Companions, zappers, and invaders: The animal geopolitics of Sealab I, II, and III (1964-1969)

ABSTRACT

Between 1964 and 1969, the US Navy undertook a series of experimental projects designed to enable 'man' to live and work on the seafloor, in undersea habitats, for prolonged periods of time without surfacing. These little studied projects, known as Sealab I, II, and III, were framed as an 'attack' on the hostile space of the sea by the warrior like figure of the American 'aquanaut'. Drawing on feminist geopolitical scholarship, this paper seeks to decentre the human protagonists of Sealab by foregrounding the role of non-human animal life in the projects. In doing so, it argues that animals actively shaped how the undersea environment came to be understood and inhabited by the US military and calls for greater attention to be paid to the agency of animals – their lives and fleshy affordances - in the construct of territory, and to the ways in which non-human life can complicate the ideas associated with the frontier, gender, and the exertion of colonial power.

Key words, Animal, Volume, Sea, Cold War, Territory, Feminist Geopolitics

The oceans captivated the imaginations of the US Government and military during the Cold War. As Hamblin (2002), Oreskes (2003) and Turchetti and Roberts (2014) have highlighted, for military planners and civilian scientists funded by agencies such as the United States Office of Naval Research (ONR), the sea was a three-dimensional space in which the enemy could prowl unseen in nuclear-powered submarines cloaked by the matter of water and ice. Yet the sea also captured the imagination of those in the US government and military for other reasons. Beyond the water column, the seabed itself became the focus of international legal practitioners. The 1958 Convention on the Continental Shelf, one of four conventions negotiated at the first United Nations Conference on the Law of the Sea (UNCLOS I), concluded as US President Truman had done in 1945, that coastal states should have control over the resources in these submerged and subterranean spaces. Looming large was the prospect of gaining access to great untapped resources, food sources and minerals beneath the sea—this for 'the benefit of all mankind' (O'Neal *et al.* 1965: i).

It was within this Cold War context of subterfuge, uncertainties and unknown possibilities that the US Navy (hereon referred to as 'the Navy') and Government increasingly sought to apprehend the depths of the sea to better understand a potentially resource rich and strategic operating environment. Perhaps less well known, is that this sub-marine imperative did not end at moving or extracting resources through the water column, but involved a number of experimental projects to test the feasibility of living, with the help of undersea habitats, for prolonged periods of time without need to return to the surface (see Squire 2016b). In the words of the Navy (1966) 'Men have begun to go down to the sea… not to play within it, but to dwell, to live for a while'.

Known as Sealab I, II, and III (1964-1969), the extraordinary projects saw teams of men, or aquanauts as they were known, live and work on the seafloor for varying amounts of time, whilst undertaking scientific research on the effects of undersea living. Led by Captain Doctor George Bond, Sealab I saw one team of four men inhabit the seafloor 58m deep off the Bermudan coast for 11 days; seeking to push these boundaries further, Sealab II, moved to less favourable conditions, 62 metres down, one mile off the coast of California. In the second experiment, three teams spent 15 days each living and working on the US continental shelf. This was followed in 1968 by Sealab III with plans to situate the habitat 185m below the surface on the US continental shelf. The habitat, however, began to leak air uncontrollably one the sea floor and in the process of trying to resolve the issue, aquanaut Berry Cannon tragically died, marking the end of the Sealab programs.
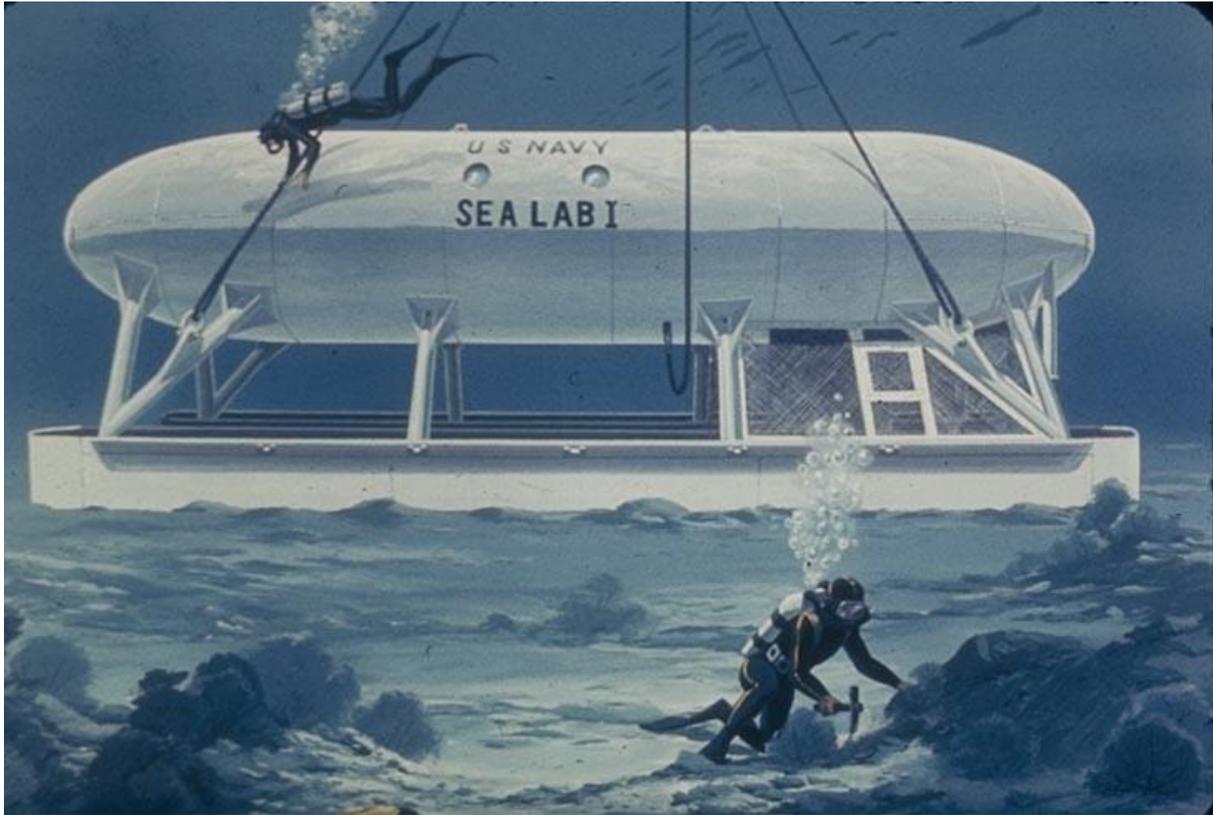
(Insert Figure 1: An artistic impression of Sealab I on the sea floor (reproduced with permission from the Man in the Sea Museum)).

Whilst ending in tragedy, the aims of the Sealab programmes were broadly achieved. Framed as an attack on the 'hostile' space of the sea, the Sealab experiments established the validity of undersea living. Expanding the capabilities of the military on the continental shelf and making the sea 'yield some of its secrets' were among other stated aims (ONR 1967:17). The sea, like other extreme Cold War spaces (see Farish 2013, Sage 2014), was framed within this process in masculine terms, as a frontier to be invaded, attacked, and domesticated by the American man for the benefit of all mankind, propagating the mythology that America was a nation without limits. George Bond, for example, describes in his diary how the aquanauts were commencing 'their own uphill fight against the hostile environment' (1964, entry 8 September). We see similar tropes at play in other extreme contexts. Alaska, for example, was framed by the US military as an 'excessively, dangerously

natural realm that confronted' those who 'were expected to live and fight across its expanses' (Farish 2013:5).

The success of the Sealab projects relied upon a nexus of actors, including the aquanauts, scientists, doctors, engineers, and of course, the institution of the US Navy. Yet, often overlooked within this nexus are engagements with sub-marine life that at different times, challenged, undermined, and fuelled this 'attack' on the seafloor and surrounding water column. Understood at various moments as invaders, companions, infiltrators, zappers, and friends, non-human animals of varying shapes and sizes proved to be significant actors in the US Navy's bid to territorialise the seafloor. From Tuffy the dolphin who was captured from the wild and trained to deliver mail and rescue lost divers, to poisonous scorpion fish that covered the sea floor surrounding the Sealab II habitat prompting fear and trepidation among the aquanauts, to the US Navy's interest in the microscopic planktonic life that drifts through the water column, the wealth of life in the sub-marine environment proved to be pivotal in shaping the Sealab experiments.

This paper seeks to delve into the significance of the intersections between this diverse range of life and the geopolitics of the Sealab projects in order to raise broader questions surrounding the 'place' of non-human life in geopolitical scholarship, and the ways in which non-human life is examined in geopolitical literature. In order to achieve this, it draws on a range of archival material on the Sealab projects gathered from sites in the United States and online. These include the archives held at the Man in the Sea Museum, Florida, and the Scripps Institute of Oceanography Archives held in California. These two archives hold a

wealth of original material on the Sealab projects. The Man in the Sea Museum, in particular, is a key site in memorialising the projects. It holds the only surviving habitat (Sealab I) and has become a focal point for the collection of materials from personnel involved in the projects alongside official documentation from the US Navy. Materials from both sites included diaries from aquanauts and key US Navy personnel, including Dr George Bond who led the projects, a wealth of newspaper articles tracing the running of the projects, technical reports, operational reports and film and photography produced by the Navy. The paper also draws on online material from the Office of Naval Research and books authored at the time by the likes of Dr Sam Ridgway who was involved in the Navy's Marine Mammal Programme (1960-present) at the time and was Tuffy the dolphin's vet. [1] Upon undertaking this research, the intention was to explore the geopolitical complexities of the Navy's engagement with the human bodies involved in the projects. It became clear, however, as the work was undertaken that the sites held 'archives of the feeling body' in unexpected ways that extended alongside and beyond the human (Dwyer and Davies 2010:91). As animals became increasingly apparent, or emergent, in the archive material (see Ashmore et al. 2012), the search for their experiences and presence became more targeted. As they emerged, relevant sources were photographed, coded, and subsequently analysed upon returning from the sites. This involved keeping an eye out for the routines, fleeting encounters, 'embodied movements, precognitive triggers' and 'affective intensities' that emerged around animal, rather than human, bodies (Lorimer 2005:84). Whilst such accounts can only ever be residual and partial (Black 2010) attuning to the presence of

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[1] Upon embarking on this research, the primary focus of my archival work was upon the embodied experiences of the aquanauts and the construction of territory beneath the sea. As the research process evolved, however, the non-human life surrounding the projects became increasingly important.

animals in the archives enabled sometimes 'small' and seemingly insignificant animal stories to surface (see Lorimer 2003).

Before delving into this wealth of under-examined material, the paper begins by providing the conceptual context for the sections that follow. It brings together scholarship on animal geographies and territory before drawing on the work of Deborah Dixon (2015) and others to argue that feminist geopolitics provides a means to expand these agendas. The second section of the paper explores the idea of an 'undersea empire' - primarily through the body of Tuffy the dolphin. The Navy's engagements with Tuffy's body became a central means of articulating wider colonial undersea ambitions and provide a moment to deconstruct the highly gendered, masculine, warfighting ideals that characterised the time period. The paper then moves to explore how animals confounded these territorial ambitions, taking in as it does the role of scorpion fish, sea urchins, and again, Tuffy. In bringing feminist geopolitics to bear on this case study, the paper argues that animals, often overlooked in discourse on the territorial volume, are vital and agential and that further attention should be paid to the ways in which non-human life can complicate the ideas associated with the frontier, territory, and the exertion of colonial power. Indeed, the animals in this case study were key in shaping how the US Navy understood and sought to apprehend the undersea environment. Finally, the paper concludes by arguing for the 'rewilding' of theoretical approaches to territory and feminist geopolitics (see Halberstam and Nyong'o 2018:454) whist also highlighting areas for further work.

ENTERING ANIMAL TERRITORY: FEMINIST GEOPOLITICS AND THE NON–HUMAN BODY

As evidenced by Buller (2013, 2014, 2016), Hovorka (2016, 2017, 2018) and Gibbs' (2019) series of reflections in *Progress in Human Geography,* animal geographies are 'blossoming into a vibrant and diverse sub-field' (Hodgetts and Lorimer 2015:291). Following the work of Wolch and Emel (1995) there has been a burgeoning literature on animal geographies that seeks to decentre the human and dislodge the assumption that animals exist simply as a background to human social and political life (Whatmore 2002, Bear 2010). On the contrary animal geographers argue that animals' matter as political and ethical subjects and that attending to the 'spatial behaviours of all animals provides a 'thicker' sense of the Earth' that can 'tell us something about us' as humans (Hodgetts and Lorimer 2015:286). For Raffles (in Tang 2010), exploring animal worlds is an important endeavour, as is exploring the 'intense relationships' that emerge with and around them to better understand 'human-animal relations, and the ways in which animals shape worlds' of different kinds (Gibbs 2019:5).

Drawing on the work of Sarah Whatmore who argues that 'earth politics…are necessarily more plural… than a global vision that maps a universal subject, the 'we' of humanity, on to a powerful image of a finite terrain' (Whatmore 2002:116), the role of the 'animal' is increasingly being drawn 'in from the margins of scholarship' in political geography (Johnson 2015:297). Interventions by scholars such as Hobson (2007:251) have sought to bring the animal to bear on the geopolitical and vice versa. Rather than conceptualise animals as objects of resource struggles, Hobson argues that they are part of, and not incidental to, 'specific political configurations', enabling a 'broader conceptualisation of how the 'political' is constituted'. As a result, a significant body of work exists that interrogates animal rights and animals as subjects of biopolitical interventions, highlighting the inherent violence of these entanglements (see Milligan 2015, Helmreich 2003, Parikka 2008, Johnson 2015).

There is also work that engages with animals used as tools of warfare (Forsyth 2016, Cudworth and Hobden 2015, Salter 2015, Kosek 2010, Hediger 2013), nationalism (Raento 2016), empire building (Kosek 2010), the animalisation of people (Vaughan-Williams 2015) and the use of animals as biomimetic aids in the curation of battlefields for the US military (Johnson 2015, Goldstein and Johnson 2015, Kosek 2010).

Whilst the focus of this work has been largely terra-centric (Gibbs 2019), the sea is emerging as a productive space in which to further this agenda. Exploring 'aquatic liveliness' (Bear 2018:30) opens up a number of opportunities to interrogate the role that animals might play in constructing the world around us– often in unexpected ways that can disrupt normative representations and assumptions (Bear 2018). As Lambert et al. (2006) have argued, there is a need to look 'beyond obvious' and visible 'marine features to more obscured uses and life at sea: …animals, fish, and underwater worlds' (Peters 2010:1267). Bear and Eden (2008) have gone some way in filling this lacuna, reminding 'us that geographies of the sea could be further enhanced by exploring not only what happens on the surface of the water, but also beneath' (Bear and Eden 2008:490, see also Besio et al. 2008 and Cloke and Perkins 2005, Taylor and Carter 2018). As Bear (2010:297-300) highlights, this does not mean that exploring these encounters is easy either in 'practice or in interpretation' but to leave them unaccounted for runs the risk of 'leaving lives beyond direct encounter invisible – especially it might be argued, when these lives are lived in spaces away from direct human gaze, such as in the deep ocean' or 'non-airy spaces' (2010:297-300).

Notwithstanding this increasingly rich body of work, there is more to be said about the intersections of animals, and (geo)political imperatives (Srinivasan 2016:76). As Srinivasan

(2016) highlights, despite recent efforts to expand political geographies purview to incorporate animals, this has not been realised to the extent that it might have been and there is more work to be done to account for the enlivened nature of geopolitical relations. The world is, after all, 'always already inhabited' (Whatmore 2002:3) and animals are part of the heterogeneous networks that constitute political life, and co-create histories and geopolitical subjectivities that may be taken for granted (Hobson 2007:263). It is all the more important to interrogate these complexities in military projects like Sealab where the sea was imagined as an uninhabited space to be mastered, or one where certain species, such as dolphins, could be brought under human control. Situating these colonial complexities in the context of literature on territory offers a means to explore this further.

'Fleshing out Territory': Feminist Approaches to Non-Human Life

'Territory' as a concept and practice has been the subject of increasing attention in political geography. Work by scholars including Stuart Elden has suggested that ideas of 'territory as bounded spaces with control exercised within them, is at a best a partial definition that needs to be challenged' (Elden 2014:np). This might be achieved conceptually by conceiving of territory as a process rather than an outcome, as something that is constantly being made and remade via dynamic processes, actors, and agents (Elden 2010). This might also be achieved by rethinking the very spaces of territory. Rather than conceptualise space as a two-dimensional plane and grounded surface on which people move across, recent scholarship has recast territory, challenging the flat, terra centric bias that has characterised political geographic scholarship (Weizman 2002, Elden 2013a,b Williams 2013, Bruun 2020, Slesinger 2020, Squire 2016a, Peters et al. 2018, Pérez and Melo Zurita 2020). It is

recognised that political geographies do not take place across the flat, two-dimensional plane traditionally associated with sovereign spaces and in doing so, spaces, materials, and objects that had otherwise evaded scholarly attention are brought into the frame. In moving discussions on territory 'into the atmospheric heights and geologic depths of the earth' (Clark 2013:49), Elden (2013a) concludes that we need to think about volume and through volume to grapple with the complexities of territory, power and security. Within such a framework, there is a need to diversify understandings of the 'things' that fill volume and the actors, agents, and atmospheres that coalesce to enable, and (re)produce territorial constructs (Adey 2013, see also see Squire 2016a, Squire 2016b, Clark and Jones 2016, Melo Zurita and Munro 2019, Forman 2020).

Thus far, however, there have been critiques of this process (see Jackman et al. 2020, Halvorsen 2018), including calls to re-orientate understandings of territorial practices to account for the view from below and for the 'coalition' of actors and networks that constitute territory (Williams 2013:226). This forms part of a much broader agenda to, in the words of Halvorsen (2018:5), decolonise understandings of territory and to open it up to 'multiple overlapping and entangled practices and ideas that exist within any historical and geographical context.' Halvorsen (2018) is speaking to wider concerns here and argues for the opening up of 'networks of knowledge production, scientific expertise, and political decision making to a wider range of interested actors - human and non-human' (Bosworth 2016: 23, see also Marston and Doshi 2016, Dixon 2015).

 As feminist geographers have long argued, 'if diverse actors, scales and spaces are to be included in political geography's purview, then the model of the political subject as one who operates in defined and contained political arenas will no longer suffice' (Hobson 2007:253).

In feminist scholarship the centrifuge for this process has been the human body, everyday spaces, emotions, and voices on the margins, opening up geopolitical scholarship to conditions and contexts that would otherwise remain beyond sight and scholarly citation (Jackman et al 2020). As Dixon (2014:147) and others have illustrated, however, the human body is far from the 'be all and end all' of this process. Dislodging the embodied centrifugal point of feminist scholarship has great potential for opening up new possibilities for thinking through and understanding territorial practices and the construction of territory itself (see Bosworth 2016). For Dixon (2015), this process has involved engaging with the sub-human – the bones and semi-living matter that constitute geopolitical phenomenon in various contexts, with a specific emphasis on materialising the lived experiences of suffering and trauma. Such a process she argues, provides access to the vital materialities, substances and life forms that coagulate to form the political.

Thinking afresh about the non-human states of territory and the geopolitical can destabilise understandings 'that underlie and privilege certain forms of thought, life, and politics' (Bosworth 2016: 33-34). Such rethinking of subject and scale, argues Hobson (2007:253), 'can and should include animals' (see also Jackman et al. 2020). As Elden (2013b) highlights, early understandings of territory as a practice drew on animal ethology and the idea that territory making was an animal like, instinctual human behaviour. Despite the role of the animal in early understandings of territory, contemporary scholarship largely overlooks and transcends the animal as a significant actor in territory complexes. As Juliet Fall highlighted in 2005 (2-3), despite a 'wealth of writing about territory, territoriality, and boundaries' there is a lack of engagement with the role of 'nature' and the 'wild' in political geography which in turn has 'implications for how space and territory are conceptualised'. The lack of

animals within this scholarship is incongruous with wider moves in political geography seeking to engage with the 'multiplicity of beings' that inhabit the world and how they 'participate in the coproduction of socio-political collectives' (Sundberg 2014:33). The lack of attention paid to non-human life in territorial projects is, as Sundberg (2014:34-35) highlights, a particularly Eurocentric worldview that separates humans from 'the world of nature and animality', neglecting more diverse ways of knowing the world whereby animals and other non-human life 'participate in the everyday practices that bring worlds into being'. Given recent efforts to re-energise understandings and conceptualisations of territory, and recent diversifications of feminist geopolitics, there is an opportune moment to draw animals in from the margins of territory scholarship, to 'wild' our understandings, in order to enrich and further enliven understandings of this key concept.

Juanita Sundberg (2011) highlights the potential of such an approach in relation to border enforcement at the US Mexico Border where two forms of feline (the ocelot and jaguarundi) shape and alter the practices of enforcement agencies as they come into contact with conservation groups and environmentalists seeking to protect the habitats of these endangered animals. The cats came to matter 'tremendously to the politics of boundary enforcement' eventually forming part of a collective that that compelled Border Patrol to change its operational plans (Sundberg 2011:331). For Sundberg, addressing the role of 'nonhumans as actors in geopolitical processes such as boundary making and enforcement' is more than an 'additive exercise' (2011:332). Not only are these actors 'whose properties energies, and potentialities matter tremendously to political outcomes' (Sundberg 2011:318) but that are actors who can facilitate the emergence of a 'more collaborative and therefore accountable ecological politics' (Sundberg 2011:333). A 'more than human

territory' that considers what happens 'when non-human animals are enlisted in territorialising practices' is therefore extremely important (Gibbs 2018:203) in accounting for the ways in which animals 'push back, challenge, and rewrite' (Massaro and Williams 2014:567) geopolitical phenomenon that may otherwise deemed the preserve of the 'human'.

BUILDING AN UNDERSEA EMPIRE

Animal bodies and Cold War ambitions

As Turchetti and Roberts (2014), Green (2016), and Farish (2010) have highlighted in different ways, the Cold War was a time when geopolitical actors sought to apprehend the 'Earth' – its materialities and its inhabitants - for geopolitical gain and as a conduit for territorial expansion. Nature, in this context, was conceived as a totality that could be comprehended, regulated, and controlled, offering potential to radically alter perceptions of the human in relation to nature (see Masco 2004:518). Masco (2004:527), for example, highlights the kinds of experiments that were undertaken on animals during the Cold War as a substitute for human life. Pigs, dogs, cats, sheep, monkeys, and mice were enrolled in this process in various ways, from measuring the effects of radiation, to bomb detection to biomimetic studies (see Salter 2015). Within this framework, the 'protected body of the Cold War Warrior' is 'prefigured by the vaporised, mutilated, and traumatised animal body' (Masco 2004:529). As Kosek (2010) illustrates, this was not just limited to mammals but to insects too – the US military for example dropping 'plagued-infested fleas' on North Korea during the Korean War and later, using 'mosquitoes, wasps, and bees as part of torture techniques against the Vietcong in Vietnam' (Kosek 2010:655). Such techniques have a long

history, demonstrating, in the words of Kosek (2010:653), how different 'species and ecologies are integrated' into the geopolitical project of empire building.

Given the Cold War preoccupation with the sea as a battlefield, space to live and dwell (see Kaji-o'Grady and Raisbeck 2005), and space of subterfuge and potential, sea-life became embroiled in the US's mission for mastery over nature. Dolphins, in particular, proved to be alluring for US scientists and the military. Dolphins are, as Fuentes (2007:129) highlights understood to 'possess certain characteristics that increase the likelihood of cultural association and coexistence' (Fuentes 2007:129). They are sentient, intelligent, social, and understood as having 'freedom of choice' in their natural habitat (Neo and Ngiam 2014:236). These characteristics bring the species 'very directly into the ecology, and culture created by the human niche' (Fuentes 2007:129). In a period characterised by what Kasier and McCray (2016) would term 'groovy' scientific practices, some of these initiatives took on eccentric and unconventional tones. American scientist John Lilly for example, experimented with dolphins in attempt to communicate with them (see Burnett 2016). He believed that in doing so, man would be better prepared to communicate with extra-terrestrials when they were inevitably discovered in outer space (Lilly 1961, 1967). For Lilly, dolphins might better be understood as humans of the sea rather than marine mammals, and as Reiss et al. (2006:324), highlight, he went further, speculating that 'dolphins communicate by telepathy, have a high level of awareness, and have stories and a culture of their own'. Other projects, such as Ant Farm's[2] Dolphin Embassy (1974) sought to bring

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[2]Founded in 1968 by Chip Lord and Doug Michels, Ant Farm consisted of a collective of designers working to 'induce social change through the creation of new forms of space and through artistic interventions' (Ruedisueli 2017)

humans and dolphins together through floating architectural structures to help solve the 'mysteries of Delphic civilisation' (Michel in Hidden Architecture 2016).

These examples rely on imagined futures of sorts whereby 'man' envisaged interacting with dolphins in new ways. This was premised on understanding dolphins as sentient beings that could be communicated with, if only the secrets of their minds and bodies could be unlocked. Set within this context, the US Navy's engagements with a dolphin named Tuffy, and other forms of sea life do not seem as farfetched as they might. This section of the paper, primarily centred upon Tuffy, explores how his body became an extension of the colonial ambitions of the US Navy in their mission to live and dwell in the sea. It highlights how his physical attributes and cognitive capabilities provided a conduit for imagining life in the future on the sea floor and projecting their imperialistic ambitions from the present into the years to come. It also engages with other marine life, in the form of microscopic plankton, in facilitating this process. These unlikely actors all became enrolled as agents through which to imagine life beneath the sea with 'ineluctable echoes of colonialism' ringing throughout (Farish 2013:5).

Project Arion

Project Arion formed a key component of Sealab II, with plans to expand its remit for Sealab III. The aim of the project, funded by the ONR, was to 'determine the means by which porpoises could be effectively utilised in scientific experimentation toward naval application' (Wood and Ridgway 1967:408). In the context of Sealab, this involved understanding how a dolphin, named Tuffy, might be put to work to further the Navy's

imperial ambitions beneath the sea. Caught from the wild in the Gulf of Mexico, Tuffy was one of the first dolphins of the newly established US Navy Marine Mammal Program, designed to explore the naval capabilities of dolphins. In the words of Dr Sam Ridgway, the first veterinarian of the Marine Mammal Program, the Navy believed that dolphins could be a 'natural' addition to Sealab. Given his proven ability in the Program to dive in excess of 300ft, wear a harness, 'home' on two different acoustic devices, and work untethered in the open sea, Tuffy proved to be the 'obvious candidate' for the trials (Wood and Ridgway 1967:408).

Dr Ridgway believed strongly that Tuffy 'could teach us something about his world' (1988:122). This involved learning from a set of pioneering physiological experiments[3] designed to unlock the secrets of Tuffy's body, his ability to thrive under the water and avoid decompression sickness when returning to the surface after diving. Much like the Indigenous 'Alaskan Natives' enrolled in the US military's engagements with the Arctic environment during the Cold War (Farish 2013:1), it was believed that Tuffy's 'native' body could 'hold clues to the mysteries' of the extreme context he called 'home'. The process of deciphering Tuffy also involved behavioural training to enable him to work alongside the aquanauts of Sealab II (see Figure 2). Officially, Tuffy's primary task was to rescue an aquanaut should they become lost in poor visibility (Wood and Ridgway 1967:407). The diver would 'summon the porpoise' via an acoustic signal. Tuffy would then carry a line to the aquanaut on his harness that would guide them back to the relative safety of Sealab II. Subsidiary tasks also included the transfer of tools, message capsules, and other small

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[3] Telemetry was used to study his heart and breathing as he swam, his blood was sampled, temperatures taken, his body was photographed at depth, and he was trained to exhale into a funnel so that the gas concentrations in his breath could be analysed.

objects (such as Coca Cola bottles) between the surface and bottom and between divers (Wood and Ridgway 1967:408). He was even trained to carry a bag of fish down to the divers so that they could feed him them in reward for successful completion of a task. This 'educated dolphin' (*Chicago Daily Law Bulletin* 16 September 1965) was, according to a variety of media sources, 'an aquanaut with fins' (*Oregonian* 14 September 1965), a 'water logged pony express (Olten 6 August 1965), 'A sea going St Bernard' (*Los Angeles Times* 14 September 1965) a 'messenger and errand boy' (*Rocky Mountain News* 16 September 1965) and an 'undersea mailman' (US Navy, Press Release Sealab II, 18 September 1965). In addition to being referred to as a 'pet' (Bowler 23 September 1965), Dr Ridgway also described Tuffy as 'marvellously complex', and a 'beloved friend' (1987:191).

(Insert Figure 2: Tuffy in training prior to Sealab II (reproduced with permission of the Man in the Sea Museum).

The undersea environment was being imagined in new ways through the body and behaviours of the dolphin. The Navy extended ownership over an animal whose natural habitat was vast, expansive, and largely unknown. In doing so, Tuffy arguably acted as a proxy for the Navy's ambitions in the sea as wildness was co-opted and 're-made in the image of human culture' (Power 2012:371). To tame, or in the case of Tuffy, to make 'friends' with 'the wild' 'is to draw it into the boundaries of the known, to 'fix' it into a (it is hoped) secure state' (Anderson 1997:497). It is a key process through which 'humans have claimed dominance over nature' (Power 2012:371), and whilst usually associated with human interactions with land mammals such as dogs (Lorimer, J. 2010), the boundaries between nature, culture, and territory were being redefined beneath the sea. The anthropomorphic language of being 'educated', of assuming roles occupied on land by humans and domesticated animals see Tuffy drawn into a wider narrative concerned with homesteading and convincing a public concerned with over population and resource demand that 'man' could not only live in the sea, but thrive in it.

This was particularly important in the wider context of the projects where great efforts were made to discursively frame the habitats and the surrounding waters as 'home'. The habitats themselves were referred to as 'home' (see Bond 1964, entry 19 July), whilst newspaper reports focused on particular home comforts, marvelling at the 'hot showers, food, bunks, and electric light 215 feet beneath the sea' (Baldwin 24 July 1965). Beyond this, we see on numerous occasions the aquanauts' described as 'pioneers'. The San Diego Union, for example, stated that 'truly' these men are '20th century pioneers, as much as the men…of

the 19th century…who opened a new nation' (*The San Diego Union*, 29 September, 1965) and who were imagined to be explorers of the 'dark world' (*San Francisco Examiner*, 31 August 1965). Tuffy was a key part of this process, the headline of the *San Francisco Examiner* (2 August 1965), describing the 'US undersea pioneers and their porpoise'. Just as the Navy extended ownership over the sea, making it 'home', Tuffy too became enrolled in this narrative, framed as a possession of the 'conquerors' of this new territory. 'More than simply being influenced' by the political transformations being undertaken in Sealab, Tuffy is 'integrated' into the process of 'empire building itself' (Kosek 2010:653). The Navy believed that in learning from Tuffy's distinct means of tuning into the world, a more-than human alliance could be formed to 'precipitate the making of new worlds' under the sea (see Goldstein and Johnson 2015:75). Indeed, part of the value of thinking through questions of territory via Tuffy comes in his capacity to prompt 'man' to imagine living beneath the sea through interspecies entanglements. Mastering Tuffy's body was, in the Navy's eyes, a step toward realising domination of the undersea environment.

This was not always straightforward, however. Beyond his 'friendly' characteristics, Ridgway (1987) described how Tuffy would gnash his teeth and growl to express his discontent. He would hit his trainers with his tail flukes and go AWOL in training. Whilst difficult to manage, mastering these qualities only reinforced the Navy's imperial ambitions. Christened 'Tuffy' by his trainers as a shortened form of 'tough guy', he was valorised in the media for possessing certain 'masculine', heroic, characteristics. Reporting for the *Chicago Tribune*, for example, Bowler (7 August 1965) writes of his 'battle-scarred' body. The scars represent to Bowler, Tuffy's 'many successful encounters with sharks'. Other media outlets reported that Tuffy, 'bearing the scars of numerous sharks', would play the role of 'body guard, shark

fighter, and rescuer' and that he might 'protect the divers from attack' (*The Sun Baltimore* 1965). Tuffy's 270lb weight and 7ft length were also emphasised along with his ability to 'flash like lightening through water' and send human's 'sprawling' (see Bowler 6 September 1965). Tuffy's body is drawn into the masculine ideals of this undersea experiment. His scars, like those adorning the bodies of military men, come to act and perform as 'material scars of physical achievement' (Mankayi 2008:35). They confirm 'masculinity in action' (Funnell and Dodds 2015:125) whilst also serving to reinforce the heroism of the aquanauts and those 'mastering' him. Whilst Tuffy was once wild – 'different from humans and more like nature' (Besio et al 2008:1220), his body is drawn into cultural and geopolitical gender norms, reinforcing a naturalised heteronormativity in a context that is anything but natural. Mastering the hardened, warrior-like 'native' dolphin therefore affirmed the place of the American white man under the sea and their ability to conquer a hostile territory (see Green 2016). Tuffy's own status as strong, scarred, 'indigenous and wild' was crucial in this imaginative and 'symbolic transformation' (Green 2016:151).

Tuffy's body, his character and his mannerisms become a kind of territory here. His teeth, scars and size becoming terrains to be mastered and managed. His scarred flesh is particularly important, his damaged skin and muscle rippling through the public discourse surrounding Sealab (see Dixon 2015 and Smith 2018) and validating the imperial ambitions of the Navy. The 'geopolitical' emerges here in unexpected places (Smith 2018:80) – in Tuffy's tissues and the inner workings of his body. Whilst Dixon (2014, 2015) and others have gone a long way in 'fleshing out' feminist thought by 'beginning from the materials of the body rather than from the human subject' (Smith 2018:80), discussions could be pushed further by decentring the sub-*human*. As Tuffy (and other examples in this paper) will

testify, the fleshy affordances of the *non*-human have the capacity to affect and 'reshape' understandings of geopolitics (Bosworth 2018:83). The need to account for the 'unruly potential of flesh' extends beyond human corporealities (Dixon 2014:138). As Tuffy's body demonstrates, his flesh became mobilised in a much wider agenda about the possibilities of undersea living and the mastery of 'hostile' contexts. In the process, the materialities of this territorial endeavour are complicated by Tuffy's body and his damaged skin.

It was not simply 'charismatic' or sentient marine mammals that held the capacity to prompt such thinking. Single celled organisms of plankton featured unexpectedly as a means of demonstrating that 'man' could live and thrive in this hostile frontier. The idea that humans could live off these microscopic organisms was an element of the Navy's wider public engagement strategy surrounding Sealab. As the videos produced by the Command Information Bureau for Sealab II (see US Navy 1965) stated, the studies of sub-marine life were an important 'inventory of a future food supply for the proliferating human race.' The voiceover describes how the men 'dined on plankton after a dive to 300ft. That floating microscopic life of the sea'. According to the film, the aquanauts reported that it 'tasted like nuts' (US Navy 1965). George Bond (Entry 3rd October 1965) went on to report in his diary that 'plans were developed for a 'plankton soup dinner', commenting on the 'great deal of woodsmanship' and 'self-sufficiency' needed to take sustenance from the water column.

The wider connotations of 'woodsmanship' here are important. It is a term that harks back to American settler communities where frontier negotiators who acted as 'go-betweens' for American colonisers and native Americans were known as 'woods-men' (National Humanities Centre 2009). The aquanauts were thus demonstrating their ability to pit themselves against the natural environment and find themselves 'self-sufficient'. Indeed,

Bond in his diary of Sealab I was keen to emphasise that his men were 'truly a breed apart'. These were men who were 'immensely resourceful…impatient with the progress of the world', men who 'take chances for all of mankind', and who seek satisfaction in the 'attacking of new frontiers' (Bond 1964, entry 18 July). Plankton, were perhaps a very deliberate choice, forming as they do the bottom of the food chain for all marine life. In becoming 'aquatic', the aquanauts were demonstrating that they too, like other marine animals, can take sustenance from the basic life of the sea. The wild plankton here served as a resource, a 'remedy' to be exploited and a 'source of white renewal' for the 'new breed' of sub-marine American man (Halberstam and Nyong'o 2018:455).

<u>CONFOUNDING TERRITORIAL AMBITIONS</u>

Whilst playing a key role in the idea of undersea empire building, the animals of Sealab did not simply fulfil this function and the Navy's engagement with animals was multifaceted as a result. In Tuffy, for example, we find a being who was resistant, belligerent, and quick to confound the Navy's ambitions. Ridgway (1987:37-38) recalls the bruises, cuts and 'bloody noses' that resulted from Tuffy's resistance as he gnarled his teeth and knocked his trainers over in the training pool. He also did not perform as expected on his first run to Sealab II. Whilst the habitat was framed as 'home' for aquanauts, for Tuffy, it presented anything but. The aquanauts reported that Tuffy appeared 'horrified', 'disillusioned' and 'anxious' after diving to the 'ungodly array of threatening hardware on the ocean floor' that constituted the habitat (Bond 1965 entry 16th September). He fled from the scene only to return later but the media were quick to report that his performance was 'not so hot' and that the 'impish dolphin performed bashfully' (*Davenport Times-Democrat*, 17 September 1965). The official report detailed that the cords, wires, flood lights, and sounds emanating from Sealab

had deterred him – the colonisation of his natural environment by humans assaulting his senses.

Perhaps the starkest form of resistance to the Navy's plans to enlist and train Tuffy was, tragically, in his death. His 'wildness' could never fully be brought under control and his life was ended by a bacteriological infection 'never before encountered in a dolphin' in the wild (Ridgway 1987:191). The infection, thought to be contracted through an 'oozing wound' on his underside, almost paralysed 'the powerful tail muscles that once swept him through the sea' (1987:191). A lack of human understanding about the complexities of the dolphin and sustained 'asymmetrical relations of power' imperilled Tuffy's life (Wilson 2019:714). He became physically unable to move – his body rendered immobile by paralysing microscopic bacteria not seen in his natural context. He was 'both intensely valued and completely disposable' (Green 2016:158), the inner workings of his body rebelling against the constraints of captivity that he unwillingly found himself in. Dixon's (2014,2015) work on the flesh and decentring the corporeal whole becomes all the more important here. In many ways Tuffy was valorised for being being physically similar to 'man' – he was framed as masculine, tough, intelligent, and a good companion – in the words of Dr Ridgway (1987:121-122), 'we recognise much ourselves in other animals, especially in mammals which have warm blood, breathe air, bear live young and nurse them on milk…the dolphin's smooth skin, perpetual smile, and exuberant behaviour appeal to human emotions' (Ridgway 1987:121-122).Yet despite these imagined affiliations, his body could not withstand the conditions imposed upon him. In 'matter-ing' his body (Dixon 2015:9), this violence becomes ever more apparent. The bacteria within him and the puss oozing from his body become agential, subverting, in the words of Dixon (2015), the idea of a sovereign

subject held neatly within a fleshy container. The materiality and liveliness of Tuffy's body

serve to reconfigure geopolitical agency, drawing attention to the vitalities and capacities of

the animal and sub-animal body. Whilst traditionally centred upon the human body, the

animal and its fleshy, pussy affordances proves worthy of attention within feminist

geopolitics, opening up further opportunities to deconstruct and materialise the power

dynamics shaping and framing geopolitical phenomenon.

<u>Getting Zapped: 'I was scared of those fish'</u>

Beyond temperament and sub-bodily processes of Tuffy, the capacities of other marine life

served to remind the aquanauts that they were never really at 'home'. Described as 'one of

the most noxious marine animals in California', scorpion fish proved hazardous throughout

the Sealab II experiments (Halstead 1951:395). Their 'formidable dorsal spines are capable

of inflicting painful wounds' and incapacitating predators (Halstead 1951:395). Whilst very

little was 'known about the poison or structure of the venom', being stung was described as

like being bitten by a rattlesnake. Framed as 'threat', it was such characteristics that saw the

fish gain 'wide notoriety' as reports circulated of aquanauts receiving 'stings from the

scorpionfish attracted to the US Navy's Sealab II' (Taylor and Chen 1969:311).

Scorpion fish, as Bond described in his diary (entry 17 September 1965), 'literally blanketed

the sea floor around Sealab II' and were 'packed in every cranny around the habitat' posing

a 'constant threat' to the aquanauts. Whilst the aquanauts reported feeling 'part of' the

underwater world, describing it as 'our little world' and 'our own back yard' (Aquanaut in

Radloff and Helmreich 1968:112), the reality was more complicated. One aquanaut, for

example, described his fear of 'going out there and getting zapped', stating that he 'was

always in fear of touching the bottom' (in Radloff and Helmreich 1968:64). He described how 'you could see those fish out there – like stones – like a cobblestone street' as they were packed so tightly together. Another added:

> 'I don't like those fish…I was scared of those fish. I don't like the idea of going out there and getting zapped and not knowing if the effects of that fish are going to prevent you from getting back inside the lab because you can get stung like that, go into a type of fit…so I was always in fear of touching the bottom.'

As the ecological report from Sealab II noted (Clarke et al.1967:1387), the scorpion fish 'piled' into the entry hatch to the habitat with 27 individuals recorded per square metre. In the area around the habitat these estimates escalated to '2800 individuals… within a 500sqm area'… 'almost 35 times that of the normal sand-bottom community' (Clarke et al. 1967 1388). They congregated in areas with the best light, the illuminated habitat becoming a draw for the fish in their hundreds.

The fish forced the aquanauts and those overseeing the project to acknowledge 'the limits of their capacities to bend space to their will and imagination' (Ginn 2014:532). Their colonial ambitions and desire to make home in this extreme context were destabilised somewhat – the scorpion fish providing a moment in which the power of 'man' over nature was 'unmade and undermined' (Wilson 2019:717). Wildness, write Halberstam and Nyong'o (2018:453) can function as a 'foil to civilisation', a feat only exacerbated in the undersea environment with the wealth of life being drawn to the lights and 'home' of the habitat. In this instance venom and sharp spines replaced the sandy seafloor, creating a land/seascape that prompted fear, apprehension, and an awareness of the precarious nature of their underwater existence. The 'other' of the fish, was brought 'into intimate contact' with the

aquanauts' (Wilson 2017:459). This did not necessitate physical touch or stinging, but the fear of it, and the potential pain and difficulties that would follow. For the aquanauts themselves, neutral buoyancy and the ability to 'hang' as though flying in the water column was key in circumventing the dangers posed by amassing scorpion fish. The Aquanauts needed be weighted down so that they would not fatally ascend to the surface but would not be so heavy 'so that they must crawl among the thousands of scorpion fish on the bottom' (Bond 1965). In the absence of reinforced wetsuits and other protective technologies, they needed to effectively occupy the volume, neither sinking nor floating to avoid the venomous spines.

Far from being a passive 'encounter' with the fish (Wilson 2017:464), we see in the build up to Sealab III how the Navy sought to address the perceived power imbalance caused by the 'zapping' creatures. Scientific studies were planned that would, according to one newspaper report, 'have significance for all people and especially those who someday will live on the sea floor' in 'underwater stations' or for farming purposes (Smith 1968). This cannot occur, it continued, until more is known about 'poisonous and venomous marine organisms' (Smith 1968). In the process, 'man' became the object in need of protection and conservation with fish, whilst dwelling in their own habitat, framed as troublesome infiltrating, stinging, - or as Bond (1965) would describe –'noxious pests'. As scorpionfish and 'man' came into contact, imperial forms were reproduced, their bodies and very existence becoming a 'dumping ground' for 'white settler colonialism' (Halberstam and Nyong'o 2018:453).

In studying the physiology and toxicology of scorpion fish scientists proposed to fix the previously unfixable to enable 'man' to more effectively inhabit the sea. The use of natural predators (or 'enemies' to use the militaristic language of the newspaper report) to achieve

this was proposed as one solution. Much like on land where biopolitical solutions are found to eradicate certain 'invasive' pests, the ecosystem of the area around the habitat was potentially going to be altered with new conditions of living and dying imposed. This raises important questions about what it means to 'bring creatures into view' (see Wilson 2019:726). Little was known about the fish at the time and whilst Sealab II sought to address this, it did so in ways that were structurally violent, bringing the scorpionfish 'into view' so as to exert power over their lives and bodies. In the process, we see a distinct necropolitics at play, 'enmeshed in more-than human contestations' over 'who must die' when species meet' (Margulies 2019:150). These intersections are important and warrant further interrogation more broadly in political geography – as Gibbs (2018:218) highlights, 'making animals killable is a common outcome of human efforts to assert power over space' and this is no less true in the sea. As Burns (2019:103) argues, oceans are a 'force of materialities that territorialise' 'binaries of nature/society, land/sea and are formative in '(re)producing unjust political geographies of difference across species divides' (Margulies 2019:159). In asking whose bodies count within the geopolitical nexus of Sealab, as feminist scholarship would encourage, the scorpion fish offer a stark demonstration of the violent practices and imperial forms that so often accompany 'attacks' on a frontier, and the complex and contradictory ways in which non-human life get embroiled in this process.

Invading Urchins

The relatively stationary scorpion fish exemplify how the US Navy's understandings of territory were being shaped by non-human life. Yet, it was also the movement of other animals that prompted re-imaginings of this 'hostile's space. During the preparations for Sealab III, it was reported in a number of newspapers that slow moving, algae feeding, globular sea urchins had the capacity to cause problems for the aquanauts. Framed as

threatening 'invaders', the mobilities of sea urchins was the key concern, particularly for their capacity to encroach upon 'man's' undersea territory. Corbett (1968) describes, for example, how surveys of the ocean floor, some 620 feet deep, disclosed the potential danger of a 'possible invasion of a large number of spiny sea urchins'. The language here is important, the word 'disclose' suggesting that the sea has the capacity to deliberately conceal – a characteristic of the enemy element hosting a species ready to 'invade' 'man's' new dominion. In response, (according to Corbett 1968), the Navy began trying 'to fence in the urchins with a variety of materials' – these attempts were unsuccessful, as one Navy spokesperson commented, 'we just can't seem to construct a fence that they can't climb over'. As Wolch (2002:731) suggests, plans to create 'crisp divisions' between animals and people are rarely straightforward, as *The San Diego Tribune* (1968) reported at the time:

> 'The Navy has reported another threat to its trouble plagued Sealab III, this time by sea urchins. The round spiny cousins of starfish, it seems, have colonised the ocean floor site off San Clemente Island, selected for the aquanauts home by the thousands. Sealab officers are so concerned they reportedly are considering protective measures such as building a small fence around the site or spreading quick lime in the area.

> Tom Cooke, ocean floor coordinator for the Sealab III, said the urchins, up to 10 inches in diameter, could cause serious problems for the aquanauts. He explained that the spines could puncture the divers' suits and skin, foul delicate instruments around the habitat…

…Sealab scientists studying the problem estimate that the urchins can travel 30 feet a day. The Aquanauts will occupy their underwater house for 60 days making every sea urchin with a quarter of a mile a potential menace.

Dr Jack Hoyt and Mike Salazar if the Naval Undersea Warfare Centre Lab say that they are testing the effectiveness of model urchin fences now in aquariums in the search for a solution'.

The mobilities of the urchins were mapped and measured to ascertain the parameters of the 'armed' 'potential menace' and 'model fences' were constructed in an attempt to contain and border the 'hazard'. We see an inversion of the 'invader' and 'invaded' here. The sea urchins are said to have colonised the sea floor despite being in their natural habitat. Whilst initially the men were described as 'interlopers in an alien realm' (US Navy 1965), with one journalist describing the Sealab projects as a 'full-scale invasion of inner space' (Costello 26 May 1965), the urchins instead became the intruders. Their 'wildness' was 'compromised by proximity' as they (much like scorpion fish) came to 'feature only as pests or invasive' animals (Lorimer 2010:494). The Navy seemed unable to contain them, the urchin's affinity and natural adaptations to the underwater volume proving a stumbling block to the construct of a secure undersea dwelling.

Just as there is a need, as Sundberg (2011) suggests, to take animals and non-humans into account of geopolitical processes such as boundary making and enforcement, so too is there a need to be attuned to their agency in the practice and conceptual construct of territory.

Understanding territory through a feminist lens enables this to take place. Such an approach dissolves the binary distinctions between the 'natural' and the social and political, offering an opportunity to account for the 'different and more complex stories' that emerge in the pursuit of territorial gain (Sundberg 2011:332). Such stories are not rooted in the grand practices of the state, but emerge, as is the case in Sealab, through the small but lively interactions and encounters between 'embodied beings at specific sites of action' (Sundberg 2011:332).

In Sealab we see clear acts of territorialisation, centred not around human agency but against sub-marine life. If, as Bear (2013:25) asserts 'territorialisation is first about the acquisition, definition, and reinforcement of spatial boundaries' then the idea of building sub-marine fences is very much an act of territorialisation, of staking a claim to a piece of seafloor and the surrounding water column. Indeed Gibbs (2018:212) argues that even the act of entering the water is 'to claim a territory of sorts' in an inhospitable environment. The building of fences and associated practices designed to claim authority and mastery over the sea and seafloor takes this to extremes. It is an 'act of power establishing a spatial entity' and material boundary through which to define self and other, whilst simultaneously challenging the 'status quo' of human-non-human interactions (Fall 2005:4-5). It is another reminder that this pioneering endeavour over the sea and its non-human inhabitants was shaped by colonial imperatives (see Hovorka 2016:7). Imperialistic processes and practices of domination, commodification, and protection were exported into the sea as the frontiering project sought to shape, craft, and engineer the ecosystem surrounding the habitat. We might think of this as a further iteration of the problematic ideologies and practices that characterised America's expansion into the Western frontier. As Harvey and Pearce (1988:3) assert the 'idea that colonial Americans, were from outset, beset' by the

'problem' of 'natives' characterised this expansionism (Harvey and Pearce 1988:3).

Practically, they write, the colonisers 'had to overcome' the inhabitants of the frontier

(Harvey Pearce 1988:3).

The colonisers in Sealab saw themselves at the pinnacle of a 'divine order' (Harvey Pearce

1988:4) with native inhabitants, and their relationship with the natural environment, seen

as something to control and subdue in the creation of a new sub-marine space (see also

Farish 2013). As the urchins became framed as 'invaders' we see again the complex

interplay 'between indigeneity, naturalness and nativity and alienness' (Green 2016:150)

and within this complex, how imperfectly the Navy were able 'to assert their authority over

these creatures' (Green 2016:157). Within the wider context of the Cold War this only

exemplifies the capacity of nature to confound geopolitical endeavours. Whilst there was

some success in the spatial mastery of the Polar Regions (Farish 2006, 2010) and Outer

space at the time (Sage 2014), and unprecedented knowledge of the planet was generated

(Turchetti and Roberts 2014), we see here the mobilities of the urchins confounding the

Navy's imperial ambitions – their movements (see Hodgetts and Lorimer 2020) challenging

the human-non-human relations of power that so characterised the period.

CONCLUSIONS

The Sealab experiments, with their concerted and unexpected engagements with animals,

provide an opportunity to explore how 'territory is made – claimed, asserted, and

confounded' through intersections between humans and animals (Gibbs 2018:205). These

are intersections that have thus far been 'poorly represented' in scholarship (Gibbs

2018:205). As illustrated in this paper, a feminist lens that attends both to corporeal bodies

of animals, and the fleshy affordances of such beings, provides great scope for expanding

this agenda and for detangling the 'tangled ecologies of nature and (in)humanity' that constitute the geopolitical world (Philo 2016:2). This can, as the paper has highlighted, take any number of forms - from 'companion' dolphins enrolled in the endeavour to colonise the sea floor, to invading urchins, zapping scorpion fish, and plankton soup. In the process of this detangling, all manner of geopolitical complexities surface, including the relationship between Cold War masculinities and gender norms, territorial ambition, and how these were inscribed, made manifest and refuted by the bodies of the animals surrounding Sealab.

Moreover, in taking seriously Dixon's (2015) call to move beyond the corporeal whole, the agency of the processes within these animals becomes apparent. The internal spaces of fish were experimented upon to find out how they maintain buoyancy, how they sting and incapacitate, whilst Tuffy's oozing, pussy body complicated the dream that dolphins could simply be enlisted and co-opted into conquering a frontier for the benefit of 'mankind'. Whilst 'most social scientists have shied away from possible connections between human territoriality and other forms of life', doing so provides opportunities to explore the roles of non-human life in the 'making and remaking of territories that inheres deep in the working of the world' (Clark 2003:177-178).

There is a need then to expand political geographies of territory to 'encompass uncomfortable and unloved non-human others', including those who are not 'big like us' (Ginn 2014:533). For Halberstam and Nyong'o (2018:454) 'rewilding' theory is an integral part of this process in order to grapple with the intimate, violent, and, at times, bewildering encounters that complicate and enliven established practices and constructs. Whilst in this paper particular attention had been paid to feminist geopolitics and territory, there is much scope for expanding this agenda. The role of 'volume' and the materialities of the sea (or

the specificities of other elemental environments), for example, warrant further attention.

As highlighted by Pérez and Melo Zurita (2020:1), there is a need to explore the 'ways voluminous environments, their flows, and ecosystems can be experienced and represented'. Whilst beyond the scope of the paper, we see in Sealab, plankton blooms making visibility in the water poor for the aquanauts poor (Murray journal, 7th day 1965) and white croakers crowding 'near the portholes' at night (see Figure 3), 'occurring in such numbers as to completely obscure the port' (Tolbert and Dowling 1967:355-356). The volume of the sea is paramount here, as is the capacity of the plankton and fish to dwell within its three-dimensional matter, to 'hang' and be perfectly suspended within depth.
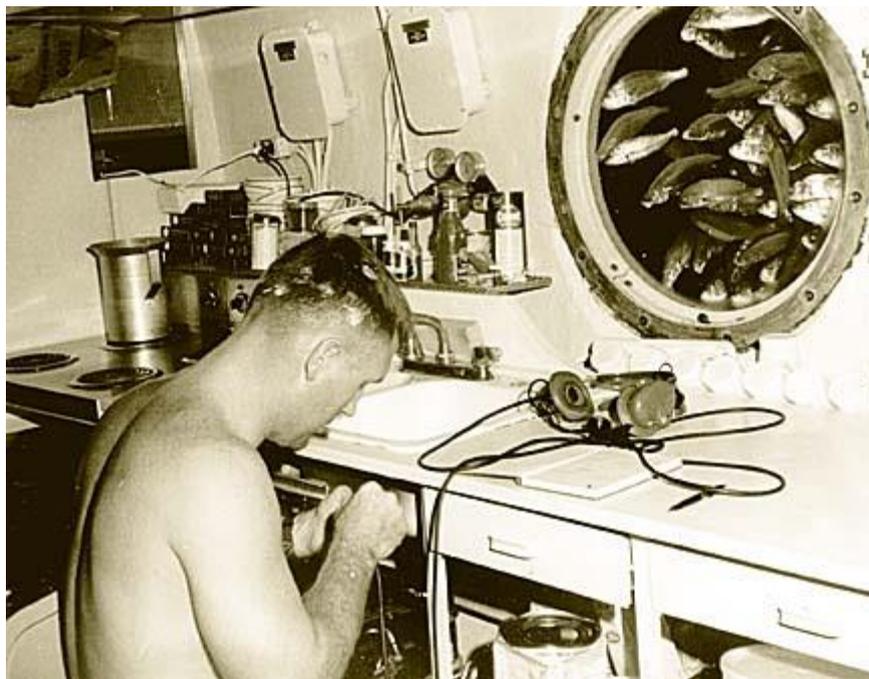
(Insert figure 3: White croakers amass at the windows of Sealab II. Reproduced with permission of the Man in the Sea Museum.)

It would also be pertinent to consider *how* best to engage with this process, and more broadly, to 'challenge not only the place and placing of the human and the animal but, critically, the methods we use to engage with both in relation' (Buller 2017:374). Drawing animals from the archives proved to be fruitful for this paper and perhaps there is a need to actively look for animals in such accounts of geopolitical events. Political geographers might also learn a great deal from animal geographers who draw upon a wide range of methodologies to attune themselves to the animal worlds around them. Such approaches seek to avoid relying wholly (as this paper does) on human accounts, finding 'other ways of letting animals 'speak'' and muddying the waters between the socio-political and the 'natural' (Buller 2017:375). Ethnographic methodologies, for example, have become widely deployed within animal geography (Buller 2017, Lorimer 2010) including at sites such as aquariums (Bear 2010), or in more 'wild' spaces such as Desprat's (2010) exploration of Arabian Babblers. We might also turn to Hayden Lorimer's work on reindeer herds and herders (2006) and seals (2010) that combines a range of methods (archival work, ethnography and observation, walking with) to produce accounts of human and animal subjects that intersect and entwine. These are methodologies that, as Buller (2017:375) highlights, are 'inclusive, troublesome, emergent and messy' and in the process, vital in moving towards multi-species methodologies (see Kirskey and Helmreich 2010) that can unravel the co-production of the world.

In conclusion, whilst there is much work to be done, this paper has made a small contribution towards a geopolitical land/seascape that is more attuned to the lives, bodies, and fleshy affordances of animals. It has highlighted the need to attend to animal beings in scholarship on feminist geopolitics and 'territory'. Doing so, has great potential, cultivating a

landscape that is better placed to account for the moments where the 'wild' is co-opted, manipulated and managed, but perhaps more importantly, 'where the environment speaks back, where communication bows to intensity, where worlds collide, cultures clash, and things fall apart' (Halberstam and Nyong'o 2018:454). Whilst the centrality of human and non-human matter has proved to be an extremely productive means of expanding the remit of both feminist scholarship and writing on territory, animal life has been somewhat neglected in this process. Addressing this would enable political geographers to better attend the 'porous, shifting, and eclectic heterogeneity of ideas, practices, methodologies and associations within a more than-human life/world' (Buller 2013:310). Such entanglements whether they be on the sea, under the sea, on land, on ice or in the air are an exciting avenue of enquiry for future scholarship.

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