

“ARE MERMAIDS REAL?”

Rhetorical Discourses and the Science of Merfolk

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ABSTRACT: The question ‘are mermaids real?’ would appear, on the surface, to be fairly straightforward to answer, at least for those more inclined to base belief on verifiable facts and scientific evidence of phenomena. As such, this question posed by the USA’s National Oceanographic and Atmospheric Administration appears to be rhetorical rather than designed to elicit an actual answer. But a deeper rhetorical analysis of the discursive boundaries that presumably exist between popular culture and scientific discourses reveals that the mermaid question is far more complicated. This article addresses and unpacks the discursive spaces of science, prediction, myth, popular culture, and metaphor and argues that the boundaries that are permeated by constructs of merfolk are far more porous than they may seem at first glance.

KEYWORDS: Mermaids, fiction, reality, discourse, metaphor

But are mermaids real? No evidence of aquatic humanoids has ever been found. Why, then, do they occupy the collective unconscious of nearly all seafaring peoples? That’s a question best left to historians, philosophers, and anthropologists. (NOAA, 2012a: online)

Introduction

In the course of my scholarly work on place-based rhetorics and literacies, most notably with islands, exclaves, and other oceanically or coastally situated locales (see Goggin, 2009; 2017; 2018) I frequently come across aquatic icons and symbols such as animals, anchors, tridents, mythical beings and creatures, and watercraft. These icons are frequently represented in the forms of memorabilia (souvenirs), and as various signifiers of national, personal, and/or cultural identity such as statues, flags, crests, coins, stamps, and so forth, both materially in the locales and as images in various multi-modal texts (see Goggin, 2015). It’s no surprise that merpeople are commonly used for iconography in these venues. The cities of Warsaw¹ and Ustka in Poland, Copenhagen in Denmark, Helsinki in Finland, and Norfolk, Virginia all have famous (or at least, well known) statues to commemorate their adopted identities with the mermaid icon. Starbucks coffee’s famous mermaid logo originated at Seattle’s Pike Place Market on Puget Sound in Washington, and it is not uncommon to find a mermaid hotel, beach, club, cantina, or resort in multiple island and coastal locations worldwide. Such legend and myth associations with poetic licenses of heraldry, marketing, and cultural narrative and identity seem appropriate and expected. Where I suspect one would not expect to find such associations are with institutions that sponsor logic, rationality, and fact-based scientific inquiry. So, I was quite surprised when I came across a United States Department

¹ While Warsaw is not a coastal city, legend has it that the mermaid swam up the Vistula river from the Baltic Sea and has since been the symbol and protector of the city (see Wasilewski and Kostrzewa, 2018).

of Commerce's National Oceanographic and Atmospheric Administration website that prominently displays a photo of a sailor mermaid statue and provides the official disclaimer concerning evidence of the existence of mermaids cited as the epigraph to this essay.

The website originally appeared shortly after the broadcast of a 'documentary', *Mermaids: The Body Found* produced by Animal Planet, a cable and satellite channel owned by Discovery Communications. The timing of the NOAA's 'Are Mermaids Real?' website seems to be a response and rebuttal to the claims in the broadcast that evidence of aquatic humanoids does exist. In his recent book, *Making a Splash*, Philip Hayward (2017) devotes the final chapter to the issue of the mermaid documentary and, what he terms, the 'cryptoscience' of the broadcast that the NOAA appears to disclaim on its website. Hayward thoroughly details the audio-visual aspects and events of the 'hoax' in his broader context of merfolk identity and representation in popular culture over the past century through various media. In this essay I draw on the apparent response by the NOAA to the so-called mermaid documentaries to discuss speculative rhetoric in scientific discourse and make a case for the notion of science as a predictive art and for the significance of merfolk in the narrative realm of science and imagination.

The NOAA's posted statement on aquatic humanoids is rhetorically intriguing. Certainly, there is an element of intended humour and playfulness to the statement and its accompanying image of the Portsmouth mermaid statue sporting a jauntily cocked US Navy sailor's cap (Figure 1). The US Center for Disease Control's (CDC) 2011 'Zombie Preparedness' website, designed to capture the public's imagination and inspire preparedness for disaster scenarios, suggests that the US Federal Government (at least in some of its offices) is not opposed to a bit of tongue-in-cheek in official public messages. However, the CDC apparently did not feel compelled to address the non-existence of zombies or the lack of evidence of zombies while the NOAA pointedly does. And urging the public to prepare for emergencies "besides a zombie apocalypse" such as "floods, tornadoes, or earthquakes" seems more crucial and necessary as a public service than denying evidence of the existence of mermaids (CDC, 2011).



Figure 1 - 'A Portsmouth Sailor Mermaid' (photo by Captain Albert E. Theberge) (June 2003)²

². National Oceanic and Atmospheric Administration/Department of Commerce, line2810. NOAA's 'America's Coastlines Collection' (public domain): <http://www.photolib.noaa.gov/htmls/line2810.htm> - accessed 3rd September 2018.

While it is uncertain that the NOAA's 'mersite' is a direct response to the Animal Planet production, and/or public misperceptions of the NOAA's role in the fictional scenarios represented in the mockumentary, what is immediately striking is the rhetorical intricacies and complexities of the disclaimer itself in the context of an official government website and further, the site and the disclaimer as a rhetorical nexus in a complex network of popular culture, institutional discourse and a confluence of myths, facts, and scientific inquiry. To post such an official response acknowledges that there is an argument worth responding to, and that while the NOAA does not validate the mermaid question as orthodox science, the organisation does purport to validate study of merfolk in other disciplinary fields. Further, the careful science-speak avoidance of flatly denying the existence of mermaids, and instead using the classic 'no evidence has ever (or yet) been found' line, still leaves the question open for potential academic inquiry (and for conspiracy theorists and mermaid believers). Could it be, perhaps, that in the grey zone where science and popular culture meet that there is room for productive connectivity of discourse on merfolk?

A popular perception, often fostered by broadcast and literary media stereotypes, holds that science (and scientists) dwell in an epistemological space of desired, if not actual, objectivity. Outside of that space is non (or pseudo)-science (and scientists) dividing the world of logic, empiricism, and rationalism from the world of fantasy, fiction, and imagination. In popular conceptions, scientists can step in either world: logical, emotionless, data-driven in one, and socially inept, child-like, and 'mad' in the other. Such popular dichotomous perceptions of science are useful — if misleading — for entertainment in TV (for example, *The Big Bang Theory* [2007-]) and film (such as *Real Genius* [Martha Coolidge, 1985] and any number of world-domination-themed James Bond films), and for political satire or political manoeuvring as has been the case with evolutionary theory, Climate Change, and vaccinations. However, science and fantasy as well as fiction and imagination are dynamically, materially, and rhetorically intertwined and mutually reinforcing. Recent 'moonshot' scientific research has embraced a 'what if' validation of scientific method, speculation, and pure fiction to boost early stage start-up projects that may lead to important technological and social breakthroughs. Google's 'Solve for X' initiative and Moonshot Factory, for example, sponsors out-of-the-box start-ups that bring scientists, engineers, artists, and other creative thinkers together to push the boundaries of invention and innovation. Speculative fiction author, Neal Stephenson has exhorted science fiction authors to stop slacking and start contributing "futures in which Big Stuff Got Done" ideas by collaborating with scientists and engineers to inspire the next technological leap (Stephenson, 2013). As Jay Mitra, professor of business enterprise and innovation states:

Fantasy, story-telling, imagination, visioning, creativity, science, technological application, research, testing, team effort, commercialisation, and changing the lives we lead — of such stuff is entrepreneurship and innovation made!
(2012: 2)

Under this paradigm of creative innovation, the divisions among the various branches of pure/physical science, social science, and formal/theoretical science are rendered less distinct. The NOAA's statement that oceanography (physical science) is not the place for merfolk study, yet anthropology (social science) is, holds less water than it first appears. A good example of a rhetorical shift in what counts as good science is apparent in scientific and political deliberations and in the public sphere about Climate Change and Global Warming where scientists from multiple areas of inquiry have broadly taken stances not only

on anthropogenic causes of climate change but on projecting and future casting its effects in terms of sustainable futures. The emerging and rapidly growing interdisciplinary field of Futures Studies, in particular, provides space for scholarly inquiry in sciences, engineering, economics and the arts and humanities for creative approaches to ‘wicked problems’³ and innovative construction of new knowledges. The World Futures Studies Federation (2018), for instance, lists “dozens of universities around the world that teach courses in futures studies. Courses cover the spectrum from short courses & single units to master’s degree courses and PhDs.” In addition to degree programs there are also numerous futures studies research centres established at universities. At my own university, Arizona State, there is the Global Institute for Sustainability, the School of Sustainability, the Consortium for Science Policy and Outcomes, the Center for Science and the Imagination, and most recently, the School for the Future of Innovation in Society. In academia, ‘the Future’ is no longer relegated to fiction writers and science boffins but is a rapidly growing scholarly enterprise.

Futures Studies researchers and affiliated scientists and scholars draw on mythology, art, performance, and fiction to develop creative scenarios of the yet to be. The Search for Extraterrestrial Intelligence (SETI) Institute astrophysicists, for example, continue to draw on the Drake Equation and the search for alien life to stimulate intellectual curiosity about the universe.⁴ While it is probably fair to assume that belief in merfolk generally declined with post-enlightenment scientific thought and inquiry, (the so-called ‘Aquatic Ape Hypothesis’ notwithstanding) science has also opened--or perhaps broadened--the window of possibility, not as a validation of the actual existence of mythological beings, but as a creative means to inspire new ways of thinking about science and scientific discovery.

Of course, one might say that *all* educators are in the futures business. Teaching, research, and publishing are based on the assumption that education will have meaning and purpose not only in the present, but in the future, for students, teachers, and society. So, what is the place of mermaids in this? Hayward (2017) primarily focuses in his book on how mermaids and the media have informed each other over the past century, but he also addresses the notion of new developments and changes to come. Implied through analyses of past and present constructs of mermaids and addressed in his final observations are questions concerning the future of mermaids in evolving pop culture technologies and resonance with pending scientific discoveries and theories. The Aquatic Ape Hypothesis (AAH), for example, posits that at some point human evolution went through an aquatic or semi-aquatic period. This hypothesis has served as a ‘cryptoscientific’ basis for the evolution of merfolk, as Hayward notes (*ibid*), that has been around for about 50 years and while debunked by

³. ‘Wicked problems’ are problems that are highly complex, seemingly unresolvable by any single solution, subject to changing conditions, global in nature, often socially divisive, and in academic terms involve multiple disciplines. Climate change, sustainability, food security, and gun violence are a few examples of wicked problems that are currently front and centre in academic and political arenas.

⁴ The Drake equation is as follows: $N = R^* \cdot f_p \cdot n_e \cdot f_i \cdot f_c \cdot L$. “Where,
 N = The number of civilizations in the Milky Way Galaxy whose electromagnetic emissions are detectable.
 R^* = The rate of formation of stars suitable for the development of intelligent life.
 f_p = The fraction of those stars with planetary systems.
 n_e = The number of planets, per solar system, with an environment suitable for life.
 f_i = The fraction of suitable planets on which life actually appears.
 f_c = The fraction of life bearing planets on which intelligent life emerges.
 L = The length of time such civilizations release detectable signals into space”. (SETI Institute [nd])

orthodox science has persisted in social science inquiry and in science journals often as a critique of heterodox hypotheses and umbrella theories of evolution.

For example, in his article, 'Umbrella Hypotheses and Parsimony in Human Evolution: A Critique of the Aquatic Ape Hypothesis' (1997), published in the *Journal of Evolutionary Biology*, biologist John H. Langdon observes that while evolutionary umbrella hypotheses often have more impact on the lay public than the scientific community and are often set aside within the profession, they are rarely, if ever, completely disproven and are often resurrected as new discoveries and theories come to light. Langdon lays at the feet of his colleagues that these problematic hypotheses persist in part because scientists do not communicate their science well and resort to simple answers, even if they are wrong, because those answers are just easier to communicate. He states, "the aquatic ape hypothesis continues to be encountered by puzzled students who wonder why mainstream paleoanthropologists overlook it. If only because of this last audience, it should not be ignored" (ibid: 480).

In an even more recent article, 'The Role of "the Aquatic" in Human Evolution: Constraining the Aquatic Ape Hypothesis' published in the journal, *Evolutionary Anthropology*, evolutionary biologists John Foley and Marta Lahr (2014) point out that despite any evidence to support AAH, adaptive theories of evolution in orthodox science continue to perpetuate the "enormous adaptability" of aquatic humanoids by more marginal scientific inquiry and heterodox theories (ibid: 59). From here it is but a small step to a pseudo-scientific media production that draws on the documentary broadcast genre and 'scientific-style' discourse to posit the possible existence of merfolk. But given the orthodox science community's general rejection or disregard for AAH/merfolk theory, why would the NOAA have taken the unusual step of issuing a disclaimer? Well, what the NOAA seems to have nicely done is enter this murky aquatic terrain in terms of speculative imagination. And although the mersite generated particular attention, probably due to its publication so soon after the Animal Planet and Discovery Channel broadcasts, there is precedence for this institution's intentional move to connect science and myth.

Both the Lost City of Atlantis, and the Bermuda Triangle, for example, have been the subject of official NOAA news releases. Regarding the former, in a 2012 news item titled 'Atlantis... Lost Again' the NOAA explained that grid markings visible on the ocean floor via Google Earth were actually just data patterns. Still, they noted, "We expect fewer inquiries regarding this mysterious, lost, underwater civilization... though we know some of you will still keep looking," a mild and humorous acknowledgement of the public pervasiveness of cryptoscience in the face of science and verifiable data (NOAA 2012b: online). As to the latter, on their Ocean Facts website, the NOAA addresses the question "What is the Bermuda Triangle?" (NOAA 2010) and while locating the so-called mystery in the context of myth and legend such as Atlantis, extra-terrestrial abduction, and interdimensional vortices, the site also states that in addition to these:

whimsical ideas.... Some explanations are more grounded in science, if not in evidence. These include oceanic flatulence (methane gas erupting from ocean sediments) and disruptions in geomagnetic lines of flux. (ibid)

Again, here the NOAA is playing an interesting rhetorical game by blurring certainty in its statement of facts concerning the Bermuda Triangle. As with the organisation's mersite statement, the site goes on to underscore the 'no evidence' argument. But in the world of orthodox science, there is no argument to begin with - or isn't there? - the NOAA seems to

imply. This then brings us back to the issue of popular culture and science as two generally constructed stakeholders in the mermaid debate - and I think is safe to say that there is a debate here though scientists may not admit it without a wink.⁵ And when scientific inquiry engages deliberately and deliberately with projections on the yet to be, myths, legends, mermaids, aliens, and triangles become useful metaphors for speculation and imaginative perspective.

Interestingly, the scientific community itself is rife with mermaid metaphors and references. For example, Mermaid Purses, the egg casings of skates, are published on in numerous scholarly zoology, biology, and planetology journals and in popular science and natural history magazines. Likewise, sirenomelia, or Mermaid Syndrome, the rare congenital condition in which the lower limbs of a human foetus are fused together and resemble a mermaid tail, is published on in journals of pathology, genetics, obstetrics and gynaecology, and journalistic venues (Sikandar and Munim, 2009). Princeton University's Mobile Earthquake Recorder in Marine Areas by Independent Divers - or MERMAID Project - is sponsored by the US National Science Foundation and the UK National Environment Research Council (Schieltz, 2016). These examples represent but a few metaphors that directly invoke conceptions of mermaids that various fields of scientific research draw on.

For the actual field of Futures Studies, which is generally considered an interdisciplinary field, much of the academically legitimised or at least funded inquiry for futures-focused development is situated in science-oriented programs and centres. The drivers for such inquiry are big ticket interests, as one might imagine - sustainability, climate change, social change and mobility, economic development and so forth. One of the key factors for this, other than the obvious economic one is, of course, methodology. Much of what counts as Futures Studies research and scholarship is supported by quantifiable data from the past and present. This data in turn can also then be understood qualitatively within a scientific context. In the science (and engineering) field of Risk Assessment, for example, probability of risk outcomes can be viewed quantitatively within a measurable numerical scale, but can also be interpreted subjectively, so that certain numerical outcome values can be defined in qualitative values as 'high' or 'low' risk. For scholars who specifically specialise in Futures Studies, constructs of various futures are often based on non-predictive scenarios - that is, possibilities or probabilities of various outcomes beyond the already known based on existing data of measurable trends. Unlike the futuristic predictions and visions of literary science fiction, there are methodological conventions to scenario construction, the acquisition of which Riel Miller (2007), a futures economist, refers to as "futures literacy". For Miller and other futures scholars, what scenarios provide is a means to bridge the presumed divide between objectivity and subjectivity. And here is where things get a bit tricky, especially when it come to the tension between probability, possibility, and prediction. Conceiving futures, in terms of trends, or preference for example, has distinctive limitations such as lack of imagination or lack of analytical precision. As Miller describes, there are different levels of scenarios from the most functional levels based on trends and thus easiest to comprehend

⁵. Oceanographer and biologist, Karl Banse, demonstrated the willingness of at least some in the science world to take at least a tongue-in-cheek approach to acknowledge fictitious creatures such as mermaids in scientific discourse with the publication of his now famous--or perhaps infamous--1990 article, 'Mermaids—Their Biology, Culture, and Demise' in the journal, *American Society of Liminology and Oceanography*. Ironically, as Hayward (2017) points out, it was Banse's article that Animal Planet and Discovery Channel used to claim legitimacy as serious science in their hoax documentaries by, "representing their subject as one explored and documented by scientists associated with government agencies and universities" (170).

and strategise to the most innovative and creative in the possibility levels and thus the most difficult, requiring strong temporal awareness.

The uncertainty of non-linear and complex systems, objectivity versus subjectivity, and trend extrapolation weakens with distance from a 'knowable' past and present. It is often said that science is about the future, and scientists speculate all the time about the possibilities, potentials, and pitfalls of research regarding the future. The scientific hypothesis and null hypothesis is based on what outcomes will logically occur, typically derived from quantifiable data. Yet, generally, objective scientific methods on physical processes are solidly grounded in the controlled and presently observable not in what may be observed at some future time unless it is temporally and physically consistent. Celestial mechanics, a sub-field of astronomy, for instance, deals with predictability of the measurable movement of celestial objects, and these measurements are quite accurate and reliable, even accounting for corrections. But much of the scientific theory on 'the yet to be' is more speculative rather than physically observable and, among these, Chaos Theory, Evolutionary Theory, Complexity Theory, and so forth, have actually served to underscore the inherent *unpredictability* of forecasting futures. While causality is difficult, if nigh impossible, to determine with absolute certainty, the relationship between science fact, science fantasy, and science fiction is hardly linear or unidirectional. In his chapter on Crypto-Science and Hoax TV, Hayward (2017) devotes a good chunk of space to the 'Bloop', the loudest underwater low frequency sound ever detected and recorded by NOAA hydrophones in 1997 in the Pacific Ocean. The cause of the sonic Bloop was initially unknown and led to various speculations: secret Navy submarine experiments, giant sea creatures both real and mythical such as whales and Cthulhu, and in the case of the hoax documentaries--possibly mermaid vocalisation. The most likely cause according to the NOAA's Pacific Marine Environmental Laboratory Acoustics Program is attributed to icequakes or ice calving as icebergs fracture or shear off glaciers (NOAA [nd]). Still, all sorts of scientific inquiry relating to this event resonates (pun intended) with a wealth of speculative inquiry. One connection to oceanic acoustics that I found especially intriguing was the study of gas release (flatulence) of herrings by Walberg and Westerberg (2003) in the science journal *Aquatic Living Resources* that speculates that the gassy piscine emissions are a behavioural response rather than a physical one, that is, perhaps a form of communication. This in turn has inspired speculation on a variety of unsolved-mystery and tabloid-style websites that the Bloop was perhaps the result of a large school of herring simultaneously warning others of a predator. I should point out here that *Aquatic Living Resources* journal makes no mention of mermaids in any of its issues, though the notion of mermaid farts gets a lot of air play in online parody sites, and even has inspired the name, 'Mermaid Farts,' for a brand of "fluffy and sweet" cotton candy (Amazon.com [nd]).⁶ The point being that in the narrative zones between science fact, science fiction, and fantasy, complex dynamic confluences of information and influence begin to emerge the closer we look at constellations of discourse.

⁶. Mermaid Farts Cotton Candy is a product of Gears Out, a company that specializes in novelty gift items and is sold on Amazon.com. The product description on the Amazon website states: "Mermaids have long been a part of mythology, and even a Disney princess, but no one has ever talked about their delicious farts. If a friend or relative loves mermaids, then you've found the perfect stocking stuffer or gag gift. You'd think that a mermaid fart might smell a little... you know... fishy, but they smell and taste divine. Get these now while supplies last, or until they turn to sea foam. You'll have much better luck than the Little Mermaid." (Amazon.com [nd])

Futures Studies scientists, whether they futurecast or backcast⁷, look at the idea of multiple potential futures, and the notion that futures are not so much predicted, as created. This perspective of created futures then underscores a rather significant question about Futures Studies: is it a more a Science or more an Art? This is a question that scholars in the field itself have addressed and in doing so have challenged the traditional category boundaries of pure, theoretical, physical, and social science. In his article, 'Future Studies: Science or Art', mathematician and philosopher, Ilkka Niiniluoto states that:

many 'ordinary' scientific disciplines — like physics, astronomy, psychology, and economics — have futuristic relevance in the sense that their theories, together with initial conditions about the present and boundary conditions about the environment, yield predictions about observable events in the future. Without such an ability the theories would not satisfy the requirement of empirical testability. (2002: 372).

He goes on to make that case for Futures Science as the systematic pursuit (*wissenschaft*) of knowledge making (*scientia*) and also the art/skill of the making (*techne*) as a replacement for the, "various kinds of unscientific 'prophecies' and 'prognoses' proposed by religious thinkers, philosophers, novelists, and fortune tellers" (ibid: 372). Futures sciences is thus a 'design science' that "combines the tasks of exploring probable and preferable futures, [and] is a mixture of theoretical and empirical research, methodology, philosophy, and political action... which attempts to help the rational planning of our future" (ibid: 376).

My own inclination here as a humanist scholar is towards constructions of the future as more of an Art. That is, any future we can envision whether it be via hard data and numerical probability that projects trends via imaginative speculation, or via a combination of these approaches is *invented*. And here is where the rhetoric comes in. The so-called 'hard' sciences are increasingly turning to new, alternative, and combined methods from multiple disciplines in a move to engage with the Art of knowledge making, and this includes the humanities, performance studies, social sciences, and by default, popular culture studies. My work in environmental rhetoric and sustainability has put me squarely into the middle of textual and face-to-face multi-disciplinary conversations, debates, and deliberations about what this all means and how scientists and humanists and artists talk about the future. How do we as scholars, researchers, and teachers talk about the yet to be? What do we mean when we talk about the future, or futures, myth, fantasy, technology, and science? How do we engage with our students and teach them about something we ourselves don't really know much about yet with any kind of certainty? Scenarios can provide a bridge or meeting place between the presumed divide between objectivity and subjectivity where we can participate in creative rhetorical deliberation and speculation in a friction zone of popular culture and science while discerning fact from fiction and crypto-scientific hoax from credible scientific method. For example, in an article in *Acta Astronautica*, a scientific, peer reviewed journal sponsored by the International Academy of Astronautics, authors speculating on future contact with extra-terrestrials used scenario analysis and science fiction resources in addition to quantifiable data trends to create models of possible impacts and consequences

⁷ There are multiple variations and nuances to specific Futures Studies methodologies but according to my colleagues in this field at Arizona State University, generally speaking, futurecasting involves the use of scenarios and existing data and trends to project various future developments and possibilities along time designations from the near future to distant futures. Backcasting involves defining a particular future scenario as a potential goal or desired outcome and then tracing back to contemporary data to determine what present actions may lead to that future goal.

for humanity (Baum, Haqq-Misra and Domagal-Goldman, 2011). Such examples bring us back to a rethinking of the Mermaid 'hoax' documentaries and the NOAA's website disclaimer as merely a fact versus fiction binary and more of a rich area of rhetorical inquiry and imaginative possibility.

In an interview with *Live Science*, a spokesperson for the NOAA demonstrates how the organisation gets this when she states:

As we had gotten a couple questions about mermaids, we thought this would be a fun way to talk about it and to have information up about mermaids in different cultures and to draw people into our website and learn more about what NOAA and the National Ocean Service does. (Bryner, 2012: online).

A striking example where discourses on mermaids and knowledge of science, art, performance, and popular culture can come together is the *Saturday Night Live (SNL)* skit about Mermaids (2016).⁸ In the skit, which parodies the genre of dramatic nautical adventure and mystery tales, three marooned sailors are rescued by three mermaids who have fallen in love with them and want to marry them. Two of the mermaids, named Oceana and Coralle, are parodies of the beautiful, dulcet-voiced, translucent-tailed, contemporary mermaid stereotype while the third is a pink, gelatinous, bald, rough-voiced 'anti'-mermaid named Shud. As the unlucky third sailor protests, Shud explains that she is a 'blobfish' from deep in the Mariana Trench and shows a photo of her 'mother,' the actual blobfish (*Psychrolutes microporosus*) nicknamed 'Mr Blobby' that became a social media meme as the world's 'ugliest fish' following its discovery (Lidz, 2015: online). As with the NOAA website, the *SNL* mermaid skit is also rhetorically complex and serves as a mirror bookend. Multiple knowledges of scientific discovery, geography, stereotypes, literary genres, performance, and so forth, are necessary for the skit to work as is also the case for the NOAA post. Both examples evoke Mitra's statement (above) on entrepreneurship and innovation and the making of new knowledges. And this brings us back to the initial question: are mermaids real? Well, while no evidence of aquatic humanoids has ever been found, discourses on them do exist — in science, in myth and legend, in social identity, in metaphors, in literature, and in performance studies, that is, as theoretical physicist and feminist theorist, Karen Barad (2007) would argue, these constitutive theories and phenomena are intra-active. And material representations of mermaids do exist in statues, crests, cotton candy, and coffee cups, and 'real' mermaids do exist as professional performers at aquariums and water parks, and thus have agency as Barad states thusly:

Discursive practices and material phenomena do not stand in a relationship of externality to each other; rather the material and discursive are mutually implicated in the dynamics of intra-activity. The relationship between the material and the discursive is one of mutual entailment. Neither discursive practices nor material phenomena are ontologically or epistemologically prior. Neither can be explained in terms of the other. Neither is reducible to the other. Neither has privileged status in determining the other. Neither is articulated or articulable in the absence of the other; matter and meaning are mutually articulated. (ibid: 152)

⁸. Online at: <http://www.nbc.com/saturday-night-live/video/mermaids/3001367?snl=1> – accessed 4th May 2018

Conclusion

Barad's notions of agential realism and intra-action challenge the rhetorical and material boundaries that the question "are mermaids real?" posed by the NOAA suggests. As a situated response to mermaid lore and (very likely) the cryptoscientific Animal Planet production, there is an implied distance between the different perspectives of the various agents that presumes a level of prior rhetorical and semantic independence, that is, *inter-active*. However, as co-constituents, the relationships between agents can be seen as *intra-active* and that the question, "are mermaids real" is an outcome of interactive networks of theory, materiality, nature, experience, technology, and so forth, in which agents intra-act and construct the evolving notions of the realness of the mermaid and mermaid concepts that emerge from these intra-actions. Further, I would conclude that mermaids themselves are ontological as discursive co-constituents in the making and unmaking of relationships and knowledge in confluences and experiences of science, mythology, legend, and popular culture. Thus, my position is to say, yes, mermaids are real. If there is a pithy bottom line here, it is that popular culture informs science and science inform popular culture and in the porous zones of their rhetorical and discursive boundaries there is plenty of room for mermaids.

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