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Marine sense. The Sea beyond Explicit Knowledge

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Abstract
I explore what is known as "marine sense" to highlight the specificity of tacit understandings of the environment in which intuition is pivotal to practical action. I argue that the concept of "marine sense" affords a finer and more nuanced understanding of the ways in which populations interact with marine environments and posit that the fishers' knowledge is operative because it is coupled with other skills that make it suitable for action and for adopting effective behaviors. Thus "marine sense" and "knowledge" become two distinct forms (or modalities) of understanding the marine environment. I outline what research on "marine sense" could constitute in relation to recent advances on the interactions between humans and oceans in the context of my ethnographic fieldwork among the Wayuu of Manaure (Colombia). I specifically highlight frames of reference that inform how freediving underwater fishers organize their (dialogical) relationship to the sea through perceptions and sensations that are on a general level central to an intuitive understanding of observable events.

Keywords Marine Sense · Oceans · Fishing · Freediving · Navigating · Perceptions · Intuition · Senses · Knowledge · Wayuu · Manaure · Colombia

Introduction

Ocean dynamics are central to the current emergencies disrupting Earth's climate on a global scale. As the effects of the Anthropocene are now visible (e.g., rising sea levels, deteriorating coral), we become aware that the seas will shape our future (Deloughrey, 2017) and of the mutually constitutive relationships that bind us to marine spaces. The importance of refining our understanding of these spaces was confirmed by the launch of the "ocean decade" in 2021 (oceandecade.org), to focus the scientific community's efforts towards developing and achieving sustainability goals for the future of ocean environments.

Through the narratives they generate, oceans also bear witness to the prisms through which we approach them (Hannigan, 2016, 2017; Crockford, 2020). Both on the international political stage and in Fisheries Science (FS), the challenges are defined primarily in terms of their technical aspects: control, regulation, performance evaluation, and effects. The management of fisheries' practices is commonly discussed in terms of resource management, monitoring, conservation, species mapping, and regulation reflecting a naturalistic framing of the Anthropocene (Stengers, 2003; Latour, 2015; Descola, 2020) that posits environmental challenges first and foremost concerns for the natural sciences and engineering (Pálsson et al. 2013; Ingold and Pálsson, 2013).

Yet scholars of the social sciences and humanities (SSH) have long highlighted the need to articulate governance strategies with local knowledge (e.g., Johannes et al., 2000; Neis and Felt, 2000; Berkes, 2003; Johannes and Neis, 2007; Silvano et al., 2009; Gasalla and Diegues, 2011; Arbo et al., 2018). It is now widely accepted that one of the greatest challenges for the management of oceans is to implement comprehensive solutions grounded in the integration of FEK (Fishers' Ecological Knowledge) into the body of knowledge of FS (Hind, 2015). Such integration has been guided by an often explicit distinction between the intimate, familiar nature of knowledge acquired through experience (FEK), on the one hand, and the distanced objective knowledge that prevails in FS on the other.

Yet, even if it is supposed to be acquired through experience and familiarity, the concept of "knowledge" commonly

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refers to what we could call "Constituted Knowledge" (CK), i.e., a cumulative set of information with the potential to contribute to a pre-existing body of data on ecosystems and organisms (e.g., behavior, distribution, symbiosis, migratory movements), a corpus that can be stabilized and standardized, inventoried and indexed. These 'explicit dimensions' of knowledge – that can be transmitted in a propositional form – are often a center of gravity in the analysis.

However, skill in fishing practices does not rely only on this kind of knowledge (e.g., Curtis Maillet et al., 2017). It also requires a specific engagement with the environment and its variations (e.g., Pálsson, 1994). As Sillitoe observes: "[t]he propositional approach to knowledge may be unable to represent some aspects of tacit awareness …" (2017, p. 2080), which is why I propose contrasting "CK" with the concept of "marine sense." In exploring the latter, I highlight the specificity of tacit understandings of the milieu, in which intuition[1] is pivotal to practical action. These two forms of knowing work together in organizing the experience of dwelling and acting with the sea.

I argue the analytical distinction between "CK" and "marine sense" has heuristic virtues. It allows development of a discerning attitude towards the cardinal concept of "knowledge"[2], while encouraging consideration of the properties of the milieu and their active influence on the practices and decision-making. It also affords a finer and more nuanced understanding of the ways in which populations interact with marine environments. I posit that the knowledge ("CK") and know-how of local fishermen are operative not because they are anchored, incorporated, and situated – as is often argued in the literature on fishing practices – but because they are coupled with skills of another kind, and these skills make them suitable for action and for adopting effective behaviors. In this respect, "marine sense" and "constituted knowledge" appear as two distinct forms (or modalities) of understanding that cannot be considered antinomic, and the articulation of which ought to be investigated in any ethnographic context (whether "Modern" or not).

I first outline what research on the "marine sense" could constitute in relation to recent advances on the interactions between humans and oceans. I then provide illustrations from my ethnographic fieldwork: since 2006 I have conducted research with fishers and underwater hunter

Fig. 1 Map of the Guajira peninsula, Colombia. (source: Simon, 2020, p. 9)

[1] I use "intuition" to refer to immediate knowledge, which partly escapes consciousness and perception.

[2] Although on the basis of contrasted criteria, the discernment between various ways of knowing has been encouraged by different disciplines, including the cognitive subfield of anthropology (e.g., Bloch, 1998; Ruddle, 2000; Harris, 2007; Adell, 2011).

communities among the Wayuu of Manaure (Colombia; Fig. 1). I more specifically highlight certain frames of reference that inform the way freedivers organize their relationship to the sea. These points of reference position the body as a seat of perceptions and sensations which, on a general level, are central to an intuitive understanding of observable events.

Theoretical Framework

The Distinctiveness of Fluid Environments

The last few decades have seen a proliferation of scholarship seeking to shift our "modernist" epistemologies (Strathern, 1988) away from their ethno- and human-centric perspectives. Much research has endeavored to highlight the complexity of the modes of cohabitation and entanglement among life forms (e.g., Latour, 1991; Haraway, 2008; Ingold, 2011; Tsing, 2015). These advances show that human-environment interactions cannot be grasped without accounting for the ways in which environments affect their inhabitants, human or otherwise (Brunois Pasina, 2007). The concepts of "engagement" (Sabinot & Lescureux, 2019) and "dwelling" (Ingold, 2000), for example, support this approach. But while many studies have contributed to this epistemological renewal, they have long remained essentially "terrestrial"[3].

While research on aquatic environments builds on this post-humanist aspiration, it introduces the project of "de-terrestrializing" our understandings of ecosystems. These works are particularly informed by the observation that water – especially seawater – has long been understood solely in terms of its position within social networks, or as a simple medium for meanings and metaphors (Mack, 2011). Rather than positing water as an "object of social and cultural production", research on aquatic environments approach it as "a generative and agentive co-constituent of relationships and meanings in society" (Krause & Strang, 2016, p. 633). The concept of "hydrosocial relationship" (ibid.), among others, underscores the impacts of rhythms specific to aquatic milieus on social landscapes. Communities living near or dependent on such environments cannot just impose their collective logics on nature as something external to them. On the contrary, societies and their dynamics are shaped by variations in the milieu, and it is therefore necessary to explore the specificities of engagements with aquatic spaces, as well as the ways in which they contribute to inducing behaviors.

In parallel, works in human geography have emphasized oceans' "material and phenomenological distinctiveness" (Steinberg & Peters, 2015, p. 248). In contrast to the stability and the grounded, bounded, static and permanent nature of terra firma, marine expanses are characterized by their volume (the water column), their mobility, and their chaotic nature. These specificities have been presented as levers to rethink – and theorize – our ways of understanding spaces (Anderson, 2012; Anderson & Peters, 2014). More generally, they give water and fluid substances a heuristic role in the reformulation of our epistemological and ontological precepts (Steinberg, 2013; Helmreich, 2007).

All these advances shed light on the value of describing marine environments and human practices in tandem to move away from essentially culturalist or exclusively materialist explanations (Strang, 2015). In so doing, they invite us to rethink the interrelationships between social worlds and environments (Krause & Strang, 2013), while avoiding the dualisms that arise from the modern divide between Nature and cultures (Helmreich, 2014). They call for documenting the "lived" nature of the seas, as well as the encounters it affords (Brown & Humbserstone, 2015).

Conceptualizing the "Marine Sense": The body as a Seat of Understanding

Building on all these advances, I explore the concept of "marine sense," which has not been problematized as such in the SSH literature – other than in a metaphorical sense, or in the work of Peignist[4] (2011). As this expression cannot be strictly defined or even delimited, it has interesting heuristic and analytical potential. The formulation of the term itself draws attention to the way in which an individual is inserted in a particular environment; it conveys the ability to intuitively grasp certain properties of the milieu. It thus presupposes a familiarity that is acquired through repeated contact. Moreover, a dialogical complicity, a closeness underpins the concept of "marine sense" (Peignist, 2011). The vocabulary used by Peignist to discuss surfing is enlightening in this respect. Among others, the terms "complicity," "affinity," "being with" (rather than against), "duo relationship," and "syntony" reflect this dialogical relationship. Peignist describes a "harmonious and fusional encounter between the body and the natural element" (2011, p. 94), which she terms "*glisséité*."

Like many others, Peignist's approach emphasizes the aesthetic, "erotic" (sensitive and carnal/physical), and

[3] Recent developments around the concept of "the living" are telling in this respect. Significantly, Aeschimann et al. (2021) bring together 26 texts by eminent researchers (philosophers, ethologists, economists, anthropologists), none of which explicitly discusses seas and oceans.

[4] See also Desfontaines (2019) for a sociological understanding of "marine sense" as referring to the socialization processes at work in learning fishing practices.

ethical dimensions of relationships with saltwater. Much of this literature focuses on sports or leisure practices (e.g., Merchant, 2011; Anderson, 2012; Rodineliussen, 2017; Strandvad, 2018), and sometimes takes on the appearance of "autoethnographies" (Broch, 2021) presenting human bodies as part of a momentary "connection" (or even an almost mystical indistinctness) with the sea.

Although the aesthetic, affective, and ethical aspects of interrelations with waves must necessarily inform the notion of a "marine sense," the encounter between fisherfolk and oceans is more than a mere merging of bodies and water: it produces inferences and enables decisions to be made. I thus examine the pragmatic purposes for which the environment is enlisted in the context of artisanal fishing. I use the term "marine sense" to refer to aptitudes and dispositions that involve facing certain situations. It is grounded in what is known as habit, understood as a "preparatory state for action"[5] (Berthoz, 2015, p. 13). In this sense, the notion points to the specificities of a local anchorage: both the affordances[6] (Gibson, 2015, pp. 119–129) of a given milieu and the "frames of reference according to which we examine the world" (Berthoz, 2015, p. 16). The body as a seat of sensations and perceptions therefore seems to offer a promising (but not exclusive) starting point. As Ingersol observes:

> "Seascape epistemology (…) demands a center that is always moving, seeking to grasp a mobile but determinate complexity. The body is the central point of contact in an oceanic literacy; the body is the first point of analysis, the point of contact, the tool for ensuing investigations" (2016: 109).

This choice is particularly informed by neuro-physiology research highlighting the inner sensory-motor drivers of decision making (Berthoz, 2003), which posits anticipation as a fundamental mechanism of action (Berthoz & Debru, 2015). As I read them, these works call for adopting a more nuanced concept of "knowledge;" they suggest exploring both "encyclopaedic" knowledge – which one can formulate and transmit through language – and more intuitive modes of understanding.

However, my aim to explore "marine sense" is not to bypass the concept of "knowledge" (nor that of "know-how"), but to consider how cumulative information on ecosystems articulates with other ways of understanding the environment. "Constituted Knowledge" implies a (less dialogical) relationship to the object of knowledge[7]: a drive to objectify, reflexive feedback, and a critical distance characterized by validation procedures (even if these are implicit). However, some of the skills required for (and induced by) fishing activities are not to be validated but developed. The authority of the person who "can" – and not just who "knows" or even "knows how" – is expressed not in terms of truth but in terms of efficacy and precision. Their skills reflect a convergence between the use of dispositions (physiological, social, cultural) and the tasks to be performed.

Neither Meaning, nor a Technical Relationship

I am thus concerned with the ways in which marine spaces put fishermen to work and vice versa. This requires that the analysis is not limited to the meanings that collectives associate with water milieus, whether they reflect local particularities or cross-cultural trends (Strang, 2005). It is also important to document the ways in which fishermen appeal to the environment when performing tasks (Artaud, 2016). I therefore focus on anchors for modes of understanding which, to be effective, must become intuitive. Moreover, while "marine sense" certainly involves the acquisition of resources and the technical acts this implies, it is not limited to these acts, nor should it be conflated with them. On the contrary, technical skills and competences are to an extent conditioned by a dialogical and sensitive relationship with the milieu.

In this respect "marine sense" does not specifically refer to the senses. Like a "sense of humor," it refers to a feel for things, i.e., the ability to intuitively identify relevant logics of a realm (be it rhythm, justice, humor, or the sea), to be discerning about its salient features, and to use them wisely. Some authors have effectively underlined the socio-cultural importance of the senses and pointed out the contingency of the Western sensorium (Howes, 1991; Classen, 1997). In so doing, they have accounted for local theories (and epistemologies) of sensoriality as rendered by local nomenclatures and categories (Geurts, 2002; Low, 2012). They also

[5] This use of the term "habit" refers to the ability to adjust behavior to specific situations and tasks to be performed rather than to automatic routine actions.

[6] Although this concept is debated, it has the merit of capturing a correlation, a back-and-forth and a "complementarity" (ibid.: 119) between the properties of a milieu and the ways in which humans (and non-humans) appeal to it. It thus shifts some of our cardinal concepts: "An affordance cuts across the dichotomy of subjective-objective and helps us understand its inadequacy. It is equally a fact of the environment and a fact of behavior. (…) An affordance points both ways, to the environment and to the observer" (ibid.: 121). This concept also seems to circumvent deterministic temptations. It points to the way in which the properties of milieus enable or elicit behaviors, without constraining them to a single prerogative: "Different layouts afford different behaviors for different animals, and different mechanical encounters" (Gibson, 2015, p. 120).

[7] Even if, in research on FEK, this concept often comes with qualifiers – such as "experiential," "empirical," "anchored," "embedded," and "situated" – that detail the cognitive specificity of the fishermen's skills (Acheson, 1981; Pálsson, 1994; Lauer & Aswani, 2009).

have documented the cultural values and symbolic dimensions attached to the perception, or the social, aesthetic, and moral qualities that are attributed to sensations (Goody, 2002; Pink, 2009; Low & Abdullah, 2020). However, my project is rather about illustrating some ways in which fishermen's skills must conform to certain specificities of an environment. How behaviors are constructed in a dialogical relationship with the environment that is, I assume, based on a situational intelligence and relies on an intuitive understanding of the milieu's properties and dynamics. It refers to a "correspondence" (Ingold 2018), which does not fix any knowledge but conforms to a provisional state of an encounter between fishers and place.

This is not to say, however, that "marine sense" reduces the analysis of fishing experiences to the temporary situations in which individuals find themselves when immersed in saltwater. Due to their socialization in a particular social and ecosystemic environment, the children of Manaure cohabit with the sea from birth (and probably before birth). From that moment, a relationship with the environment is instilled as a complicity starts to form, and a sensitivity develops. "Marine sense" does not suddenly come into existence when fishing and navigating; going to sea simply brings this relationship to life in new ways. Thus, prior to any technical acts being performed, understanding the sea also arises from an education of attention.

Further building on this idea, the experience to which "marine sense" refers is not bounded by the limits between terrestrial and aquatic expanses. On the contrary, it relates to individuals' ability to perform an operative synthesis of multiple factors: maritime and nautical factors, of course, but also meteorological, stellar, biotic, atmospheric, social, and cultural factors. While much research posits the aquatic environment as an autonomous element of the individual's experience, it cannot truly be isolated, for fishing activity (and more generally "marine sense") is not restricted to that environment. The concept of "amphibious" has been applied to particularize the experience of collectives living in environments that oscillate between the fluidity of water and the stability of land (Gagné & Rasmussen, 2016; Pauwelussen, 2017; Krause, 2017). Far from trying to point out this oscillation in the daily life, I endeavor to highlight certain skills that the journeys of the Wayuu of Manaure on and in the sea necessitate. These involve a synthesis that goes beyond the water element, integrating a heterogeneous set of elements.

Fig. 2 Lobster trap made from car tyres, Samaria Mash (Media Guajira)

On this basis, I argue that "marine sense" has two properties that enable its exploration. First, since it is difficult to explicate, it is not (essentially) transmitted through propositions, a form of transmission underpinned by student-teacher relationships. Second, it denotes an alignment between an environment and the aptitudes that enable one to mobilize that environment's properties. These do not pertain to the chemical, biological, and physical aspects of the milieu that cannot be perceived by human bodies. On the contrary, the sea is encountered through its phenomenal dimensions, that is, the ways in which it comes into play in one's experience (and contributes to shaping it).

Bodily Engagement with the Milieu

Synthesizing Disparate Information

Sailing at sea necessarily relies on accurate information about the destination and its location. It also requires a precise representation of the seabed's salient features. In this respect, the Wayuu tend to attribute toponyms to places, referring generally to their geomorphological, faunal or floristic properties. These essentially descriptive nomenclatures attest to an in-depth knowledge of the Guajira coastline as well as its biotic and abiotic elements (Guerra C. 2015: 56-58).

Even with this knowledge, which is materialized into linguistic categories, evolving in such an environment requires an ad hoc attitude. Aquatic expanses cannot be apprehended by relying on fixed and distinguishing marks, at least not those specific to the maritime horizon. There is no path to follow, no relief to pass or go around (other than submerged relief), no stable point of focus to orient movements. The Wayuu do not use buoys or floats of any kind to locate their traps and fishing grounds (Fig. 2).

During the day, they navigate mainly by terrestrial landmarks. This mode of orientation articulates the permanent aspects of the terrestrial visual field to compensate for the inconsistency of the sea (a wave never resembles another). Anything that stands out in a shrubby and mostly flat landscape can be used as a reference point. "Marking" a place generally involves four landmarks, unless one of them,

owing to its physiognomy, offers sufficient contrast when observed from different positions to count as two. This can be the case of a hillside with a shape or thickness that varies depending on the angle from which one looks at it. The trap, in the middle of the water mass, is immersed at the precise point where the vanishing lines that the chosen points would draw coincide (Fig. 3). In practice, the trap is located where the distances between the landmarks are the same as when it was set.

This technique requires visual acuity[8] and a particularly well-trained photographic memory[9]. Like any orientation process, it involves "putting together information captured in the environment and knowledge retrieved from memory" (Denis, 2016, p. 83). Although scholars in cognitive psychology and geography have taken a close interest in spatial cognition[10], landmark navigation has received relatively little attention. Yet it does require specific skills, since it essentially relies on the association of an underwater landscape that no fisherman has seen from above with the vanishing points offered by the salient elements of the terrestrial horizon.

This mode of wayfinding combines at least two cognitive tasks: first, "marking the trap" situates it at an absolute position relative to terrestrial elements. The cognitive work performed during the "marking" is based on an allocentric spatial reasoning, where situating the trap calls upon "non-indexical" knowledge (Gell, 1985), i.e., that does not vary depending on the context. This involves a "mental map", i.e., "abstract representations of the spatial relations that exist between objects, features and locations" (Crielaard, 2021, p. 6).

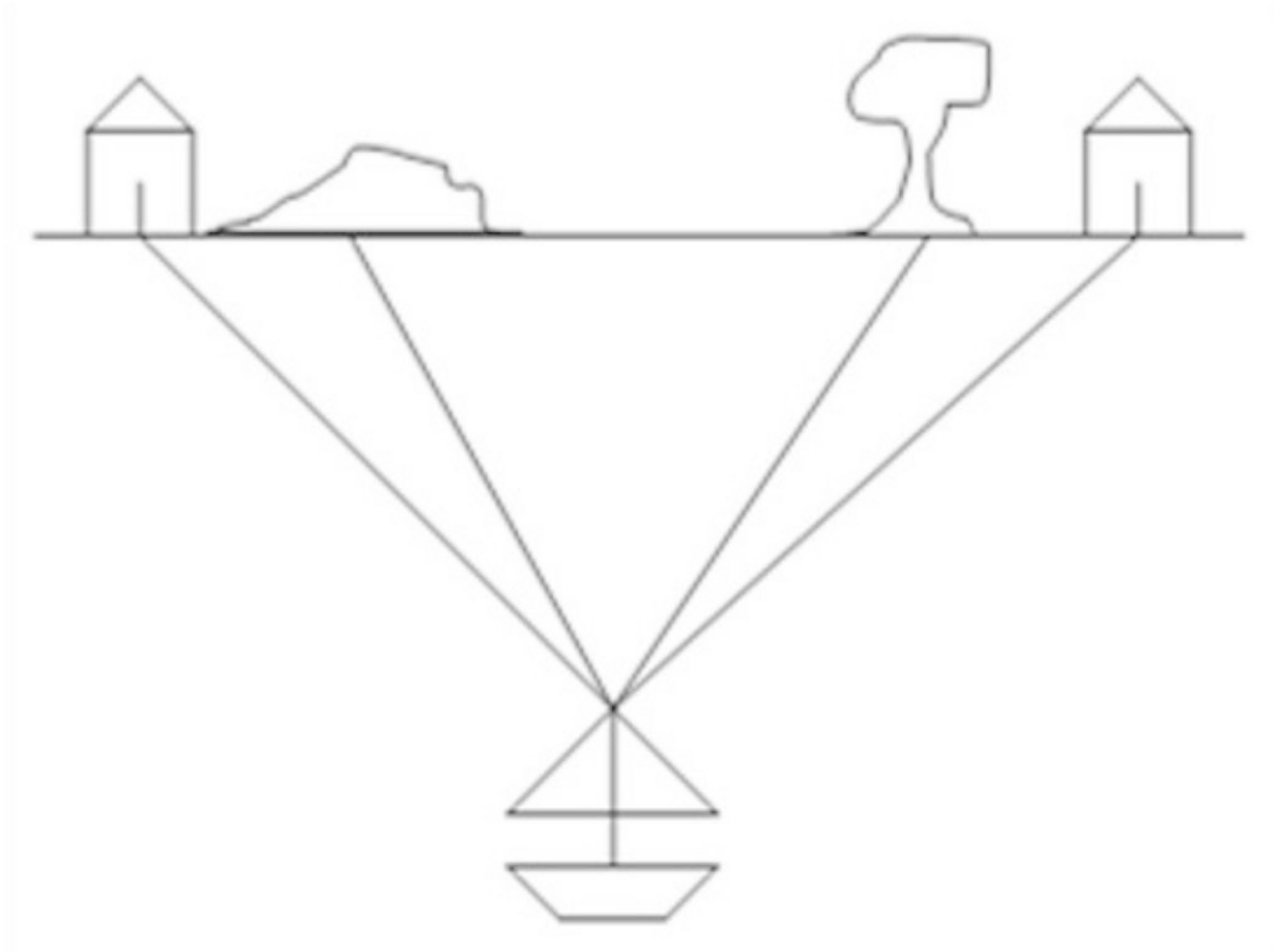

Fig. 3 Orientation technique with landmarks

[8] At sea, I was rarely able to discern the landmarks the Wayuu used to navigate.

[9] Some fishermen have several dozen traps immersed without visible surface markings.

[10] For a review of multidisciplinary research on spatial cognition, see Denis (2016). For debates on rival anthropological theories, see Gell (1985), Thiering (2014) and Ingold (2000, p. 220–223). For a synthesis of these debates and a critical review, see Istomin and Dwyer (2009).

Second, orientation relies on an egocentric frame of reference. The navigator's changing position provides the benchmark for evaluating location, and for moving the boat accordingly. In addition to the identification and memorization of alignments, Wayuu wayfinding is based on a keen ability to assess the correspondence between the configuration of the present visual field and that which was memorized when the trap was immersed.

The conceptual mapping of aquatic places thus implies a specific form of engagement with space, with its own perceptual and cognitive dimensions. Wayuu orientation depends on the ability to project bodies and elements of the landscape. When they navigate, they do not follow a route; they estimate distances, gauge deviations, rectify trajectories, adjust directions. They probe with their bodies more than they measure; they analyze, anticipate, and foresee more than they weigh up "objective" information.

These estimates involve speedy analysis, as the swell constantly shifts the observation position. When the waves are large, the Wayuu have only fleeting moments of visibility to assess their location. The skills required to evolve in such an environment certainly rely on intuition and lucidity as much as they do on "constituted knowledge." They mobilize the acuity of the senses and alertness just as much as a cumulative corpus of information on the environment. When the body is the main instrument, sensitive data cannot be measured; they are gauged. These skills do not replace the propositional knowledge needed for fishing but complement and operationalize it.

Thus, the Wayuu "explicate" the marine expanse, describe the places, give them toponyms, and report their salient features. They can also use linguistic categories for expressing spatial relations between objects or topographies[11]. This form of knowledge can be taught and memorized. It can also be compiled by the ethnographer. But to be operational, it must be coupled with specific skills that the fishers have to develop: acuity of perception, identification of the relevant aspects impacting navigation, capacity of inferences, triangulation, and synthesis between these aspects.

The act of throwing the anchor overboard offers a good illustration of the multiple contextual factors that decision-making must synthesize. Finding a rock formation or a one-square-meter trap on the ocean floor, when waters are murky, requires accuracy of the order of a meter. With no visibility, say the Wayuu, any search is futile if the boat is not located precisely above the target site. Thus, anchoring at the right moment is crucial and requires an intuitive assessment of the boat's headway. The fisher must estimate its inertial movement as well as the impact of the factors interacting with the hull: the strength of the currents together with the direction and the intensity of the winds. He also must gauge the length of the mooring line and correlate it with the height of the water column and the amplitude of the waves. He must constantly appraise the direction of the boat and its evasive movements, as well as the distance to the point in space where a trap is located, which is not visible. Everything is done by dead reckoning, guided by a focused attention on the multiple stimuli present.

This simple maneuver depends on the fisher's familiarity with a heterogeneous set of factors. When mastered, it results in the co-ordination of the crew's bodies and their behavior, as well as the assessment of positions and of the dynamic factors that influence trajectories. Because it gives rise to complex decisions that cannot be the product of lengthy reflection, this familiarity relies not so much on a cumulative set of information that can be catalogued, as on motor, cognitive, and sensory skills. By their very nature, these dispositions are difficult to explicate since they are informed by feelings and sensations.

This tacit understanding of the environment is a part of what I call "marine sense." It appears here as a set of dispositions that allow for synthetizing the milieu and for operationalizing sensations in effective decision-making. Along with a fine knowledge of the spatial relations between terrestrial and marine features, Wayuu wayfinding calls upon cognitive skills. It is of the order of triangulation and requires the development of appropriate inference systems, as well as precise expectations about the boat's movements. The latter is necessary to integrate the punctual and changing conditions in navigation.

Feeling the Milieu, Probing its Variations

As noted, orientation using landmarks requires two points of reference, sharply trained eyes, and the ability to intuitively synthesize contextual elements (currents, winds, swell, visual field, etc.). But the specific conditions imposed by the environment must also be considered to ensure a safe and successful sea journey.

In addition to distance from the coast and the land skyline, several other factors constrain landmark-based navigation. Insufficient visibility due to weather conditions or high waves make the "marks" difficult to see. For this reason, Wayuu fishermen often carry out a visual and auditory evaluation of navigation and diving conditions at dawn from the houses, i.e., around 500 m (Fig. 4). The presence of foam and "whitecaps," the sounds produced by the swell, and the color and texture of the water are clues to the temperament

[11] To express their location or direction, the Wayuu most often use linguistic categories that refer to the "absolute" position of environmental features (Levinson, 2003). The geographic bearings are expressed by *Wuinpumüin* (north, literally "the direction toward the waters"), *Wopümüin* (south, "the direction toward the paths"), *Uuchimüin* (east, "the direction toward the hills"), *Palaalamüin* (west, "the direction toward the sea").

Fig. 4 Visual assessment of navigation and fishing conditions, Samaria Mashi (Media Guajira)

of the water and underwater visibility. But this assessment, which can sometimes be misleading from that distance, is complemented with inferences based on haptic sensations.

For example, the Wayuu generally identify the winds according to the sensations they create in addition to their direction. The two dominant winds *Jouktai* (East Wind) and *Jepirachi* (North-East Wind) each has its own temperament and influences human activities, by creating conditions that facilitate or constrain them. *Jouktai* is warm, blows from inland, forms vortexes of sand and dusty earth visible from the open sea, and gives the sensation of a "warm veil" over the body. Its gusts can carry away objects and even damage houses. For the Wayuu, it dries out the soil, making daily tasks particularly unpleasant, and hinders fishing. By carrying sediment-laden coastal waters out to sea, *Jouktai* is said to "dirty the sea" and make diving difficult. Because it gusts violently into sails and nets, it also makes traveling and fishing perilous. *Jepirachi* blows in from the sea and is often described as "cooling." Loaded with salt-saturated moisture, it moves the waves by creating a sea spray, which leaves a thick, greasy film on the skin. *Jepirachi* is described as a good companion of fishermen for sailing and to make the work of divers easier. By pushing the turbulent waters towards the shore, it leaves the sea clean and clear.

The Wayuu deduce fishing and sailing conditions based on sensations produced by air currents on their skin, an example of what Howes calls "exterodermality:" "the fusion of haptic horizons across bodily boundaries" (2018, p. 231). These approaches again ground the understanding of the environment in sensoriality, which is the starting point for inferences that enable one to work with the inconstancy of the sea and to adapt one's behavior to specific situations. Factoring in wind conditions produces a "skinscape", that is, "the contiguity or intimate association between the surface of the body and the surface of the earth" (ibid.: 229). Gleaning information from skin sensations is stimulated by the intuition of correlations between environmental and nautical factors, but these correlations are not based on necessary causalities that could lead to systematic deductions. Both the strength and the duration of winds are as important as their direction. The Wayuu therefore assess sensitive data in a state of vigilance that is not limited to their time at sea. During all their daily movement on land and sea they show a constant alertness to relevant sounds, sensations, and visual cues. Their "marine sense" is embedded in (and constitute) an ethos.

While correlations between wind and wave agitation can be articulated ("*Jouktai* is blowing too much, the sea is rough"), words only imperfectly reflect the operative syntheses that permeate decision-making processes, which incorporate the interpretations that individuals may have made when probing sensitive data. Downs and Stea capture this idea of synthesis:

> "The individual receives information from a complex, uncertain, changing, and unpredictable source via a series of imperfect sensory modalities, operating over varying time spans and intervals between time spans. From such diversity the individual must aggregate information to form a comprehensive representation of the environment" (2011: 313).

These skills supporting (and supported by) a spontaneous understanding of a complex environment – at once terrestrial, marine, atmospheric, and stellar – cannot conform to learning based on propositional transmission. While the acquisition of the necessary abilities can be coupled with and guided by explanations of body posture and ways of focusing one's attention, effective execution only comes about through repeated practice and the development of automaticity/spontaneity. Ingersoll speaks of a "multifarious existence" (2016, p. 108) to highlight the specificities of engaging with a fluctuating environment. This very idea calls into question the possibility of a propositional, linguistic synthesis of the multiple factors that contribute to framing experience. The author thus defines "oceanic literacy" as "a spatial engagement, a performed pattern that represents anew, a kinesthetically and visually documented event (…)" (ibid.).

"Marine sense" refers to this tacit understanding of the milieu. It is the pivot that renders knowledge operative. We can of course – as many have done – establish connections between the drawing of a wind rose and the names of air movements and note their impact on fishing practices. We may also list the names given to portions of the seabed to build local nomenclatures. However, the operationality of

this information remains very uncertain if it cannot be associated with the sensations that render it useful in practice. To put it another way, the knowledge that can be catalogued would be of little use if it were not coupled with a situational intelligence that it necessarily involves, and which is probably at the origin of its stabilization. The "marine sense" transmutes sensitive data into a dialogue with the environment, and in turn derives from this dialogue the means to operationalize their environment's (ir)regularities.

The acquisition of such abilities relies on a progressive education of the senses. One must both perceive and discern relevant sensations to draw effective conclusions and adopt appropriate behaviors. Some orientation methods further illustrate this aptitude for probing the milieu. To identify a place at sea, rather than seeking a visual landmark, Wayuu fishermen sometimes listen to the composition of the seabed by plunging the blade of a paddle into the water and placing one ear on the end of the shaft. The Wayuu use their sense of hearing to probe the seabed, inferring its nature from crackling sounds, which indicate a mineral formation and the presence of corals, or the absence of sound, a sign that the bottom is sandy. Identifying the type of formation allows them to predict the prey that divers will find and thus adapt the technical devices to be deployed. This simple technique is also a sensory substitution device: it uses hearing to situate the boat in a space that cannot be seen. "Marine sense" appears here as a set of dispositions that allow for probing the environment with the body and operationalizing intimate knowledge of the seabed and the life that unfolds there. Conversely, to be operative, the acoustic information must be coupled with a representation of the submerged spaces and with a deep ethological knowledge of potential prey.

Fig. 5 Divers' equipment, Samaria Mashi (Media Guajira)

Compensating for Distortions in the Body-Environment Encounter

While the "marine sense" involves using one's senses to probe the milieu, it also requires tuning one's sensations when the milieu alters one's perception. This is particularly striking in the context of underwater hunting, which involves a direct relationship with the environment and dictates the perceptual conditions that envelop the diver (Merchant, 2011; Rodineliussen, 2017), in particular, the visual and auditory distortion effects of immersion. The physical laws of light and sound transfer from air to water are well known. Sounds are perceived without clues to ascertain their direction, partly due to the significant acceleration (4x) of noise waves in water. This is why, according to Helmreich, the underwater world must be thought of as "a zone of sonic immanence and intensity: a soundstate [rather than a soundscape]" (2007, p. 624). Likewise, the change in density of the medium involves a refraction phenomenon that modifies the perception of distances and of objects' size. The diver sees them as being closer (1/4 magnification) and larger (1/3 magnification) than they are[12].

Effective diving maneuvers therefore require correcting for distortions in the perception of stimuli (see also, among others, Ota, 2006; Pauwelussen, 2017), particularly when harpooning a prey or catching a fleeing lobster. The diver must adjust his movements and understand the small alterations he experiences, without this involving naming them. The dialogue with the sea that is established during this activity thus requires "compensation" mechanisms. His "marine sense" is based on tacit expectations that anticipate the properties of the water and their effects.

These bodily adjustments are at work in all the technological aspects of navigation and fishing. Thus, sensoriality is not the only bodily dimension of these activities that requires simultaneous consideration of behaviors and properties of the environment, and which cannot be acquired relying exclusively on language for transmission.

Wayuu divers' equipment is rather rudimentary although ingenious (Fig. 5). It is often limited to patchworks of materials to make fins, masks, and harpoons. Pieces of fabric layered and sewn together as gloves for protections complete the paraphernalia. Above all, however, this basic equipment is an extension of the bodies that use it. It is recognized in the literature that experience with technical activities results in the artefacts employed becoming a physiognomic extension described by the concept of "coupling" (Moricot & Rosselin-Bareille, 2021).

[12] This is due to the variation in the media and densities through which light rays pass before reaching the eye: air; sea water; mask glass; and air in the mask.

It is important to acknowledge, however, that diving particularizes human-object-environment interactions. In addition to refraction, the use of the mask itself entails a light reflection effect that restricts the field of vision to 97.2° in all directions. Light beams that hit the glass at a higher angle are reflected and therefore cannot reach the eye. This limited vision requires compensatory body movements. Moreover, due to the density of the water column, divers must adapt their behaviors in such a way as to facilitate the penetration of their bodies and equipment into the water. Immersion requires an adjusted use of limbs and artefacts (Rosselin et al., 2015; Raycraft, 2020; Raveneau, 2021), as well as familiarization with the sensations of moving in water. This is as a prerequisite for the Wayuu: "Before fishing, you must learn to move in the water, " who begin a gradual acclimatization of future fishers at the shore from a very young age.

Just as water prescribes sensory engagement and the interpretation of stimuli (Schirrer, 2018), it imposes the possibilities and limits of motor skills and of movement in time and space (Schirrer, 2015). As Krause and Strang (2013, p. 100) observe: "… water 'does' particular things, in accord with its unique properties, behaviors and capacities." Because it both enables and constrains, the materiality of water requires a capacity for dialogue from those who immerse themselves. "Marine sense" lies here in an ability to sense the aquatic environment, to move through it, to evaluate its specific conditions and their effects. Skillful fishermen can operate without thinking about these parameters and the associated constraints (Rosselin et al., 2015, p. 18).

Similarly, the importance of the body schema in navigation needs no demonstrating. Although marine spaces have sometimes been described in terms of the monotony of the spectacle they offer the senses, for those who work with the waves more than they watch them, the oceans are consistently changeable, whether in form, color, or intensity. Marine surfaces are characterized by their inconstancy, mobility, fluidity, "volume," and "chaotic" nature (Steinberg & Peters, 2015). In this respect, the undulatory movements of a swell impose specific motor and proprioceptive capabilities. While Wayuu children (or ethnographers) are learning these skills, they are teased and even bullied by the experienced fishermen: "Sit down!" is a regular injunction.

Moving in boats and canoes requires a sensitivity that has been demonstrated in bargemen able to absorb the effects of rolling and pitching (Walter et al., 2019a, b). To be able to relate the wave intensity of the swell to its effects on movement, one needs accumulated experience. For the Wayuu, understanding the sea consists in mobilizing one's body and sensations. This implies an ability to synthesize information from the environment (and its interactions with technical tools, including boats), a familiarization with the effects of its modulations, and an adjustment of body postures. This dialogical process, putting bodies in tune with the environment, develops and is refined as the fishermen engage repeatedly with the sea. "Marine sense" here lies in the expectations that the Wayuu implicitly form regarding body-tool-environment interactions.

These processes in no way provide an exhaustive inventory of the aspects that might be encompassed by the expression "having marine sense." This faculty is anchored in movements and postures, in ways of paying attention and mobilizing physiology. It involves intuitively understanding the constraints that the environment exerts on the anatomy and enabling it to respond effectively. In this respect, while "marine sense" forms part of the technical acts mastered, at the same time it conditions their implementation. The skill of the fisherman handling a net depends on his ability to absorb the roll, pitch, and yaw produced by interactions between the water and the boat. The effects of the environment on the body involve the mastery and internalization of corrective adjustments as a prerequisite for successful fishing and underwater hunting.

All these aspects, which are often treated separately by specialized literature, are articulated and show that the acquisition of fishing experience largely escapes discursive mechanisms of transmission. The particularities of bodily (cognitive, perceptive, and motor) involvement make up part of the specificity of the skills that many authors have sought to highlight to capture fishing activity. Many anthropologists have noted that understanding interactions with the environment requires highlighting specific modes of knowledge that are generally not encompassed by understandings of modern science. However, I propose that they differ from knowledge in the strict sense of the term only insofar as they pertain to sensation and internalized attitudes.

These embedded (spontaneous, intuitive) modes of understanding the sea, however, do not reduce the analysis to the individual and his or her "instinctive" behavior: "marine sense" is in fact entirely forged by a context of socialization. Studying these skills in no way focuses research on internal personal dynamics: on the contrary, they reflect the social contexts in which they form, refine, and mature as determining factors of a being-in-the-world. As Mauss (1936) argued, everyone inherits prerogatives regarding bodily practices, which reflect a complex cultural baggage. The aptitudes mobilized bear (and are) the mark of the collective choices that govern the adoption and development of techniques and technologies. Although they escape explications and propositional transmission, they are the product of sharing across generations, and link individuals to a long incubation of collectively tested practices.

Conclusions and Openings

I show that the decisions on which fishing practices are based involve a synthesis of multiple pieces of information, of which fisher's bodies capture the salient aspects (and those relevant to the tasks to be carried out). In so doing, I highlight modes of apprehension and understanding that are difficult to transmit entirely by explication, since they largely escape propositional and linguistic content.

Although fishing skills have often been investigated through the prism of constituted knowledge (CK), they are largely the result of cognitive, sensory, and motor processes that need to be objects of study in their own right. The ways in which they are validated, stabilized, and mobilized differ from the uses that can be made of propositional and cumulative contents. In this respect, Delbos and Jorion (1990) were right to draw a clear distinction between relationships that unfold at school and at work. What is acquired in these two contexts is not strictly comparable. If we treat the two uniformly, we run the risk of overlooking their specificities and their respective roles in the being-in-the-world of individuals and groups.

This exploration of "marine sense" is driven by the epistemological need for a joint approach to the ecological dimensions of behavior and the social dimensions of environments. Sidestepping the concept of "knowledge" – or at least being discerning about it – supports this approach, as this concept implies an a priori distinction between the knowing subject and the object of knowledge. "Marine sense" appears as a dialogue, a complicity between dispositions – social, cultural, physiological, motor, sensory, affective, etc. – and phenomenal properties of the environment. Compensating for the constraints that this environment exerts on the acting and perceiving body, soliciting visual, haptic, or sound cues to synthesize them into an intuitive decision is more a matter of interaction than of thinking exteriority. These fishing and navigation behaviors are tuned to an environment – marine, terrestrial, atmospheric, meteorological, and stellar – as much as they attune the environment to themselves.

The fact remains that this exploration of "marine sense" needs to be complemented by explorations of other tacit dimensions – aesthetic, affective, and cognitive – that are superimposed onto propositional content, and which form the starting points of systems of inference, decision-making processes, and interactions. The focus on certain motor, sensory, and proprioceptive specificities should not lead to overlooking other fundamental aspects of what constitutes the Wayuu experience, and which should also inform the concept of "marine sense." This particularly includes the meanings surrounding the factors I have explored here[13].

I have highlighted elsewhere (Simon, 2015, 2017, 2020) the relational-intentional scheme associated with the understanding of observable phenomena, whether meteorological (winds, rain) or nautical (sea temperaments). Among the Wayuu of Columbia, the inconstancy of the milieu, as well as weather events, are attributed to the temperament of associated beings – Rain, East Wind, North-East Wind, the Mermaid. This intentional-relational framework that governs the experience of Wayuu fishermen allows them to account for the haptic dimensions discussed here, but also for the social rules surrounding the learning of fishing, the contrasting temperaments of the waves or the constraints of the water environment (pressure and barotrauma). Far from referring to the contingency of the encounter between physical causes, all these elements are understood as the result of volitions. These meanings are not mere beliefs. They reflect the qualities that the Wayuu have retained to engage with the environment. As Berque has shown, meaning itself arises from the process of "mediation:"

> "It is [indeed] the dynamic coupling (the Strukturmoment, or Gegengefüge) of the two indissociable 'halves' that concretely make up a human being: his individual physiological body on the one hand, his eco-techno-symbolic environment on the other … It is precisely this structural moment – this mediation – that sets in motion the trajection by which the environment, from being an abstract datum (Umgebung), becomes a concrete milieu, charged with meaning, and is thus perceived" (2016: 174).

Data Availability Informed consent was obtained from all individual participants included in the study.
Verbal informed consent was obtained prior to the interviews. The participants have consented to the submission of the case report to the journal.

Statements and declarations

Competing Interests The author has no relevant financial or non-financial interests to disclose. The author has no competing interests to declare that are relevant to the content of this article. The author certify that he has no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript. The author has no financial or proprietary interests in any material discussed in this article.

Ethics approval and consent to participate The submitted work is original and has not been published elsewhere in any form or language (partially or in full). No data, text, or theories by others are presented as if they were my own. Proper acknowledgements to other works are given, quotation marks are used.

[13] See Delbos and Jorion (1990, p. 134): "Far more than explicit instructions, the knowledge that is passed to the child, without being transmitted, for it goes without saying, is of this particular kind: a cosmology, an ordered representation of the world, hierarchical not in an absolute way, but in a relative way, with possible shifts as needed."

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