

The Strait and the Sea Unsettling Scores

Tarek Elhaik

University of California, Davis; CIFAR, Program co-director of Future Flourishing

Abstract In this inquiry I build on my previous work on contemporary aesthetics to engage the media practices and bio-acoustic mappings of cetacean scientists, as well as fishers' video diaries and sound cartographies of interactions with cetaceans. To these, I also juxtapose a contemporary composer, sound engineer, and media artist's sonic and musical records of encounters with these decidedly intriguing marine mammals alas too often reduced to the adjective 'charismatic'. Concretely, I zoom in on three media practices: the sound compositions of Ariel Guzik, founder of the Nature Expression and Resonance research laboratory, who designs and engineers instruments to communicate with grey whales, sperm whales, and bottle nose dolphins in the Sea of Cortez; the hydrophone recordings, spectrograms, drone footage, and photo-identifications by a team of cetacean ethologists and communication scientists who run a research vessel and a marine ecology lab in the Tyrrhenian Sea; and the multimedia online platforms of fishers who produce video diaries of potentially fatal interactions with orcas in the Strait of Gibraltar. These carefully selected and juxtaposed audiovisual practices are the graphic, acoustic, and musical fragments that compose the curatorial mise-en-scène I am calling *The Strait and The Sea*. The reader will also be able to explore some of these media practices by navigating the links provided in the endnotes.

Keywords Strait. Sea. Ocean. Sound. Music. Mapping. Cetaceans. Recording. Marine ecology.

Summary 1 Prelude: Map-Territory Resonances. – 2 Hetero-Ethologic. – 3 Stretto Fuga.



Peer review

Submitted 2024-03-04
Accepted 2024-03-27
Published 2024-07-26

Open access

© 2024 Elhaik | 4.0



Citation Elhaik, T. (2024). "The Strait and the Sea. Unsettling Scores". *JoLMA*, 5(1), 191-212.

Like God, no one could agree what they really looked like, or what they might be capable of. Whales bore all of this ignorance on their backs, burdened by scholars and artists balanced up there. Dürer new better. He'd been reading about these creatures since he was a boy.
(Hoare 2012, 15)

Any sound can be made into a radiophonic sound by the treatment it receives. The sort of sounds we usually use are electronic sounds of various sorts, and sounds that are recorded, picked up by a microphone, everyday sounds, and also musical instruments.
(Delia Derbyshire, "Sculptress of Sound")

Music is a mysterious mathematics whose elements partake of the infinite.
(Debussy 2012, XI)

1 Prelude: Map-Territory Resonances

The design for this essay is an echo of the worlds and territories traversed during my latest inquiry. Like Theremin¹ player, classically trained violinist, and electronic music pioneer Clara Rockmore, I tried to gently touch and adroitly move my fingers in the vicinity of a singular instrument that enables the performer to generate eerie acoustic patterns and melodies out of an invisible yet perceptible electromagnetic field. What follows is a written piece composed of images and sounds inspired by the intriguing audiovisual territories encountered during fieldwork engagements with the media practices of my most beloved interlocutors. These creative practices not only render untenable the all-too neat distinctions between the arts and the sciences,² on the one hand, and between the philosophical

1 "The theremin is an electronic musical instrument controlled without physical contact by the performer (who is known as a thereminist). Patented and invented by Leo Theremin in 1928 this fascinating monophonic instrument generates electronic pitches of various volumes that are controlled by the proximity of the player's hands to metal protrusions associated with each. Thus, moving the hands closer to or farther away from the pitch protrusion will result in a higher or lower pitch and moving the hands closer to or farther away from the volume protrusion will result in a louder or softer volume. The somewhat eerie quality of the theremin can be heard in many movie soundtracks in the sci-fi and horror genre in the 1940's, 1950's, and 1960's". OnMusic Dictionary.

2 The call to straddle the boundaries between the "two cultures", to borrow C.P. Snow's expression, is a staple of contemporary dialogues between the humanities, arts, and technosciences. Suffice to mention the work of Donna Haraway, Paul Rabinow, Stephen Helmreich, Claire Colebrook, Kriss Ravetto, Todd Meyers, Tobias Rees, Elizabeth Grosz, Roger Bartra, and Gary Tomlinson, to name only those whose work I have learned a great deal from. Indeed, inquirers are today increasingly moving playfully between the sciences and media arts, often animated by an imagination that endeavours towards

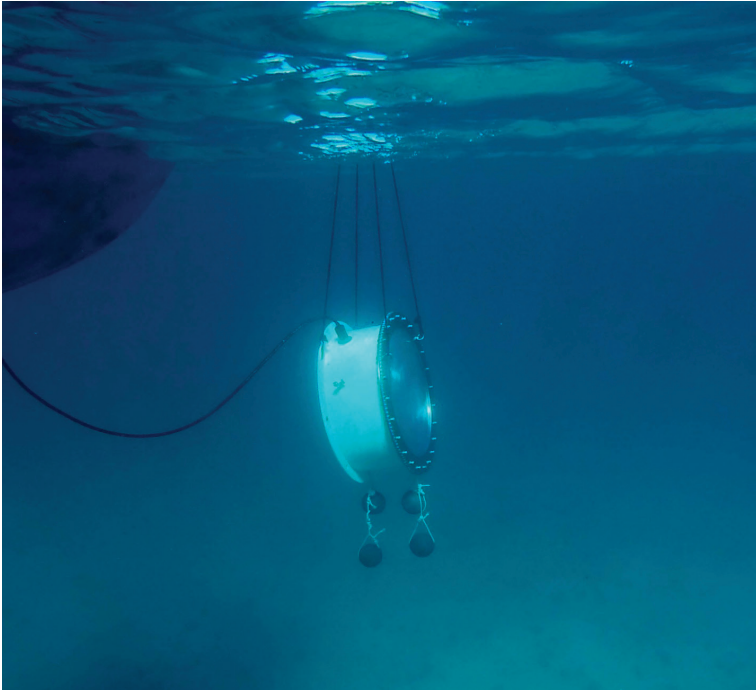


Figure 1 *Timpano Marino*, acoustic instrument and music composition.
Ariel Guzik, 2021, Sea of Cortez, Baja California, Mexico.

Although not visible on this image, a hydrophone was used to record the artist's improvised alto saxophone 'musical offering to the sea' and to its cetacean inhabitants.
Courtesy of Ariel Guzik

and the scientific, on the other. They also invite a form of navigation across geographical maps by drifting in them with a kind of love³ that seldom finds harbour in existing nations and disciplines. Their

the creation of new domains of inquiry. In her *Darwinian reflections* (2011), Elizabeth Grosz has called such emerging domains the "inhumanities", a heterogenous field of investigation that does not lend itself to being tamed by a single discipline or life form. Historian of science Mario Biagioli invites us to cultivate "post-disciplinary liaisons" (2009). Georgina Born (2010) proposes creative inter-disciplinary options between musicology, the social sciences, and the history of science.

3 I use the word 'love' for two reasons. First, an empirical reason: the term often arises in the context of my fieldwork conversations, often in reference to marine environments and life. Second, in reference to Emily Dickinson's poem *My River Runs Through Thee*, a poem about the plea of a river to be welcomed by her lover, the sea it is flowing into. "My River runs to thee - Blue Sea - Wilt welcome me? My River wait reply. Oh Sea - look graciously! [...] Say Sea - take Me?". The last line of the poem usually closes with either an exclamation point (!) or interrogation point (?). The undecidedness between interrogation and exclamation in Dickinson's riverine and marine poem evokes matters of hospitality and welcomeness inquirers face as they move between places and disciplines.

creative energy fuels travels to realms that are both worldly and cosmic yet never otherworldly.

One of my interlocutors, the artist, engineer, composer, musician, and inventor Ariel Guzik, founder of the Nature Expression and Resonance Laboratory in Mexico City, remediates the art-philosophy-science triumvirate by nourishing it with sources inspired by natural history, science fiction, and spirituality. Another fieldwork interlocutor, the marine scientist, bio-acoustician, and photographer Dr. Daniela Silvia Pace, with her team of collaborators, has been studying and monitoring bottlenose dolphins, a species of dolphins described as “cosmopolitan”. This is the term recruited by the Encyclopedia of Marine Mammals to designate life forms with a wide geographic range on the planet. To my knowledge, there are no indications that the term is here being used (or that it ought to be) in its technical philosophical declinations, Kantian,⁴ Cynic, Stoic, or otherwise. To be sure, these dolphins and other marine mammals (pilot whales, orcas, sea lions) were “conscripted” as “biological assets” by the US Office of Naval Research and Soviet army (Colby 2020) for all sort of instrumental reasons – primarily for service missions to recover undersea military equipment⁵ – and therefore belong to the dark legacies and assemblages of the environmental history of the Cold War, its global order of things, and the ecologically onerous space race (Elhaik 2022). Said differently, the practices of my interlocutors unsettle the connections between the maps and territories imagined by scientific, political, artistic, and philosophical communities. They have one foot in the various intermedia worlds of our cosmopolitan order of things, and the other foot resonating with other realms.

The audiovisual practices of these interlocutors, an artist-engineer-composer, and a team of scientists-bioacousticians-photographers, are therefore also cosmic, and not only for the aforementioned geopolitical reasons. Indeed, our current maps and navigation instruments fall short of the pathos out of which the contours of their imaginative territories and intensive encounters with marine creatures emerge and take shape. “The art of reading a sextant”, Ariel Guzik tells us in his beautiful essay *Deriva* or *Adrift* in which he discusses his current design project to engineer the “helmless” ship named *Narcissa* – a ship designed to communicate with cetaceans and marine environments – “surpasses that of reading maps, when it forces us to turn our gaze to the sky, and thus to give the helm to the

⁴ Cf. Kant 1991.

⁵ “Technical film reports” and other media materials about these cetacean-led retrieval tasks are now available online. One of these is a 1972 film that was part of the series Moving Images Relating to Military Activities that documents the activities of Project Deep Ops, a program designed to train orca and pilot whales to assist the US Navy. The film can be viewed here: <https://www.youtube.com/watch?v=isyo5tQfeqM>.

stars". He further adds: "Perhaps, being adrift is now the most promising form of transit of all. It overlooks maps, compasses and sextants, and in the unlikely flight forward, it saves us from that worn-out certainty of science that breaks the mysteries of the world into pieces. And in a world of a thousand certainties and few mysteries, maps and navigation instruments no longer make sense".⁶ Cosmic because, as an inquirer, my own writings on 'reveries' and 'drifts'⁷ resonate with that of these esteemed intercessors who use these terms in ways that complicate the general semantics of Alfred Korzybski, author of the widely read and influential *Sanity and Science*. "A map is not the territory it represents", we are told by the author who would influence a generation of illustrious thinkers interested in articulating productive dissonances between Aristotelian and non-Aristotelian systems of thought, from anthropologist Gregory Bateson (1972) to philosopher of science and of the imagination Gaston Bachelard (1940). Instead, Korzybski further elaborates, "the map has a *similar* structure to the territory, which accounts for its usefulness (Korzybski 1998, 145)". To symmetrically reverse this statement and state instead that The Territory is Not the Map would only consist in inserting an inversion that falls short of the more profound work of difference. Thanks to stimulating fieldwork encounters and interlocutors, I find myself drifting in the interstices between map and territory, without the secure helm of representation.

Consequently, our sanity will not consist in recovering, after the fact, a lost territory. The art of unsettling our maps, with their nightmarish dream of absolute exactitude, will consist in recomposing and repopulating our world, albeit ephemerally, in the company of beloved interlocutors whose singular media practices both resonate with our invisible cities and animate other kinds of scientific reveries. Moreover, this spiral-like voyage would take its cue from the efforts of those ancient and medieval philosophers, mathematicians, and astronomers (at times also astrologers, Kepler!) whose understanding of philosophy as "a way of life" (Hadot 1995) and music as a "mysterious mathematics" (Debussy 2012) begs for a contemporary reconfiguration of the anthropo-cosmic bond. In other words,

6 "El arte de leer un sextante supera al de la lectura de los mapas, cuando nos fuerza a tornar la mirada al firmamento, y así a ceder el timón a los astros [.] Quizá derivar sea ahora la forma de tránsito mas prometedora de todas. Obvia los mapas, las brújulas y los sextantes, y en la improbable huida hacia adelante, nos pone a salvo de esa desgastada ciencia cierta que rompe en pedazos los misterios del mundo. Y es que en un mundo de mil certezas y pocos misterios, no tienen ya sentido los mapas y los instrumentos de navegación". This unpublished short text was kindly shared with the author by Ariel Guzik.

7 See *Tricontinental Drifts* (2012); *Strait of Gibraltar: A Reverie in Blue* (2020); *Ermernautica* (2023)

a reconfiguration, in new forms and modes, of the severed link between the music of the spheres⁸ and the *politeia* of a cosmic city. The inquiries of my interlocutors take place in conceptual and experiential “penumbras” (Bachelard 1940, 113) between map and territory, and certainly not by privileging *physis* over *techne* (or vice versa) since in the ancient cosmic city “human laws produced by civilization are replaced by the universal laws of nature” (Goulet-Caze 2017, 25). Far from being a naturalism in the New Age sense of the term, the cosmic city yet to come requires a different understanding of the bond between the new sciences, with their “atomistic intuitions” (Bachelard 2019), and a new spirituality with concrete and practical exercises. This city would also call for another kind of relationship to technology and instruments, including the urge, as is the case of Ariel Guzik’s marvellously engineered families of instruments, to build new ones since most available instruments only keep returning us either to imperial exactitude or melancholy over lost territorial bodies.

Unsettled between map and territory, I now find myself inhabiting a *space* and *mode* of thought and practice that re-assembles and re-curates the physical oceanographic maps of cetacean scientists and the spectrograms of bio-acousticians *with* the helmless adrift capsules, invented instruments, and harmonic compositions of Ariel Guzik whose cosmic reveries and spiritual exercises are spoken in the idiom of a “cetacean calligraphy” (2019). This mode of thought and practice requires the cultivation of an *ethos*, with the understanding of the term inspired by the Greco-Arab tradition – from Pythagoras to Al-Kindi to Avempace – that associates *ethos* (plural *ethoi*) with musical modes and moods. To test and be worthy of the multiplicities of modes and moods encountered in the spaces traversed during an inquiry is to both wink at previous illustrious essayists⁹ and to allow oneself to be animated by what I propose to call a “hetero-ethological” imagination.

⁸ The astrophysicist Sylvie Vauclair (2013) has even suggested a “new music of the spheres” in her beautiful study of the resonances and frequencies of stars.

⁹ Suffice to mention philosophical and anthropological essays such as Claude Lévi-Strauss’ *Tristes Tropiques* (1955), Paul Rabinow’s *Gerard Richter: Unconsolable Contemporary* (2018), and Roger Bartra’ *El Mito del Hombre Lobo* (2023). One can add the ‘reflections’ of illustrious natural scientists, including Stephen Jay Gould’s *Ever Since Darwin: Reflections on Natural History* (1977), oceanographer Anouar Aleem’s *Concepts of Marine Biology Among Medieval Arab Writers* (1968), and more recently the genre-defying essays of falconer and historian of science Helen McDonald.

2 Hetero-Ethologics

In this new ‘inquiry’ (Rabinow; Stravrianaki 2014) I build on my early fieldwork on critical art and curatorial practices in Mexico City (2016), as well as on a recent book on contemporary aesthetics (2022).¹⁰ In the latter, I had engaged the image work, ethical demands, and existential struggles of contemporary artists who find their inspiration in natural history, ornithology, and marine worlds. I now shift my attention to the audiovisual media practices of cetacean ethologists and communication scientists, as well as fishers’ video diaries of interactions with cetaceans. To these, I also juxtapose contemporary artists’ sonic and visual records of encounters with these decidedly intriguing marine mammals alas too often reduced to the pacified adjective “charismatic”. Concretely, I zoom in on three audiovisual media practices: the sound compositions of Ariel Guzik, an artist who designs and engineers instruments to communicate with whales and dolphins in the Sea of Cortez; the hydrophone recordings, spectrograms, drone footage, and photo-identifications by a team of cetacean ethologists and communication scientists who run a research vessel and a bioacoustics lab in Rome alongside the Tyrrhenian Sea; and the online platforms of fishers who produce video diaries of potentially fatal interactions with orcas in the Strait of Gibraltar. These carefully selected media practices are the fragments of actuality and micro-tonalities that compose the curated series I am calling *The Strait and The Sea*.

Dubbed ‘curatorial design’ (Elhaik, Marcus 2020), my research design turns on an assemblage of *ethoi* or manners of being in the world that both corresponds and exceeds the terms “scientist”, “fisher”, “artist”, and “cetacean”. None of these forms and ways of

¹⁰ I am indebted to Paul Rabinow and Anthony Stavrianakis’ philosophical-anthropological style of practice and “designs on the contemporary”. In lieu of thinking in terms of “method” which often results in a moralist economy of “self-justification”, Rabinow and Stavrianakis follow a Deweyan understanding of inquiry whereby the inquirer moves “adjacently” to situations of conceptual and experiential breakdown. In both my previous and current work, I have sought to both observe and participate to situations in which the practices and spaces of curation are undergoing such conceptual breakdowns. To this end, I have concretely situated myself alongside fieldwork situations and conversations that beg for new conceptualization of curatorial practice. Moreover, these situations draw our attention on other forms and ways of being human. Such is the mode of conduct and form of truth-seeking of the “anthropologist as curator” (Elhaik 2016; 2020). Here, I have therefore extended my previous inquiries on curation to include the practices of cetacean scientists, bio-acousticians, fishers, and artists who are sound designers. Concretely, I am testing and searching for emerging forms and modes of curation in an ecology of marine environments, venues, and sites, including marine ecology laboratories, artists’ studios, annual congresses for the study of cetaceans, fisheries institutes, research boats, as well as by involving my fieldwork interlocutors in the various series and activities I curate at the laboratory I run in UC Davis, including co-teaching workshops with them.

life is ethically primed over the other and neither is a representative of a given ethos, *Bildung*, character, and culture. However, the order “cetacean”, species individual “*Tursiops Truncatus* tag number 345”, and vernacular “ese viejo cachalote” are here consistently mediated by the domain of human practices we call audiovisual media (artistic, scientific, amateur). The motion of the inquiry takes place across a *trptych* of sites and venues that together forms a transversal *mise-en-scène*: the Strait of Gibraltar, the Tyrrhenian Sea, and the Sea of Cortez. This transversality enables me to avoid the pitfall of hypostatization which would unduly stabilize the case studies under examination. In doing so, I steer clear from national-culturalist¹¹ ways of mapping vocations and practices, as well as from symptomatic diagnoses that would read into cetacean-human relations catastrophic harbingers of extinction or the sublime dawn of post-human worlds. Attentive to these marine environments’ politico-ecological dynamics and to technologies currently being tested in marine mammal ethology, communication science, and fisheries management, I am beginning to discern the contours of an aesthetics of existence animated by a hetero-ethological imagination. By relying on the tools of bioacoustics, music composition and theory, as well as those of media studies and media anthropology, this research also aims to draw the reader’s attention to the inter-media worlds of those who experience and inquire into cetacean-human interactions.

During the past two years I have been in conversation with and learning about marine mammals at the Marine Ecology Lab of the Environmental Biology department at the Sapienza University of Rome, as well as from the National Institute of Fisheries in Tangiers.¹² The marine ethologists and cetacean experts I’m observing and sailing with in the Tyrrhenian Sea are exploring bottlenose dolphins’ sonic repertoire and acoustic behaviour to understand how they communicate amongst themselves and with other marine life forms, as well as how they interact with and respond to human activities. They also try to understand whether cetaceans’ forms of sentience, behaviour, and attitudes – their *ethoi* – may or may not relate to the affective lives of humans. Daniela Silvia Pace and Giulia Pedrazzi, in particular, have been examining “epimeletic” behaviours – what we designate as grieving, empathy, altruism – among

11 However, references to media practices taking place in multiple sites and locations (eg. Belyounech, Ksar Sghir, Fiumicino, Tiber river Estuary, laboratories, institutes, research vessel) will be specified.

12 For my Podcast with Dr. Mohamed Malouli see Alboran Sea. For a conversation with Dr. Pace and Giulia Pedrazzi on the venues and media environments of cetacean research see *Cetaceans: All Over the Place*. Further collaborations can be found in the lab’s series *The Strait and the Sea*.

the very iconic species of dolphins studied by the notorious neuroscientist John Lilly (1961) in the 1960s and 70s, namely *Tursiops Truncatus*, but with completely different objectives (Pace, Pedrazzi, Giacomini 2022).

Pace and Pedrazzi's audiovisual practices and data mappings are based on a use of various instruments and technologies (drones, photographic cameras, hydrophones) the aim of which is *both* to "confer authority" to their observations *and* maintain an "ambiguity in the word instrument" (Van Helden, Hankins 1994, 4-5). On the one hand, sensor-based hydrophones register analog sound signals that are then digitally converted into visual spectrograms. These are afterwards juxtaposed to other visual footage sources - photo-documentation of dorsal fins and drone footage tracking the movement of individuals carefully catalogued in data bases - to provide a visual map and preliminary assessment of the behaviours of "resident" or "transient" dolphins near the mouth of the Tiber River. The aim of this sonic and visual data is to ultimately contribute research findings that could advance conservation policy in the central part of the entity known as The Pelagos Sanctuary for Mediterranean Marine Mammals, a large marine area placed under a trans-national juridical arrangement (Italy, France, Monaco). On the other hand, these scientific instruments fall short of expressing the poetic imagination of these marine scientists who, like Albert Dürer at the dawn of modernity, have been interacting with and reading about these creatures since childhood. In other words, their invisible cities and taxonomic imagination renders tenuous the rigid art-science division of creative labour. While looking together at blueish spectrograms of a "mysterious" sequence of "gulps", "grunts", and "squeaks" belonging to a group of vocalizations called "bray-calls" recorded in both the Tiber estuary on the Tyrrhenian Sea and Mazara del Vallo on the Strait of Sicily, I could not help but notice Dr. Pace's awe for bottlenose dolphins and their acoustic repertoire. Of sperm whales, whom she "fell in love with long ago", Pace often reminds me they are "very special animals".

I also have in mind here Pace's images from her inspiring lecture at AIL, the Anthropology Image Lab I direct at UC Davis. One of the slides in her presentation drew our attention to the polychromatic acoustic maps and graphic scores from the hit album *Songs of Humpback Whales*, famously featured on the cover of the celebrated 1971 issue of the journal *Science*. Sounds graphically shown on these scores and heard on the album comprise acoustic fragments recorded by hydrophones and other bioacoustic instruments belonging to the Marine Mammal Program of the US Office of Naval Research. These unsettling scores are not only reminders that humans often tend to anthropologize cetaceans as musical animals. They also function as acoustic data maps that complicate the relationship between

notational and non-notational understandings of sound composition,¹³ a relationship often used to distinguish classical music from electronic music, Voltage Controlled Oscillator (VCO) sound synthesis, and the field recordings of ethologists and eco-acousticians. Pace's slide was taking us in a realm between musicology and bioacoustics. Indeed, it was becoming clear that early cetacean scientists who attempted to transcribe the songs of humpback whales did not rely on the solfeggio notes of the five-line staff notation. Instead, they used a form of graphic representation related to the medieval notation systems used in both so-called Western and Eastern music, a system of inflective marks known as *neumas* that indicated the general contours rather than the precise pitches, notes, and rhythms to be vocalized. If "infographic studies of whales songs" (Deal, Rothenberg 2014) consider cetaceans to be musical animals, I mused half-seriously, then these marine creatures have affinities with both Gregorian chants that used neumatic notation to guide singers with their vocal levels and electronic composers who compose with spectrograms and by means of modulated waveforms. At the very least, and beyond any facile analogy, the graphic scores shown on Pace's slide are an occasion to explore the ambiguity and challenge posed to classical music by electronic composition or bioacoustic mappings.

Dr. Pace is also a consultant and contributor to the marine mammal section of the *Atlante degli Habitat dei Fondali Marini del Lazio*, the atlas that maps the habitats, ecosystems, and ocean dynamics of the marine seafloor of the Lazio region alongside the coast of Rome. In that invaluable resource, one can learn a great deal about the marine environments from the "symbolic form"¹⁴ of perspectival thinking. To simply dismiss, as it is customary these days, these maps, diagrams, and graphs on grounds that they are mere variations of Mercatorian cartographic techniques and as visual representations of spatial relations framed in Euclidian terms would be to miss out on Korzybski's complex lessons discussed in the prelude. The creative work and scientific imagination that sustains Pace and her team's engagement with a certain kind of phenomena, such as dolphins' signature whistles, is decoupled from the certainties assumed to be guaranteed through direct observation. On more than one occasion while on the research vessel, I recall instances of sensorial mismatch: I could see a graphic representation on the spectrogram all the while being unable to hear the high frequency vocalizations

13 Contemporary composer and music theorist Richard Beaudoin uses spectrograms to study the non-notational elements heard during live performances but downplayed by record producers of iconic musical performances. For more, see his fascinating work on the sounds of the "creaking chair" (2021) during pianist Glenn Gould's performances.

14 See Panovsky's (1997) classic *Perspective as Symbolic Form*.

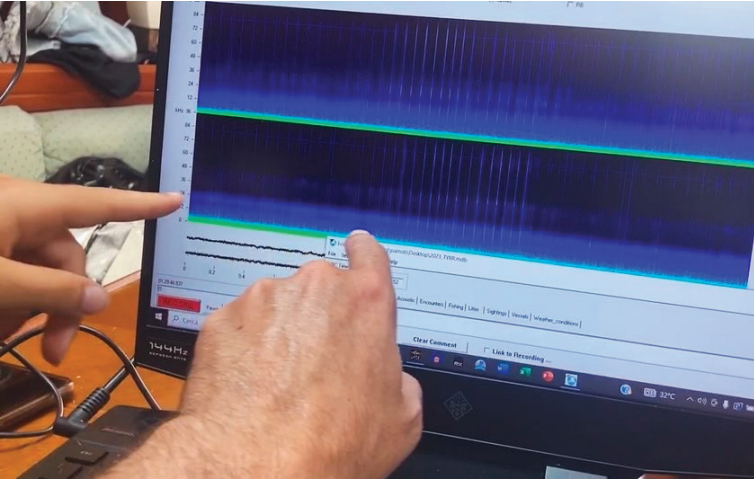


Figure 2 The anthropologist and bio-acoustician discussing the multiplicity of marine sound signals and their graphic representations on a spectrogram aboard the research vessel sailing near the Tiber estuary in the Tyrrhenian Sea. © Author

on the headphones. Conversely, I remember vividly situations where no graphic cue was visible on the spectrogram while I could hear a cacophony of sounds of unclear multiple provenances (eg. snapping shrimps). By means of the combined technologies of hydrophones and headphones, these underwater marine sound signals arrive to our ears in intermittent waves of shapeless hallucinations the timbre of which is uncapturable by spectrograms. When hearing and listening to them we enter complex “soundstates”¹⁵ that beg for other

15 Stephen Helmreich (2010) refers to media philosopher F. Kittler on the “psychedelic” nature of headphone listening. Helmreich conducts fieldwork in underwater environments and proposes the term “soundstate” as an alternative to “soundscape”. The latter is the term most of my interlocutors (who are also divers) mobilize to talk about the acoustic dynamics of marine environments, often by following naturalist and soundscape ecologist Bernie Krause’s tripartite understanding of acoustic environments: anthropophony (sounds produced by human activities, including sound pollution), geophony (wind, earthquakes, and so on), and biophony (sounds generated by non-human life-forms). Indirectly, the notion of soundstate resonates with my reconfiguration of curatorial practice into “states of curation” (2016). Ultimately, as Helmreich remarks in an argument with Tim Ingold, this is more than a question of being for or against “soundscapes”, of being experientially immersed versus being detached contemplators, a debate ultimately too concerned with dualisms such as visual vs. sound media, immersive phenomenology of perception with artisanal tools vs. transductive phenomenology with scientific instruments, or indeed tiring debates about sensoriality vs. cognition. It is a matter “of listening to, listening for, listening through, listening-in, listening out, listening over and listening with. I would add to this listening against: a style

conceptualizations of curation.

Moreover, human scientists should not be expected to engage a marine scientist's sound catalogues and maps by asking them to relate to the worlds they traverse and imagine as if they were Calvinos, Borgeses, and so on. Yet, Pace and her team of cetacean scientists have long both welcomed uncertainty and abandoned the drive to exactitude uninformed commentators imputes to them. They have not given up on the infinite, as Deleuze and Guattari (1996) too hastily suggest scientists have. Indeed, uninformed commentators often tend to overlook the complex status of (un)certainty in the visual representations of maps and mapmaking processes of scientists. Instead, I find the attitude, indeed the ethos, of my fieldwork "epistemic partners" (Holmes, Marcus 2005) quite modest insofar that they welcome inexactitude in their statistical interpretations of spectrograms and the software that underwrites them. To be sure, for them as for the media anthropologist with a curatorial sensibility, the specter of positivism looms large. But, it is often unclear what form that specter takes when it takes possession of the thinking and making of the underwater geophysicists, cetacean scientists, seismologist, ethologist, and marine ecologists who too shuttle back and forth to grapple with their own vertiginous transits between map and territory. To put it differently, these epistemic partners handle these maps by introducing a certain uncertainty principle via a subtle and nuanced articulation and modulation of the relation between "globe, world, and planet" (Giardini 2013).

Another kind of cartographic poetics is taking place on the fisher end of the curatorial design, a poetics prefigured in the tradition of documentary cinema about fishers, of which John Grierson's *Drifters* (1929) on the precarious herring industry in the Northern Sea

of anthropology of sound, of transductive ethnography, of theorizing against immersion, of hearing inside, outside and - ultimately - beyond the notion of the soundscape" (Helmreich 2010, 10). In my own words, it is not only still a question of curating human practices and ways of life between experience and science, but also a matter of composition that requires from the anthropologist-as-curator to tune into and broadcast the complex harmonics and microtonalities of our curatorial designs. The task at hand is to cultivate the art of curating the lives of those (fishers, scientists, artists, bioacousticians, composers, and so on) who somehow have thrown or found themselves in marine media environments, assemblages, and mise-en-scène, including the anthropologist who too have found himself there in different ways and for different reasons. The aim is therefore to re-curate the technologically mediated soundstates we experience when we follow and move with/alongside our interlocutors. This re-curation must also not only rethink our habitual ways of questioning technology. It ought to also take seriously into account the status of signals rather than signs in the linguistic or semiological sense of the term. Signals cannot be accommodated by a new semiotics, dualist or triadic. On this point, see the illuminating work of musicologist Gary Tomlison (2023) who shifts our attention from meaning-generating signs to "countless organisms that generate awe-inspiring behavioural intricacies without meaning".



Figures 3-4 Drawings of Timpano Marino used and sounded in different situations. Courtesy of Ariel Guzik

remains the undisputed precursor. For a number of reasons (sound pollution, overfishing practices), orcas on both the Spanish and Moroccan sides of the Strait of Gibraltar have been disturbing the practices of fishers, at times ‘attacking’ their boats, even sinking them, and therefore endangering their lives. In response, fishers sometimes retaliate in ways that have been deemed “cruel” and even criminal by activists and citizen science groups. On a video documenting a nearly fatal interaction, we see and hear a terrified Bilal Arhoun, a popular fisher and active internaut, shouting: “Oh Allah, I implore your protection from these mother fuckers”. Scientists and citizen science groups eschew the word “attack” preferring instead “interaction”. The video diary was later edited by Bilal, posted on his platform with geographical indications, and liked by 17,000 subscribers. It circulated virally on Youtube¹⁶ and other social media platforms, including that of the citizen science group Okeanos. In a way, these

¹⁶ See the complete video on Youtube: <https://www.youtube.com/watch?v=cMQxmzguudo&t=4s>.

fishers' video diaries of tense interactions with orcas and bottlenose dolphins – as well as bewildering sightings of large basking sharks near the shores – have become both signals and visible evidence of a disorganized ecology.

From an ethological perspective, various behavioural hypotheses have been advanced, including play or hunting attitudes transmitted by female adults to young practicing orcas, or learning process requiring the rehearsal of aggressive techniques on moving targets that will ultimately be put into action when “depredating” fisher’s bluefin tuna catch. As recently noted, “orcas who call the Strait of Gibraltar home feed off endangered bluefin tuna, following their migration patterns and even interacting with drop-line fisheries to find food. Like Chinook salmon, bluefin tuna is of high commercial value to fisheries. Despite how iconic these massive mammals are, orcas are difficult to study in the wild. They are classified as ‘Data Deficient’ by the IUCN, meaning that there isn’t enough information on population or distribution to make an accurate assessment of their conservation status. *The only exception is in the case of a small sub-population of orcas living in the Strait of Gibraltar; they are listed as ‘Critically Endangered’*” (Gallagher 2022; emphasis added). Other scientists (perhaps less cautious, certainly less cautious than my interlocutors) suggest that Strait orcas have been cultivating an ethos of “revenge”, a collective call for revolt against humans that gradually “spread” among this small ecotype and community of 40. This unusual attitude towards humans was allegedly “transmitted by a female orca named Gladis Blanca after a traumatic event” (Monica Gonzales, CEMMA spokesperson),¹⁷ most likely either an injurious collision with a commercial ship or a fatal collision of her calf with a cargo ship in this transit zone characterized by relentless maritime traffic¹⁸ and sound pollution.

From a fisheries perspective, these episodes have practical implications on binational coastal economies and communities, fishers and other citizens alike. They also prompt transnational collaborations about the use of technologies to prevent these interactions from occurring, as well as discussions about more durable mitigating tools like Marine Protected Areas (MPAs). Mohammed Malouli (2020), an MPA expert, director of the Institute of National Fisheries Research

17 Interviewed by *The Washington Post* on YouTube (21 August 2023) to give the perspective of the Galicia based organization Coordinadora para o Estudo dos Mamíferos Mariños (CEMMA).

18 These kind of incidents in the Strait of Gibraltar are not new and have taken different forms in the past. During World War I, a Brazilian Navy cruiser called the Bahia, on a patrol mission in the Strait, mistook a pod of porpoises for German submarine, firing at and killing them. This incident became known as “The Battle of the Porpoises”. For more, see Alvarez 2023.

in Tangiers, and a key interlocutor for my inquiry, has been at the forefront of these debates. Similar interactions with sail boats have also been digitally mapped by experts and reported and discussed on social media, extending this argument beyond fisheries and halieutic concerns. From an existential perspective, a perspective I find lacking in these discussions, one can read the fisher's video diary as a multimedia event that converts a historical technology of mechanical reproduction - a camera - and a new media platform - a Youtube channel - into a venue for the remediation of limit-experiences the ancients called "meditations on death" or "spiritual exercises" (Hadot 2022): a kind of fear and trembling that tests the "anthropo-cosmic relation" (Bachelard 1964, 4).

These contemporary accounts are new media adaptations of a long line of cartographic and narrative accounts (mythological, naturalistic, and scientific) of interactions between cetaceans and humans. These include texts and fragments of manuscripts from various traditions. Suffice to mention Aristotle's *History of Animals* and *Parts of Animals*, with its designation and naming of the genus Cetacea, a 'kind' of leg-less aquatic mammal distinct from both terrestrial mammals and fishes; Oppian's description of dolphins and orcas in his *Halieutica*, alongside praiseful pages on the *techne*, skills, and art of fishermen when these are concerned with 'beluae'; Pliny the Elder's tales of friendly interactions between musically endowed dolphins, swimmers, navigators, and fishers; and Al-Qazwini's section on oceans in his classic book of world marvels and wonders with its beautiful illustrations and colourful representations of dolphins as smiling half-human and half-fish hybrids. Indeed, the plural naming practices surrounding these marine creatures, invariably marked as fish or mammals, provides us with a heterogeneity of attitudes, or *ethoi*, towards marine environments. It also provides us with tools and resources for critically "re-curating *anthropos*" (Elhaik 2016) in the border zone between taxonomic and mythological imaginations.

In the Sea of Cortez, I've been following and in conversation with artist Ariel Guzik's two-decade long "Proyecto de Comunicación con Cetáceos". Guzik's long-term dedication to communicating with cetaceans brings to the table something different. His concerns are neither scientific nor halieutic nor ethological. What animates his inquiry is strictly "spiritual". He is also inspired by science-fiction. Guzik views cetaceans as a "civilization". With a group of collaborators, he has undertaken several expeditions to contact grey whales, sperm whales, and bottlenose dolphins off the coast of Baja California. In 2007, Guzik completed the construction of an underwater capsule, Nereida, a musical instrument to interact with cetaceans. He distinguishes his work from scientific inquiry and is recalcitrant to generate useful data maps for practical applications. He is only animated by the 'intuition' that "co-existence is in itself a form of

communication”.¹⁹ The founder of the Nature Expression and Resonance Research Laboratory, Guzik is also clear about the *techne* of his making process. Even if he uses hydrophones, they are assigned a marginal role. The Nereid capsule, named after the Greek mythological sea nymph, is “a different kind of instrument”. It is “not” composed of “sensors”. It uses the acoustic and electromagnetic properties of its fused quartz crystal membranes, especially the properties of “harmonic resonance”²⁰ and “optical conductivity”.

His current project consists in the design of a “helmless” vessel named Narcissa, to which he would attach the musical instrument Timpano Marino [figs 1, 3-4], an underwater drum as intriguing as the above-mentioned Nereida. One of Narcissa’s features is that it is “designed to drift”. Although often collaborating with scientists – and although writing unsettling scores combining cetacean calligraphy with complex electric circuitry – Guzik takes another approach: cetaceans invite us in a space and mode of interaction as singular “ancestors who have migrated back to oceans” (conversation with the artist). His cetacean alphabet remixes the tools of classical anthropology, classical physics, and those of science fiction. The tropes of “encounter” and “contact zone” are key to his endeavour. Interestingly, his engagement with cetaceans overlaps with the current orientation among ethologists who attribute “culture”²¹ to them. During encounters, cetaceans and humans “glance at each other” in the language of reverberation and resonance. Through instruments “understood in musical terms”, dolphin and sperm whale echolocations “cross path” with the resonating capacities of the Timpano Marino, an instrument serving as a medium through which the artist sends a musical offering to these migratory inhabitants of the seas. The Timpano Marino emits sounds that might or might not be received, and if they are answered, they cannot be identified or anticipated as coordinates on spectrograms or on oceanographic and navigation maps. Encounters are furtive and feel like caresses, whispers, and glances. In his hetero-ethological imagination, *logos* is kept to a bare minimum, but never shut off given his deep knowledge of physics and electronics. Yet, Guzik de-instrumentalizes sound recording devices

19 Conversation between Ariel Guzik and Benjamín Mayer Foulkes at the Instituto de Estudios Críticos 17 in Mexico City. The dialogue took place in June 2015 on the occasion of the institute’s awarding a Doctorado Honoris Causa to Guzik at the Biblioteca Vasconcelos in Mexico City.

20 The reader can listen to Guzik’s sound compositions on the online audio distribution platform Bandcamp: <https://arielguzik.bandcamp.com>.

21 While I am not sure how Guzik (and ethologists) would respond to the “post-ethnos” orientation of contemporary anthropologists and its call to think “beyond culture”, cetacean communities for him are no less differentiated. They are composed of a multiplicity of *ethoi* (i.e. hetero-*ethoi*).

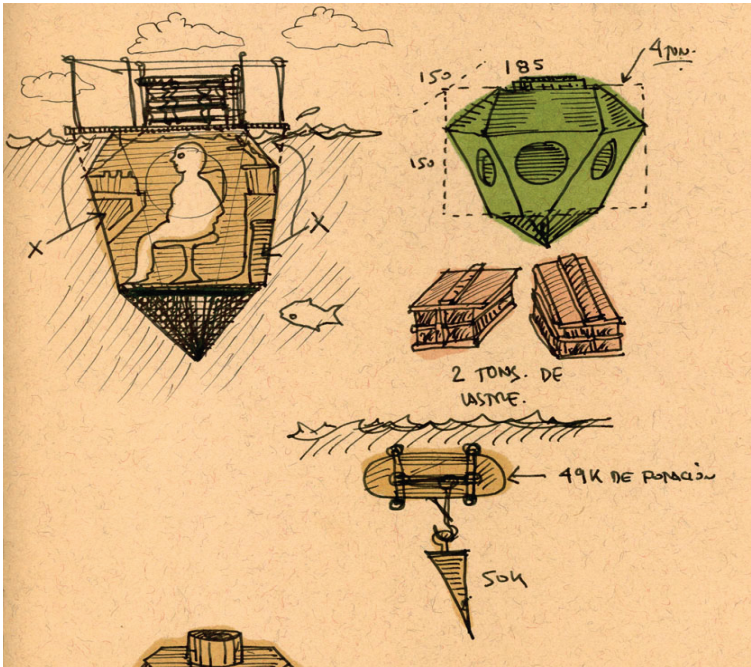


Figure 5 One of the many drawings and versions of the Nave Narcissa. Courtesy of Ariel Guzik

such as hydrophones and takes away their authority while redeeming their enigmatic, if not hermetic capacities. Attuned to the question concerning technology and poetically situated beyond “technophobia and technophilia”,²² Guzik’s practice proposes another kind of cetacean-human co-flourishing. By taking us on the Nave Narcissa [fig. 5] to a cosmic city yet to be accommodated by our maps, his practice is inviting us to repair, remediate, and perhaps even to recreate the anthropo-cosmic relation that has been severed by the still largely dominant instrumental ethos of both scientific practice and fisheries management policy.

3 Stretto Fuga

Artists, inventors, and composers like Guzik are taking a first step, as are multi-media fishers, and imaginative cetacean ethologists who together are recalcitrant to both scientific uses of technology and

²² Cinema and digital media scholar Kriss Ravetto’s expression.

science-phobic formulations of artistic creation. To curate this kind of enigmatic flourishing, to flourish tout court, is to accept that we live, today, in a conceptual and experiential intermediary zone located between biocentric and anthropocentric views of the *vivants*. As ethologist Bernie Würsig remarked in his keynote address at the 34th Annual Conference of European Cetacean Research:

All of nature is special, as in the concepts of biophilia and ‘natural goodness’. This is the biocentric view, not at odds with the anthropocentric view of conserving nature for the good of humanity, if we reject the dualist notion that humanity is a separate entity from nature. As we blend the two, we realize that to truly do good for nature does good for humans also, and the better stewards of water environments we become (we are not there yet), the better chances marine mammals have to thrive. (Marine Mammals, Humans, and Nature, April 2023)

The *anthropological problem of the hetero-ethological imagination* begins with, yet reconfigures the philosophical ethos of a “critical ontology of ourselves” (Foucault 1984, 45). While I remain committed to my previous endeavours to *curate anthropos* (Elhaik 2016) – to curate “the being that suffers from an excess of hetero-logoi and perhaps of hetero-ethoi” (Rabinow 2003, 6) – I nonetheless expand the conceptual cursor of “ethos” to include the manners of being of cetaceans. The aim of this curatorial design is two-fold: to juxtapose audiovisual media practices that together form an unstable arrangement without a centre of gravity, *and* to test whether we can transform this excess and suffering into co-flourishing: cetacean and human flourishing. This type of imagination therefore demands from us to reconceptualize new forms of curation that challenge exhibition designs at work in art, ethnographic, and science museums and to think beyond “the exhibition complex of the visual arts” (Smith 2021, 12). In order to eschew naïve therapeutics, curation must still be taken up in pharmacological terms: at once poison and antidote. It therefore begins with the understanding that curation has its etymological sources in a series of ethical, clinical, and spiritual terms – care, well-being, cure, curare, curé, incurable – that turn on the question of flourishing in *both* its eudaemonic²³ and non-eudaemonic senses. The first sense takes flourishing as a *telos*, an end reached through means, while the second invites us to drift in the manner Ariel Guzik imagines his helmless marine inventions to harmonically resonate with cetaceans.

23 “neltiliztli” (Nahuatl), “*al-sa’ada*” or ‘izdihar’ (Arabic), “*haslahah*” (Hebrew), and “*felicitas*” and “*beatitudo*” (Latin).

The re-compositions and hetero-ethological imagination at work in the audiovisual practices of fishers, artists, and scientists I have shared in this essay demands other curatorial designs and curatorial designers. Perhaps, we need to train a sci-fi inspired and spiritually oriented generation of Curators of the Sea who would reanimate and reconfigure, from the future, the conceptual personae of the ancient *Curator Aquarum*. In Ancient Rome, the Curator Aquarum was a public figure responsible for the care of water works and flows from aqueducts to the city. The Curator did not have any technical knowledge and relied instead on an assemblage of human practices: hydraulicians, engineers, artisans, and so on, to make sure that flourishing and livelihood was secured between the city, the river, and coastlines. It was a “distributed centred” (Mialet 2019) mode of curation, one that takes place in a space and mode of thought and practice in which the anthropological inquirer resonates with his interlocutors and the marine creatures they seek out and follow. To be concerned with the well-being and flourishing of coastal communities, the sea, its straits, and marine lives - including the flourishing of top predators like humans and orcas - is to embrace the task of creating venues that can host a triptych composed of artists and inventors like Guzik, marine scientists and bioacousticians like Daniela Silvia Pace, and multi-media fishers like Bilal Arhoun.

I have learned these provisional insights particularly from media practices taking place in, near or around straits, with their adjacent seas and oceans. They have the capacity to prompt new relationships between mathematics, music, and philosophy by remediating the ecology of ideas and materials that compose them. Straits, perhaps, harbour practices that, when juxtaposed with care and adequate curation, renders palpable the topological nature of the cosmic city dreamt by the Epicurians, the Cynics, the Avempacists, among others. A strait is above all a composite of marine, coastal, and landforms that cannot be grappled with without turning first to the etymological registers of the term (legal, aesthetic, oceanographic). Etymologically, in Latin, a strait “stems from ‘strata’ from the verb ‘strenere’, which means to pave or build a road, and from ‘strictus’ from the Latin verb ‘stringere’, which means to contract or to restrict. The Oxford dictionary defines a strait as a ‘narrow passage of water connecting two seas or two other large areas of water’” (Caminos, Cogliati-Bantz 2014, 112). And, finally, given the fact that the maps and territories we’ve traversed in this essay can only be composed and recomposed, a strait cannot be experienced properly without an engagement with its musical etymological register. A Stretto

Fuga.²⁴ The territories that circumscribe our curated mise-en-scène do indeed appear and are named on oceanographic and geopolitical maps: the strait of Gibraltar and the Alboran Sea, the Tyrrhenean sea and strait of Sicily, the Sea of Cortez or Gulf of California and the Pacific Ocean.

Together, these names form the contour of a triptych which demanded a fieldwork-specific curatorial and compositional thinking. You might perhaps recall Dziga Vertov and his *The Man with the Movie Camera* (1929) who created a futuristic cinematic city by montaging and synthesizing fragments of actuality filmed in four different cities. Montage is both sensible and insensible to Maps that are not Territories and Territories that are not Maps. It is both a “cinematic metaphor” (Marcus 1995) and a key practice for the media anthropologist as curator. The straits and seas composed here are cinematic in that they retain yet transform the actual straits and seas experienced by the inquirer at various intervals and instants during the inquiry. They are also musical insofar as the media practices of the bio-acousticians, fishers, and artist-engineer making up this curatorial design can be likened to the frequency knobs of a modular synthesizer or the multiple tracks on a digital audio workstation. If arranged contrapuntally and played sequentially, they sound like a radio documentary that unsettles and resonates with the worlds of both the inquirer and his interlocutors.

Bibliography

- Aleem, A. (1968). “Concepts of Marine Biology Among Arab Writers in the Middle Ages”. *Proceedings 1st Internatl. Congress on History of Oceanography. Bull. Inst. Océanographique Monaco*, 2, 359-67.
- Álvarez, J. (2023). “The Battle of the Porpoises, when a Brazilian Cruiser Fired on Animals Believing Them to Be a German U-boat”. *Magazine Cultural Independiente*, 27 December.
- Ardizzone, G.; Belluscio, A.; Criscoli, A. (2018). *Atlante degli Habitat dei Fondali Marini del Lazio*. Rome: Sapienza Università Editrice.
- Bachelard, G. (1940). *La Philosophie du Non: Essai d'une Philosophie du Nouvel Esprit Scientifique*, Paris: PUF.
- Bachelard, G. (1964). *The Poetic of Space*. New York: Penguin Classic.

24 The term ‘fuga’ refers generally to successive appearances of a certain subject in different voices. The term ‘stretto fuga’ refers, specifically, to a case where the appearance or appearances of subjects occurs immediately, while the first subject is still playing. The result is a type of counterpoint with a strict set of rules. However, there are sources that suggest that such technique was also taught and practiced in improvisation, making it really the bread and butter of musicians, performers, and composers alike” (Rotem, Schubert 2021).

- Bachelard, G. (2019). *Atomistic Intuitions: An Essay on Classification*. Transl. R.C. Smith. Albany: SUNY Press.
- Bartra, R. (2023). *El Mito del Hombre Lobo*. Barcelona: Anagrama.
- Bateson, G. (1972). *Steps To an Ecology of Mind*. Chicago: University of Chicago Press.
- Beaudoin, R. (2021). "Gould's Creaking Chair, Schoenberg's Metric Clarity". *Music Theory Online*, 27(1), March.
- Biagioli, M. (2009). "Post-Disciplinary Liaisons: Science Studies and the Humanities". *Critical Inquiry*, 35(4), 816-33.
- Born, G. (2010). "For a Relational Musicology: Music and Interdisciplinarity, Beyond the Practice Turn". *Journal of the Royal Musical Association*, 135(2), pp. 205-43.
- Caminos, H.; Cogliati-Bantz, V.P. (2014). *The Legal Regime of Straits*. Cambridge: Cambridge University Press.
- Colby, J.M. (2020). "Conscripting Leviathan". *Diplomatic History*, 44(3), 466-78.
- Deal, M; Rothenberg, D. (2014). "Whale Song Explained". *Medium*, October.
- Debussy, C. (2012). *Images: Iere Série*. Ed. by D. Woodfull-Harris. Kassel: Bärenreiter-Verlag.
- Deleuze, G.; Guattari, F. (1996). *What is Philosophy?*. New York: Columbia University Press.
- Derbyshire, D. (2018). "Sculptress of Sound: The Lost Works of Delia Derbyshire", *Radio 4 Archives*.
- Elhaik, T. (2016). *The Incurable-Image: Curating Post-Mexican Film and Media Arts*. Edinburgh: Edinburgh University Press.
- Elhaik, T. (2022). *Aesthetics and Anthropology: Cogitations*. New York; London: Routledge.
- Elhaik, T.; Marcus G. (2020). "Curatorial Designs: Act II". Sansi, R. (ed.), *The Anthropologist As Curator*. London: Routledge, 17-34.
- Foucault, M. (1984). "What is Enlightenment?". Rabinow, P. (ed.), *The Foucault Reader*. New York: Pantheon Books, 32-50.
- Gallagher, K. (2022). "Are Orcas Endangered? Conservation Status and Threats". <https://www.treehugger.com/are-orcas-endangered-5100851>.
- Giardini, F. (2013). "Cosmopolitiche. Ripensare la politica a partire dal kosmos". *B@BELONLINE.PRINT*, 13, 147-63.
- Gould, S.J. (1977). *Ever Since Darwin: Reflections on Natural History*. New York: W.W. Norton and Company.
- Goulet-Caze, M.O. (2017.) *Le cynisme, une philosophie antique*. Paris:Vrin.
- Grosz, E. (2011). *Becoming Undone: Darwinian Reflections on Life, Politics, and Art*. Durham: Duke University Press.
- Guzik, A. (2019). "Caligrafía cetácea". *Revista de la Universidad de Mexico, Dossier on Languages*, July 2019. <https://www.revistadelauniversidad.mx>.
- Hadot, P. (1995). *Qu'est ce que la Philosophie Antique?*. Paris: Gallimard.
- Hadot, P. (2022). *Exercices spirituels et philosophie antique*. Paris: Albin Michel.
- Helmreich, S. (2010). "Listening Against Soundscapes". *Anthropology News*, 10, 10.
- Hoare, P. (2021). *Albert and the Whale: Albrecht Dürer and How Art Imagines Our World*. New York: Pegasus Books.
- Holmes, D.R.; Marcus, G.E. (2005). "Cultures of Expertise and the Management of Globalization: Toward the Re-Functioning of Ethnography". Ong, A.;

- Collier, S. (eds), *Global Assemblages: Technology, Politics, and Ethics as Anthropological Problems*. Malden: Blackwell Publishing, 235-52.
- Kant, I. (1991). "The Idea of History with a Cosmopolitan Intent". Reiss, H.S. (ed.), *Political Writings*. Cambridge: Cambridge University Press, 61-104.
- Korzybski, A. (1998). *Une Carte N'est Pas le Territoire: Prolegomena aux systèmes non-aristotélien et à la Sémantique Générale*. Paris: Edition de L'Éclat.
- Lévi-Strauss, C. (1955). *Tristes Tropiques*. Paris: Plon.
- Lilly, J.C (1961). *Man and Dolphin*. New York: Doubleday Publishers.
- Malouli, M. et al. (eds) (2020). *Alboran Sea: Ecosystems and Marine Resources*. New York: Springer Publishers.
- Marcus, G.E. (1995). "The Modernist Sensibility in Recent Ethnographic Writing and the Cinematic Metaphor of Montage". Devereaux, L.; Hillman, R. (eds), *Fields of Vision: Essays in Film Studies, Visual Anthropology and Photography*. Berkeley: University of California Press, 35-55:
- McDonald, H. (2020). *Vespers Flight*. New York: Grove Press.
- Mialet, H. (2019). "The Distributed Centred Subject". Bennett, J. (ed.), *Thinking in The World*. London: Bloomsbury, 131-49.
- Pace, D.S; Pedrazzi, G.; Giacomini, G. (2022). "First Report of Epimeletic and Acoustic Behaviour in Mediterranean Common Bottlenose Dolphins (*Tursiops truncatus*) Carrying Dead Calves". *Biology*, 11(2), 337.
- Pace, D. et al. (2022). "Bray-Call Sequences in the Mediterranean Common Bottlenose Dolphin Acoustic Repertoire". *Biology*, 11(3), 367.
- Panofsky, E. (1997). *Perspective as Symbolic Form*. New York: Zone Books
- Rabinow, P. (2018). *Unconsolable Contemporary: Observing Gerhard Richter*. Durham: Duke University Press.
- Rabinow, P.; Stavrianakis, A. (2014). *Designs on the Contemporary: Anthropological Tests*, Chicago: University of Chicago Press.
- Rabinow, P. (2003). *Anthropos Today: Reflections on Modern Equipment*. Princeton: Princeton University Press.
- Rotem, E.; Schubert, P. (2021). "Stretto Fuga: How to make a masterpiece out of two intervals". *Earlymusicources.com*, May 2021.
- Smith, T. (2021). *Curating the Complex & The Open Strike*. London: Sternberg Press.
- Tomlinson, G. (2023). *Machines of Evolution and the Scope of Meaning*. New York: Zone Books.
- Van Helden, A.; Hankins, T. (1994). "Introduction. Instruments in the History of Science". *Osiris*, 9, 4-5.
- Vauclair, S. (2013). *La Nouvelle Musique des Sphères*. Paris: Édition Odile Jacob.
- Würsig, B. (2023). "Marine Mammals, Humans, and Nature". *Keynote at the 34th Annual Conference of the European Cetacean Society, Galicia, Spain*.