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AMPHIBIOUS SCALES AND ANTICIPATORY DESIGN

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ABSTRACT

This paper considers dynamics between Anticipatory Design and relational ontological scales in imagining, articulating and shaping futures. This spans speculative, experimental and experiential engagement with imaginary futures for rethinking relations to the present and long-term sustainable ones. Such acts are situated as design futures literacies that encompass design fiction, extended choreography and arctic futurescaping. Drawing on three design fictive devices developed across two projects, a set of eight 'Amphibious Scales' we developed in the context of the Anthropocene. The scales are amphibious in their slipperiness and dynamic, and emergent status. Their genesis is given via accounts of the design fictive works centring on the persona of an octopus and scenarios on the Arctic Northern Sea Route.

INTRODUCTION

FICTIONAL FUTURES, TROUBLING PRESENTS

In Gulliver's Travels Jonathan Swift (1726) created a satirical narrative polyverse that to this day challenges readers' sensibilities of scale and mediations and critical interpretations of context. Devised as a social commentary, a narrative experiment and a discourse of political reflection, Swift used a Baroque extravagant mode of pastiche and irony (Buci-Glucksmann, 2013) to engage and challenge readers about perceptions and expectations. As the lead protagonist, Gulliver journeys through a diversity of environments and systems in the form of a series of books in which scale is repeatedly inverted, such as an entire society of miniature people called the Lilliputians struggling to overcome the giant Gulliver who then becomes the minute plaything of the Queen of Brobdingnag provoking a treatise on the politics of monarchy and the kingdom.

Swift's now legendary lengthy work remains a remarkable example of how the imaginary and a mode of satirical narrative propel us to re-think relations of scale between a complexity of conditions, contexts, systems and agency. It functions as a cultural device to characterise and to criticise while embedding readers in narratives of relational embodiment of scale from the individual to a wider polity and back. The selection of an absurd, non-mimetic representational stance allows Swift to use associative, abductive and relational logics in an 'unnatural' narrative (Alber et al. 2013). This toggles between story and discourse levels in which the imaginary and the fictive are used to juxtapose, contrast, compare and reconfigure experiences and perceptions through a scale of negotiative implicature, associatively and abductively, on the part of the reader. This is realised through their performative and reflexive scaling of the scenarios, personas and diegesis to understanding present realities and the conditions, complexities and contradictions of their lifeworlds.

We open with this mention of Swift's work to indicate the force and intricate means of engagement that may be

fabricated through imaginary and satirical choreographic, narrative and game design fiction as a mode of cultural mediation and critique. We do not seek to replicate Swiftian tales in contemporary forms (Menzes 2005: online). Rather we tangentially use some of the techniques he adopts as part of a design Baroque mode of inquiry (Law 2016) that is subjunctive, speculative and prospective in its stance, offering and potential in a frame of Anticipatory Design.

Below we offer a new set of eight 'Amphibious Scales 'we devised through the development of a set of design fictive devices. These are centred on the persona of an octopus and its physical and imaginary lifeworld in the context of the 'changing climates' – physical, geo-political, cultural – of the Arctic Northern Sea Route.

ANTROPOCENIC REALITIES, SPECULATIVE ENQUIRIES

Accordingly, this paper draws on research and practice in critical and speculative design and related work in design fiction. As design, we weave them together with an experimental heuristic futures-oriented persona and a set of activities and scenarios that we locate within the emerging domain of Anticipatory Design (Celi & Morrison 2018). Attention to ways of fathoming complex futures, systems, conditions and context by futures design is central to Anticipatory Design (Morrison et al. 2021). Below we present Anticipatory Design that ventures into shaping an exploratory and emergent weave of complex contexts, changing conditions, and crisis of climate that in the scales of the Anthropocene.

Given the challenges of looming ecological disaster and pressure to secure equitable food and water supplies amongst others, there is a need for understanding that the future is upon us. These futures are not just plural and challenging to understand (e.g. Sardar 2013). They also necessitate particularly novel ways for engaging us. In appreciating and acting on these futures in order to effect durative and structural change in the changing face of political economies (e.g. Frase 2016), Anticipatory Design seeks to support content and communicatively centred contributions towards sustainable long term futures (Boehnert 2018). This necessarily implies its work is situated within wider critical discourses of design futures, power relations and participatory politics (Mazé 2019) and related design futures literacies (e.g. Celi & Colombi 2019).

In this paper, this is patently the case in the instance of the contextual focus on the Northern Sea Route as part of the intersecting study of two practice-based research projects. Between these projects we deploy speculative design within the actual and imagined settings of rapid, unsettling and unpredictable change, such as melting ice and permafrost. We engage with these bodily and imaginatively through visits to arctic cities, islands and seas, in a new collaborative journeying into an area of

the globe with the most rapid, far reaching and tangible changes in climate, environment, life and livelihoods.

The Northern Sea Route (NSR) was the stuff of gruelling physical explorations and accounts of imagined monsters in the age of colonial discovery in which Swift's imaginary tales were penned. Today it is undergoing rapid transformation. In response we have also devised three design fictive devices around the imaginary persona of a female octopus called OCTOPA.

OCTOPA has been co-developed over the past two years between two funded research projects: *Amphibious Trilogies* and *Fuel4Design*. She has floated and darted between the main themes of the projects, extended choreography and design futures literacies respectively. In this transdisciplinary and design poetic shift and drift, and tangle of tendrils and tentacles, we have found shared interests and focus: on movement futures and language, lexis, play and the role of satire in addressing difficult, pressing, urgent contemporary and long-term issues and needs. On the one hand is embodiment, movement and an extended arctic landscape and on the other design futures literacies with a focus on language, discourse and mediation.

SLIPPERY SCALES AND RELATIONAL ONTOLOGIES

Being amphibious and working amphibiously through a mix of art, design, humanities and social science (see e.g. Nilsson, 2009), allows engagement with the role of irony, the pose of personas, the potential of the fictive, while working with contexts of the actual and societal and the futural and speculative. In our work we have adopted the notion of amphibiousness, an elusive, queer theory oriented, and excessive Baroque-like scalar term. It has allowed us to shift and dip and to change character and qualities in motion. The notion allows one to move between, within and across domains of knowledge, environment and reflections. These entail the kinetic in context, in the now, through its legacies and into futures. The slipperiness of amphibiousness also refers to being tricky, even deceptive and playful between states, ideas, movement and reflection.

Collaboration between the two projects has led to the formative and developmental co-construction of a broad set of thematic relational ontological scales, with the wider goal of supporting long terms sustainable futures by design (Benjamin 2015). The scale has been devised through linked work on embodied experimentation with the notion of an extended choreography central to *Amphibious Trilogies* (AT) and a relational semantics of the design futures lexicon in *Fuel4Design* (F4D). The scales are built from our prior and related design practice, pedagogy and research that led to three related design fiction devices centred around the biological and behavioural characteristics of an octopus. These devices were devised and deployed by design and artistic research practice: they used narrative co-design fictions

scenario building and importantly metaphor. The scales were developed thereafter and drew reflexively on narrative, speculative and situated means and methods of design-*ing* (Lury et al. 2018).

The scales, as the figure of the octopus central to our thinking suggests, are amphibious in their slipperiness, dynamic, prosessural and emergent status in a mode of becoming. We have labelled them 'Amphibious Scales' with eight 'arms': 1) Multi-perspectival, 2) Indeterminate, 3) Counterfactuality, 4) Mixed materiality, 5) Multi-temporality, 6) Poly kinetic, 7) Pan experiential, and 8) Plural engagement.

Walsh el al. (2021) note that 'relational ontologies aim to overcome the bifurcation of nature/culture and various other dualisms (e.g. mind/matter, subjectivity/objectivity) shaping the modern worldview.' For us, in the Anthropocene this entails elements of process philosophy, new materialism and diverse knowledge systems (e.g. Whitehead 1938, Stengers 2011). They acknowledge ways we may approximate and enact shifts to working towards long term sustainable futures in a mode of becoming.

The set of OCTOPA devices we developed prompt participants to speculate, consider, design and act in an anticipatory mode in relation to the rapidly changing NSR.

APPROACHES AND METHODS

This paper draws on a diversity of disciplines and methods, located in a prospective and reflexive design hermeneutics (Morrison 2018) and design oriented and digital humanities conceptualisation and practice that elaborates on ways of designing, the roles of participants and modes of critical reflection. The aim of these works is to pose and offer and explore a set of speculative, situated and critical means to approach the changing, complex conditions, historical and political contexts and cultural and communicative character of designing within the Anthropocene and climate change.

The 'account' is populated by practices of co-design situated in the critical articulations of design fiction and gaming, extended choreography and design futures literacies. The paper draws on practice-based research situated within speculative inquiry, design and art (e.g. Borgdorff 2013) in which the aim is to support transdisciplinary relational knowledge making via epistemic artifacts and uses. In doing so, we explore and critique intersections between design fiction, extended choreography and arctic landscapes.

We accentuate that engaging with emergent and even prevailing discourses of the Anthropocene for our urgent, changing, and challenging futures needs must be approached not only in terms of systemic and post-geological scales but diverse cultural, speculative,

educational and communicative ones. These approaches need to engage and facilitate diverse identities and experiences to imaginatively and critically enact futures in postnormal times (Kuzmanovic & Gaffney 2017). They also need to be positioned to expand design and speculative design to more than human concerns (Akama et al. 2020). As Amsler and Facer (2017: 8) argue concerning education and anticipation, '… it is possible to create holistic, life-generating and possibility-enabling educational projects which re-establish critical relationships with the future rather than prohibiting them, and which seek to create the future open, working with novelty as a constantly evolving possibility….' For us this needs to be extended to design's imaginaries and critical situated review to address and broker urgent matters global scale as and through anticipatory design. The work presented here engages with physical and digital elements and activities, and their interplay with a diverse group of participants: designers, educators, researchers, and master's and doctoral students. Participants worked with exploratory, experimental design and artistic poetics to support qualities of a wider understanding of design futures literacies (Morrison et al. 2021), world-making and 'futureCrafting' as reconceptualising contingency and rethinking uncertainty (Marenko 2020).

By eliciting, evoking, prompting, proposing, and projecting possible, potential, putative and provoking futures, the fictive persona of OCTOPA motivates thinking, engagement and action. In this paper we include three aspects to the work in the form of 1) OCTOPA TOOLKIT, 2) OCTOPA'S JOURNEY and 3) OCTOPA REGENERATED.

The Toolkit was developed through study of the biological characteristics, amphibious qualities and behaviours and kinetic affordances and dynamics of cephalopods. The form of the creature was used to embody these qualities in two key categories (see below). The Toolkit was trialled in a set of movement-based master's level workshops in choreography and in undergraduate classes in design and form. Connecting with pedagogical learning resource development on lexis, futures and design in F4D, the persona OCTOPA was situated within 28 design fictive scenarios in the NSR by our design-art-research team. It was co-scripted and placed online for open access, with use in master's, doctoral and design teacher training sessions.

Using the metaphor of a journey, the aim was to engage users in enacting critical and reflective travels of their own and into their own work, as we had done. In the Regenerated part of the work our goal was to further engage participants in looking beyond their experience or access to aspects of the complex and increasingly important NSR, but to see how narrative and metaphorical device might be used imaginatively in their own anticipatory designing.

RELATED RESEARCH

TOWARDS ANTICIPATORY DESIGN

Anticipation Studies is an emerging transdisciplinary research domain that draws together inquiries into futures, incorporating systems, policy, governance and foresight views (Miller 2018) from Futures Studies along more culturally located studies from education (Facer 2016), sociology and design (Celi & Formia 2017). Anticipation Studies (Poli 2018) has addressed issues of systemic change and futures literacies in the context of the climate emergency of sustainable, changing circular economies. As key contributors to the field from Design, Celi and Morrison (2017: online) argue that '… Anticipation may be shaped as a future pursuit, informed through Design and supported by way of linkages with Futures Studies that are equally polymorphous and conjectural alongside other much needed procedural, factive, and necessary foundations upon which to aspire, approximate, propel, and together project designs fictions and future-oriented inquiries.' This complements systems-oriented approaches.

For Celi and Morrison, Anticipation Studies need to also encompass cultural aspects when inquiring into futures. Appadurai (2013) argues that the future is a cultural fact, while Escobar (2018) reminds us that futures are multiple and ought to cover cultural pluriverses of contextualised knowing and being. Anticipatory Design accentuates the role of design as a futures-facing and futures-shaping pursuit and tradition of practice-based research, extending futures literacies (Morrison et al. 2021).

Anticipatory Design works to shape and to interpret cultural, speculative and exploratory modes of address and engagement (Zhou & Morrison in press). It deploys aspects of critical and speculative design, such as design fiction, as complements to the more strategic decision-making character of foresight approaches in Futures Studies. It does so to expand cultural imaginaries in shaping links between Design and Futures (e.g. Candy & Potter 2018). These are links located within changing societal conditions and practices, including our relation to other species (Haraway 2008) in a nonbinary take on entities and objects, posthumanist in design orientation and emergent character and practices (Forlano 2017).

THE BAROQUE, SCALE AND DESIGN FUTURES

The Baroque may be seen as a conceptual, cultural and design affordance that burst beyond the historical boundaries of 17th century culture where it had a frame breaking effect in art, architecture and literature. Often studied in terms of aesthetics, the Baroque provides us with means to work beyond the frames of given approaches and assumptions. Buci-Glucksmann (2013) observes two embodied aspects. Drawing on the myths of Prometheus and Narcissus, a Baroque aesthetics was realised allegorically, materialised as formlessness, attending to the marvellous and extending to furore. In contrast, via the melting figure of Icarus, the Baroque is manifested in a culture of flux or slipperiness.

Eggington (2010) argues that we need to also note major and minor views on the Baroque. The first is located within core centres of power and position in Europe; the latter has been developed in Latin America as a subaltern, resistant and alternative expressive and critical mode of knowing and being (Salgado 1999). Sack (2015: 59) suggests that drawing on a neo-Baroque allows ' … the creation of a design strategy that is purposeful, indeterminate and speculative, circumventing any caricature of nature as "scenic beauty".'

The STS scholar Law (2016) also motivates that we approach the Baroque as a register less an aesthetic. He advances six techniques of the Baroque connected to 'messy' ways of knowing in social science: 1) Theatricality, 2) Boundlessness: 3) Heterogeneity, 4) Folding, 5) Distribution, Movement & Self-Consciousness, 6) Mediation. Law's categories were part of a previous design fiction project on personas and arctic experiential and research futures landscape project (Morrison 2018) and indirectly informed the design of the OCTOPA related devices and the 'Amphibious Scales' communicated here.

SPECULATIVE DESIGN

Design fiction has become an established constituent of Speculative Design (Dunne & Raby 2013, Augur 2013, Maplass 2015, Lindley & Coulton 2015), entering different domains such as HCI from its original, critical and creative design origins. Design fiction concerns the suspension of belief, a means to making changes through diegetic prototypes (e.g. Sterling 2009).

Relations between futures and alternate narratives has begun to appear in Futures Studies (Ravan & Shirin, 2015) but little on design fiction has appeared there. Coulton et al. (2019: 166ff) view design fictions as not necessarily rhetorical devices infused by narrative but rather by diegetic prototypes (after Kirby). They see that such prototypes may be positioned in relation to scales (akin to the Eames' power of 1-10) that extend to the wider environments in which they occur or are situated. Lindley and Coulton (2015) also argue we think of storyworlds (Ryan 2006) and world-making in which we cast works in terms of fabrication and world-building (Dunne & Raby 2016; Haraway 2016). These diegetic prototypes function to 'tell worlds' not stories.

Focus on the fictive and gender does appear in design fiction in which personas are taken up to make problematic, awkward and powerful relations between gender and technology in near future imaginary lifeworlds (e.g. Morrison et al. 2014; Morrison 2018).

Such works may be seen as a mode of queering design fiction into how vetriloquising technology and life critiques may be turned back on us in a wider posthuman environment in more reciprocal relations between which humans and nonhumans. Connecting to similar work in multispecies discourses, Westerlaken (2020) suggests, we may see multispecies creatures as imaginary hyphenations of the fictive and the factual.

They function as personas through which we are able to further embody and perceive processes and potentials of 'multispecies worldings' inspired by actual creatures and the imaginary of legends and myths. Given these qualities, it is perhaps no surprise that the polymorphous, historically monstrous figure of the kraken and literal, biological characteristics of the octopus or cephalopod, zoomed into view.

The octopus is a truly enchanting creature. It changes texture and colour, transforms its shape, defensively dissembles its outline in a cloud of ink and propels itself through a variety of motions, in the water, tentacles rippling over rocks and even walking across the sea bed. Recently it has appeared in the Oscar winning documentary on NETFLIX (Erlich & Reed 2020).

After serious reading of scientific journals, popular science communication and accounts of maritime studies and aquariums, such as Sy Montgomery's *The Soul of an Octopus* (2015) this 'bestiary of design fiction personas was extended in Amphibious Trilogies to include a new, imaginary, futures rich being called OCTOPA. Her name for us slips between the contemporary physicality of the Occupy movement and the always just beyond our reach, in the shadowy dreams of utopia. Her name symbolises a universal figure for some perhaps, god-like in her capitalised proper noun name, yet suggesting a state of preoccupation. None of these words fit, nor can they be bound together, to anchor her polymorphous, slithery selfhood in one time, place or, indeed, scale.

AMPHIBIOUS THEMATIC SCALES

The 'Amphibious Scales' we have developed function within, across and between states, contexts and domains and hence are amphibious in character (Table 1). As relational ontologies, they are dynamic, emergent, fluid and flexible markers of 'Themes'. The Themes allow the scales to be applied and interpreted on the needs, pressures, demands, potentials, constraints and pitfalls of designing within the complex, uncertain and changing contexts of the Anthropocene. This is suggested as lexical semantics under 'Characteristics'.

As pliable and reflexive vectoral constructs, the 'Amphibious Scales' have been co-created through transdisciplinary design from practice-based inquiry in design futures literacies, 'extended choreography' and arctic landscapes. They are open to multiple perspectives on context and culture and the force of uncertainty and indeterminacy. Perception is also crucial in scaling world views and practices in terms of fact and fiction; these may be mediated through mixed materialities related to articulations of diverse genres and discourses. Multitemporal and chronotopical multiplicities concern movement (spatial, transversal, poly kinetic). Negotiation involves multisensory experience, a plurality of engagement, offers and prompts for transformations via human agency.

Table 1 'Amphibious Scales' and Anticipatory Design

1. Scale: Multiperspectival
Theme: Complexity. *Characteristics*: Systems, autonomy, Anthropocene and climate change, esoteric, obscured, dense, profound, enigmatic, flux, shape shifting, rhizomatic
2. Scale: Indeterminate
Theme: Comprehension.*Characteristics*: Uncertainty, intangibility, abstract, remote, Indistinct, unfathomable, unanchored, ineffable
3. Scale: Counterfactuality
Theme: Perception. *Characteristics*: Truth relations slide between fact and fiction, speculative, prospective, reflexive
4. Scale: Mixed materiality
Theme: Mediation. *Characteristics*: multimodal, semiotic, narrative, physical-digital, personas, scenarios, play
5. Scale: Multi-temporality
Theme: Time. *Characteristics*: Multiple timescales, linear to dynamic, expansion, contraction, divergence, disruption, delay, pause, speed
6. Scale: Poly-kinetic
Theme: Movement. *Characteristics*: Friction, fluidity, viscosity, vectors, speed, pattern, spread, diffused, concentrated, connected, osmotic, undulating, jettisoning etc
7. Scale: Pan-experiential
Theme: Negotiation. *Characteristics*: Multimodal embodiment, sensorial, participative processes, serious play
8. Scale: Plural engagement
Theme: Transformation
Characteristics: Action and agency, identifying, recognizing, locating, positioning, shaping, sharing changing futures

Concerning Design, the 'Amphibious Scales' have been conceptualised within a wider anticipatory design perspective that splice, weaves and knots together research and practice from Speculative Design in Design and from aspects of design and foresight in Futures Studies.

From choreography, the scales extend from the rehearsal and performance stage to environmental and societal ones. On Arctic landscapes, the scales concern the changing nature of maritime- and coastal-scapes as ice and permafrost melts, erosion and extreme weather advance, livelihoods are denuded.

The scales may be understood as a set of amphibious semantic devices (cat's cradles, regenerative arms) and a means to devising (cultural material future-facing resources) for imaginary mappings of anticipatory design futures and related design futures literacies. These scales are posed to suggest ways of 'staying with the trouble' (Haraway (2016) of living, designing, teaching and learning in contexts of local/global change.

SHAPING OCTOPA

Drawing on a previous transdisciplinary landscape, urbanism and design project *Future North* (Kampevold-Larsen & Hemmersam 2018), we were motivated to conjure a figure who might assist us in deciphering the complexity of the Northern Sea Route, one of the sub projects in *Amphibious Trilogies*. We drew on a similar persona called Narratta who was co-authored by core designer-researchers in *Future North* (Morrison 2018). Narratta functioned as a mediated imaginary in making sense through personas and design fiction (Morrison & Chisin 2017). Experience with ventriloquising content through the mediating device of Narratta suggested promise in shifting to the co-design of a narratively informed fictional poetic experimental device (Knutz et al. 2013). Between our two new projects we chose to focus on movement, language and perception, including making and receiving humorous and critical responses to 'seriously silly design fiction (Blythe et al. 2016).'

OCTOPA was conceived of a new imaginary creature. She is a generation of our times, a creature beyond our ken, a deliberative, even 'excessive', device that is always skilled in her grasp but able to evade containment and reductionism. She is able to 'stay with the trouble' (Haraway, 2016). She is a device to serve us our own troubles and ways to think about facing them, considering their construction and perpetuation, playfully and challenging asking us and provoking us to think, and to reflect on how we might act. OCTOPA is fluid: she jettisons herself between time and space and across distances. She swirls and hides, reveals and conceals, exposes and catches, grips and repels. These are all acts of sensitive embodied knowing, propulsion with repulsion, amphibiously testing her distributed intelligence across the Anthropocene and NSR.
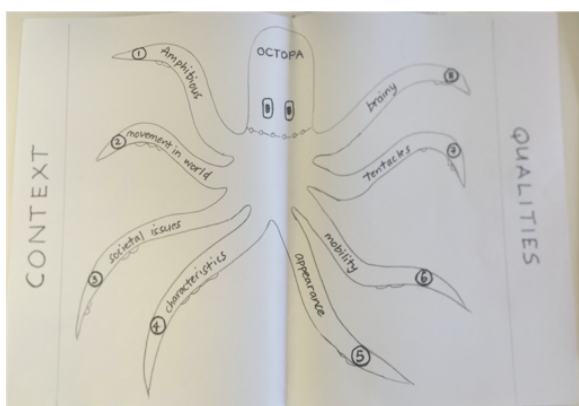

Figure 1 A hand drawn illustration of OCTOPA, her tentacles relating to key themes of wider context and her own qualities.

Working with this arctic context, language and movement, Eight aspects of an octopus' characteristics and features were discussed, revised and placed on a large hand drawing of an octopus designed to be cut out in a participatory workshop (Fig.1). Two main aspects were selected to cover sets of fours arms each:

'Contexts' (Persona, Movement in the world, Societal issues, Characteristics) and 'Conditions' (Appearance, Mobility, Tentacles, Braininess). These aspects provided the basis for the 'Amphibious Scales'. The paper device was taken up in 4 Master's and 4 PhD workshops in design and choreography and presented in 3 research settings (Fig. 2), over two years. For mediation and access, an online Toolkit was developed together with a reflection on a workshop.

Next, we present and discuss further ways in which OCTOPA has taken on a life in set of deliberately diverse but connected co-designed and experienced initiatives. This encompasses a mix of travelling and communicating visually and verbally in an online format. This involves material generated by the choreography and design researchers on shared practices and reflection on arctic environments, fiction and embodied experience, especially on the NSR.

It extends in *Fuel4Design* to a contribution on language and movement to the Lexicon, also contributing to the wider interplay of language-discourse relation where Semantic Categories have in turn informed the design of the 'Amphibious Scales'. The section below draws on blog entries by OCTOPA in a mode of self-reflexive story making. This accentuated her qualities and characteristics so as to decipher and query climate change, cultural histories, present experience and future strategies.

Figure 2 Workshop with a group of design and choreography researchers and practitioners.

The NSR is a complex, emergent and Arctic phenomenon. For many, outside of The Russian Federation, it is obscure and remote (Vakhtin 2019). It is increasingly in the news as for marking the passage of climate change, from melting ice to navigable shipping Østreng et al. 2013). Carbon fuel extraction.

Nuclear energy and militarisation. Methane and anthrax exposure on its adjacent land mass. Much here is undergoing transformation; movement is central to changes. The ice as solid, surface, barrier and a given is under erasure as increased commercial tonnage and military expansion, including nuclear vessels, continue to carve new routes (Savitzky 2016), and ones recently unattended by icebreakers.

Our response was to venture into 'Building a poetics of design fiction' (Markussen & Knutz, 2013) in the wider context of 'being ecological' (Morton, 2018) in an ecosphere in which design, ecology and politics are entwined via design. This entwining would be shaped through a transdisciplinary co-design mode of connecting movement, narrative scenarios, critical play, and the facilitation of 'anticipation-oriented thinking' (Kerspern 2019). Kerspern has conceptualised this as a slippery interweaving of game design and design fiction to produce 3 hybrids: 1) playing (with futures, 2) replaying futures, and 3) counterplaying futures. In addressing the range of issues, possible, likely and conjectural survivable futures and the NSR, we would need to engage people in a design fiction that would both play with and play the future through limited options (Coulton et al. 2016). However, those given and contemporary projected futures, from utopian to supremacist, linear to dystopian, would need to be repositioned to facilitate a mode of 'replaying futures'. As transductive method and multimodal digital rhetoric, we used irony as a key mode of address and 'hook'.

OCTOPA'S JOURNEY

The game design fiction OCTOPA'S JOURNEY (Fig. 3) is a satirical take of using scenarios (Blythe & Wright 2006) in a mode of critical play marked by pastiche, and a Baroque-like non-literal, non-mimetic worlding.

Figure 3 Splash page of OCTOPA'S JOURNEY.

Through OCTOPA and the 28 scenarios we co-devised (e.g. nuclear+oil spill, a NSR blockade, a sea of data, last chance tourism, Fig, 3), we wanted to escape ghosts and monstrous sea creatures. Instead, the being of a multi- brained, many armed and shape shifting character would demand of us similar tenacity, regenerative acts, distributed and connected thinking and an ability to move amphibiously, literally and physically. As 'counterplaying' futures (Kerspern 2019) this would

employ irony and satire to make apparent and to reveal entanglements and potentialities that accentuate the fictions of proposed developments in the NSR.

We designed this as a way of 'gaming futures literacy' (Candy, 2018), intwining movement and language. It would also reveal that in such play we are engaged in acts of alternate world-building in which narrative is a central co-creative futures resource (Raven & Elahi, 2015). This is not for play itself but for moving into, being moved by and moving on discourses of the NSR in the time and dynamics of the Anthropocene
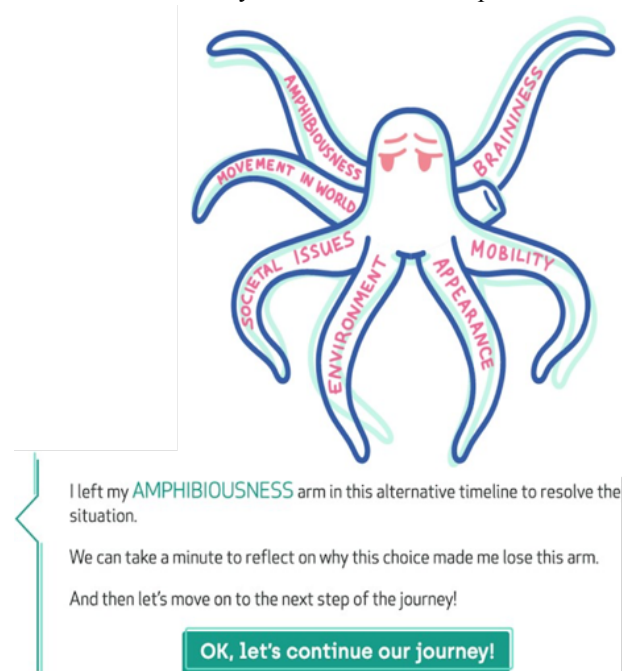

Figure 4 OCTOPA presents 28 scenarios to the player with multiple, branching possibilities and consequences.

Here were we reminded of the practice differentiations Malpass (2015) makes between associative, speculative, and critical design. Kerspern (2019) charted this as a mode of bridging mediation through games and design fiction with the purpose of facilitating anticipatory thinking. This was built on game mechanics to form anticipatory scenarios and alternate futures. Making a future scenario more experiential and accessible may be achieved by turning it into a game, as offered in the branching options. Kerspern sees the potential of a game experience to include browsing between scenarios and to thereby confront future visions. This too was embodied in the online game design fiction space.

OCTOPA REGENERATED

Within OCTOPA's JOURNEY, there is a regenerative element of limb and holistic regrowth as choice in scenarios eventually return one to a different beginning, scenarios and problematics, building experience and critique together. Drawing on this aspect of the online NSR scenarios, OCTOPA REGENERATED is made up of three further reflexive and critically anticipatory

cyclical, adaptive and regenerative elements. OCTOPA's ability to turn herself inside out, and to refresh and alter her appearance and her survivability.

We have been concerned as to how to shift participants' experiences of working with what were inbuilt but unarticulated 'Amphibious Scales'. We have been concerned to engage participants in more than an experiential here-and-now use of the devices. A regenerative twist offers suggestions and prompts, troubling and unresolved questions and potentials application in actual projects, and beyond design, in times of uncertainty (Lindström & Ståhl 2016).

OCTOPA REGENERATED comprises three main themes underway. 1) To add the eight 'Amphibious Scales' to a newly hand drawn outline of the OCTOPA TOOLKIT. This re-kits the tool by adding the purpose of the individual or group design student or researcher or project to her head. Meta cognitive questions are marked out. Related themes are then added to the reverse side with a request to elaborate on the qualities in relation the aims or methods depending on focus and need. 2) To ask questions as to what each of the scenarios in OCTOPA'S JOURNEY asks an individual or group to consider in relation to a personal or joint educational or research design project. This too may be cross-connected to the 8 Amphibious Scales. 3). Such regenerative acts as just mentioned could be carried forward, directly and abductively as anticipatory design, to other domains of futures inquiry, such a policy and governance, participatory local decision-making etc.

On reflection, we see a need to motivate, facilitate and engage us all to look more deeply into the content and diversity of materials in terms of media and research and design, policy and geo-strategy that are embedded in the scenarios. By not adding a reflexive look behind the scenarios, from satire, irony and pastiche, we may miss attention a scale of underlying detail and an opportunity to discuss the scales themselves.

Importantly, this also related to delving further into to the layers behind scenarios and their seeming playfulness to sculpting matters of more serious critical play (Flanagan 2010) in an Anticipatory Design sense. The additional layers of mediated meaning making that on our own parts demanded intensive and diverse inquiry, from site visits, arctic sea journeys, immense online searches and research itself.

AMPHIBIOUS SCALES & DESIGN FUTURES

Anticipatory Design has immense work to do between the human and nonhuman, the tangible and intangible. The scale of our 'new normal' is populated by the COVID-19 virus that is invisible to our human eye and where infection may manifest in a loss of the sense of smell that may endure. Design needs to consider how we work with, through and beyond scales; we suggest amphibious ones may help us to do this in ways that are anticipatory in the sense of taking care ahead of time in a wider cultural, ecology of shared shaping futures. The multiscalar device OCTOPA has been taken up in critical research writing for troubling times (Morrison 2020) akin to reflections on 'futureCrafting' that motivates for narratives, and returns us to the classical Greek figure of the thoughtful octopus (Marenko 2020). This reminds us that we have been engaged in precisely such ventures and mediations, experiences and qualities of relational thinking, and a 'travelling of becoming' in arctic waters, islands, cities and a medley of discourses, historical, contemporary geo-political and imaginary.

Here we have presented a set of novel, contextually fashioned 'Amphibious Scales' developed out of design fictional experimentation and connection. The related projects projects also indicate some of the ways such scales may be imagined, motivated and generated.They could be mapped onto OCTOPA's arms and repurposed as to need, interest and propsects. The scales offer a set of flexible, generative and adaptive future facing concepts that are 1) *multi-perspectival*. They allow the positioning of views and responses to changing contexts of climate change and the Anthropocene and the 2) *indeterminate*. The contested nature of truth and design fiction allow exploratory work via 3) *counterfactuality*. A relational anticipatory design, needs to address 4) *mixed materiality*. On the rate and consequences of change 5) *multi-temporality* is an added dimension of the slipperiness of the given and emergent. Speed and movement shift us into unexpected situations in a 7) *poli-kinetic* scale. Amphibious Scales are nondualist between 'actors', senses, multimodalities and ecologies, thus 7) *pan experiential*. As the future is plural, we need a scale that allows it to be 8) *experienced plurally* in an anticipatory futures design view.

For Sack (2015: 68), 'The Baroque straddles the categories of the intellectual and the physical in the forms of delight and play.' She motivates for strategies that are purposeful, translational, actionable and diverse. We concur that it is the matter of *meraviglia* - wonder, astonishment, surprise - that needs to be incorporated in ways we build engaging speculative design futures projects and works, and imaginatively so. Hope and engagement are keys to dynamic, relational anticipatory design ontologies (Celi & Formia 2017) and change.

Octopa's several brains, munificent sensory tentacles, many armed simultaneous and directed movements (probe, secure, jettison, propel etc) present and facilitate a vocabulary of articulating potential thinking and acts of transformation. They also allow us to think through the role of scenarios and narratives as modes of agency and articulation that have potential to further interest in agency and engagement, for designers, by way of choreography and as mediated communication.

The 21st century Northern Sea Route has an imaginary, brainy, challenging and quirky creature in its multimodal and cultural water of the future, not a monstrous squid of the maelstroms of Swift's more Baroque oceans. OCTOPA's tentacles reach out towards us cognitively and imaginatively and tickle and push us into thinking afresh. They may jettison us into action and design futures that may be propelled by a multiple, distributed intelligence of multiple, networked, individual and simultaneously armed agentive acts of our own in shaping our learning, work and lifeworlds. OCTOPA's inversions, camouflage and mutability offer ways to motivate us to rethink relational scales of the Anthropocene and to act to adaptively change its futures today into ones for survivable shared tomorrows.

OCTOPA has suddenly re-appeared. Then with a squirt of ink she vanishes. We are left clutching the eight 'Amphibious Scales' in surprise, wonder and anticipation as we are returned to our present materialities and their situated contexts of designerly collaborations and imaginative shaping of futures in posthuman, post normal times.

REFERENCES

Akama Y., Light, A. & Kamihira, T. (2020). Expanding participation to design with more-than-human concerns. *PDC '20*. 1: 1-11.

Alber, J., Skov Neilsen, H. & Richardson, B. (2013). (Eds). *A Poetics of Unnatural Narrative*. The Ohio State University Press: Columbus.

Amsler, S. & Facer, K. (2017). Contesting anticipatory regimes in education'. *Futures*, 94, 1-5.

Appadurai, A. (2013). *The Future as Cultural Act*. London: Verso.

Auger, J. (2013). Speculative design: Crafting the speculation. *Digital Creativity*. 24(1): 11-35.

Bakhtin, M. (1981). *The Dialogic Imagination*. Holquist, M. (Ed.). Austin: University of Texas Press.

Benjamin, A. (2015). *Towards a Relational Ontology*. Albany: SUNY Press.

Blythe, M. & Wright, P. (2006). Pastiche scenarios. *Interacting with Computers*. 18(5): 1139-1164.

Blythe, M., Andersen, K., Clarke, R. & Wright, P. (2016). Anti-solutionist strategies: Seriously silly design fiction. In *Proc. of CHI '16*. ACM, New York, 4968-4978.

Boehnert, J. (2018). *Design, Ecology, Politics*. London: Bloomsbury.

Borgdorff, H. (2013). Artistic practices and epistemic things. In Schwab, M. (Ed.). *Experimental Systems and Future Knowledge in Artistic Research*. Leuven: Leuven University Press. 112-120.

Buci-Glucksmann, C. (2013). *The Madness of Vision: On Baroque aesthetics*. Athens: Ohio University Press.

Candy, S. (2018). Gaming futures literacy: *The Thing from the Future*. In Miller, R. (Ed.). *Transforming the Future:*

New York: Routledge. 233-246.

Candy, S. & Potter, C. (2019). (Eds.). *Design and Futures*. Taipei: Tamkang University Press.

Celi, M. & Formia, E. (2015). Advanced design practices for sharing futures: a focus on design fiction. *11th EAD Conference*. 22-24 April. Paris. 1-16.

Celi, M. & Formia, E. (2017). Aesthetics of futures. *Design for the next...12th EAD*. 12-14 April. Rome. 563-576.

Celi, M. & Colombi, C. (2019). Design future literacy in the Anthropocene: A matter of awareness. 3*rd International Conference on Anticipation*, 9-12 October 2019. Oslo: AHO.

Celi, M. & Morrison, A. (2017). Anticipation and design inquiry. In Poli, R. (Ed.). *Handbook of Anticipation*. Vienna: Springer, 1-25 (online).

Coulton, P., Burnett, D. & Gradinar, A. I. (2016). Games as speculative design: Allowing players to consider alternate presents and plausible futures. In *Proceedings of DRS 2016*. 1609-1626.

Coulton, P., Lindley, J., Sturdee, M., & Stead, M. (2017). Design fiction as world building. In *Proc. 3rd Biennial RTD Conference*. 22-24 March. Edinburgh. 163-179.

Dunne, A. & Raby, F. (2013). *Speculative Everything*. Cambridge: The MIT Press.

Dunne, A. & Raby, F. (2016). Critical world building. In Coles, A. (Ed.). *Design Fiction*. EP/2. Berlin: Sternberg Press. 47-68.

Eggington, W. (2010). *The Theater of Truth*. Stanford: Stanford University Press.

Erlich, P. & Reed, J. (2020). *My Octopus Teacher*. Documentary film. NETFLIX.

Escobar, A. (2018). *Designs for the Pluriverse*. Durham: Duke University Press.

Facer, K. (2016). Using the future in education. In Lees, H. & Noddings, N. (Eds.). *Palgrave International Handbook of Alternative Education*. N.Y.: Palgrave Macmillan. 63-78.

Flanagan, M. (2010). Creating critical play. In Catlow, R., Garrett, M. & Morgana, C. (Eds.). *Artists Re:Thinking Games*. Liverpool: Liverpool University Press. 49-53.

Forlano, L. (2017). Posthumanism and design. *She Ji*, 3(1), 6-29.

Frase, P. (2016). *Four Futures*. London: Verso.

Haraway, D. (2008). *When Species Meet*. Minneapolis: University of Minnesota Press.

Haraway, D. (2016). *Staying with the Trouble*. Raleigh: Duke University Press.

Haraway, D. (2017). '2 symbiogenesis, sympoiesis, and art science activisms for staying with the trouble'. In Tsing, A., et al. (Eds.). *Arts of Living on a Damaged Planet*. Minneapolis: University of Minnesota Press. 25-50.

Hunt, J. (2020). *Not to Scale*. New York: Grand Central Publishing.

Kerspern, B. (2018). Economic design fictions: Finding the human scale. In Davies, W. (Ed.). *Economic Science*

Fictions. London: Goldsmiths Press. (Kindle).

Kerspern, B. (2019). Game design fiction. Paper at *3rd International Conference on Anticipation*, 9-12 October. Oslo: AHO.

Knutz, E., Markussen, T. & Christensen, P. (2013). 'The role of fiction in experiments within design, art and architecture'. *Proceedings of NORDES 2013*. 9-12 June, Copenhagen/Malmö, 341-348.

Kuzmanovic, M. & Gaffney, N. (2017). Enacting futures in postnormal times. *Futures*, 86, 107-117.

Law, J. (2016). 'Modes of knowing. Resources from the Baroque'. In Law, J. & Ruppert, E. (Eds.). *Modes of Knowing*. Manchester: Mattering Press. 17-56. Kindle edition.

Lindley, J. & Coulton, P. (2015). Back to the future: 10 years of design fiction. In *Proceedings of British HCI '15*. ACM, N.Y. 210-211.

Lindström, K. & Ståhl, Å. (2016). Becoming response-able stakeholders. In *Proceedings PDC'16*. 2: 41-44.

Lury, C., et al. (2018). (Eds.). *Routledge Handbook of Interdisciplinary Research Methods*. London: Routledge.

Malpass, M. (2015). Between wit and reason. *Design & Culture*. 5(3): 333-356.

Marenko, B. (2020). Future-Crafting: The non-humanity of planetary computation, or how to live with digital uncertainty. In Witzgall, S. et al. (Eds). *Hybrid Ecologies*. Univ. of Chicago Press / Diaphanes. 216-227.

Markussen, T. & Knutz, E. (2013). The poetics of design fiction. In *Proceedings of DPPI 2013*, 231-240. New York, USA: ACM.

Mazé, R. (2019). Politics of designing visions of the future. In Candy, S. & Potter, C. (Eds.). *Design and Futures*. Taipei: Tamkang University Press. 23-34.

Miller, R. (2018). Sensing and making-sense of futures literacy. In Miller, R. (Ed.). *Transforming the Future*. New York: Routledge. 15-50.

Montgomery, S. (2015). *The Soul of an Octopus*. New York: Simon & Schuster.

Morrison, A. (2014). 'Design prospects: Investigating design fiction via a rogue urban drone'. In *Proceedings of DRS 2014*. 16-19 June 2014, Umea: Sweden.

Morrison, A. (2017). 'Design-Baroque-Futures'. *2nd International Conference on Anticipation*. 8-10 November. London: University of London.

Morrison, A. (2018). Future north, nurture forth. Design fiction, anticipation and arctic futures. In J. Kampevold-Larsen & P. Hemmersam (Eds). *The Future North*. London: Routledge. 119-141.

Morrison, A. (2019). Design Futures Literacies. Keynote address. *2019 International DEFSA Conference*. Cape Town, VEGA Campus. 9-11 September.

Morrison, A. (2021). Courage. In Staszowski, E. & Tassarini, V. (Eds.). *Designing in Dark Times*. London: Bloomsbury. 95-98.

Morrison, A., et al. (2020). Lexicons, literacies and design futures. *Temes de Disseny*, 36, 114-149.

Morrison, A., Celi, M., Clèries, L. & Dudani, P. (2021). Anticipatory design and futures literacies. *CUMULUS ROMA 2020*.

Morrison, A., & Chisin, A. (2017). Design fiction, culture and climate change. Weaving together personas, collaboration and fabulous futures. *The Design Journal*, 20(sup1), S146–S159.

Morrison, A., et al. (2013). 'Design notes on a lonely drone'. *Digital Creativity*, 24(1): 46-59.

Morton, T. (2018). *Being Ecological*. Cambridge: The MIT Press.

Nilsson, P. (2009). *The Amphibian Stand*. Umeå: H:ström-Text & Kultur.

Østreng, W., et al. (2013). *Shipping in Arctic Waters*. Heidelberg: Springer.

Poli, R. (2017). *Introduction to Anticipation Studies*. Dordrecht: Springer.

Raven, P. & Elahi, S. (2015). The new narrative. *Futures*, 74: 49-61.

Ryan, M.-L. (2006). *Avatars of Story*. Minneapolis: University of Minnesota Press.

Savitzky, S. (2016). *Icy Futures: Carving the Northern Sea Route*. PhD Thesis. Lancaster: Lancaster University.

Sardar, Z. (2013). *Future*. London: Hodder & Stoughton.

Sack, C. (2015). 'A landscape neo-Baroque. *Landscape Journal*. 34(1): 57-78.

Salgado, C. (1999). Hybridity in New World Baroque theory. *Journal of Amercian Folklore*, 316-331.

Selin, C., Kimbell, L., Ramirez, R. & Bhatti, Y. (2015). Scenarios and design. *Futures, 74*: 4-17.

Stengers, I. (2011). *Thinking with Whitehead*. (Transl. M. Chase). Cambridge: Harvard University Press.

Sterling, B. (2009). *Scenarios and Speculations*. Amsterdam: Sun Publishers. 18-29.

Swift, J. (1726). *Gulliver's Travels*. https://www.gutenberg.org/ebooks/829

Tanenbaum, J., Pufal, M. & Tanenbaum, K. (2016). The limits of our imagination: Design fiction as a strategy for engaging with dystopian futures. *Proceedings of LIMITS 2016*. Article 10, 1-9.

Tyszczuk, R. & Smith, J. (2018). Culture and climate change scenarios. *Current Opinion in Environmental Sustainability*, 31: 56-64.

Vakhtin, N. (2019). Sovetskaya Arktika journal as a source for the history of the Northern Sea Route. *Acta Borealia. A Nordic Journal of Circumpolar Societies*, 36(1): 53-74.

Walsh, Z., Böhme, J. & Wamsler, C. (2021). Towards a relational paradigm in sustainability research, practice, and education. *Ambio* 50, 74-84.

Westerlaken, M. (2020). *Imagining Multispecies Worlds*. PhD thesis. Malmö: Malmö University.

Whitehead, A. (1938). *Modes of Thought*. N.Y.: MacMillan.

Zhou, Y. & Morrison, A. (In press). Sharpen your anticipatory senses for sustainable "scentory" futures. *Futures*.