musician most widely associated with the climate crisis. *The King of Limbs* recalls the dead oak tree veneration at the centre of *Forever*, with its protrusion of ghostly limbs. Radiohead's album is named after one of Great Britain's oldest trees: the eponymous 1000 year old oak tree in Savernake Forest in Wiltshire, 130km west of the oak tree used in *Forever*. Nature veneration plays out heavily in the album, concerning communion with the more-than-human world, through sensory experience of lakes, bodies of water, forests and fauna.

The first track of this album, *Bloom*, explores a dimension of the submarine that is the only example to date in popular music known to the author: ocean acidification. The song concerns the life and death of whales, plankton, turtles, jellyfish and an ambiguously placed human protagonist. Verse one starts from the perspective of a whale roaming the oceans with wide open mouth to collect plankton:

Open your mouth wide
The universal sigh
And while the ocean blooms
It's what keeps me alive (Radiohead, 2011).

The critical word 'bloom' is deliberately ambiguous. Phytoplankton and algal blooms are increasing due to ocean chemistry changing because of global acidification and proximal industrial effluents. Such blooms are hazardous to marine life in general, such as whales, and turtles. Zooplankton blooms are far less common, and are beneficial to those species which subsist on them, such as whales. However, a bloom is also a collective noun for a large group of jellyfish. As jellyfish have no calcifying membrane they are one of the few species potentially equipped to tolerate the deep future of acidic oceans. Their ability to do so contrasts with current projections of how acidification will render the majority of marine species extinct as the ocean is acidifying at the fastest rate in the last 300 million years (Hönisch et. al., 2012, p. 1058).

Verse two brings together the impact of human activities with planetary trajectories that have anthropogenically deviated from their deep time historical pathways.

I'm moving out of orbit
Turning in somersaults
A giant turtles eyes
Jellyfish float by (Radiohead, 2011).

The lyrics retain a deliberate air of ambiguity, though their influence has extended to scientists working on ocean acidification, such as marine ecologist Davide Di Cioccio, who used the first two verses to preface his PhD on ocean acidification (2014, p. xi).

Of the innumerable contemporary bands indelibly influenced by Radiohead, Beirut is one that has gained critical and commercial clout. Zach Condon, principal songwriter and performer, formed the band in 2006 in Sante Fe, New Mexico. Six months after the release of *King of Limbs*, Beirut released *The Rip Tide*, on 30 August 2011. The titular song is the only example to date in pop music known to the author to explore climate engineering. Inspired by his

encounter with the submarine realm when swimming in a beach while on tour in Brazil, Condon describes how:

a rip tide took me out pretty far - I was struggling to get back in. And as I came back in, a wave crushed me and actually punctured a hole in my eardrum. It just got me thinking: these last five years of my life, me and everyone I'm close to have all been taken by this bigger force that's mostly out of our control (Condon, in Smith, 2011).

This experience formed the catalyst for the song, wherein Condon searches across terrestrial and submarine realms for a place to call home. Like Lennon in *Forever*, he questions whether he is, or even can be, alone. In this search the refrain recalls his near-drowning experience in Brazil:

Soon the waves and I found the rolling tide

Soon the waves and I found the rip tide (Beirut, 2011).

As with *Forever* and *No Surprises* the full subject matter of *The Rip Tide* only emerges when considering the song alongside its video counterpoint. Condon himself found this to be the case as the video “brought the song somewhere that I had only been able to describe to myself, now available for others to see and feel it much more as I had in the process of writing it” (Condon, in Snapes, 2012). The “somewhere” that video director Houmam Abdallah “brought the song” displays a similar prescience to the video for *No Surprises*. Just as Cousteau explored biophysical human limits in underwater habitats and Yorke explored his respiratory limits in the submarine habitat of *No Surprises*, *The Rip Tide* too explores the limits of human habitability in otherworldly realms.

The video features a lone empty sailboat sailing itself across the open ocean. The steady percussive rhythm forms a slow funeral march, mimicking repetitive nautical sounds of waves lapping at a sailboat or a sail flapping against a mast. Our invitation is to follow the sailboat on its journey into the abyss. There are no signs of life other than seagulls, which appear after 45 seconds, wings beating in time with the steady percussive rhythm. Over the following two minutes the number of seagulls swarming around the sailboat increases, as if they are attracted by carrion on board, as the sailboat is evidently not a fishing vessel. The boat then enters a transformative ‘storm’ whereupon they all leave. Throughout the remaining 1:50 this ‘storm’ completely reconfigures the sky, which changes from typical light sky blue to a kaleidoscope of colours, textures, patterns and forms, achieved by overlaid special effects from dropping different coloured ink into a water-filled glass tank.

The transition from typical sky blue to highly volatile and changeable colours resembles the more visual side effects of the foremost climate engineering proposal which is to inject sulphur particles into the stratosphere to mimic the planetary cooling effects of large volcanic eruptions. The video recalls such sudden atmospheric modification and its optical side effects, which “would have turned the deep blue skies of rural areas into a Parisian-style white haze - but also have made dramatic fiery sunsets like the Krakatoa-induced one painted by Eduard Munch in *The Scream* entirely routine” (Szerszynski, 2017, p. 88).

The future existence of species in *The Rip Tide* and *Bloom* is ambiguous and indeterminate. Perhaps that is fittingly open ended, given we are living in a “no-analogue state” (Crutzen and Steffen, 2003, p. 253) with a “no-analogue future” (Williams et al., 2013, p. 29). The ‘bloom’ in question could be for phytoplankton

or zooplankton or jellyfish. The population of some species may proliferate via capitalising on human detritus. Recall phytoplankton feeding off nutrient runoff from agricultural fertiliser and seagulls as urban scavenger extraordinaire. The Rip Tide video location off the Cornwall coast is an area where climate change has already demonstrably benefitted certain gull species that capitalise on warming waters (Blight et al., 2015, p. 110), while in other regions climate change has already decimated other gull species by reducing available marine food (Luczak et al., 2012, p. 821). *Bloom* and *The Rip Tide* invite us to ruminate on which species will be no more in light of anthropogenic climate change, and which will come to inhabit future anthropogenic biomes.

5: ENDLESS FORMS MOST BEAUTIFUL

The songs of Radiohead and Beirut offer a soundtrack to accompany the rapidity of biophysical change at the outset of the 21st century. Gone is the reminiscence for childhood wonder that Lennon and Safina drew from. Such nostalgia has been replaced by a yearning to sense our existential predicament. A yearning for refuge from modern life in *No Surprises*. For facing up to climate change in *Idiotique*. For communion with the more-than-human aquatic world in *Bloom*. For casting adrift a path forward to a posthuman world following a near-drowning misadventure in *The Rip Tide*. These yearnings are not site-specific in the manner of *Forever* or *Song*. Instead, these contemporary songs are ungrounded and footloose – cast into the elements like the sail boat in *The Rip Tide*. This is the desert island soundtrack offered by the rightful heirs to The Beatles. This is the zeitgeist for “our times” (Safina, 1999).

We are nevertheless bound to recall some sense of anchorage amidst such turbulence. For Lennon and Safina such anchorage was located in specific sites and the childhood experiences they gave rise to. The site that served as an “image” (Lennon, in Daniels, 2006, p. 59) for Lennon’s ruminations lives on every time you accept his invitation to “let me take you down...” (Lennon and McCartney, 1967). However the physical Salvation Army site is no more: knocked down in the decade following Lennon’s song, replaced by a small home subsequently closed in 2005. Even the iconic red park entrance gates, which served as the symbolic epicentre of fans’ pilgrimage, did not survive. They were replaced with replicas in 2011 – the geo-piety is now toward a simulacrum. Following Lennon’s own untimely death in 1980, his cultural imaginary was embodied in Strawberry Fields Forever, a memorial in New York City’s Central Park, located around the corner from where he was murdered.

Strawberry Fields in New York City and Liverpool share something else in common, beyond surrogate memorials to Lennon and his invitation in *Forever*. The Liverpool site is 2km from the Mersey, the nearest river, and 10km from the ocean at the Mersey mouth. The New York City site is 1.3km from the Hudson, the nearest river, and 8km from the ocean at southern Manhattan. The sites are respectively 77m and 25m above sea level. On the basis that existing historical emissions have already made runaway climate change nigh on inevitable, both cities are proximate to the deep future height of the ocean in Liverpool, and well underwater in New York City. By the time the sea has risen to such heights, the cities themselves would not even exist in any inhabitable form, and the tolerance thresholds of human civilisation for such biophysical change would have been breached long ago, like Cousteau’s or The Beatles’ yellow submarine filling up with water. I am referring not to the persistence of naïve environmentalism

wherein the Intergovernmental Panel on Climate Change (IPCC) is consistently overly conservative about projecting sea level and temperature increase for the remainder of this century. Instead, an emerging body of climate science, exemplified in the work of Anderson and Bows (2008, p. 3864; 2010, p. 21), and Hansen (2013, p. 234), lays out just how far we have already fallen through the looking glass and into the realm of runaway climate change.

Sometime in the deep future Earth will become consumed by runaway climate change, leading to a Venus-type hothouse, or a Mars-type freezer. The eventual loss of the atmosphere, cryosphere, lithosphere and hydrosphere is a given for any planet that ever had them. ‘Good planets go bad’ is just another manifestation of the second law of thermodynamics. All that is always tending toward increasing entropy, whether a cell or a solar system. At the level of the individual organism, we call these biophysical limits ‘mortality.’ At the level of a species, we call these biophysical limits ‘extinction.’ At the level of the universe, we call this inevitability ‘heat death’. Because at all levels the state of entropy will always increase over time. Though it remains to be seen whether this planet will be tipped over in the coming decades by the cumulative effects of human industrial activity, or by inhuman forces, such as the continual increase in solar radiation from the sun. In the meantime, the final sentence that Darwin uses to *close On the Origin of Species* will hold true for any future shy of full scale runaway climate change: “endless forms most beautiful and most wonderful have been, and are being, evolved” (1859, p. 459).

Can this invitation to let me take you down, then reframe how we see evolution and extinction play out in the littoral zones of cities founded in the early modern period? Popular music that engages with this order of magnitude of depopulated species does not remain to be seen, but rather remains to be heard. Perhaps the youth generations coming of age in this epoch of a “no-analogue future” (Williams et al., 2013, p. 30) and “no-analogue state” (Crutzen & Steffen, 2003, p. 253) will write a new soundtrack of popular music as novel as the geological era they were born into. Any ending to this line of inquiry is then speculative, of necessity. It deliberately eschews conventional closure because it is about evolution (which has no conventional closure itself) and the deep future.

So, I end this invitation to let me take you down, with life forms that may evolve to colonise cities situated in the contemporary littoral zone. Say a new order of coral, that befittingly adapts to become suffused with the detritus of industrial civilisation. For coral, like *homo economicus*, are colonists. Their ability to grow on substrates of metal, plastic, concrete and other mainstays of our times means that some deep future ancestor may come to make a home in ‘tropicalised’ oceans above underwater urban detritus of the former Strawberry Fields sites of Liverpool and New York City. Picture a descendent species of modern day Strawberry Fields Montipora covering the site of the Strawberry Fields orphanage, or the Strawberry Fields memorial in Central Park. I think Lennon would find either a fitting finale for the notions of *Forever* in his song. Perhaps he was right all along that

It’s getting hard to be someone

But it all works out (Lennon and McCartney, 1967).

Only for the “someone” to be replaced with a ‘something’ that may come to flourish in a post-human world. To re-invoke Safina’s 12-year-old sense that “the world seemed unspeakably beautiful” (1999, p. xii) we may need to broaden our

horizons, “submerged at the bottom of an ocean of air” (Torricelli, in Walker, 2010, p. 24) as it were, toward a world whose beauty we cannot yet speak of.

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